St. Mary's university

ANALYSIS OF FLEET MANAGEMENT PRACTICES AND ITS EFFECT ON OPERATIONAL PERFORMANCE OF HAGBES PLC

A THESIS SUBMITTED TO THE GRADUATE STUDIES OF SAINT MARY UNIVERSITY, SCHOOL OF GRADUATE STUDIES IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTERS OF BUSINESS ADMINISTRATION

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DECLARATION

I, the undersigned, declare that this thesis entitled "Analysis of fleet management practices and its effect on operational performance of Hagbes Plc" is my original work and has not been presented for degree requirement in any other university, and all the sources used to support this particular study have been appropriately acknowledged.

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Selamawit Belachew – May 2022

LIST OF TABLES AND FIGURES

- **LIST OF TABLES**

- **LIST OF FIGURES**

Contents

LIST OF ACRONYMS /ABBREVIATIONS

FM: Fleet management

FMS: Fleet management

GPS: Global positioning system

KPI: Key performance indicator

PLC: Private Limited Company

SPSS: statistical package for social sciences

ABSTRACT

Fleet management concerns with the management of a company's vehicles which includes the purchase, maintenance, inventory, disposal and work scheduling with the main objective of to achieve efficiency and productivity for the organization. The main purpose of this study was to analyze the effect of fleet management practices on operational performance of Hagbes Plc. This study attempts to see the effect of maintenance and repair, Utilization, Availability and Replacement on the operational performance of the company. The study has incorporated both primary and secondary source of data. The primary data was collected using questionnaire and interview. Secondary data was collected from journal articles, internet website, annual report and journals. The study was done on a sample of 192 people from three divisions in Addis Ababa (head office and two branch offices), and 143 replies were obtained, representing an 80 percent response rate. The necessary data was gathered utilizing a mixed data collecting strategy, which included a questionnaire and an interview. The respondents were chosen using a simple random sampling technique. Explanatory research designs were used, and IBM Statistical Packages for Social Sciences version 20 was used to analyze the data. The data was analyzed using regression, correlation, and Cronbach alpha coefficients. Descriptive data analysis method through the use of Statistical packages for social science (SPSS) version 20.0 software was used to analyze the data. The study incorporates four independent variables in which all of them were measured on a 5-point Likert-Scale and the mean was used as a measure of central tendency. The results indicate that, operational performance of Hagbes Plc. is improving the fleet management practices using FMS (fleet management system) software. The study also found that all variables except Availability and Replacement have significant effect on operational performance of the business company. All variables Fleet utilization, vehicle repair and maintenance, Vehicle availability and replacement have positive effect on operational performance. Finally, the results on the conclusion entails us that the four research questions developed in this study were considerably rated all above average mean by the employees which actually indicates the organization fleet management practices are in a good manner. And also, the study recommends proper maintenance and repair, optimized usage of fleet, Availability and replacement practices in order to bring effective operational performance.

Keywords: Fleet management, Repair and Maintenance, Utilization, Availability, Replacement, Operational performance, Hagbes Plc.

CHAPTER ONE: INTRODUCTION

This chapter incorporate the background of the study, statement of the problem, objective of the study, research question, scope and limitation of the study, among others.

1.1 Background of the study

Effective fleet management is an important and sohesticated activity in every successful business firms. Businesses that have the intention of excelling in their fleet management operations in today's competitive market have to adopt effective and robust managerial strategies to coordinate resources that will facilitate their success and enable them to improve their operational performance. The quest to achieve operational performance has therefore put pressure on management to deliver faster and cheaper vehicle utilization fleet management resulting in lower operating cost through better planning (Gitahi and Ogollah, 2014: Jonsson, 2008; Waters, 2009). It is important to note that fleet management for most organizations is seen as having short term effect and short response periods (Martinez et al., 2010). There are varied services offered through transport and most of these services have been segmented into areas of expertise and specialty which aimed at offering valued services through effective fleet management practices (Bask et al., 2010).

According to Jonsson (2008) and Waters (2009) the pressure to deliver faster and cheaper has made vehicle utilization an important aspect of fleet management (Gitahi & Ogollah 2014). Better vehicle utilization, proper maintenance, low downtime and timely fleet disposal and replacement lowers operating cost through better planning. Fleet operation planning requires software support with the use of fleet management systems. The aim is to determine routes that will provide the highest overall utilization of vehicle capacity, with as many customers served and the largest amount of goods delivered, at the same time as the delivery times are minimized. In order to provide a more realistic route, in fleet management, advanced planning also takes into account specific factors such as road and traffic conditions. Technological communication improvements in the business environment have allowed for better planning through the use of electronic data interchange (EDI), radio frequency identification (RFID), satellite navigation, and so on (Gitahi & Ogollah 2014).

Firms are, thus, no longer able to satisfy the various demands of their customers effectively with just product and price. They must also increase the performance of the product and service in terms of reaction speed, delivery policy, information services and flexibility. For this reason, firms are, in many instances, being forced to redesign their internal processes using different methods. (Waiyaki 2013, p 22). The increasing demand for full-service leasing and associated fleet management has significantly fuelled the growth and profitability of fleet management companies in recent years. This growth sparked the interest of several other players such as automotive companies and banks that are (re)entering this market based on their own core products, be it vehicles or leasing business (Pfeifle *et al*. 2017). A sustainable fleet management strategy is one that aims to reduce environmental impacts through a combination of cleaner vehicles and fuels, fuel-efficient operation and driving; and by reducing the amount of road traffic it generates (Martinez & Wassenhove, 2012). Hence, nowadays, local and multinational markets have been increasingly open and competitive, many companies and fleet managers need to focus on how they can improve the performance of their organizations in the new business paradigm.

1.2. Statement of the Problem

Fleet management concerns with the management of a company's vehicles which includes the purchase, maintenance, inventory, disposal and work scheduling. As a result of the new business paradigm, in which markets have been increasingly open and competitive, many companies and fleet managers need to focus on how they can improve the performance of their organizations. The main objective is to achieve efficiency and productivity for the organization (Borirug *etal*, 2009). In logistics and delivery management, a key element in gaining the goal of better performance is the elaboration of efficient distribution systems where goods are delivered at the right place, with the right quantity, at the right time, and to the right receiver (*ibid*).

According to Gitahi & Ogollah, (2014) there is little literature on the current Fleet Management on their concern of study in humanitarian operations as well as business operations. Wassenhove (2010) also put that data on vehicles is gathered and stored using unstructured databases like excel spreadsheets and text files (Kibatu 2014). Gitahi & Ogollah (2014) stated that well managed and maintained equipment can result in 20-30% or more cost savings. Literature reviews suggest that fuel savings of 10% or more can be obtained through a range of relatively low cost measures such as driver training, vehicle maintenance and vehicle design (Baas 2012).

On the other hand, the dynamic fleet management systems provide fleet managers and users the tools to accomplish their tasks efficiently and effectively by using technology such as Internet and Global Positioning Systems (GPS). Logistics management including fleet management requires advanced technologies to improve the logistics information system (Borirug *etal*, 2009).

Fekadu (2013) identifies the constraints associated with logistics system in Ethiopia characterized by inadequate fleets of vehicles (means of transport) for goods transport, the market possibility of the country is hampered by poor logistics system, very high traffic accident in which contribution of goods transport is significant congestion in cities and at inlets/outlets. Furthermore, damage of goods and quality deterioration while in storage, packaging transporting, and post-harvest loss in food items (up to 70%) & lack of organization and management tools that are required to promote intermodal system (Fekadu, 2013).

2021 fleet operation actual report of Hagbes plc shows that the in availability of vehicles becoming the main cause for unbalanced level of service delivery and the customer demands. This situation affects the market potential of aftersales and sales department of the company. Currently, the

numbers of customers are increased throughout the country due to the expansion of industrial zones in Ethiopia from time to time. Because of this, the company is unable meet customer expectation and deliver the required level of service. Moreover. The company needs to improve its fleet operational efficiency which has an impact on its market competitiveness as well as its profitability.

The impact of fleet management on the overall performance is implied in previous studies, the absent of prior studies that have empirically examine the impact of fleet management on the operational performance of firms with in developing economies is challenging. Although previous studies have been conducted to examine fleet management across many countries, majority of these studies mostly explore the impact of fleet management on disaster and relief response, and overall humanitarian logistics perspective (Gitahi and Ogollah, 2014;Pedraza-Martinez and Van Wassenhove, 2012; Besiou et al., 2012, 2011; Martinez et al., 2010; Beamon and Balcik, 2008). This is a major gap in literature and this study addresses this by analysing the effect of fleet management on operational performance in product and service deliverer companies like Hagbes Plc. By realizing this, the research model is developed to examine the impact of fleet management practices on operational performance. In this study the existing practices of fleet management of Hagbes Plc was critically analyzed and tried to show the gap between their practices with an improved fleet management practices which will be proposed to enhance the efficiency of the fleet management system. The researcher also believes that conducting research on this area have paramount role on fleet management factors and hence operational efficiency performance which directly related with profitability and competitiveness of the company in particular product and service provider firms in general.

1.3 Research Questions

To achieve the purpose of the study, the researcher formulated the research questions depending on the background, the objective and problem statement of the study.

Since the main objective of this study is to analysis practices of fleet management and its effect on the performance of Hagbes Pvt. Ltd. Co, The researcher tried to find practical and reliable answers for the following questions:

- What are the recent practices and processes of fleet management in Hagbes Pvt. Ltd. Co?
- How does Fleet management affect the overall performance of Hagbes Pvt. Ltd. Co?

1.4 Objective of the Study

The general and specific objectives of this study are discussed below.

1.4.1 General objective

The general objective of this study is analyzing the recent practices of fleet management and its effect on the performance of Hagbes Pvt. Ltd. Co. based on the theoretical benchmarks.

