

UNIVERSITY OF CAPE COAST

**SITING OF VEHICLE TERMINALS IN CAPE COAST
METROPOLITAN AREA: SAFETY ISSUES, CHALLENGES AND
THE WAY FORWARD**

JAMES PAA GHARTEY

2015

UNIVERSITY OF CAPE COAST

SITING OF VEHICLE TERMINALS IN CAPE COAST METROPOLITAN
AREA: SAFETY ISSUES, CHALLENGES AND THE WAY FORWARD

BY

JAMES PAA GHARTEY

DISSERTATION SUBMITTED TO THE DEPARTMENT OF
GEOGRAPHY AND REGIONAL PLANNING OF THE FACULTY OF
SOCIAL SCIENCES, UNIVERSITY OF CAPE COAST IN PARTIAL
FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF
MASTER OF ARTS DEGREE IN GEOGRAPHY AND REGIONAL
PLANNING

JULY 2015

DECLARATION

Candidate's Declaration

I hereby declare that this dissertation is the result of my own original work and that no part of it has been presented for another degree in this University or elsewhere.

Candidate's Signature: Date:

Name: James Paa Ghartey

Supervisor's Declaration

I hereby declare that the preparation and presentation of this dissertation was supervised in accordance with the guidelines on supervision of dissertation laid down by the University of Cape Coast.

Supervisor's Signature: Date:

Name: Prof. A.M. Abane

ABSTRACT

Cities and traffic have developed hand-in-hand since the earliest large human settlements. The level of urbanisation in the developing world indicates that more people live in cities than before. This blueprint has led to high unbearable levels of traffic congestion in cities, vehicle terminals, streets and thoroughfares.

The main objective of the study was to examine issues and challenges with respect to the siting of vehicle terminals in the Cape Coast metropolis. The study employed a descriptive survey design to sample 196 respondents and road management institutions in the Cape Coast metropolis through simple random and purposive sampling techniques. The main instruments used to collect data for the study were questionnaires and in-depth interviews.

The study revealed that passenger demands, availability of space, limited space in the Central Business District, demand from community members and availability of passengers were the main factors that contributed to siting of vehicle terminals in the Cape Coast Metropolis. In addition, it was found that stakeholders in the transport sector played key roles in managing vehicle terminals, even though respondents were not satisfied with their roles.

The study recommends provision of proper and standard lorry terminals, regular inspection, decongestion of illegal terminals and collaboration among stakeholders as measures to deal with unplanned vehicle terminals in the Metropolis.

ACKNOWLEDGEMENTS

This study could not have been accomplished without the knowledge, guidance and support I received from many. First, I would like to thank my supervisor Professor Albert M. Abane and his assistant Mr Dauda Suleman of the University of Cape Coast for their guidance, critiques and enormous contributions made towards the completion of this study. My special thanks also go to all lecturers and colleagues (course mates) in the Department of Geography and Regional Planning, University of Cape Coast for their criticisms, and contributions made to the full realisation of this dissertation.

I also express my sincere thanks to Ebenezer Tetteh for his support and precious time devoted to this dissertation from the inception to completion. I must say that am very grateful for your timely and diligent efforts made throughout this work. I express my profound gratitude to respondents and key informants from the various institutions related to the transport sector and any other persons who in diverse ways contributed to the success of this work. I am very grateful to you for your enormous commitments and contributions.

Lastly, I would like to express my sincere gratitude and appreciation to my family and all friends who in diverse ways contributed to the success of my entire programme.

DEDICATION

To my family, friends and all my love ones

TABLE OF CONTENTS

CONTENTS	PAGE
DECLARATION	ii
ABSTRACT	iii
ACKNOWLEDGEMENTS	iv
DEDICATION	v
LIST OF TABLES	ix
LIST OF FIGURES	x
LIST OF ACRONYMS	xi
CHAPTER ONE: INTRODUCTION	1
Background to the study	1
Statement of the problem	3
Research questions	5
Objectives of the study	6
Significance of the study	6
Organisation of the study	7
CHAPTER TWO: REVIEW OF RELATED LITERATURE	8
Introduction	8
The concept and definitions of vehicle terminals and congestions	8
Factors that influence the siting of vehicle terminals	10
Safety and security in vehicle terminals	12
Effects of siting Vehicle terminals on stakeholders and Environment	13
Environmental Impacts	14
Impacts on Humans	15
Role of stakeholders in managing vehicle terminals in Ghana	20

Role of Metropolitan, Municipal and District Assemblies in city planning	24
Summary	26
CHAPTER THREE: RESEARCH METHODOLOGY	27
Introduction	27
Study area	27
Research design	31
Target population	33
Sample size determination	33
Sampling procedure	34
Data and sources	35
Data Collection Instruments	36
Fieldwork/Data collection	37
Field Challenges	38
Data analysis and presentation	38
Ethical considerations	39
Summary	40
CHAPTER FOUR: RESULTS AND DISCUSSION	41
Introduction	41
Demographic characteristics of respondents	41
Factors that account for siting of vehicle terminals in Cape Coast	
Metropolis	45
Causes of congestion at vehicle terminals in Cape Coast Metropolis	53
Effects of vehicle terminals on the safety of road users and environment	55
The roles of stakeholders in mitigating the impacts of vehicle terminals	61

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS	69
Introduction	69
Summary of the study	69
Key findings	69
Conclusions	71
Recommendations	71
Areas for further studies	73
REFERENCES	74
APPENDICES	85
APPENDIX 1: Questionnaire for respondents	85
APPENDIX 2: In-depth interview guide for key informants	91
APPENDIX 3: Observation check list	95

LIST OF TABLES

TABLE	PAGE
1: Socio-demographic characteristics of respondents	42
2: Factors that led to the siting of vehicle terminals in Cape Coast	47
3: Views of respondents on whether vehicle terminals in the Metropolis have served their purpose in which they were created	52
4: Causes of congestion at vehicle terminals in Cape Coast Metropolis	53
5: Challenges of vehicle terminals on stakeholders and environment	58
6: The effectiveness of institutions in addressing indiscriminate siting of vehicle terminals	62
7: A cross tabulation of category of respondents and their responses on the effectiveness of institutions	65
8: A cross tabulation of category of respondents and their opinions on vehicle terminals	66

LIST OF FIGURES

FIGURE	PAGE
1: A map of the Cape Coast Metropolis	28
2: Institutions that established vehicle terminals in the Metropolis	45
3: Facilities available at vehicle terminals	56
4: Assessment of facilities available at vehicle terminals	57
5: Respondents opinion on conditions at vehicle terminals	65

LIST OF ACRONYMS

CCMA	Cape Coast Metropolitan Assembly
CBD	Central Business District
DVLA	Driver Vehicle and Licensing Authority
ECMT	European Conference of Transport Ministers
GPRTU	Ghana Private Road Transport Union
MMT	Metro Mass Transit Limited
MTTU	Motor Traffic and Transport Unit
NCHR	National Cooperative Highway Research
NRSC	National Road Safety Commission
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxide
NGOs	Non-Governmental Organisations
OECD	Organisation for Economic Cooperation and Development
PROTOA	Progressive Transport Operators Association
SO ₂	Sulphur dioxide
UNICEF	United Nations International Children Educational Fund
UCC	University of Cape Coast
WHO	World Health Organisation

CHAPTER ONE INTRODUCTION

Background to the study

Development is one of the most important areas that every society tries to achieve in both the developed and developing world (United Nations, 2013). Population growth of the world increases and the demand for space to cater for the needs of the growing population also increases (Mckinsey Global Institute, 2012). When there is urbanisation there is the need to provide infrastructural facilities like potable water, power supply, health facilities and building of social overhead capital such as transportation for ease of mobility for both urban and rural dwellers (Pech & Sunada, 2008). Provision of these facilities requires thorough planning and laid down principles to reduce much of the problems that come with development.

Traffic congestion is one of the most negative impacts associated with development in urban cities throughout the world (Thompson, 2014). In the advanced countries, efforts have being made to correct or reduce this situation through proper planning of transport facilities and laws that regulate the movement of vehicles. The situation is different in developing countries where the level of development is low relative to the developed countries (Economic Commission for Africa, 2009). In many developing countries, rest areas and well planned vehicle terminals are often lacking, and since drivers cannot obtain their services because of the poor nature of vehicle terminals, they frequently turn road sides as parking places to provide their services for passengers. Areas with large numbers of parked vehicles often create poor visibility and reduced traffic capacity, resulting in serious deterioration in

traffic safety. Severe hazards in such areas endanger residents in communities along road. A typical example is Salgaa, a town about 200km west of Nairobi, Kenya that experiences frequent traffic accidents that claims about 240 lives every year as a result of uncontrolled parking (Yokota & Yamanaka, 2004).

The Joint Transport Research Centre (2007) of the Organisation for Economic Cooperation and Development (OECD) and the European Conference of Ministers of Transport (ECMT) explained congestion as a situation in which demand for road space exceeds supply to reflect different broad perspectives. Congestion is the impedance vehicles impose on each other, due to the speed-flow relationship, in conditions where the use of a transport system approaches capacity (Organization for Economic Cooperation and Development, 2007).

Literature suggests that traffic congestion occurs when a city's road network is unable to accommodate the volume of traffic that uses it (Fadairo, 2013). This situation is caused by rapid growth in motorization and with less than corresponding improvement in the road network, traffic management techniques and related transport facilities (Eniola et al, 2013). When there is traffic congestion, it induces pressure on traffic flow in urban areas.