1.4.2 Specific Objectives

Specific Objectives of the study was based on the following research objectives:

- Evaluate whether the practical fleet operation plan is snergized with the organization's operational strategies.
- To analyze internal and external consideration should be encounter in fleet management operation plan formulation, implementation and monitoring process.
- To examine the extent of fleet management impact on the organization performance.

1.5 Significance of the Study

As a research, the primary merits of the study goes to the university academics. It gives a comprehensive starting point for further research on fleet management since there are few studies in the area. Secondly, organizations get ideas on fleet management and fleet maintenance for their respective company.

Because of the dynamic business environment firms are realizing the importance of the overall fleet management practice and measuring their performance in order to improve their productivity and efficiency.

1.6 Scope of the Research

The study mainly focuses on assessment of the practices of fleet management particularly on vehicles repair and maintenance, Utilization, Availability/Downtime and Replacement/retention in the case of Hagbes Plc in Head office and two branch offices located in Addis Ababa. The study didn't include the customers or their fleet.

1.7 Limitation of the Study

During the research, the researcher encountered both large and minor issues; some of these issues were quickly resolved without hurting the study, while others were beyond the scope of the researcher. Another difficult and time taking task for the researcher were obtaining qualitative data from the company but thanks to some management staff members the researcher could have get few reports from them.

1.8 Organization of the Study

The report is organized under five chapters.

Chapter One: An introduction to the dissertation is given in order to provide the general context for the research problem relating to the fleet management systems implemented at Hagbes Plc. The chapter also briefly discusses the research objectives and the research methodology for the proposed study.

Chapter Two: The literature review discusses existing information on the research topic and examines the historical development of the fleet management as well as some of the research concepts, principles and applications. The importance and challenges of fleet management and the benefits of real-time data for a qualified decision making are included in this chapter.

Chapter Three: The research methodology includes a description of the research design, target population, sample and sampling procedure used in the study, as well as the research instruments, piloting of the research instruments, data collection and data analysis.

The study approach to be adopted, the data collection methods and subsequent data analysis are discussed in depth in this chapter.

Chapter Four: This chapter includes the discussion based on the research findings and discussion describes in detail the findings derived from the results obtained from the research study. In other words, the key results obtained from the research work are described in an attempt to highlight the significance of the results achieved and their relevance in direct applications.

Chapter Five: This chapter contains the research conclusion and recommendation. The purpose of the chapter is to present a summary of the study and to draw conclusions in the interests of both present and future research. The chapter describes, point by point, the major conclusions drawn from the findings of this research work in an attempt to provide recommendations for further studies.

1.9 Definition of Terms

Fleet – collected unit of equipment's owned by individual or an organization.

Fleet management is an administrative approach that allows companies to organize and coordinate work vehicles with the aim to improve efficiency, reduce costs, and provide compliance with government regulations (Borirug *etal*, 2009).

Operational performance: is defined as Firm's performance measured against standard or prescribed indicators of effectiveness, efficiency, (business dictionary)

Telematics - is a term that combines the words telecommunications and informatics to broadly describe the integrated use of communications and information technology to transmit, store and receive information from telecommunications devices to remote objects over a network.

GPS or the Global Positioning System- is a global navigation satellite system that provides location, velocity and time synchronization.

Sustainable fleet management: strategy that aims to reduce environmental impacts through a combination of cleaner vehicles and fuels, fuel-efficient operation and driving.

CHAPTER TWO: LITERATURE REVIEW

This chapter trot out a review of the existing literatures in the study area. The main techniques of fleet management are described in detail in this chapter, including vehicle repair and maintenance, Fleet Utilization, Fleet Availability, and Fleet replacement. Furthermore, the chapter appraise the notion of Operational Performance and include the empirical literature in order to explicate the conceptual model of the study.

2.1 Theoretical Literature Review

2.1.1. Practices of Fleet Management

Fleet management is amongst one of the main asset management activity and it is not only about operating and maintaining fleet equipment. It is a continuous cycle of justification, specification, acquisition, assignment, distribution, scheduling activities and maintenance, utilization, disposal and replacement

Fleet Management system is the operation and administration of fleet vehicles and related cases in an organization and Queree C. (1993) stated that organizations may face internal and external factors which affect their operations and so as the fleet management in a company may face dynamic problems such as unplanned situations taking place during operations. As such, the study suggests that the organizations need to be able to respond in the midst of market competition (Borirug *et al*, 2009). Fleet management comprises all actions needed to maintain and operate pieces of equipment throughout its life from the beginning stages of equipment acquisition to the final stages of asset disposal. Such areas include maintenance and repair, inventory control, training, and safety issues (Hamzi *et al*, 2013).

According to Queree C. (1993), businesses may confront internal and external elements that affect their operations, and fleet management in a corporation may face dynamic difficulties such unforeseen circumstances occurring during operations. As a result, according to the study, businesses must be prepared to respond in the face of market rivalry (Borirug et al, 2009). From the initial stages of equipment procurement to the last stages of asset disposal, fleet management encompasses all operations required to maintain and operate pieces of equipment. Maintenance and repair, inventory control, training, and safety concerns are just a few examples (Hamzi et al, 2013)

2.1.2. Vehicle Repair and maintenance

Fleet Maintenance Management is an extensive solution to fleet management and it comprehend endorsement, encoding and recording of vehicles' status like operation, service and breakdown history. According to K.Schneider and C.R.Cassady (2004) the fleet repair and maintenance system provides real time data for vehicle fleets in the organization including the estimated overall fleet lifetime costs throughout its service life and disposal and replacement. Hence, Fleet Maintenance Management enables the fleet managers to estimate and plan the budget of fleet preventive and corrective maintenance costs. Maintenance operation of fleet management forecast the scheduled maintenance of vehicles with their consumable spare parts and emergency kits (Borirug et al, 2009).

Any type of business firms requires the equipment or asset that deliver outputs that is very essential in the dynamic global economy (Murphy, D. 2002). Through the time the fleet equipment will depreciate and increase the downtime. Therefore the scheduled maintenance has to be performed properly in order to extend its service life time.

2.1.2.1. Fleet Maintenance strategies

Maintenance operations are initiated when the fleet equipment is due for service or have a sudden breakdown but having maintenance strategy prevent this unplanned maintenance activities and keep the vehicle in a good condition for a longer time. To perform maintenance both human and material resources are needed especially trained professional (Supervisor, mechanic, service engineer etc), tools and consumable/ recommended spare parts.

Maintenance operations focused on repairing and replacing parts of fleet equipment while maintenance strategies audit when spare parts needs to be changed or repaired. Arts (2013) categorized repair strategies as 'Modificative' techniques. Breakdown or corrective maintenance strategy and preventive or scheduled/planned maintenance strategy. Modificative repair is ordinarily established on project and non-periodical concerns cannibalizing parts of similar equipment in order to improve performance of equipment. Under unplanned breakdown or corrective maintenance strategy spare parts are not replaced before failure occurred while the main aim of preventive maintenance strategy is prevent the equipment from sudden breakdown and by replacing the parts as per its service schedule.

2.1.2.2. Spare part management

Arts (2013) identified the three categories of spare parts as serviceable, maintainable and consumables. He defined that serviceable parts as items that constitute a sufficiently large subsystem of the original equipment to warrant a separate usage based maintenance strategy by giving examples include aircraft engines and elaborate weapon or radar systems on frigates. Items that are repaired after replacement after which they are ready-for-use (RFU) again are maintainable. Accordingly, contrary to servicables, maintainable do not have their own usage based maintenance strategy, and are not usually individually tracked and traced. A repair shop handles the repair of many different types of maintainable and compressors and pumps are examples of maintainable. The consumables are items that are discarded after replacement and bought new from a supplier. Generally these are relatively cheap items such as gaskets. Hence, these different part types generally are also connected to different maintenance strategies (Arts, 2013).

2.1.2.3. Driver Management and training

Baas (2012) argues that driver behavior and education are directly imposed with improvements in fuel efficiency and safe driving practices. Hence, accordingly driver training is aimed at improving fuel-efficient driving and decreasing incident rates. Following their finding a number of initiatives were introduced, aimed at improving driver behavior and education.

Baas (2012) the author stated that there is a general and often misleading assumption made by drivers of speeding and driving more aggressively will result in a substantial reduction in their travel time. (DfT2004), UK SAFED program, an independent review noted that:

There can be as much as 35% difference in fuel consumption between a good driver and a poor one. Accordingly the difference is largely created by differences in road speed, gear selection, the engine speeds at which gears are changed, aggressiveness of accelerator and brake pedal use, and the amount of time the driver leaves the vehicle idling (Baas 2012).

Baas (2012) identified many steps taken to improve driver management in which level of recognition was directly related to individuals' safety behavior, customer service and incident rates. The drivers' recognition scheme encouraged honest reporting. The steps included developing a comprehensive prestart check sheet, ensuring that drivers understand that they are responsible and accountable for their actions, improving driver recruitment procedures, educating and coaching drivers about vehicle standards and visual inspections, holding regular monthly driver

forums, developing a culture where a driver can intervene in any unsafe or non-compliant act, preparing monthly feedback reports on individual driver performance and vehicles related to speed and fuel consumption, developing a culture of continuous improvement within the driver teams to focus on total fuel consumption and driving techniques, including urban operation and all drivers participating in an individual driver recognition/incentive scheme that rewards positive behaviors and outcomes (Baas 2012).

2.1.3 Fleet Utilization

Fleet utilization is the process of organized process of activities starting from who, what, where, when and how to use fleet in optimized way. Wen fleet managers are being aware of what usage gives them the tendency to recognize the potential of their fleets. In this vibrant economy where operations might temporarily ceased or extended, evaluating fleet utilization more frequently is relevant for fitting vehicles to the changing business needs and validating if vehicles are being used efficiently or not (Mark, Roben, Ana, Juan, and Carmen, 2021)

2.1.3.1. Fleet Sizing

anaging a fleet of vehicles requires balancing the needs of management, the drivers, and vehicle requirements. Right-sizing the fleet is a step towards ensuring the operations are cost-effective and sustainable, providing a solid foundation for further growth. Fleets are an expensive asset, and finding ways to reduce costs may involve removing some vehicles from the fleet. Right sizing provides opportunity to optimize operations (Koo, Lee & Jang, 2004)

Right fleet sizing is the best means of prolonging the existing fleets for the future. The process includes evaluating and implicit the set of tasks that need to be accomplished by the certain fleet.

Fleet sizing action plan, integration and timeliness enables a company to minimize the fleet while decreasing the capital investment in the fleet without ceasing the tasks need to be accomplished (Ratnaji and Venkateswaran, 2020). A fuel efficient vehicle purchasing strategy should accompany and inform this process to ensure the most fuel efficient and life cycle cost effective vehicles possible that fit your needs. The benefits of vehicle and fleet right-sizing include: more efficient operating practices, reduced GHG emissions and related pollutants, reduced fuel consumption, reduced operating costs, reduced insurance costs and freed up capital.(Vanga and Jayendran, 2020)

2.1.3.2. Fuel Management

Fleet management (FM) in every organization has to deal with managing fleets more efficiently and economically with the use of purchase controls, data collection and reporting tools since the cost of fuel is changing rapidly nowadays (Borirug et al, 2009). According to their study result they found Fleet fuel management one of the nine listed tools of existing real time FM and noted that fuel management in dynamic fleet management system has been an important tool in the vehicle operation. The use of customized cards which are used to all fuel related activities which help to protect against irregular or unauthorized activities and allow the collection of all relevant information such as date, time, location, odometer reading, driver name, product type, unit and cost per unit, and total cost (Ruiz-Garcia et al., 2009)

After reporting a wide range of factors affect fuel, Latto and Baas et al (2005) specify possible measures for improving fuel efficiency are driver training, speed management, improving fleet management practices, improving in-cab temperature control, matching vehicles to the transport task, improving maintenance management and improving tyre management.

2.1.3.3. Fleet management controlling systems

Crainic and Laporte (1998) as cited by Yi-Chung Hu et al (2015) stated that first-generation fleet management systems provided relatively simple functionalities such as vehicle tracking components. With increased management sophistication, these systems have evolved into planning tools (Yi- Chung Hu et al, 2015). The concept monitoring systems is functionally different to fleet management. Fleet management involves supervising the use and maintenance of vehicles and associated administrative functions, including coordination and dissemination of tasks and related information to solve the heterogeneous scheduling and vehicle routing problem (Sorensen and Bochtis, 2010). For vehicle fleet management and monitoring, one of the main applications is the global positioning system (GPS) technology tools. The current asset management systems require real-time monitoring and interaction with fleet vehicles with such technologies in order to achieve high utilization and rapid responses to customer needs.Managing a fleet of vehicles is more challenging since it needs balancing of rising fuel costs, mounting maintenance costs and safety concerns which are critical all the while driving a commitment to excellent customer service(Yi-Chung Hu et al 2015)

The whole purpose of a vehicle is to move people and/or their goods from one place to another. Other than the major commonly considered criterion of on time delivery, as Kuehling (2018) stated, other plenty of things such as current location, destination, schedules, traffic, preferred routes, diversions along the way, parking once you've arrived and fuel levels have to check and balance for vehicle tracking system in logistics (Kuehling 2018).

Although the majority of the dynamic fleet management models assume that the travel times are deterministic, according to Huseyin (2006) as cited by Kibatu (2016), there are a variety of applications where traffic jams, equipment failures and undesirable weather conditions create substantial variability in the travel times. Even if these events are rare, the travel times may appear to be random to the modellers, since they depend on factors outside the scope of the model (Kibatu, 2016).

2.1.3.4. GPS vehicle tracking system

G.Mark and P.Parooj (1998) as cited by Borirug et al (2009) advocates that logistic management including fleet management requires advanced technologies to improve the logistic information system (Borirug et al, 2009). Information and Communication Technology (ICT) has become an important backbone for the business that aims at reducing operational costs, and increasing customer satisfaction which in turn will gain higher levels of competitiveness. The study stated that there are various aspects on how to improve the capability of the fleet and delivery systems. The key points are to provide real-time and dynamic tracking of vehicle movements, maintenance schedules, fuel and financial management, where dynamic FM systems provide fleet managers and users the tools to accomplish their tasks efficiently and effectively by using technology such as Internet and GPS, Global Positioning Systems (Borirug et al, 2009).

Originally, the GPS was created to identify the precise location of any object on the earth, anytime, anywhere. Today, one of the fastest growing markets for GPS technology is vehicle tracking and location. According to Yi-Chung Hu et al (2015) GPS-based fleet management system technology states that it has provided synergy to transport companies and has achieved many management goals such as monitoring and tracking commodity distribution, energy savings, safety, and quality.

2.1.4 Fleet Availability

Availability expressed in terms of average days available per year, but this is less usual because vehicles spend varying times undergoing maintenance or repair, the number available will tend to vary constantly throughout the day. The most relevant time for calculating vehicle availability is at the time of peak vehicle requirement, and it is appropriate to record the number of vehicles available at this time each day, and to calculate the average over a period, such as a week or a month. There will rarely be 100% availability except possibly for short periods, since every vehicle requires time out of service for routine maintenance, and there will always be an element of unscheduled maintenance and accident repairs.(Miller, 2022)

With effective preventive maintenance it should be possible to obtain average availability figures of 90% of licensed fleet; 85% is a reasonably good figure in most circumstances, although 75% or below is more typical in developing countries. However, in many countries, particularly in Africa, extremely low availability figures are recorded, where large numbers of vehicles are unserviceable for various reasons, but principally due to shortage of spare parts: availability figures of 10% or less are not unknown. (Antich, 2010)

Average number of vehicles available for service during the peak period (morning or evening, whichever has the greater vehicle requirement), expressed as a percentage of the total number of vehicles licensed. This may be calculated daily, and for a period such as a month. In the latter case, the average number of vehicles available each day during the period should be expressed as a percentage of the licensed fleet at the end of the period. (Cousineau, 2019)

2.1.5. Fleet Replacement

Managing a fleet is more than just supplying your employees with cars; it's about maximizing the value while minimizing costs, and knowing when your fleet is no longer providing that value or incurring unnecessary costs. As a vehicle ages, its capital costs decrease while its operating costs increase, which means the vehicle will reach a point in time where it is no longer cost-effective. Vehicle capital costs are the monthly market value depreciation or decrease in secondary market value attributed to vehicle age and mileage. Vehicle operating costs are all those costs incurred in keeping the car on the road – like fuel, tyres, registration, insurance, scheduled or non-scheduled maintenance, out-of-warranty repairs and temporary replacement rentals.(Jason. 2015)

Real time fleet replacement is essential for the organization to reduce excessive maintenance cost, maintain environmental safety and prevent sudden traffic accidents. Hence, the fleet managers need to identify that highest level of service life out of the whole of life cycle of the vehicles in order to replace the fleet at the optimum and replacement timing. (Antich, 2010)

The fleet replacement problem of a profit-maximizing manager is examined using an optimal control model that captures both utilization and replacement decisions. Conditions for optimal utilization of each vessel in the fleet and optimal vessel acquisition and retirement strategies are discussed. The results indicate that the optimal replacement schedule and fleet size are influenced by utilization schedules, and vice versa. Thus, replacement and utilization strategies should be determined jointly. (Jin & Kit-Powell, 2000)

2.1.6. Operational performance

operational performance is an organization's performance measured against standard or prescribed indicator of effectiveness, efficiency and environmental responsibility such as cycle time, productivity, waste reduction and regulatory compliance in which their measurements is key for continual improvement process (Welansa 2018). Performance metrics are needed in order to measure of outputs or results which can describe using words or numbers. According to John Sullivan (2004) metrics generally cover five assessment areas including quantity, quality, time, money and satisfaction.

A broader conceptualization and more effective business performance should include indicators of operational performance. This study, focus on operational performance of the fleet efficiency to measure the benefits of fleet management pracstices. Stank et al. (1999) show that operational performance has a significant effect on customer satisfaction and loyalty, which in turnaffect market performance (Stank et al. 2003).

2.1.6.1. Key performance indicators and Fleet Efficiency

Key performance indicators are used to monitor the efficiency of fleet operations. Key performance indicator (KPI) can help to better predict when a vehicle needs maintenance and can prevent unplanned down time or failures in the field (Oracle 2017). Hence a metric or a key performance indicator in any measurable value demonstrates how efficiently fleet is operating and helps to meet business objectives. The collection of data for an extended period creates a historical

record of operational data which is used to predict by analyzing it. The data also help one to know where to make changes to reduce risk, improve the efficiency of fleet, and enhance customer service.

Accordingly, KPI are typically grouped in three categories of safety, efficiency and compliance. Safety KPIcategory constitutes speed violations, driving speed, alerts etc. monitors driver behavior and provide data that can use to promote and improve driver safety. The efficiency category in other case monitors operational performance and provide data that can use to reduce wear and tear on vehicles and maintenance costs. The compliance category has sample KPI types like consumed fuel cost, idling violations, idling durations, and fuel consumed (Oracle, 2017).

Fuel consumption in heavy trucks operations, like construction operations is one of the critical components in the operating cost. Fuel consumption is greatly influenced by road topography. Several researchers have examined fuel consumption reduction methods that use information concerning road terrain (Jiali Fu 2017). Jiali Fu mentioned many studies and all provide the theoretical background of improving fuel efficiency by regulating speed/acceleration on different topographical road profile. Accordinglly, the advancement of new information and sensing technologies has facilitated the further development of methods to improve fuel efficiency. In recent years, several studies have been conducted to improve fuel efficiency by combining road topography and signals from Global Positioning System (GPS) (Jiali Fu, 2017).