Ukpata and Etika (2012) listed the causes of traffic congestion in Lagos to include the following: Presence of pot holes/bad road, trading activities, on-street parking, loading and discharging of passengers, illegal bus stops, flooding/poor drainage, vehicle breakdown, narrow road sections, religious activities, high volume of traffic, lack of parking space and lack of traffic light at some road intersections (Ukpata & Etika, 2012).Traffic

congestion is sometimes the result of urban development, housing, employment and cultural policies which cause people to live and work relative to one another in close proximity (United Nations International Children Educational Fund, 2012).

Many urban cities in Ghana are baffled with traffic congestion which tends to defy various remedial measures adopted by different governments over the years. Congestion poses a lot of inconvenience and makes urban centres unsafe for human life (Mahama, 2012). Journey times from one point to another within a town have remained unreliable and residents have continued to face disturbing inconveniences in transportation (Morgan, 2014). These are accompanied by noise and air pollution and the high costs associated with burning of fuels from stationary vehicles (Pal & Bhattacharya, 2012). Most of these identified traffic congestion related problems still persist in cities particularly in the Less Developed Countries due to lack of adequate geospatial information in invariably usable format to tackle these spatially related problems (Ayotunde, 2013). These have negative impact on the social, economic and the environment in urban areas in many Ghanaian cities.

Statement of the problem

Although many researchers have conducted studies on traffic congestion and delays in Ghana, (Abane, 1993; Mahama, 2012; Yalley, Poku & Adjarko, 2013) most of these studies concentrate on specific cities such as Kumasi, Accra, and Takoradi. Besides, many of these studies have being conducted on road traffic situations with much emphasis on the other causes such as the number of automobiles that ply on a particular road, the nature of

road in terms of size and quality but little work focuses on the indiscriminate siting of vehicle terminals as another factor that contributes to congestion in urban centres (Zhang, 2011). The negative impact of traffic congestion has led to development including road expansion and redistribution of land uses in city centers. Notwithstanding these measures, traffic congestion continues to be a headache to city planners, commuters and transport sector agencies (Abane, 2010).

In Cape Coast Metropolis, traffic congestion occurs at some places, particularly Pedu, Abura, Kotokuraba and Tantri. This tends to create environmental problems and also affects human health (Ghana News Agency, 2014). Examples of the environmental problems posed by congestion in the communities mentioned include solid waste material, emission of carbon mono oxides from the exhausts pipes of vehicles that create respiratory disease, destruction of the aesthetic nature of the land, conflict over access to land and etc. Although the Metropolitan Assembly has made several attempts to mitigate the situation of road traffic congestion but it still exists (Cape Coast Metropolitan Assembly, 2014). This is because one most important factor which often escapes the attention of city authorities and researchers is indiscriminate siting of vehicle terminals in the Metropolis.

Within the Cape Coast Metropolitan area, the Pedu, Abura, Kotokuraba and Tantri vehicle terminals were sited along main roads without adequate space to accommodate the increasing vehicle population. The size, nature and quality of these road side vehicle terminals make them unsafe for use by both drivers and passengers. In addition these terminals have limited spaces and are situated along the main roads in the Metropolis (Cape Coast

Metropolitan Assembly, 2014). This situation coupled with other limitations compelled vehicle operators to park haphazardly along the major roads linking the various localities in the metropolis.

In order to fill this inadequacy in traffic congestion which is mainly due to lack of spatial planning of vehicle terminals that has being neglected for so long a time, this study serves as a platform to provide a wider perspective on the issue of traffic congestion relating to siting of vehicle terminals in the Cape Coast Metropolis.

Research Questions

The study sought to answer the following questions:

- i. What factors account for the siting of vehicle terminals in the Cape Coast Metropolis?
- ii. What are the causes of congestion at vehicle terminals in Cape Coast Metropolis?
- iii. What are the effects of the siting of vehicle terminals on the safety of road users and the environment?
- iv. What are the challenges facing vehicle operators, passengers and city authorities as a result of the siting of vehicle terminals in the Metropolis?
- v. What roles do stakeholders in the transport sector play in mitigating the negative effects of the siting of vehicle terminals in the Cape Coast Metropolis?

Objectives of the study

The main objective of the study was to assess safety issues and challenges involved in the siting of vehicle terminals in Cape Coast Metropolitan area.

The specific objectives were to:

- i. Examine the factors that account for the siting of vehicle terminals in the Cape Coast Metropolis.
- ii. Ascertain the causes of congestion at vehicle terminals in the Cape Coast Metropolis.
- iii. Assess the effects of the siting of vehicle terminals on the safety of road users and the environment.
- iv. Ascertain challenges facing vehicle operators, passengers and city authorities as a result of siting of vehicle terminals.
- v. Examine the role of stakeholders in the transport sector in mitigating the negative effects of vehicle terminals in the metropolis.

Significance of the study

The findings from this study can provide adequate information to assist the Cape Coast Metropolitan Assembly and concerned private companies and international agencies in responding to the challenges of indiscriminate siting of vehicle terminals in Cape Coast. Findings from the study are expected to help the Town and Country Planning Department of the metropolis to develop strategic development plan that will take into consideration areas that will be suitable for siting of lorry terminals to meet future urban sprawl. Pedestrian safety will also improve in the Metropolis as road crossing injuries will be minimized or reduced. This will help the most vulnerable group of people

including children and the disabled to cross roads in the metropolis. Besides, unnecessary noise that emanates from tooting will reduce when vehicles move with ease in the area.

Furthermore, the study will unveil challenges facing stakeholders in managing these lorry terminals so that appropriate measures can be put in place to mitigate them. This will encourage drivers to make use of these places and desist from parking and using main roads as loading terminals. This will help to increase the spatial extent of these terminals. Lastly, the conclusion and recommendations of the study can also serve as a basis for further studies into issues related to road safety and urban transport systems.

Organisation of the study

The study consists of five chapters with the first chapter covering introduction background information, problem statement, research questions, research objectives, significance of the study and organisation of the study. Chapter two provides a thorough review of existing literature with respect to siting vehicle terminals, road safety and their attendant issues.

The third chapter presents a discussion on the methodology used in the study. The main areas covered include, study design, study settings and target population, data and sources, sample size and sampling procedures, methods of data collection analysis and ethical issues that were observed during field work. Chapter four discusses the results generated from the analysis of data and relates them to key findings in the literature. Chapter five provides a summary of the findings that emerged from the study draws conclusions and makes recommendations for the study.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

Introduction

Literature review serves as medium for critiquing, comparing and contrasting the methods and findings of previous researches that relate to one's current study (Sarantakos, 2006). It also brings out empirical data and theoretical issues that underpin a given study. This chapter presents literature review on areas that are relevant to the study. The first part addresses the definition of basic concepts used in the study while the second part is presented under the following sub-topics: factors that influence the location of vehicle terminals; safety and security in vehicle terminals; challenges of vehicle siting of vehicle terminals on stakeholders and to the environment; and the role of stakeholders in mitigating the challenges emerging from indiscriminate siting of vehicle terminals.

The concepts and definitions of vehicle Terminals and Congestions

Vehicle terminal is the point where a vehicle route starts or ends, where vehicles stop, turn or reverse, and wait before departing on their return journeys (World Bank Group, 2006). It is also a place where passengers board and alight from vehicles. The size and nature of a terminal vary and could be sited along roads with limited or no facilities to an off-road terminal that is well planned and built with adequate facilities.

Ideally the term vehicle terminal is normally used to refer to an off-road location with at least basic facilities for passengers (World Bank Group, 2006). However, in recent times, location of vehicle terminal is either along

road or off-road and mostly depends on the number of vehicles that use the place. When the number of vehicles arriving and departing a given terminal is low, a roadside terminal is sometimes adequate to cater for the needs of people. In the case where there is a large number of vehicles arriving and departing, it may be necessary to provide off-road vehicle terminal facilities that will be convenient for all users and hence reduce congestion (Yokota & Yamanaka, 2004).

Congestion defies a single definition and this is due mainly to its nature that is being recurrent, non-recurrent, or pre-congestion state. Traffic congestion is defined as a condition of traffic delay (when the flow of traffic is slowed below reasonable speeds) because the number of vehicles trying to use the road exceeds available road space (National Cooperative Highway Research (NCHR), 2001). The Joint Transport Policy Research Center (2004) defines congestion as a physical phenomenon relating to the manner in which vehicles impede each other's progression as demand for limited road space approaches full capacity.

In developing countries rapid increase in the number of car ownership coupled with poor land use planning, inadequate road space, lack of regulated parking systems, uneducated use of the road by pedestrians and bad driving behavior of motorists have all combined to produce congestions (Development, Organisation for Economic Co-operation & Transport European Conference of Ministers, 2007).

Factors that influence the siting of vehicle Terminals

The location of transit terminals is very important because the terminal and its “station area” have a reciprocal relationship. If the terminal is well sited, it will be a catalyst for development with uses that can make transit safer and used more (Vogel & Pettinari, 2002). On the other hand, indiscriminate siting of terminals also retards development and therefore much attention must be given to the siting of terminals during the planning stage of infrastructure development particularly for urban areas.

Vehicle terminals are delimited by their spatial as well as a functional character. By virtue of where they are found, their functions are specific going a long way to influence the environment in which they are located. The main rationale behind the location of a vehicle terminal is to meet the needs of surrounding communities in terms of serving a large population in performing their daily activities

The numerous activities that go on in urban areas attract people's attention to vehicle terminals since that is the point where people from all walks of life converge and diverge to various places. The activities that take place at vehicle terminals include boarding and disembarking from the following types of vehicles – Metro Mass Transit (MMT) buses, mini buses (*trotro*), taxis and private cars and carrying, loading and unloading of goods and luggage to or from vehicles. Other activities that go on in vehicle terminals are queuing to purchase tickets, waiting in sheltered areas for vehicles ready to depart and others expected to arrive to embark on subsequent journeys.

According to Gairhe (2013), a number of factors influence terminal or terminal location decisions and this can be viewed from demand and supply perspectives. From demand perspective, the major determinants that influence the siting of vehicle terminals include proximity to industries, market, and Central Business District, as well as vehicle characteristics (McCalla, Slack, & Comtois, 2001). Considering the siting of vehicle terminals from the supply perspective, West and Kawamura (2005) considered site and space, access to transportation infrastructure (truck routes, railway lines, port etc.), and accessibility as the predominant factors.

However, many vehicle terminals are located especially in third world countries without considering the most important factors such as their spatial extent. For instance, Bakare (1985) did a study on the location of terminal facilities in Ibadan and found out that their locations did not follow any particular order, but spontaneous. Similarly, Yalley, Poku and Adjarko (2013) examined the impact of the locations of vehicle terminals at Old Tafo, Kaneshie and Anaji in Kumasi, Accra and Takoradi respectively in Ghana and found that Old Tafo, and Kaneshie terminals were sited closer to markets places where various economic activities occurred while the Anaji trotro terminal in Takoradi is also located within residential areas, precisely in streets. This clearly indicates that no consideration was given to the development of most vehicle terminals in these cities.

Adesanya (1984) conducted a study on the location of vehicle terminals in Abeokuta, Nigeria and observed that their locations and provisions were mainly in response to demand of stakeholders. Also Hong and Huapu (2001), in their study of vehicle terminals in Seoul, South Korea,

observed that terminal distribution was mainly restricted by geographic conditions (the physical environment that affect vehicle terminals that determine the economic possibilities and activities of a region) and the pattern of urban development with its implication on traffic. Oyesiku and Olaseni (2012) also suggested that the provision of passenger and vehicle terminal infrastructure facilities in urban centres should take into consideration variations in residents' characteristics and their needs.

Safety and security in vehicle Terminals

One of the most vital issues that come into mind when planning and managing vehicle terminals is safety and security of the people who use these Terminals for several purposes. Personal safety is an important issue in an effective transit system because personal safety greatly impacts use (Hazaymeh, 2009). The safety of vehicle terminal users and their perception of their safety are often vital factors in the decision to use a particular terminal or not.

The ultimate goal of every transit organization is to provide safe transportation facilities to its clients. As a result of this, much attention is paid to the safe design and operation of vehicle terminals in developed countries. However, in developing countries, most of the safety measures are rare to find. Rodrigue, Comtois and Slack (2013) identified crowd control and safety issues as the priority matters bothering managers of railway terminals and airports due to the dense numbers of passengers there. Extensive screening of passengers both manually and with electronic gadgets as well as rigorous inspection of their luggage are some of the means employed at ensuring safety in airports (Noland & Quddus, 2006). These same systems if incorporated into

road transport terminals will go a long way in helping with the safety and security of the users.

There is therefore the need to put in stricter measures to ensure that the safety of people who use vehicle terminals is given much attention. However, Rodrique et al, (2013) indicated that the cost of installing high-tech security devices and paying of more security personnel are some difficulties faced by managers of vehicle terminals especially in developing countries. Beside, when tighter security measures are put in place, it creates a lot of inconveniences to some users and also delays the movement of people and goods.

Vogel and Pettinari (2002) are of the view that transit environments are safer if they are visible to users and observers. Crimes against people are usually committed in places that are hidden from the view of others. Victims that are accosted in visible areas are taken to secluded areas. Provision of adequate lighting levels and routine maintenance are essential in maintaining visibility and safety throughout the day and night environment of vehicle terminals. Provision of multi sources of light is more resistant to vandalism and provides personal safety (Vogel & Pettinari, 2002).

Effects of siting Vehicle Terminals on Stakeholders and Environment

Siting of vehicle terminals impose a lot of challenges to various stakeholders who make use of such terminals as well as on the environment. Some of the challenges can be in the form of direct and indirect effects. Environmental impacts of transportation are divided into three dimensions. These are 'direct environmental impact', indirect environmental impacts' and

‘cumulative environmental impacts’ (Duffy, 2009). Direct impact in this case refers to impacts that have immediate influences on those affected and the environment in general. Similarly, the impact caused in secondary phase is called indirect impact but in practice this kind of impact can come with bigger consequences than the direct impact does. Cumulative impacts are known as unpredictable impacts; these are basically the result of direct and indirect impacts (Rodrigue, 2009). The cumulative impacts are mostly not felt immediately but rather take time to manifest itself (Sirikijpanichkul & Ferreira, 2005). For the purpose of this study, the impacts of vehicle terminals are classified into two namely, impacts on the environment and humans. Besides, the impacts of vehicle terminals on the environment and humans can either be negative or positive. These impacts are briefly presented in the next section.

Environmental Impacts

The emissions of sulphur dioxide (SO₂) and nitrogen oxides (NO_x) in the atmosphere combine to produce a range of acidic compounds that lead to acidic rain when it comes into contact with clouds in the atmosphere. This form of rainfall has a lot adverse effects on the built environment in most cities, degrades the natural landscape in the form of desertification which eventually lead a decline in crop yield. According to Wiwanitkit (2011), pollution, an unwanted destruction of the natural environment by human, is a problem facing the present world.

Productive land uses and land value in and around city terminals may fall due to transport noise emanating from the movement of vehicles (Banister,

Crist, & Perkins, 2015). This is due to the negative externalities associated with such urban environment. The externalities may be in the form of increasing risk of cardiovascular diseases and among others which may deter certain people from living in such areas (World Health Organization, 2011). In most city terminals in Ghana, people who live around such places mostly complain of noise and the fact that it difficult to sleep in such environments (Payer, 2007).

City terminals activities also have a tremendous impact on hydrological conditions. Fuel, chemical and other hazardous particulates discarded from different kinds of vehicles can contaminate nearby rivers, lakes, and wetlands. This is very rampant in places where the terminals have impervious surfaces. In view of this, infiltration is very low while runoff increases in sheets, rills and gullies which pollute nearby water bodies.

The environmental impacts of city terminals also consist of soil erosion and soil contamination which degrades the natural landscape and reduces the aesthetic value of the environment (Wasiu, 2010). The removal of earth's surface for terminal construction has led to significant loss of fertile and productive soils. Soil contamination on the other hand occurs through the use of toxic materials by the transport industry (Rodrigue, Comtois, & Slack, 2013). For instance fuel and oil spills from motor vehicles when mishandled enter the soil and reduces it quality.

Impacts on humans

Noise that occurs in city terminals especially in developing countries represents the general effect of irregular and chaotic sounds (Gerbase, 2010). The noise occurs in the form of commuters communicating with each other,

engines of vehicles, and unnecessary tooting of horns by drivers (Neitzel et al, 2009). The long term exposure to noise may have a greater impact on the hearing organs and affects the quality of life. Besides, it is traumatizing for the hearing organ and may have a negative impact on the physical and psychological wellbeing of humans (Tahzib & Zvijáková, 2012).

Vehicles and locomotives engines are the main sources of pollution in the form of gas and particulate matters emissions that affects air quality causing damage to human health in urban areas (Monzón & Guerrero, 2004). However, the status of (gas and particulate matter) emission produced by vehicles increases daily (Rodrigue, 2009). These air pollutants often lead to cancer, respiratory, cardiovascular and other neurological diseases. For instance the presence of Carbon monoxide (CO) in the blood stream when being inhaled reduces the availability of oxygen which is tremendously detrimental to human health (Silva, Kang, & Airoidi, 2015).

Apart from particulate matter, release of nitrogen dioxide (NO₂) from vehicle terminals lead to the malfunction of lungs which eventually affects the respiratory immune defense system and increases the possibility of respiratory diseases. Particulate emissions in the form of dust emanating from vehicle exhaust in and around vehicle terminals are associated with health risks like blood clotting, skin irritations, and eyes inflammations (Cunningham et al, 2005).

According to the World Health Organisation (2009), more than two million premature deaths each year can be attributed to the effects of urban outdoor air pollution and indoor air pollution (caused by the burning of solid fuels). With this figure, more than half of this disease burden is borne by the

populations of developing countries. Many other megacities of developing world have extremely poor air quality. Beijing, Seoul, Mexico City, and Cairo exceed World Health Organization guidelines for air quality for at least two pollutants (Schweitzer & Zhou, 2010). The WHO estimates that particulates in Mexico City contribute to 6400 deaths each year. Not only does poor air quality in such cities increase the death rate, but the general health of the population is lower (Enger & Smith, 2000).

Time wasting in travel time is one of the consequences of siting of vehicle terminals in many developing countries especially when these terminals were unplanned during their inception stage. Terminals that are closer to roads and have limited space become very congested due to the rapid increase in automobiles. This leads to congestion in lorry terminals as vehicles that are ready to depart would have to be in long queues because they have no place to move out. This often paralyses economic activities in many urban areas (Sweet, 2011). For instance the Texas Transportation Institute studied and reported on traffic congestion trends in the United States from 1982 to 2003 and found that in 2003 there were 3.7 billion total hours of delay (Biliyamin & Abosedo, 2012).

Yalley, Poku and Adjarko, (2013) also identified lack and inadequate facilities in vehicle terminals as one of the issues that affects the safety of users. They asserted that location, sanitary, health, and safety management are problems of the Old Tafo Lorry Park in Kumasi, Kaneshie terminal in Accra, and Anaji trotro Lorry Park in Takoradi. The study shows that with the exception of the Old Tafo vehicle terminal, there are inadequate facilities at the other two terminals under study. In spite of all the problems found in these

terminals, Seventy four percent of the respondents were of the view that these terminals should not be relocated but maintained rather due to their proximity to markets.