Generally as Scott (1998) states that the minimization of fuel consumption and the maximization of vehicle utilization are the tools that can be used to improve operational efficiency (Meseker, 2018). Strategic manager, fleet manager and operations manager have their tasks responsible for in which fuel consumption management to be efficient. A fleet manager is a responsible body for the task of fuel management program which save money even in other areas to improve operations.

2.2. Emerical Literature Review

2.2.1. Practices of Fleet Management in business companies

Fleet management in Europe is a multibillion-euro industry based on a profitable business model. (Pfeifle et al, 2017) on their study of Fleet management in Europe, they found and put four key success factors for fleet management by arguing that Fleet management is a highly profitable business. Accordingly the factors are strong funding and service mind-set as competitive advantages; able to shift from vehicle-related services to driver related-service; size matters – regarding footprint and fleet size, based on customers demand; and multi-brand is the key to fulfilling customer requirements (Pfeifle *et al*, 2017).

Maintenance spare parts planning and control also has a significant financial impact. Here are some impressive statistics that illustrate this: a study by Aberdeen Group (2003). In 2003, spare parts sales and services (mostly maintenance) accounted for 8% of the gross domestic product in the United States and; a study by Deloitte (2006) among 120 large manufacturing companies in North America, Asia Pacific and Europe shows that service revenues represent more than 25% of total business (Arts, 2013).

(Baas, 2012) his work entitled fleet management commitment to fuel efficiency with the aim of identify ways of overcoming the barriers faced by managers of New Zealand's light and heavy vehicle fleets took place case studies of seven giant companies incorporates in fleet management practices identified that the nature of transport fleets in New Zealand and those in other countries are significantly different because of the nature of the transport task, the road environment, fleet composition, fleet ownership structures, fleet management culture, regulations, compliance and enforcement. These differences mean that New Zealand solutions need to be found other than the way of the United Kingdom (UK), the United States of America (USA) and Canada, have implemented very successful schemes in improving the fuel efficiency.

A feedback made a number prevailing experience comes after series of consultation meetings were held with transport operators, equipment suppliers, transport industry associations and the relevant government agencies. Amongst the main points are: very few operators monitored fuel consumption; many operators found that fuel cards are unreliable as a means of monitoring fuel consumption because multiple vehicles can be filled with the same card, different drivers may use the same vehicle, and auxiliary equipment is also fuelled; driver training did not adequately cover

fuel-efficient driving practices, as being more effective the industry wanted government agencies to coordinate the information they produce with common branding etc. They are very effective in reducing fuel consumption measures aimed at improving vehicle use, the necessary of monitoring and facilitating the introduction of new technology and supporting strongly the use of case studies are other feedbacks of the sessions (Baas, 2012).

Baas (2012) come with finding the case studies results related to barriers to adopting fuel saving measures that are fleet managers often do not have any formal training in financial management and therefore do not have a good handle on what each truck costs to run over its lifetime rather, fleet managers and owners largely base their decisions on the experience of previous generations of fleet managers. As a result, very few fleets are putting effort into saving fuel despite the financial benefits. Accordingly, he find that managers are too busy dealing with day-to-day issues to introduce new initiatives that require a proactive approach; very few operators measure fuel used by individual vehicles; often concerning with issue of the attitude of drivers and other staff; lack of accurate and independent information on options; slipping back into old habits and non-staying in company after training of drivers; fleets generally use GPS tracking systems to solve particular issues and review specific events rather than looking for trends (Baas, 2012).

A study used the P Transport Company, which operates the largest shipping line in Taiwan, is a subsidiary of a famous food and retail conglomerate, which is the largest group of chain stores in Taiwan, as an empirical study Case by Yi-Chung Hu *et al* (2015) as a baseline of the attempting and unsatisfactory And not successful results of begin introducing electronic operations and systems to enhance its competitiveness in the industry and to achieve the goals given by the corporation, in the hope that these systems would lead to higher corporate operating efficiency. The study results with the finding of the very important to the logistics industry of GPS-based fleet management systems especially in transport companies in order to monitor and track commodity distribution, thus saving energy. In addition, the systems also improve scheduling, operating efficiency, and effectiveness. Because fleet management systems are very important, the successful introduction of these systems has become a key issue (Yi-Chung Hu et al, 2015).

Having the purpose of identifying the key factors for introducing GPS-based fleet management systems to transport companies of their research they combined DEMATEL and ANP to determine the key indicators, and identify the most important one, and discover how it affects others.

They overcome with top executive support was determined to be the most important criterion in their study; other key factors selected were funding and budget, experience and ability of consultants, project team composition, user recognition, timely and correct information, and degree of completeness of transmission equipment. They discussed these seven key factors in their research conclusions (Yi-Chung Hu *et al*, 2015).

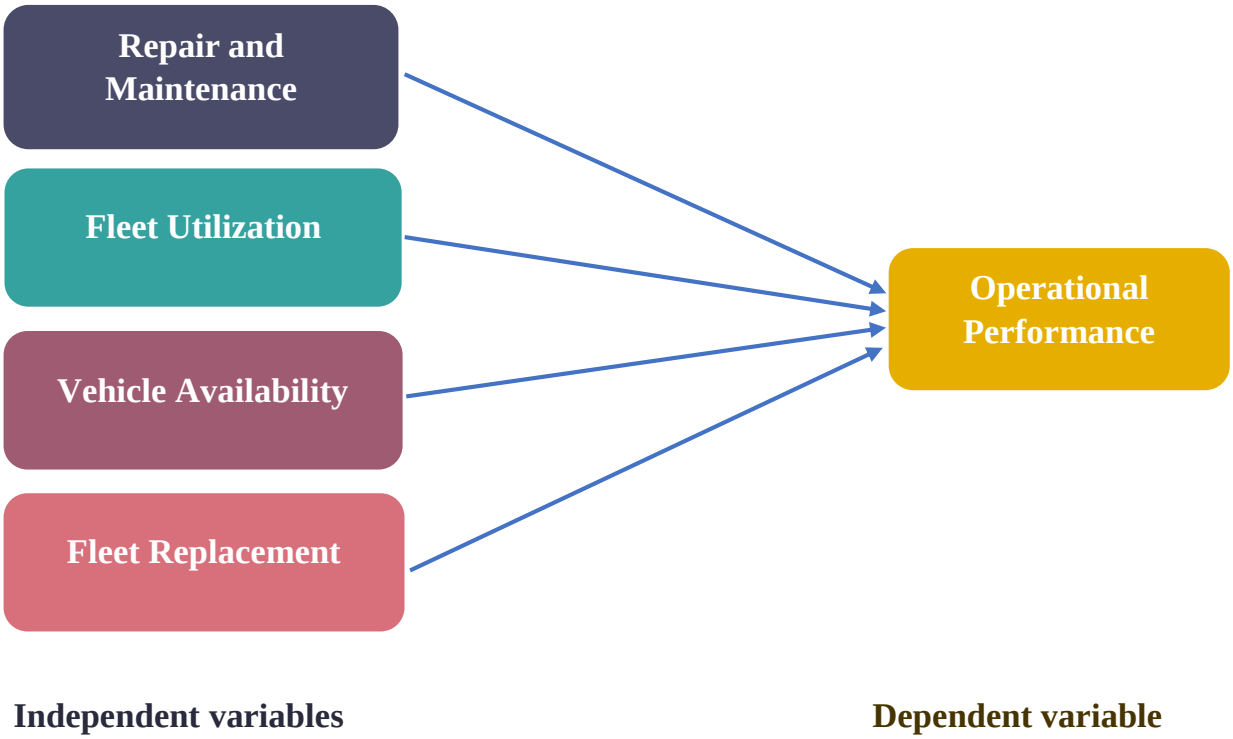
Hamzi *et al* (2013) work entitled Fleet management: assessment of the best practices stated that a company fleet management process is evaluated using and combining of two methods: HADDON Matrix and Network Influence in order to assess the best practices in its fleet management. They present the results of the application of the HADDON matrix method which is a very useful self-audit tool. It is used simply by asking the question 'do we have the following in place?' for each of the selected factors/ statements in their matrix. The realized factors are 'management culture, journey, road/ site environment, people, drivers and managers, vehicle and External/societal/ community/brand. The Network Influence is applied to the fleet management using the results of HADDON matrix to identifying effective measures to improve performance. The study with the application of the HADDON matrix and remedy measures to selected oil company come with results. Hamzi *et al* (2013) stated that of the main application of the HADDON matrix is to reduce the sudden accidents and injuries due to the road danger in the organization. It is difficult to recognize and resolve which are the major shutters have direct involvement to create the insecurity on long-distance truck drivers in the company and the decreasing of distance is one of the solution to of reduce such damage. The advantage of the influence network method is it granted alternative solutions to this issue and disclose the constituents that contribute to the uncertainty long-distance truck operator which resolved the most effective means to control the road related risk in the organization.' (Hamzi *et al* 2013).

Literatures reveals that various logistics projects are implementing by firms using latest technologies namely global positioning system (GPS) as well as wireless technologies in most of developed nations. The usage of wireless technology is expanding in the developing countries such as Kenyan firms for example the practices of GPS tracking system has modified their operations.

2.3. Conceptual Framework of the Study

According to 2012 national equipment fleet management conference held in Michigan state, the following independent variables are taken as the main fleet performance metrice/indicators which has influence on the operational performance of the organization. The conceptual framework is a diagrammatical representation that shows the relationship between dependent variable and independent variables. In the study, the conceptual Framework is look at assessment of fleet management practices of Hagbes Plc.

Figure 2.1: Conceptual Framework



Based on the above conceptual framework, the researcher developed the following null hypothsises:

H_1: Vehicles repair and maintenance does not have influence on operational performance.