Literature suggests that congestion that occurs in vehicle terminals has severe air pollution which affects users of vehicle terminals and people who live around such areas. Pollutants such as carbon-monoxide, nitrous oxides, volatile organic compounds, total particle matter; carbon dioxide are released into the environment by vehicles which are standstill with their engines still working (Murphy, 2005). The release of fumes and excessive noise from the exhaust pipes of vehicles all contribute to environmental pollution which eventually creates health problems to living things.

Congestion in vehicle terminals is also very wasteful in terms of gasoline consumption. The 2010 National Transportation Statistics in the United States reported on the amount of fuel wasted due to congestion in a variety of urban areas in 2005, and the result was an average of 120.1 million gallons in very largely populated areas, 23.4 million in large areas, 7.3 million in medium areas and 1.8 million in small areas (U.S. Department of Transportation 2010). However if environment surrounding vehicle terminals is large enough to accommodate vehicles, roadways will be free of congestion fuel waste could be avoided.

Also, severe accidents that lead to loss of human lives and serious injuries as associated with vehicle terminals that become congested. This mostly happen due to impatience on the part of drivers as each one is eager to move whenever there is a minor hold-up in vehicle terminals. Vehicles that are not supposed to move at that point in time would want to move whiles

pedestrians and hawkers also want to maneuver through and sell their goods. The end result is accidents among vehicles and knocking down of pedestrians and hawkers.

It is estimated that the number of worldwide injuries from congestion-related accidents ranges anywhere from 20 million to 50 million each year (Gerbase, 2010). Based on this statistic, traffic injuries are projected to become the third highest cause of global disease and injury by 2020. In 2002, 1.18 million people worldwide died from traffic-related crashes, comprising 2.1% of all deaths and placing traffic incidents at 11th among the leading causes of death (Gibson, 2009).

Congestion in vehicle terminals imposes cost on drivers as there is a constant tremendous wear and tear on the vehicles especially the gear, clutch and the brake system (Hymely, 2009). These systems have been applied intermittently during peak periods of congestion in both planned and unplanned vehicle terminals. This may result to frequent repair of the vehicles, gulping huge sum of money, time and energy from the owner.

Despite the fact that vehicle terminals create a lot of impacts that affect the environment and humans, there are other positive aspects. Among a few of the positive impacts associated with vehicle terminals are discussed in this part. Vehicle terminals that are properly cited beautify the environment or add aesthetic value to the land. This is mostly found in urban environment as in the case of the Achimota vehicle terminal in Accra and former Kejetia terminal in Kumasi in. Another well noted example is Metro Mass Transit terminals in Kumasi and Cape Coast.

Aside the beauty it adds to both the human and natural environment, terminals serve as a place where different categories of people travelling to various destinations take rests before their departures or after arrivals. Well planned vehicle terminals with basic facilities like good furniture, wash rooms and toilets create comfort for users. Areas with security systems like adequate lightening systems, Closed-Circuit Television (CCTV) cameras provide adequate security for all and sundry. These provide some level of security for terminal operators and the public at large.

The presence of terminals also boosts economic activities in the surrounding communities as the movement of goods and services become very easy. Vehicle terminals provide a linkage between the Central Business Districts where they are sited and all the adjoining communities. This makes easy access to information, goods and services to community members.

Role of stakeholders in managing vehicle Terminals in Ghana

In developing countries, transportation has to be taken care of by governments through official departments and experts in the transport sector. This is because people have different mentality towards transportation development responsibility. They think all the transportation and traffic system has to be taken care of by the government, and that is why government has to be functioning in the transportation-based system. Nevertheless, private sectors are helping to manage hauls (Masood, Khan, & Naqvi, 2014).

According to Yokota and Yamanaka (2004), the planning, construction and operation of vehicle terminal requires collaboration among many stakeholders such as government agencies, private sectors, Non-governmental

Organisations (NGOs) and local residents who constitute immediate beneficiaries of such projects. In view of this, solicitation of opinions and consensus on the siting of vehicle terminals mostly at the inception phase helps in resolving conflicts of interest among all stakeholders. However, this most important aspect is often ignored especially in developing countries and has lot of negative implications on users and the environment (Sánchez-Triana et al, 2013). In order to mitigate the unpleasant impacts brought out as a result of siting of vehicle terminals especially in urban areas, there should a dialogue between stakeholders to discuss the size, design and site selection of such facilities. Through coordination between various stakeholders, the economic, social and environmental impacts can be identified and being addressed adequately.

One of the most efficient measures used by stakeholders to reduce the challenge of indiscriminate siting of vehicle terminals in cities is decongestion and relocation. This was done in the Kumasi Kejetia Lorry Terminals by the Kumasi Metropolitan Assembly which was eventually supported by owners of the terminals. The relocation of 14 terminals from Kejetia to Afia Kobi (Abinkyi Market) has eased the movement of vehicles in the Cental Business District of Kumasi (Modern Ghana News, 2014). Aside this, there were also newly created terminals at Suame Hill Top to accommodate other vehicles by the Assembly in collaboration with other stakeholders in the transport sector. This decongestion and relocating exercise when being endorsed in Cape Coast metropolis can help mitigate this challenge confronting the Metropolis.

All stakeholders in the transport sector should ensure that the environment around vehicle terminals is kept clean at all times as in the case

of Achimota terminal in Accra. According to Frimpong (2013), in the Achimota terminal, polythene bags and water sachet bags lying around are rare to be found, no stench and no unauthorised structures competing for space with vehicles and humans. Generally, filth that engulfs many lorry parks in the country is absent because cleaners and drivers assist in keeping the place tidy by picking up pure water sachet and other materials dropped by passengers (Frimpong, 2013). This conscious effort being taken in Achimota terminal when introduced in other places in the Ghana will contribute to reducing filth in city terminals.

In addition, improvements in existing infrastructure facilities in vehicle terminals such as expansion and renovation help to alleviate the challenges brought by indiscriminate vehicle terminals (Rahaman & Hossain, 2009). This involves provision of good pavements that serve as walkways for pedestrians. Also, the necessary infrastructure required for the establishment of new vehicle terminals need to be included in the planning process in the development of new towns and cities in order to avoid future challenges. Existing urban road networks in unplanned areas should also be rehabilitated so that if there are adequate road networks in towns and cities, vehicle would have alternative routes rather than using few routes that link vehicle terminals. In this situation, roads that lead to terminals will be ploughed by vehicles departing or arriving at vehicle terminals to off-load goods and passengers (Ukpata & Etika, 2012).

The use of parking restriction by various stakeholders serves an efficient and effective means of controlling the congestion that occurs at vehicle terminals. Illegal parking or parking at unauthorised places creates a

lot of inconveniences to all road users and therefore if restrictions are placed on parking it helps to reduce the issue of congestion in lorry terminals, roads, and enhance the free flow of vehicles (Gifford, 2005). In many urban centres such as Accra and Kumasi where space is an essential commodity, vehicles that even park at approved place are charged on hourly basis by city authorities. By restricting parking in congested areas, it is possible to increase the space available for traffic and to encourage certain car trips, thereby easing congestion

Road pricing is another mechanism used in controlling congestion that occurs in vehicle terminals of urban areas where the supply of vehicle often exceeds the space available to accommodate them (Ogundipe, 2007). This involves charging users a fee using a particular route that link to a given terminal in order to control the number of vehicles who plough on these routes to such terminals. This is a way of discouraging drivers from frequently using these routes and accessing these terminals that are overcrowded and also encouraging them to use alternate routes that attract no charges. Only drivers who are willing to pay such charges are allowed enter such congested places.

Road safety education also plays a vital role in controlling the issue of congestion that occurs as a result of indiscriminate siting of vehicle terminals in urban centres (Kiunsi, 2013). When all stakeholders involved in ensuring road and traffic safety educate all road users especially drivers, it goes a long way to change their behaviour and road safety is ensured. Road safety education by Ghana Highway Authority, Driver and Vehicle Licensing Authority and other institutions aids drivers to desist from parking at unauthorised places such as intersections at entrance of vehicle terminals in

order to improve rapid flow of vehicles and also prevents accidents. Therefore, it is important to educate the entire community about traffic regulations, a process which should start from childhood.

Role of Metropolitan, Municipal and District Assemblies in city planning

The District Assemblies consist of various departments among which some of these departments play key roles in the transport sector. These departments are the Department of Physical planning, Department of Transport and Town and Country Planning Department. These departments do not solely work independent but work in collaboration with each other and other stakeholders that ensures that sanity prevails in the transport sector from planning, management and ensuring safety of all users of transport facilities. For instance the Department of Physical Planning at the District levels manages activities of the Department of Town and Country Planning and the Department of Parks and Gardens.

The planning department advises the District Assembly on national policies on physical planning, land use and development which siting of vehicles cannot be ruled out. In addition, the Department assists in preparation of physical plans as a guide for the formulation of development policies and decisions and to design projects in the district whiles at the same time assist to identify problems concerning the development of land and its social, environmental and economic implications. From this function, one clearly notes that they play a role in siting of projects which includes vehicle terminals and assesses the social, environmental and economic implications that emanates afterwards. The Department also ensures prohibition of the

construction of new buildings unless building plans submitted have being approved by the Assembly.

Another department in the District Assembly that works by providing other useful facilities in Vehicle terminals is the Department of Works. Among some of the functions performed by the department include facilitating the construction, repairs and maintenance of public roads, provision of drains in the major settlements in the district. The works Department also works in consultation with Electricity Company of Ghana in the provision of street lighting and other public places such as vehicle Terminals and markets, hence a major stakeholder in the transport sector.

The Department of Transport in the District helps the Assembly formulates and implements policies on transport services that are within the framework of national policies. As a major stakeholder in the transport sector, the Department advises the Assembly on matters relating to transport services in the District, regulates the use and conduct of public vehicles, including the routes and parking places in accordance with the Driver and Vehicle Licensing Authority Act (Act 569). The department gives identification to licensed vehicles, licenses taxis, bicycles and motor bikes and prescribe fees to be paid to the Assembly. Other responsibilities performed include the maintenance and control of parks for vehicles and assists consultants in evaluating road designs within the District. Within the Transport sector, the urban roads department advises the Assembly on issues relating to formulation and implementation of urban roads in the region.

In spite of the various roles that the various major stakeholders in the transport sector should play in order to bring sanity in and around city vehicle terminals and urban roads, several challenges exist in many Ghanaian cities. This is mainly because certain groups are not performing their duties as expected or there is lack of coordination among institutions.

Summary

The chapter reviewed literature related to the study. Specifically, issues that were considered included definition of key terms; factors that influence the siting of vehicle terminals; the impacts of city terminals on stakeholders and the environment. It concluded the chapter by examining the roles of major stakeholders in addressing the issues and how far this has been addressed.

CHAPTER THREE

RESEARCH METHODOLOGY

Introduction

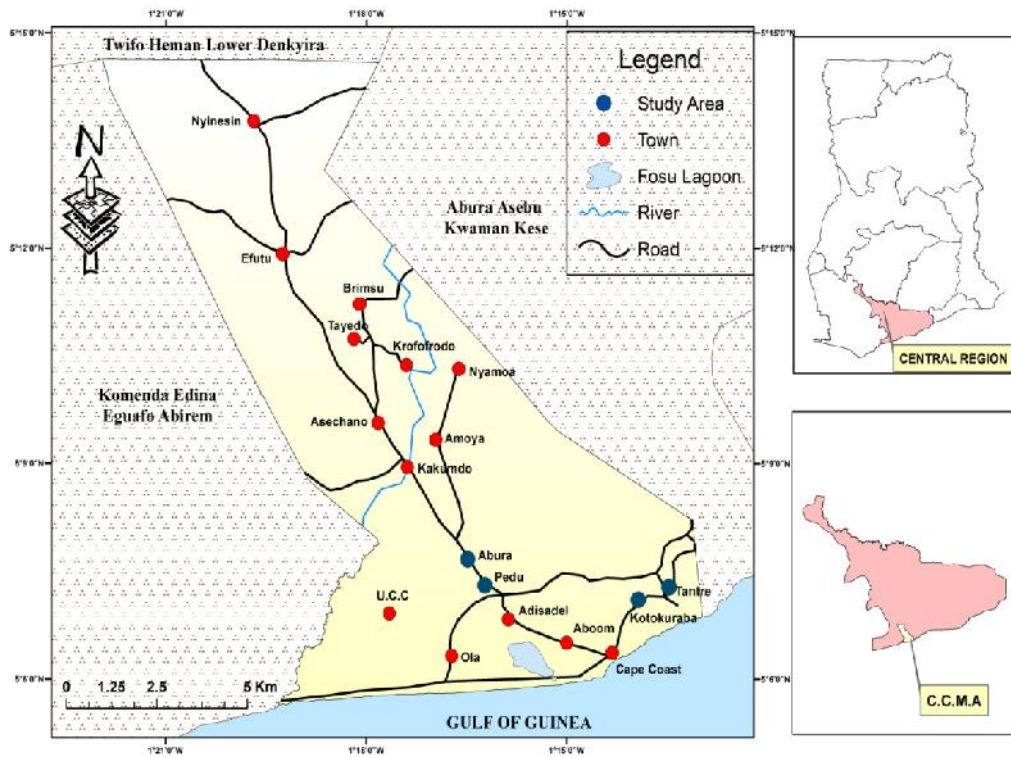
This chapter focuses on the methodology of the study. It begins with a brief description of the study area and the various methods and techniques that were used in collecting and analysing data. It also describes the research design, target population, sample size, sampling technique, data and sources, research instruments, data analysis and ethical issues.

Study area

This section of the study provides a brief description of the study area. It begins with the location and size, map of the study area, physical characteristics, climate, road networks and economic activities of the metropolis.

Location and size

Cape Coast Metropolitan is bounded on the south by the Gulf of Guinea, west by the Komenda / Edina / Eguafo / Abrem Municipal, east by the Abura/Asebu/Kwamankese District and north by the Twifu/Hemang/Lower Denkyira District. The Metropolis covers an area of 122 square kilometers and is the smallest metropolis in the Ghana. The capital, Cape Coast, is also the capital of the Central Region (see Figure 1).



Climatic conditions

Cape Coast Metropolis is located in the littoral anomalous zone of Ghana which makes the municipality experiences high temperatures all year round (Ministry of Food and Agriculture, 2013). The hottest months are February and March, just before the main rainy season, while the coolest months are between June and August. Cape Coast experiences relatively high temperatures throughout the year and is humid. The municipality has a double maximal rainfall, with annual rainfall total between 750 mm and 1,000 mm.

Road network

Three main types of roads are found in the metropolis and these are asphalted, bitumen and graveled roads. The total length of road network in the metropolis is 220.83 Km, out of which, asphalted road constitutes 17.60 Km, 106.93 Km is bitumen and 96.30 Km is graveled (Cape Coast Metropolitan Assembly Annual Composite Report, 2012). The major towns or communities in the metropolis are well connected with road networks. The drainage and surface conditions of some roads are good while others are poor (Department of Feeder Roads, CCMA, 2012).

Cape Coast, as an old town, has narrow roads with very old buildings situated so close to the edges of the road and thereby making it difficult for future expansion to cater for such a growing populace with corresponding volume of vehicular and human traffic. The roads in the Municipality lack walkways and therefore, pedestrians are compelled to compete for space with vehicles. The roads are very narrow in nature and usually one way since it is

very difficult for larger vehicles to use in the case of the two way system. More so, along these narrow roads are the vehicle terminals and therefore parking of vehicles is done along road sides which hinders the free flow of vehicles. Vehicle terminals in the Metropolis are smaller in sizes, thus have low capacity to accommodate vehicles. Besides, the limited spaces, security measures are rare to find at vehicle terminals. Generally, sanitation is a major challenge at vehicle terminals and terminals become very muddy in the rainy season.

Population

The population of the Metropolis according to the 2010 Population and Housing Census Report was estimated to be 169,894. Out of this total, 82,810 (49 %) are males whiles 87,084 (51%) are females (Ghana Statistical Service, 2012).

Settlement

The Cape Coast Municipality is made up of both smaller and larger communities. Most of the communities especially in the unplanned areas are nucleated in nature whiles those in the new developed areas are dispersed. Examples of the nucleated areas include, Amamoma, Apewosika and the Kotokuraba area. In the case of dispersed areas include Abura, Mempeasem and Ekon whiles a typical example of a well planned linear settlement is Ola Estate. Settlements in Cape Coast are connected to each other with roads that ease the movements of goods and services.

Vehicle terminals

Vehicle terminals in the municipality are unevenly distributed because the main terminals are located at Kotokuraba, Tantri, Pedu, Abura and that of the taxi terminals in University of Cape Coast. Apart from these terminals there are other minor ones sited by some groups of drivers. Example is the Anloga terminal at UCC South gate and the UCC East gate terminal.

The volume of Traffic

In the case of traffic volume, it occurs at around 7 am to 10am when many people are rushing to their work place and between the hours of 2pm to 5pm when people are returning home. The main areas affected are along the terminals of Pedu, Abura, Kotokuraba, and Tantri terminals.

Economic Activities

Fishing is the dominant occupation in the metropolis. Most of the men especially the real indigenous people are into fishing while the women are also into selling of fish. Other people engage in trading activities at Kotokuraba and Abura markets. Besides fishing and trading, some people also engage in both commercial and subsistence farming as means of cultivating food crops and rearing farm animals. Sand winning activities are also practiced along the coast by the youth as means of generating income.

Study design

The study adopted the mixed method or triangulation approach and this was also used in the data collection process. This study design was used because it puts much emphasis on collecting of quantitative and qualitative

data and analyses of the data in a single study (Creswell, 2003). It also serves as an efficient means of solving the problems associated with using single theory, method and single data set in the research process by seeking convergence across both qualitative and quantitative methods.

For the purpose of this study, the descriptive cross-sectional survey research design was employed. This study design utilises the scientific methods in research process without influencing the methods of data collection, analyses and presentation of results in any way (Iacono, Brown, & Holtham, 2009). Besides, descriptive research design allows researchers to obtain much information about a particular phenomenon within a given discipline of study (Neuman, 2003). Descriptive research design is capable of representing a clear picture of information of a given situation, social setting or relationship. This study design again collects data, describes events and organises, tabulates, depicts, explains and validates data and findings being gathered on through fieldwork (Krathwohl, 2009).

Although descriptive study design provides much useful information in research that makes it unique among other study designs, it has being criticised for a number of reasons. According to Creswell (2003), descriptive study is narrow in scope and this limits analysis of studies, concepts and theories without considering an in-depth exploration of events being studied. Despite the few challenges or limitations that are associated with the use of this study design, the study still considered it as the best design because of its flexible nature in terms of data collection, analyses and interpretation using simple descriptive statistics (Sarantakos, 2006).

Target population

The target population for this study comprised both private and commercial drivers, passengers and stakeholders involved in the siting and management of vehicle terminals in the Cape Coast Metropolis. These included some officials of the Motor Traffic and Transport Unit (MTTU) of the Ghana Police Service, Town and Country Planning Department, Department of Urban Roads, National Road Safety Commission (NRSC) and Ghana Private Road Transport Union (GPRTU).