H_2: Utilization does not have significant effect on operational performance

H_3: Availability does not have effect on operational performance

H_4: Vehicle replacement/retention does not influence on operational performance

CHAPTER THREE: RESEARCH METODOLOGY

Since the main aim of the study is to analyze the practices of fleet management on in the case of Hagbes Plc. Hence, the research design and methodology part of the study encompasses research approach, research design, sample size the research based, data source and type of those data's used, method of data collection and mechanisms of analysis of the data.

3.1. Description of the Study area

Hagbes Plc was founded in 1957 as an importing & trading company for small agricultural machinery and building materials, becoming the pioneer to introduce stone grinding mills in Ethiopia. Today the company employs a workforce of roughly 640 people, spread across a dozen locations around Ethiopia and regarded as one of the largest private organizations in the country engaged in importation and distribution of heavy construction machinery, Mining and excavation machinery, Agricultural Machinery and Water treatment plants, Industrial machineries, small automobiles to Heavy Trucks.

After the remarkable amount of fuel and maintenance cost registered in the last consecutive two years actual financial reports and assessment held by the fleet managers in mid-2020, Hagbes Plc management team realized that fleet management has unavoidable influences on operational performance as well as the key element to achieve customer satisfaction. As a result they decided to implement Fleet Management System (FMS) since then. Therefore, the effectiveness of the research is highly dependent on the four variables main factors of fleet management where the fleet management is expected to provide efficient & effective service delivery. Therefore, the study analyzed how employee perceived the effect of fleet management functions on operational performance of the Hagbes PLC.

3.2. Research Approach

The study followed both quantitative and qualitative research approaches (mixed approach) in the study in order to achieve its aim. According to Creswell (2003) mixed research approach helps to get relevant data from both pre-established and recent data collection methods with open and closed ended questions. Mixed approach helps to fill the information gap crated in one of approaches by the other approach.

3.3. Research Design

The research is designed in two features, descriptive and explanatory. Descriptive study enable the researcher to describe the data in detail whereas explanatory study is useful to scrutinize the relationships between the variables**.** The cross-sectional study is essential to identify the phenomenon of events took place by testing the relationships of variables in a given time period. Also, according to Saunders, Lewis & Thorn hill (2009) a Cross-sectional study is recommended in survey data collection method as the best to describe the incidence of a phenomenon or to examine how different factors are related.

3.4. Target Population and Sample size determination

The researcher used simple random techniques to get unbiased data out of the target population of the study such as Branch Managers, Department heads, Supervisors, Sales Engineers, Fleet officers/Managers, Technicians and Analysts & Heavy and light vehicle drivers, other professionals of Hagbes Plc who are staffs in both fleet management department and users of company vehicles for working activities are included in the survey.

The total population size in 10 branches is about 560 but the researcher selected three (two branch offices and the Head office) of them that are practicing fleet management properly for the study

The total population size of the selected offices is shown blow:

1) HO (Head office) = 173
2) KHMSC (Kality Heavy Machinery Service Center) = **156**
3) Atlas Copco Division (AC) = 40

Therefore the total number of the target population is **369**.

Let's determine the sample size using the following formula:

$$\mathbf{n} = \frac{\mathbf{N}}{\mathbf{1+N(e)^2}}$$ …… (Israel, 1992)

Where:

N is the population size

e is the desired level of precision which is ±5% with 95% confidence level.

Therefore; the determined sample

Size is $\boldsymbol{n} = \frac{\mathbf{369}}{\mathbf{1+369(0.05)^2}}$ **= 192**

Now let's compute the ratio of the distribution of the questionnaires for each branch's:

Let X_1 = HO , X_2 = KHMSC , X_3 = AC

The total number of the target population is X1 + X2 + X3 = 369

$X_1/X_2 = 173/156$…… $X1 = 1.11X_2$ eq.1

$X_2/X_3 = 156/40$…… $X2 = 3.9X_3$ eq.2

From equation 1 and 2 :-

$X_1 = 4.33X_3$..... eq3

Use the above ratios to calculate the correct questionnaire distribution using the computed sample size by substituting the above values:

$X_1 + X_2 + X_3 = 192$

$X_1 + (X_1/ 1.11) + (X_1/ 4/.33) = 192$

$X_1 = 91$.....for HO

$X_2 = 82$ .....for KHMSC

$X_3 = 19$.....for AC

Table 3.1: Summary of total and target populations of the study

No.	Fleet Department Organogram	Total Population Size			Total
		HO	KHMSC	AC	
1	IT Expert	14	0	0	14
2	Manager	4	5	3	12
3	Sales Engineer	31	30	9	70
4	Technician	50	56	9	115
5	Supervisor	7	8	2	17
6	Driver	30	35	6	41
7	Fleet Manager	2	3	1	6
8	Others	35	19	10	64
	Sub Total	173	156	40	
				Total population	**369**
				Sample size	**192**

Sources: Survey data, 2022

3.5. Data Sources and Types

Both primary and secondary types of data were used in the study**.** The primary data was ordinal (categorical) type to help giving score on the bases of respondents' opinions. Once the aim of the study was to identify the critical factors by evaluation the score obtained, ordinal (categorical) data type found to be the right one to identify those variables based on their importance to the factors to be studied. Respondents who filled the questionnaire were a source of primary data. In the meantime, Hagbes Plc.'s fleet management annual reports are also serves as a source for secondary data.

3.6. Data Collection Procedures

The data collection method applied for primary data was survey. Survey method provides a description of trends, attitudes, opinions of a population using primary data that is quantified. It helped the researcher to generalize about the population by studying a sample of that population (Creswell, 2009).

The questionnaire was organized in Likert scale prepared in a close-ended (fixed alternative) form of questions to avoid waste of time that may be spent for editing. A closed ended form helps in standardizing alternative responses helped to compare the answers by facilitates coding, tabulating, and ultimately interpreting the data. The questioners developed by self-administered ways to identify the relationships of factors between dependent and independent variables. A funnel technique of developing questionnaires was taken in to a consideration starting respondents to answer general questions before go to specific questions in order to obtain unbiased responses.

3.7. Method of Data Analysis

The data (both primary and secondary) analyzed separately. The primary data was ordinal in nature that needs examining of relationship between variables for ranking purpose, as a result, the test applied was a non-parametric or one way ANOVA test which is analogus to Kruskal Walis test. The data was analyzed after getting response for the questionnaires and coding before it record. All available clear response recorded to analyze using SPSS. The secondary data, on the other hand, analyzed using percentage and graphs to depict the operational performance of the company with regards to each factor being tested. But, the interpretations were given based on both (primary and secondary) findings.

In this study, a linear multiple regression analysis was conducted to test the influence of each of the four independent variables specifically the fleet performance metrics on the operational performance. In this study the researcher prepared Likert scaled questionnaire in order to compute linear multiple regression easily and analyzed the quantitative data using SPSS V 20.0 (statistical package for social sciences)

Regression model: the equation was expressed as follows:

$$Y = \alpha + B_1 (X_1) + B_2 (X_2) + B_3 (X_3) + B_4 (X_4) + e$$

Where;

Y Operational Performance – Dependent variable

A Constant (coefficient of intercept)

X_1- X_4 are independent variables that are stated in the conceptual framework.

X_1 Maintenance and repair

X_2 Fleet Utilization

X_3 Vehicle Availability

X4 Replacement

e – Error term

B_1, B_2, B_3, B_4 – Non standard regression coefficients for four independent variables.

The regression equation has established that taking all factors into account to the dependent variable operational performance to establish and results were presented as per the SPSS generated.

3.8. Ethical Consideration

The researcher was applied oral an informed consent to solicit the willingness of the individual to participate on this research. The participants were given information on the purpose of the study, the time it takes, the procedures to be followed, and benefits before starting the research. It is only after getting an informed consent that the participants were required to move to the next steps. The potential participant has also been informed that he/she can refuse to answer any question and that he/she can quit the interview at any point. If the participant has any questions, the researcher was required to respond adequately. The researcher shall assure information that participants provides during the study kept confidential. The raw data set and recorded interviews shall not be used for any other purpose than the intended purposes.

CHAPTER FOUR: RESULTS AND DISCUSSION

4.1 Introduction

In this chapter, the collected data from Managers, Maintenance workers and Drivers of Hagbes Plc at headquarter and branches are presented, interpreted and analyzed in order to realize the ultimate objective of the study. Accordingly, demographic profile of the respondent, descriptive analysis and regression analysis on the practices of fleet management of Hagbes Plc and factors of fleet management discussed.

In order to address the research questions, 192 questionnaires were prepared and distributed to Hagebs plc fleet management department employees, out of these questionnaires 102 were filled and returned, the rest 90 questionnaires were unreturned, and no questionnaires were discarded due to missing data.

4.2. Response Rate

A total of 102 responses out of the 192 questionnaires sent out were received, achieving an acceptable response rate of 80% including questionnaires. All the questionnaires were edited and checked for completeness and used in the data analysis**.**

Below table 4.1 shows that the number and the percentage value of the respondents of the research questionnaires and Interview questions:

No.	Branch Offices	Distributed to	Responded		
		No.	Questionnaire	Interview	%
1	HO	91	50	18	75
2	KHMSC	82	41	16	70
3	AC	19	11	7	95
	Totol	192	102	41	80

Source: Survey data, 2022

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4.3. Descriptive Analysis

Meseker (2018) used a kind of rule of thumb to create equal intervals for a range of five points Likert scale (that ranges from strongly disagree to strongly agree in the survey questionnaire). A calculated mean value that ranges from 1 to 1.80 implies strong disagreement, a mean range from 1.81 to 2.6, from 2.61 to 3.4,from 3.41 to 4.2 and from 4.21 to 5.00 represented respondents' perceptions of somewhat disagree, neutral, somewhat agree and strongly agree respectively. The 0.8 served as a boundary for each elements of the measurement in the questionnaire.