Sample size determination

The sample size determination for the study (categories of drivers and passengers) was obtained by employing sample size formulae from Fisher et al (1998). The underlying assumption of this sample size estimator is that it is only used when the population of the area under study is more than 10,000. Mathematically the formula is given as;

$$n = \frac{z^2 pq}{d^2}$$

Where:

n= the desired sample size (when the population is greater than 10,000)

z= the standard normal deviation, usually set at 1.96 (or more simply 2.0) which corresponds to 95 percent confidence level

p= the proportion in the target population estimated to have particular characteristics

$$q=1.0-p$$

d= degree of accuracy desired, usually set at 0.05 or occasionally at 0.02, but 0.05 was used in this case. Given that p = 85% (0.85) for both drivers and passengers,

$$n = \frac{(1.96)^2(0.85)(0.15)}{(0.05)^2}$$

$$n= 196$$

Therefore, a sample size of 196 was used (for both drivers and passengers).

Sampling procedure

The study adopted both probability and non-probability sampling techniques. Specifically stratified random, convenience or accidental and purposive sampling techniques were used to draw the required sample size for the study. First, a stratified random sampling method was adopted to ensure that the sample size selected spread across the study area mainly because of the large spatial extent of the Metropolis. Stratified random sampling is used in instances where the target population to be sampled lacks adequate homogeneity but consist of several sub-populations (Adegoke et al, 2013; Patten, 2005). In view of this, an aspect of the target population was divided or stratified into three (3) main sub groups. These were passengers, commercial drivers, and private drivers. This stratification of the target population was done because all these sub groups are all terminal users. Key informants were made up of managers of the selected terminals, the Planning Officer of Metropolitan Town and Country Planning Department and the National Road

Safety Commission and the regional commander of the Motor Traffic and in the Metropolis. The commercial drivers, private drivers and passengers in each stratum were selected using accidental sampling while the key informants which in this case were the heads of the various departments that were purposively sampled.

According to Bernard (2006), in purposive sampling, you decide the kind of data required from informants and also because they are the people who are believed to be knowledgeable and have adequate information pertaining to what the study seek to address. It is also useful in situations where one needs to reach targeted sample quickly and where the sampling for proportionality is not the primary concern (Trochim, 2000). Sarantakos (2006) and Oliver (2006) support the idea that purpose sampling is more flexible due to convenience and time reasons.

Data and Sources

The study made use of both primary and secondary data. Primary data was obtained mainly through field work with the use of questionnaires and in-depth interviews. The primary data that was collected included the factors that account for siting of vehicle terminals in the metropolis; the effects of the siting of vehicle terminals on the safety of road users and the environment, challenges facing vehicle operators, passengers and city authorities as a result of siting of vehicle terminals and; the role of stakeholders in the transport sector in mitigating the negative effects of vehicle terminals in the metropolis.

Secondary data was obtained from books, journals, newspapers, articles, reports, the internet, conference proceedings and working papers. Data extracted from these sources included historical development of Terminals, efforts being made by stakeholders in alleviating the effects of vehicle Terminals on congestion. These data was being sourced from the offices of the planning department of the Cape Coast Metropolitan Assembly Demographic and Health Survey Reports and Ghana Statistical Service respectively.

Data collection Instruments

Questionnaires, interview schedules and observation checklist were the main instruments used in data collection. Questionnaires, indepth interview guides and observation checklist was used to collect primary data from target population in the metropolis. Questionnaire and indepth interview were adopted because they allow high flexibility in the questioning process yield a higher response rate. In this case questionnaires were used to collect data from passengers and drivers while indepth interview was used to collect data from key informants. Besides, interviewers have control of interviewing situation and also there is the possibility of collecting supplementary information which may not be in the data collection instrument.

Aside the benefits derived from the use of these instruments, the indepth interview may be associated with some flaws. First, there is lack of anonymity which occurs as a result of hesitant to disclose personal data, an element of bias on the side potential interviewers and time consuming. Despite all these shortfalls it was still used because of the high flexibility in the data

collection process (Rubin & Babbie, 2010). The use of observation checklist also served as a non-participatory method of data collection where the observer only observes the behaviours of the subjects under study without taking part in their activities (Sarantakos, 2006).

Fieldwork/Data collection

A reconnaissance study was done in order to have a fair idea of the study area before the actual data collection started. Also the questionnaires were pretested in a different area to check their strengths and weaknesses. Questionnaires were administered to the respondents on the field. Respondents who could neither read nor write were also given the necessary assistance by reading and interpreting the questionnaires for them to provide responses. In this case an interview schedule was used. Other officials of Motor Traffic and Transport Unit, Town and Country Planning Department, National Road Safety Commission and Unions of the various vehicle terminals were also interviewed to solicit their views based on the specific objectives of the study.

Observations were made at vehicle terminals based on items that were included in the observation checklist. Extensive observations of the situation on ground at various vehicle terminals were undertaken as a data source for this study. The observation focused on the general layout of the structures in relation to other facilities around, the activities that go on at the vehicle terminals, circulation patterns of humans and vehicles, structure and aesthetics of any building, safety and security as well as ground treatment.

The data collection period began in February, 2015 and took two weeks to complete. Four field assistants who had being given in-service training on the study were deployed to the field for the data collection within the two-week period. The data collection was from 8:00 am to 4: 00 pm each day.

Field Challenges

A number of challenges were encountered in the course of the fieldwork. Key among these includes the fact that many of the drivers were busy rendering their services and did not have adequate time to answer the questionnaires. Drivers who were waiting to take off because their vehicles had being booked especially taxi drivers had to leave and continue at a later time during the day or in subsequent days. For private drivers, some were on their official duties and hence did not want to keep long responding to the questions. Other road users such as passengers were also busy carrying out their daily routine activities and hence getting them to fully participate in the study was a little bit problematic. However, all these challenges were solved through personal dialogue with respondents by making them to understand the relevance of the study and the need for them to contribute their part to make the study successful by partaking in the study.

Data Analysis and presentation

Data collected from the field was sorted, cleaned, coded and analysed using Statistical Package for Social Sciences (version 21) and Microsoft office Excel 2007. Descriptive and inferential statistics were done for variables that are relevant to the study. Specifically, descriptive statistics like measures of

central tendencies, frequencies and percentages were computed. Results were presented under the various themes or specific objectives outlined in the study. Information from in-depth interviews and observation were used to support or buttress some of the findings from the questionnaires. Results were presented using tables and figures for clarity and visual presentation.

Ethical considerations

Ethical issues remain a vital part of the research process. Thus, in order not to mishandle information that was provided by the respondents, the issue of anonymity, confidentiality, and informed consent were considered in this study. Also, the questionnaire that was used to collect data was passed through the University of Cape Coast Ethical Review Board for assessment before administering them to respondents.

The research team identified themselves to the subjects or respondents in respect of the issue of informed consent in order to enable the respondents to have a free mind when responding to the questionnaires. Besides, the main objective of the study and the relevance was communicated and explained to the respondents for them to provide all the useful information required.

Participants were also assured that all forms of identification prior to their names, areas of residence and any other relevant information that will reveal their identity would be kept confidential without being exposed and will be destroyed after the study to ensure their anonymity. Respondents were again assured that any information given will be kept confidentially and would be used solely for academic purpose and therefore will not be given to any individual or organisations for any other purpose.

Respondents were again made to understand that they have the right to withdraw from the study at any point in time when they felt it was necessary to do so. Lastly respondents were made to know that they have the right to withhold any informational that is very personal to them when they feel very uncomfortable to give it out. Respondents were then made to sign an informed consent form which indicated their willingness to participate in the study.

Summary

The chapter described the methodology used in the study. It began with a description of the study area, the study design and how the sample size for the study was determined. It also delved into the sampling procedure, data sources and instruments used in the data collection. The fieldwork or the actual data collection as well as the challenges encountered on the field were also addressed in this chapter. Besides, the methods used in analysing and presenting the data are well noted. Finally, some ethical considerations that were observed are also elaborated in this chapter.

CHAPTER FOUR

RESULTS AND DISCUSSION

Introduction

This chapter presents the results obtained from the field and discusses the findings in relation to the specific objectives of the study. That is, the results or findings of the study are presented based on each specific objective and after which discussions are made based on the findings. This part also delves into finding from the literature review where relationships exist and where there are certain differences and probably what accounts for such disparities between the findings of the study and existing literature.

Analysis of respondents demographic characteristics is presented first, followed by factors that account for siting of vehicle terminals; the effects on the safety of road users and the environment; challenges that various stakeholders face as a result of the siting of these terminals in the metropolis; and the role of stakeholders in mitigating challenges brought about by the siting of vehicle terminals in the metropolis.

Socio-demographic characteristics of respondents

The study sought to find out the socio-demographic characteristics of respondents. Specifically, the key variables included in this section are, category of respondents, sex, age, marital status, religion and educational level (Table 1).

Table 1: Socio-Demographic characteristics of Respondents

Socio-Demographic Characteristics	Frequency	Percentage
Category of Respondent		
Commercial driver	60	31.0
Private driver	40	20.0
Commuter or passenger	96	49.0
Sex		
Male	141	72.0
Female	55	28.0
Ages		
Below 19	13	6.6
20-29	84	42.9
30-39	58	29.6
40-49	32	16.3
50-59	6	3.1
60 and Above	3	1.5
Marital Status		
Single	85	43.3
Married	98	50.0
Divorced	5	2.6
Separated	3	1.5
Widowed	5	2.6
Religion		
Christian	144	73.5
Islam	47	24.0
Traditional	5	2.5
Educational Level		
No formal Education	23	11.8
Basic/Middle/JHS	72	36.7
Secondary/SHS/A Level/Voc/Tech	59	30.1
Tertiary	42	21.4

N=196

Source: Fieldwork (2015)

Three main categories of people formed the respondents and these were commercial drivers, private drivers and commuters or passengers. Out of the total number of respondents, commuters or passengers were 49 percent since they are many and also everyone has being a passenger for at least once in his or her life time. Thirty-one percent were commercial drivers and Twenty percent private drivers.