Accordingly, the 0.8 was a result found by dividing the difference between the maximum (5) and minimum (1) scores to the maximum score (5) of the questionnaire. In the process of examining of the data, standard deviation was used. Small standard deviations (relative to the value of the mean itself) indicate that data are close to the mean whereas a large standard deviation (relative to the mean) indicates that the data points are distant from the mean. The mean is a poor fit of the data. Standard deviation is a measure of how well the mean represents the data (Field 2009). All of the variables were measured using a five point likert scale where 1 stands for Strongly Disagree and 5 stands of Strongly Agree. Therefore the interpretation made using the mean of each variable, as a matter of fact the mean falls between the two ranges, hence if the mean approaches to 1 the interpretation would be the respondents didn't agree on the raised issue or variable and if it approaches to 5 the reverse would be true.

4.3.1 Reliability Test

Toke et al. (2012) defines reliability as the extent to which results of a study are consistent over time and there is an accurate representation of the total population under study. The most common technique used literatures to assess the scales reliability and stability is use of the Chronbach Alpha Statistics which was employed to measure the reliability of the research. Chronbach Alpha should be over 0.70 to produce a reliable scale and any scale with Chronbach Alpha less than this standard should be eliminated.

To ensure the measurement and assessment of the real situation in Hagbes plc, the researcher conducted pilot survey on the questionnaire by taking 5 employees. The Chronbach alpha result from the pilot survey is presented below.

Table 4.2 reliability test

	Cronbach's Alpha	N of Items
Vehicle repair and Maintenance	0.850	2
Fleet Utilization	0.834	3
Vehicle Availability	0.823	2
Fleet replacement	0.821	2
Operational Performance	0.822	2
Overall	0.830	11

Source: Survey data 2022

Regression is a parametric approach. 'Parametric' means it makes assumptions about data for the purpose of analysis. Due to its parametric side, regression is restrictive in nature. It fails to deliver good results with data sets which doesn't fulfill its assumptions. Therefore, for a successful regression analysis, it's essential to validate at least three of these assumptions.

4.3.2. Analysis on Vehicles Repair and Maintenance Practices

Table.4.3 Vehicles Repair and Maintenance Factors

	N	Mean	Std. Deviation
The practices of preventive maintenance in your company are good.	102	4.83	.985
Based the fleet performance metrics vehicle repair and maintenance, your company fleet operation is in a good status	102	4.92	.723
Grand Mean	102	4.875	0.854

Source: Survey SPSS output (2022)

Table 4.3 displayed that fleet management practices of vehicles maintenance and repair factors. The first factor which the respondents gave higher mean score was the question state that, the practices of preventive maintenance in Hagbes Plc are good which is the mean score of 4.92 and the

second practice is vehicle repair maintenance is in a good status which has relatively the highest mean value 4.83. lays in agree level as important determinants of mode choice factors in the case of Hagbes plc. Hence, the analysis shows that maintenance and repair had a means score of 4.875, which almost the score of this variable falls in strongly agree level. Based on this research finding maintenance and repair were one of the major influential variables that are assumed to affect operational performance. Tsige (2019) in her research also found out that repair and maintenance and maintenance and operational performance are significantly associated but there was a gap while following the maintenance and repair fleet management practices. While the operational performance of the company is dependent on this variable and has decreasing effect on operational performance of the company keeping other variables constant.

4.3.2. Analysis on Fleet Utilization Practices

Table 4.4 Fleet Utilization Factors

	N	Mean	Std. Deviation
Based one of the fleet operation performance metrics, Utilization, your fleet operation is in a good status.	102	4.75	.480
There is the best practice of Fleet Management in your company	102	4.72	.483
The new fleet management trends in your company like GPS vehicle tracking system are helping your organization to create sustainable fleet operation.	102	4.78	.475
Daily fleet operation activity status regarding vehicle assignment and distribution in your company is effective	102	4.64	.524
Grand Mean	102	4.723	.4905

Source: Survey SPSS output (2022)

Table 4.4 displayed that Fleet Utilization were one of the predictable variables that are expected to have an effect on operational performance in which four out of four Fleet utilization factors.

All variables falls in strongly agree level and are important determinants of mode choice factors in the case the company. The factors which the respondents gave higher mean score are the questions supposed that GPS vehicle tracking which is the mean score of 4.78 and the respondents gave relatively lower mean score of 4.64 for the factor of vehicle assignment and distribution in the company which still lays at strongly agree level.

As a result, the analysis indicate that Fleet utilization had a means score of 4.723. Therefore, the Fleet utilization were one of the best expected variable that have an positive effect on operational performance which indicate the score of this variable assign of strongly agree level.

As (Scott, 1998) in fleet management, the two tools that can be used to improve operational performance are the minimization of unplanned fleet operation activities, proper GPS usage of car tracking system and maximization of vehicle utilization while still meeting required company goals. Also this finding support that as long as the vehicle tracking system become good and sustainable the operational performance more likely to be at the highest level of efficiency and the same is true in daily fleet operation.

4.3.3. Analysis on Fleet Availability Practices

Table 4.5 Fleet Availability Factors

	N	Mean	Std.
Based on fleet operation performance metrics, Vehicle Availability, your fleet operation is in a good status.	102	4.45	.453
Daily fleet operation activity status regarding vehicle assignment and distribution in your company is effective	102	4.64	.434
Grand Mean	102	4.545	.4435

Source: Survey SPSS output 2022

Table 4.5 indicates Fleet Availability were one of the variable that are expected to affect operational performance. The respondents mean scores for the questions are as follows the first quest vehicle Availability in the company which hold the mean score of 4.45 & the second vehicle assignment and distribution in the company has the mean score of 4.64 which is the highest score of this variable's factor and it indicates strongly agree level.

The result shows a positive overall improvement in fleet availability as shown on table 4.5 which represents a direct positive contribution from the effect of more efficient operational performance management process. The objective of improving fleet availability is to gain operational performance imrovement by providing superior customer service with improved fleet efficiency and closer customer and supplier relationships.

The greatest advantage has been the real-time monitoring and interaction with fleet vehicles to attain a high fleet operation and provide a fast response to customer need. The findings of this study are consistent with the research findings published by the Aberdeen Group (Marketwire, 2009)

4.3.4. Analysis on Fleet Replacement Practices

Table 4.6 Fleet Replacement Factors

	N	Mean	Std. Deviation
Based on the fleet operation performance metrics, Fleet replacement, your fleet operation is in a good status.	102	4.36	.847
Most of the vehicles in your company are below their service life time.	102	3.95	1.03
Grand Mean	102	4.155	.9385

Source: Survey SPSS output 2022

Table 4.6 ensures that the fleet replacement is one of the variables that are expected to influence the operational performance. The factors that the researcher used to determine the effects of operational performance and the respondents gave higher mean score was 4.36 for the practice of fleet replacement and the second question with lower mean score was 3.95 for the available vehicles that are below their service life time but the respondents opinion falls on somewhat agree level which is lower score relatively to the first question. Hence, the analysis shows that Fleet replacement had a means score of 4.155, which score of this variable falls at the extreme of, agree level.

Demeer (2016) also in his research proposed the optimization method in a real-life decision situation (the case study) within the Polish environment and the obtained solution are presented and the solution shows that there exist optimal exploitation periods of particular vehicles in a fleet. However, combination of them gives a replacement plan for an entire fleet violating budget constraints. But it is possible to adjust individual age to replacement of particular vehicles to fulfill budget constraints without losing economical optimality of a developed replacement plan for an entire fleet.

4.3.5. Analysis on Operational Performance

Table 4.7 Operational performance Factors

	N	Mean	Std.
The extent of Fleet management effect on your company operational performance is high.	102	4.68	.609
Feet management has a vital role in achieving the core business goals of your organization.	102	4.73	.596
Grand Mean	102	4.705	.6025

Source: Survey SPSS output 2022

Table 4.7 displays that operational performance based on the performance parameter factors is scored the mean value of 4.68 to 4.73 respectively and both are falls on extremes as strongly agree level with the total mean score of 4.705 which also lies on strongly agree level which is shows the better operational performance practices in the company because the mean value is the central tendency that shows the inter relationship and variance between the above research questions.

Studies on the subject matter proves that fleet management practices have important role in developing the performance of an organization and achieving the goal of the company. Based on this survey findings results Hagbes plc is in a good status of the fleet management practices of vehicles repair and maintenance, fleet utilization, Fleet availability and Fleet replacement factors which are the main fleet performance indicator factors to improve the operational performance of the business company.

4.4. Regression Analysis

4.4.1. Regression Assumption Test

The first regression assumption is No autocorrelation between the variables. Durbin – Watson (DW) statistic. It must lie between 0 and 4. If DW = 2, implies no autocorrelation, 0 < DW < 2 implies positive autocorrelation while 2 < DW < 4 indicates negative autocorrelation. The Durbin Watson value indicates 1-2.5 Durbin-Watson value is accepted and the result shown in the following table is 2.038 that means there's no autocorrelation between the independent variables.

Table 4.8 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	0.73[a]	0.5329	0.5294	1.15864	2.038

a. Predictors: (Constant), Repl, RM, AV, U
b. Dependent Variable: OP

Source: Survey SPSS output (2022)

The second regression assumption is No or little Multicollinearity among variables. The VIF factor indicates if there's a multicollinearity between the varibles. The VIF value <= 4 suggests no multicollinearity whereas a value of >= 10 implies serious multicollinearity. According to this rule the VIF values shown in table__ are below 4 and it means there's no multicollinearity between the variables.

Table 4.9. Multicollinearity assumption test

Coefficients

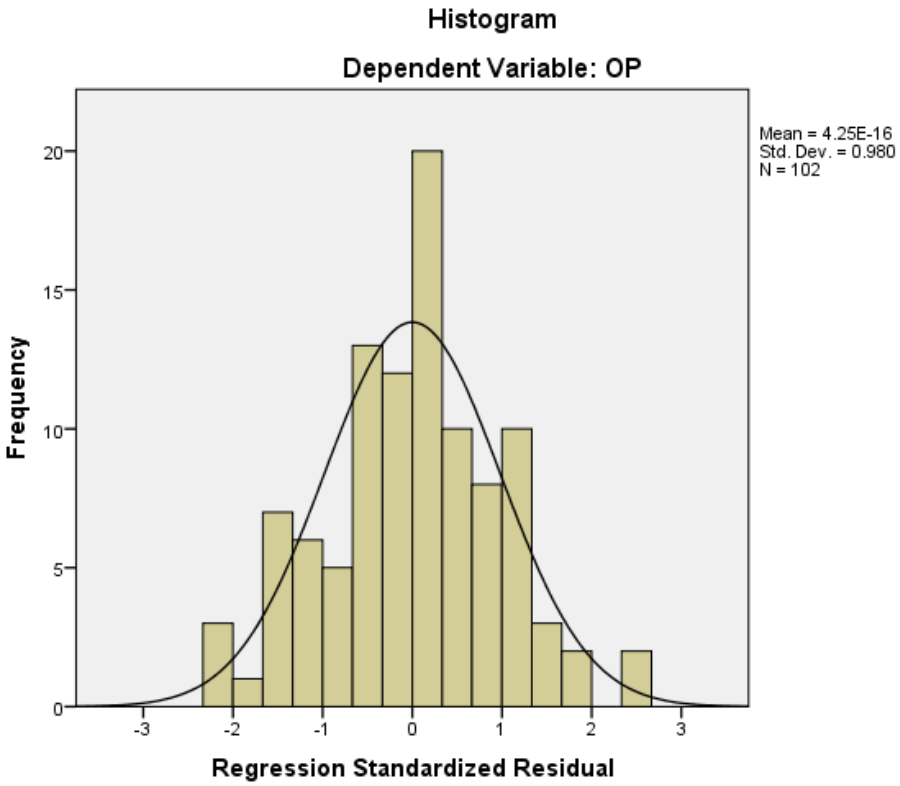
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	**VIF**
1	(Constant)	2.396	1.324		5.826	000		
	RM	.571	.105	.582	0.382	. 000	.734	1.363
	U	.138	.208	.0149	2.26928	.000	.558	1.792
	AV	.320	.164	.298	1.015	.001	.579	1.727
	Repl	.273	.105	.193	1.432	.008	.482	2.073

a. Dependent Variable: OP

Source: Survey SPSS output (2022)

The third regression assumption is the presence of non-constant variance in the error terms results in Heteroskedasticity. Generally, non-constant variance arises in presence of outliers or extreme leverage values. These values get too much weight, thereby disproportionately influences the model's performance. When this phenomenon occurs, the confidence interval for out of sample prediction tends to be unrealistically wide or narrow. The residual vs. fitted values plot tells if heteroskedasticity exists, the plot would exhibit a funnel shape pattern as shown in below fig. 4.1 Histogram plot:

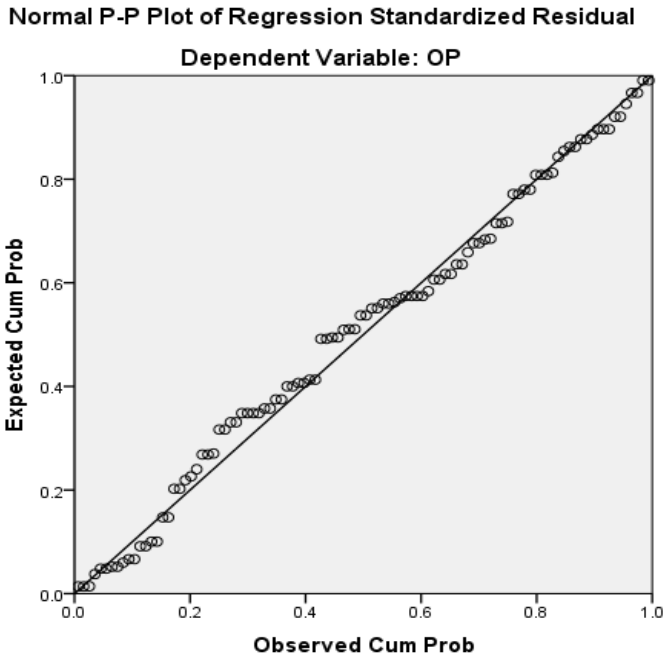
Fig. 4.1. Histogram Plot



Source: Survey SPSS output (2022)

The fourth regression assumption is Normality Distribution error terms. If the error terms are non-normally distributed, confidence intervals may become too wide or narrow. Once confidence interval becomes unstable, it leads to difficulty in estimating coefficients based on minimization of least squares. Presence of non – normal distribution suggests that there are a few unusual data points which must be studied closely to make a better model. Fig 4.2 the p plot shown below has diagonal shape and it means the normality criteria is fulfilled.

Fig. 4.2. P Plot



Source: Survey SPSS output (2022)

Last but not least regression assumption is Linear and Additive: If the linear model fits to a non-linear, non-additive data set, the regression algorithm would fail to capture the trend mathematically, thus resulting in an inefficient model. Also, this will result in erroneous predictions on an unseen data set. The above residual vs fitted value plot indicates the linearity because the residuals are lines well on the straight dashed line.

The researcher performed regression assumption test before computing the regression analysis. All of the assumptions are fulfilled as shown back in chapter three. To briefly explain the five assumptions, the first one is No or little Multicolliniarity using VIF values less than 10 (Gudjrat, 2003) and the Hetroscedsticity were checked using residual vs fitted values plot which have funnel shape. The third assumption test normality distribution test in order to run ordinary least square method the error term or residuals must be normally distributed and the p-plot has diagonal shape so that the normality criteria is fulfilled. The last regression assumption test is linearity and additive test indicates that the dependent variable and independent variables should have a linear relationship. And the scatter plot technique was implemented to test the linearity assumption the assumption is also fulfilled.

Table 4.10. Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the
1	.73a	.5329	.5294	.2410

a. Predictors: (Constant), Mean RM, MeanU, MeanAv, MeanRepl
b. Dependent Variable: MeanOP

Source: Survey SPSS output 2022

The model summary displays the significance and percentage of variation in operational performance which is caused by independent variables.

Multiple correlations R of +ve 0.73 represent the combined correlation of all the independent variables. Adjusted R2 tells us that 52.94 % of the variation in operational performance can be explained by variation in the four independent variables taken together and leaves 47.06% variation unexplained.

4.4.2 Estimation of Result

This study aimed to analyze the effects of fleet management on operational performance of Hagbes Plc. how maintenance and repair, Fleet utilization, Fleet Availability and Fleet replacement determine the operational performance. Furthermore, Ordinal logistic regression (Ologit) model were employed to estimate the operational performance.

The results of the econometric model estimation revealed that all variables have positive relationship with the operational performance and have their significant value is below 0.05 which indicates that there is a significant relationship between the operational performance and the four independent variables such as Vehicle repair and maintenance, Fleet utilization, Fleet Availability and Fleet replacement. And also the Sig. value should be below the tolerable level of significance for the study i.e. below 0.05 for 95% confidence interval in this study. Based on the significant value the null hypothesis is rejected or not rejected. If Sig. is < 0.05, the null hypothesis is rejected. If Sig. is > 0.05, then the null hypothesis is not rejected. If a null hypothesis is rejected, it means there is an impact. However, if a null hypothesis is not rejected, it means there is no impact.

The positive coefficient shows that Vehicle repair and maintenance, Fleet utilization, Fleet Availability and Fleet replacement have significant capability of improving the operational performance of the company also increases its productivity.

Table 4.11 ANOVA

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	1.527	4	.377	1.492	.000[b]
	Residual	10.433	98	.250		
		11.960	102			

a. Predictors: (Constant), Mean RM, MeanU, MeanAv, MeanRepl

b. Dependent Variable: MeanOP

Source: Survey SPSS output 2022

In the ANOVA sub table we have the F value of 1.492 which is significant with p <.001. This informs us that the four independent variables taken together as a set are significantly related to the dependent variable.

In order to see the contribution of fleet management factors that affect operational performance, regression analysis of operational performance were employed. Table 4.13, provides the result of multiple regression analysis beta coefficient and significance.

Table 4.12 Regression coefficients

Coefficients[a]

Model	Unstandardized Coefficients		Standardized	T	Sig.
	B	Std. Error	Beta		
(Constant)	2.396	1.324		5.826	.000
MeanRM	.571	.105	.582	0.382	. 000
MeanU MeanAv	.138	.208	.0149	2.269	.000
MeanRepl	.320	.164	.298	1.015	.001
	.273	.105	.193	1.432	.008

a. Dependent Variable: MeanOP

Source: Survey SPSS output 2022

4.5.3. Regression model

Regression model: the equation was expressed as follows:

$Y = \alpha + B_1 (X_1) + B_2 (X_2) + B_3 (X_3) + B_4 (X_4) + e$

The above table gives the results for the regression coefficient for the multiple linear equation; ($Y=B_0+B_1X_1+B_2X_2+B_3X_3+B_4X_4+\varepsilon$) which by supplying the coefficients becomes:

Y=2.396+ 0.571MRM+0.138MU+0.32MAv+0.273MRepl

Where: Y= Operational performance

According to the regression equation established, holding all independent factors constant, then operational performance will be 2.396 units. From the regression equation holding all other independent variables constant, a unit increase in maintenance and repair will lead to a 0.382 increase in operational performance; a unit change in Fleet Utilization will lead to a 2.26 units improvement in operational performance a unit increase in Fleet availability will lead to a 1.015 increase in operational performance and Fleet replacement will lead to 1.432 increase in operational performance.