From the survey it was necessary to ascertain the gender of the respondents who took part in the study. Out of the 196 respondents, 72% were males and 28% were females. This is different from the 2010 Population and housing census report that males constitute 47.7% and 52.3% females in the Central region. What accounts for this might possibly be the higher number of males than females in the driving profession especially among commercial drivers.

The study also sought to look at the age distribution of respondents who were involved. From Table 1, 6.6% of the respondents were below 19 years and these were in the category of passengers. For 20-29 years, there were 42.9%, while 29.6%, 16.3% and 3.1% of the respondents were for 30-39, 40-49 and 50-59 years respectively. The least was 1.5% denoting the age category of at least 60 years. The highest number of people fell within the age group of 20-39 and this could be attributed to the fact that most of the drivers are in their youthful age. Generally, the majority of the respondents (88.8%) fell within the age interval of 20- 49 years.

Taking into consideration the marital status of the respondents, 50% were married, followed by 43.3% single. In the case of respondents who were

divorced and widowed there was 2.6% for each while 1.5% were separated. This is consistent with the 2010 Population and Housing Census Report (population 18 years and older by marital status) that indicated that 27.0% of the population are not married while 50.0% are married.

In the case of religion, about one-third (73.5%) of the total respondents were Christians with 24% being Muslims. Traditional religion constituted about 2.5%. This is consistent with Population and Housing Census Report which indicated that in the Central Region, Christians constituted about 76% and 8.7% Muslims. Christianity dominates in the Cape Coast Metropolis. This is not surprising since Cape Coast was the seat of the colonial masters and hence one of the first areas where Christianity started in the country.

With respect to the level of education, about 11.8% of the total respondents had no formal education and most of these people were commercial drivers who could not read the questionnaire during the fieldwork. However, generally the level of education is very high in the metropolis with 36.7% representing Basic/Middle/Junior High School level, 30.1% Secondary/Senior High School/Advance level/Vocational/Technical level, while 21.4% denoted respondents with Tertiary level education. The findings are consistent with Ghana Statistical Service (2010) District Analytical Report that the metropolis had the first secondary school in the country and hence training grounds for Catechists and teachers in the country.

Factors accounting for siting of vehicle Terminals in the Metropolis

This section of the study sought to explore respondents' knowledge on factors that account for siting of vehicle terminals in the Cape Coast Metropolis. In view of this a series of possible factors based on literature were used to ask questions and statements of which their responses were measured using a five point Likert scale. For ease of analysis of the result, this was further reduced to three- point likert scale items. Figure 2 provides summary of results.

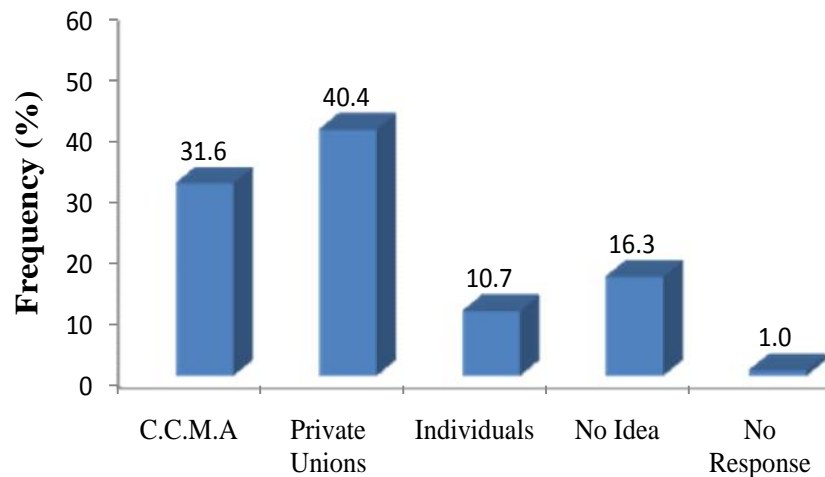


Figure 2: Institutions that established vehicle Terminals in the Metropolis

Source Fieldwork (2015)

In trying to find out from the respondents the people who sited the study terminals in the metropolis, about 40.4% of the respondents are of the view that the Private unions like the Ghana Private Road Transport Union (GPRTU), Progressive Transport Operators Association (PROTOA), Concern and among others sited the vehicle terminals. Apart from these private unions, 31.6% of the respondents also believe it is the Metropolitan Assembly that

sited the vehicle terminals in the Metropolis. Respondents who said individuals sited vehicle terminals were 10.7%, while respondents with no idea and those who did not provide any response constituted 16.3% and 1.0% respectively.

In order to find out further information about this issue, some terminal masters in the Metropolis were also interviewed. For instance one terminal master said.

Vehicle terminals are sited by us, then after establishment, we go for approval from the Municipal Assembly to operate. Our terminal is called Angloga terminal because we are Ewes which most of us live in Duakor Community. Although as at the moment, we have not been given a permit to operate, however we have families to take care of. So we have to remain in business.

(Terminal Master, UCC South gate, 7th February 2015, 9:00 AM)

The results of the interview schedule with the terminal masters are consistent with the findings of respondents that vehicle terminals in the Metropolis were sited by the private unions and not the Metropolitan Assembly. Most of these terminals were sited without consultation with the Assembly but later on sought approval from the Assembly to be registered.

In order to find out some possible factors that led to the siting of vehicle terminals in the Cape Coast Metropolis, respondents were given a set

of possible factors for them to indicate the extent to which they agree to these statements or otherwise. From Table 2, about 89.3% of the respondents agreed that passenger demand is one of the contributing factors that led to the siting of terminals, while 7.7% of the respondents disagreed. The results are consistent with the ideas of Rodrigue (2009) and Gairhe (2013) that the demand of people influences the siting of vehicle terminals. This implies passenger demand is a key factor that influences siting of vehicle terminals. Thus, as more people begin to stop and board vehicles at particular destinations, then the area eventually is formalised as a terminal.

Table 2: Factors that led to the siting of vehicle terminals in Cape Coast Metropolis

Factors	Agree	Undecided	Disagree	Total
Passenger Demand	89.3	3.1	7.7	100
Availability of Space	58.2	13.3	28.6	100
Limited Space in CBD	65.8	12.2	21.9	100
Demand by Community Members	80.6	3.6	15.8	100
Availability of Passengers	91.3	2.6	6.1	100
Increasing Demand for Vehicles	78.6	8.2	13.3	100
Emergence of New Private Unions	51.5	19.4	29.1	100
Vehicle Terminals were not planned well	60.2	30.1	9.7	100

N=196

Source Fieldwork (2015)

On the issue of availability of space as a factor that contributes to siting of vehicle terminal, 58.2% of the respondents agreed that space is a

necessary requirement for locating vehicle terminal as compared to 28.6% who disagreed to this as a factor that led to siting of vehicle terminals in the Metropolis. Still on the same issue about 13.3% of the respondents were undecided whether space availability contributes to siting of terminals. The number of respondents who agreed clearly demonstrates to the fact that without space availability a terminal cannot be sited, hence a major factor in siting of vehicle terminals.

Furthermore, it is also seen that limited space in the Central Business District plays a significant role in siting vehicle terminals. About 66% of the respondents agreed that limited space in the Central Business District (Kotokuraba area) contributed to the siting of the vehicle terminals along roads and thus creating the congestion situation while 21.9% disagreed and 12.2% were undecided. A terminal master during an interview also noted this and said,

I consider proximity to the Central Business District before putting up terminals in order to ease the movement of goods and services". (Terminal master, Abura, 13th February 2015, 11:21 AM)

This is in line with studies by West & Kawamura (2005), and McCalla, Slack & Comtois (2001) that limited space in the Central Business District leads to siting of terminals elsewhere. Thus, as the CBD becomes congested, new terminals are sited in the peripherals surrounding the CBD.

Another contributing factor was the demand from community members. Out of the 196 respondents it was realised that 80.6% agreed it was

a major contributing factor to siting of vehicle terminals in the Metropolis. On the other hand, 15.8% disagreed while respondents who neither agreed nor disagreed (undecided) constituted only 3.6%. Thus, community members demand vehicle terminals in order to ease their movement in interacting with adjoining communities.

Availability of passengers in the metropolis is another salient factor that emerged from the study. In the case of this variable, the survey report indicated that respondents who agreed constituted about 91.3% denoting the majority out of the 196 respondents. Based on the responses given it is therefore established that passenger availability in a given area (especially in a student's community) contributed immensely to the siting of vehicle terminals. During the interview a terminal master at Pedu vehicle terminal added that,

Before we put up a terminal, we consider access to passengers especially students. Therefore so long as this condition is met we operate without any delay (terminal manager, 53 years, Pedu, 15th February 2015, 8:35 AM).

The study also revealed that demand for vehicles in recent years is a major contributing factor for siting new vehicle terminals as existing terminals become choked and are unable to accommodate more vehicles. In respect of this, about 78.6% of the respondents opined that the rate at which demand for vehicles is increasing in recent times necessitates emergence of new terminals. For respondents who disagreed were about 13.3% while those who took neutral (undecided) position were 8.2% the need to site new vehicle terminals

especially in the case of commercial vehicles. For instance, a man at Abura terminal said that

Everyone wants to buy a car for commercial activities irrespective of the occupation of the person. The reason is that no matter how the economy is difficult, people still travel. So for me owning a vehicle and managing it well is a profit making business (driver, 47 years, Abura, 14th February 2015, 3:23 PM).