At 5% level of significance and 95% level of confidence, repair and maintenance, Fleet Utilization, Fleet availability and Fleet replacement have a significance influence on the company operational performance with p-values of 0.000, 0.000, 0.001 and 0.008 respectively. Therefore all the independent variables are significant and rejected the researcher null hypothesis that means these independent variables which are Vehicle repair and maintenance, Fleet Utilization, Fleet availability and Fleet replacement have a significant effect on the operational performance of an organization i.e. Hagbes Plc

CHAPTER FIVE: CONCLUSION AND RECOMMONDATION

The final chapter of the study provides conclusions and recommendations drawn from the findings of the data collected by questionnaire and interview questions.

5.1 Conclusion

The purpose of this study was to determine the impact of fleet management on firm operational performane. According to the findings, fleet management plays a critical role in the operational performance. Firms are now able to overcome some of the problems they face during operational activities like product and service delivery as well as meeting customer demand and providing timely service to clients as promised, thanks to effective and efficient fleet management practices, giving them an opportunity to achieve their business goals. It's also worth emphasizing that, despite the numerous benefits gained by businesses via the adoption of fleet management methods, there are still significant problems that impede successful fleet management.

The study's goal was to look into the impact of fleet management methods on Hagbes Plc's operational performance. Maintenance and repair, Fleet Utilization, vehicle Availability, and Fleet Replacement were the four key variables evaluated to assess the influence on operational performance. To achieve these goals, data was collected from the company's personnel and processed using both quantitative and qualitative descriptive approaches, as well as regression analysis.

Table 4.13 Summary of Hypothesized result

Independent Variables	Hypothesis relationship	Dependent variable	IV Coefficient	Average Mean value	Significance	Hypothesis
H1: Repair and Maintenance	→	Operational Performance	0.571	4.875	Significant at 0.000	Supported at p < 0.01
H2: Fleet Utilization	→	Operational Performance	0.138	4.723	Significant at 0.000	Supported at p < 0.01
H3.: Fleet Availability	→	Operational Performance	0.320	4.545	Significant at 0.001	Supported at p < 0.01
H4: Fleet Replacement	→	Operational Performance	0.273	4.155	Significant at 0.008	Supported at p < 0.01

Source: Survey SPSS output 2022

Based on the analysis and interpretation of the data obtained from primary and secondary data sources as shown in table 4.13, the researcher has come up with the following findings:

Repair and Maintenance has direct relationship with operational performance. The mean score of this variable is 4.875 that falls on strongly agreed level and that indicates that there is the best repair and maintenance fleet management practices in the organization.While the operational performance of the company is dependent on this variable and the result shows that a unit change on maintenance and repair has 0.571 increasing effect on operational performance of the company keeping other variables constant.

Fleet Utilization: descriptive analysis shows that the mean score of the fleet utilization is 4.723 lies on strongly agree level. The implication was that fleet utilization in the company was strongly attached to an improvement in operational performance. Fromthe regression analysis the operational performance of the company is dependent on this variable since it has significant effect on the operational performance. A unit change in service quality has 0.138 incremental effect on operational performance keeping other variables constant.

Fleet Availability: respondents was also given a bold respond since the mean score is 4.545 which lays at strongly agree level. A unit change in this variable has scored 0.320 and it has increasing effect on the operational performance keeping other variables constant.

Fleet replacement: the respondent opinion indicates that the overall mean score is 4.155, which indicates the respondents are somewhat agree for the fleet replacement. From the regression analysis the operational performance of the company is dependent on this variable valued 0.273 and it has increasing effect on the operational performance. In general, the value of regression analysis shows that the results of the model estimation revealed that the independent variables had positive and have significant effect on operational performance.

5.2. Recommendation

Based on the result of the study findings, the researcher suggests the following recommendations to improve vehicle fleet management problem:

On Vehicle repair and maintenance, the company has the best practice the practice of preventive such as scheduled service time and technicians training, driver training needs special attention in order to avoid unplanned breakdown, driver safety and keep the vehicle in a good condition for a long period of time. The aftersales department needs to prepare the training manual or use the supplier instruction manuals to update the knowledge of the technicians and drivers to enable them to maintain and use vehicle safety properly. Both the technical and management team needs to have transparent communication to apply the above program.

On Fleet Utilization, there are a good practice of utilization in Hagbes plc especially GPS vehicle tracking system, fuel optimization and fleet sizing but they still needs to be improved by using Fleet management system (FMS) software in a full stand. In order to implement FMS, training program has to prepare for all members of the fleet department and vehicle user employees so that they can have the necessary knowledge and awareness how to use FMS effectively and motivated themselves and work willingly for the betterment of fleet performance.

On Fleet Availability, The Company is trying to improve the practice of fleet availability but the daily fleet operation plan is essential to prioritize the demand and fleet size so the daily and strategic plan needs to be developed and implemented by advising the fleet analyst and the remaining of fleet department members also has to takepart actively. Scheduled service and dailay safety checkups, driver training also helps to increase the fleet durability, safety and uptime of the fleet. The availability of fleet assets owned shall be optimized on a regular basis. Fleet Management endeavours to maintain the fleet in an effective, efficient and economic manner over its economic useful life and, if circumstances warrant it, arrange for the renting of a substitute to maximise the availability to the user department.

On Fleet Replacement, the company has good practice but lowest relative to the other variables because they give a priority to corrective maintenance, modification or cannibalization rather than dispose the aged vehicles. This leads the company to incurred excessive maintenance cost, time and sudden failure risk. Therefore; Fleet Administrator needs to evaluate and review vehicles due for replacement periodically and prepare a list to provide information on the recommended replacement and the estimated change over costs.

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APPENDICES

APPENDIX I: Research Questionnaire

SAINT MARY UNIVERSITY SCHOOL OF GRADUATE STUDIES

Research Title: Fleet management Practices and its effect on operational performance

Dear Respondents!

The following questions are developed for research data collection from the employees of Hagbes Plc. First and for most I would like to thank you for your willingness to fill this questionnaire. All piece of information will be used only for research purpose. You don't have to write your name.

assure that your response will be kept in secret. Since each of your response is very useful for study, Please go through each question patiently and give genuine answer.

Please put "√" on your best alternative's box and fill the blank spaces provided in some questions.

A. Personal Details

Gender	Male ☐	Female ☐					
Age	18-24 ☐	25-30 ☐	31-40 ☐	41-50 ☐	>50 ☐		
Occupation	Manager ☐	Fleet Manager ☐	Sales Engineer ☐	Supervisor ☐	Technician ☐	IT Expert ☐	Driver ☐
	Others ☐						
Working Experience	<1 year ☐	2-3 years ☐	4-7 years ☐	>7 years ☐			

B. Information regarding employee response to the fleet management practices

1. There is a tangible practice of Fleet Management in your company.

Strongly agree	Agree	Strongly Disagree	Disagree	Neither Agree nor Disagree
☐	☐	☐	☐	☐

2. Based on the following fleet operation performance metrics, your company fleet operation status is is strong.

Note that: Strongly Disagree = **1**, Somewhat Disagree = **2**, Neither Agree nor Disagree = **3**, Somewhat Agree = **4** and Strongly Agree = **5**

	1	**2**	**3**	**4**	**5**
Vehicle repair and maintenance	☐	☐	☐	☐	☐
Utilization	☐	☐	☐	☐	☐
Availability/uptime	☐	☐	☐	☐	☐
Replacement /Retention	☐	☐	☐	☐	☐

3. The new fleet management trends in your company like GPS tracking system are helping your organization to create sustainable fleet operation.

Strongly agree	Agree	Strongly Disagree	Disagree	Neither Agree nor Disagree
☐	☐	☐	☐	☐

4. Daily fleet operation activity status regarding vehicle assignment in your Company is effective.

Strongly agree	Agree	Strongly Disagree	Disagree	Neither Agree nor Disagree
☐	☐	☐	☐	

☐

5. The extent of Fleet management effect on your company operational performance is high.

Strongly agree	Agree	Strongly Disagree	Disagree	Neither Agree nor Disagree
☐	☐	☐	☐	☐

6. Most of the vehicles in your company are below their service life time.

Strongly agree	Agree	Strongly Disagree	Disagree	Neither Agree nor Disagree
☐	☐	☐	☐	☐

7. The practices of preventive maintenance in your company are remarkable.

Strongly agree	Agree	Strongly Disagree	Disagree	Neither Agree nor Disagree
☐	☐	☐	☐	☐

8. Feet management has a vital role in achieving the core business goals of your organization.

Strongly agree	Agree	Strongly Disagree	Disagree	Neither Agree nor Disagree
☐	☐	☐	☐	☐

C. Kindly answer the following questions based on your company fleet operation practices.

9. What is your criterion for fleet disposal? Please explain how you optimize the fleet life cycle cost in related to this?

10. What are main challenges that you are facing in fleet management/operation?

11. Do you have any thought that you would like to share with me to improve the fleet Management practices in your company?

Thank you for your time & all your answers are important and supportive for my research!

APPENDIX II: Interview Questions

SAINT MARY UNIVERSITY SCHOOL OF GRADUATE STUDIES

Research Title: Fleet management Practices and its effect on operational performance

1. What are the recent practices and processes of fleet management of your company?
2. What are the internal and external consideration needs to be encounter in fleet operation plan formulation, development and monitoring stages?
3. How does Fleet management affect the operation performance of your company regarding cost, time and effectiveness?
4. What is your company trends regarding preventive maintenance? Do you keep scheduled maintenance time or you assign vehicles as long as it is operational and give priority for the work urgency rather?
5. What kind of measure do you take on your vehicle fleet after their operational life completed? Please explain to me your disposal and replacement policies?