The emergence of new private unions in the metropolis also requires that they have their own vehicle terminals. As has been noted in the Cape Coast Metropolis, the various unions have their respective vehicle terminals. Few examples include the Ghana Private Road Transport Union (GPRTU), Progressive Transport Owners Association (PROTOA) and Ford terminal. The survey revealed that 51.5% of the respondents agreed to this as a contributing factor that lead to the establishment of vehicle terminals. On the contrary, 29.1% of the respondents think otherwise while 19.4% of the respondents neither agree nor disagree to this as a factor that contributed to the siting of vehicle terminals in the metropolis. What accounted for the large number of respondents who were undecided might possibly be the fact that they did not know that when a new union is formed there is the need to get a terminal to enhance the swift operation of their activities.

The study also made an attempt to find from the perspectives of respondents whether vehicle terminals in the Cape Coast Metropolis followed

laid-down principles that involved various stakeholders such as planners and other city authorities like the National Road Safety Commission, and Motor Traffic and Transport Unit Departments. The results in Table 2 indicated that vehicle terminals in the metropolis did not follow any well laid down rules and regulation before being sited. Out of the total respondents of 196, about 60.2% agreed to the fact that vehicle terminals in the metropolis did not follow any proper rules before being sited as opposed to about 30.1% who disagreed.

It is clearly indicated that vehicle terminals in the metropolis did not follow well laid down rules and regulations based on the total percentage of respondents who agree. In order to find more about the issue of whether terminals were planned before being sited or not, the Assistant Planning Officer of the National Road Safety Commission was interviewed. According to the Assistant Planning Officer of the Road Safety Commission,

Terminals in the metropolis were put up before we started operation in the Metropolis. In view of this, NRSC was not involved in the siting of all vehicle Terminals that were in existence before we started our operations in the region (Cape Coast, 17th February 2015, 10:15 AM)

The findings are consistent with the ideas of Bakare (1985) and Yalley, Poku & Adjarko (2013) that lorry Terminals are often not planned before siting them.

The study again sought to ascertain the perceptions of respondents as to whether vehicle terminals in the Metropolis have served the purpose in

which they were created. Although some of the respondents were of the view that several challenges still exist (Table 3).

Table 3: Views of people on whether vehicle terminals in the metropolis have served the purpose in which they were created

Responses	Frequency	Percentage
Agree	135	68.9
Disagree	39	19.9
Neutral	22	11.2
Total	196	100.0

Source: Fieldwork (2015)

Despite these challenges, about 68.9% agreed that vehicle terminals in the Metropolis have served the purpose that they were put up while respondents who disagreed were 19.9%.

For respondents who agreed, there was the need to find out why they think vehicle terminals have served their purpose during the interview section, the following were some of the important comments that emerged.

The various needs of passengers have being established by reducing the stress of travelers in search of vehicle when travelling, especially students and market women. This has aided the movement of goods and services as all areas become accessible in no time (Passenger, 25years, Tantri, 15th February 2015, 1:46 PM).

Also, a man at Kotokuraba taxi terminal said that

There is ready market for products and this has promoted development and expansion of economic activities in the metropolis. The terminals provide sources of revenue to the Assembly through the collection of taxes and dues from vehicle drivers
 (Taxi driver, 35 years, 15th February, 2:52 PM).

Causes of congestion at vehicle terminals in Cape Coast Metropolis

Although this part of the study considered issues on factors that accounts for siting of vehicles, however, it was very vital to find from the respondents their views on some causes of congestion at vehicle terminals in the Metropolis. Among the key causes included in this section based on literature are; indiscipline on the part of drivers, indiscipline on the part of passengers, inadequate parking spaces, inadequate walkways, dysfunctional road signs and vehicle breakdown on roads (Table 4).

Table 4: Causes of congestion at vehicle terminals in Cape Coast metropolis

Causes	Agree	Undecided	Disagree	Total
Indiscipline on the part of Drivers	87.2	3.6	9.2	100
Indiscipline on the part of Passenger/Commuters	59.2	8.7	32.1	100
Inadequate Parking Spaces	91.3	1.0	7.7	100
Inadequate Walkways	91.8	3.1	5.1	100
Dysfunctional road signals	85.2	4.1	10.7	100
Vehicle Breakdown on Roads	84.2	5.1	10.7	100

Source: Fieldwork (2015)

First, with the issue of indiscipline on the part of drivers as a cause of congestion, about 87.2% of the respondents agreed that driver indiscipline contributes immensely to congestion while 9.2% think otherwise. In view of this, indiscipline on the part of drivers is a major source of congestion at vehicle terminals in Cape Coast metropolis. This mostly occurs at the Abura and Kotokuraba vehicle terminals.

Indiscipline on the part of passengers also contributes to congestion situations at vehicle terminals. From the survey result, about 59.2% of the respondents agreed, 32.1% disagreed and 8.7% were undecided. Most of the drivers were of the view that when commuters or passengers do not adhere to road use rules and regulations, cross roads anyhow they have no other choice than to stop and remain in queues. Although indiscipline on the part of commuters is a factor, driver indiscipline outweighs that of commuters. Most terminals in the Metropolis become choked with vehicles because they lack adequate parking spaces to accommodate vehicles. Vehicles that need to take off are often delayed because other vehicles have blocked their ways. From the study, 91.3% of the respondents agreed to the fact that vehicle terminals do not have adequate space while only 7.7% disagreed. This situation often occurs at Tantri and Kotokuraba terminals.

Inadequate walkways as a cause of congestion at vehicle terminals were well noted in the survey. With respect to this about 91.8% of the respondents Agreed that major roads linking vehicle terminals in the Metropolis lack adequate walkways. This clearly indicates that roads that connect vehicle terminals in the metropolis lack adequate walks and as a result

passengers compete with vehicles on the same narrow roads around terminals creating congestion scenarios in these places. For instance a man said

Within the central business district (Kotokuraba area) the market women and men have used part of the road for their trading activities and these contribute more to the congestion that occurs in that area (Commercial Driver, 47 years, Tantri, 20th February 2015, 11:26 PM).

Dysfunctional road signs and vehicle breakdown in and around vehicle terminals are other causes of congestion that were well noted in the study. In the case of dysfunctional road signs, 85.2% of the 196 respondents agreed while 10.7% disagreed that these could create congestion at vehicle terminals.

Effects of vehicle terminals on the safety of road users and the environment

This section of the study presents findings and discussions on how the siting of vehicle terminals affects users and the environment. In assessing the facilities that were available at vehicle terminals in the Cape Coast Metropolis, 10.2% of the respondents said some of the terminals have pavements especially the Tantri terminal, meant for parking spaces. About 43.4% of the respondents thought that vehicle terminals have parking spaces to accommodate vehicles (Figure 3). The Kotokuraba taxi terminal near the Cape Coast Municipal Assembly office complex was one of the examples cited by the respondents. Out of the 196 respondents involved in the study, 34.7% were

of the view that no facilities have being provided in vehicle terminals and also in relative terms vehicle terminals in the Metropolis do not meet international standard. Lack of rest stops accounted for only 4.1% whiles direction signs accounted for 6.6%.

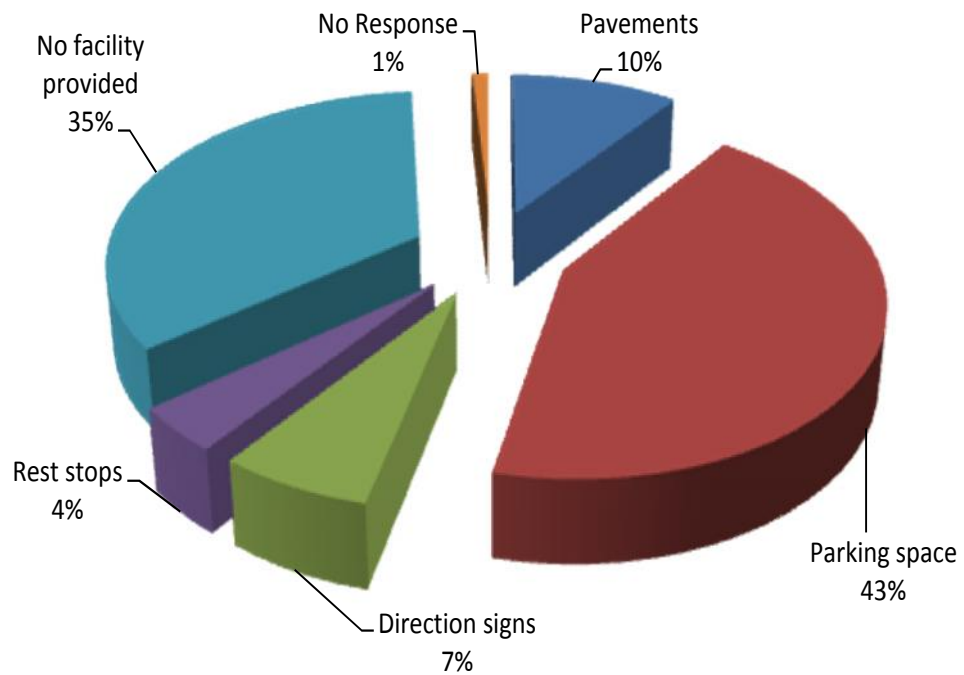


Figure 3: Facilities available at vehicle terminals

Source: Fieldwork (2015)

When respondents were asked to assess the current state of facilities in the vehicle terminals, 39% gave an average score while 14% said that the facilities are in good conditions. About 45% said the states of facilities were bad while 2% of the respondents did not give any response regarding to how they assess the current state of facilities at the vehicle terminals (Figure 4). This finding is consistent with the ideas of the key informants that they do not have adequate basic facilities at the vehicle terminals and Yalley, Poku and Adjarko, (2013), that inadequate facilities at vehicle terminals affect the safety of users.

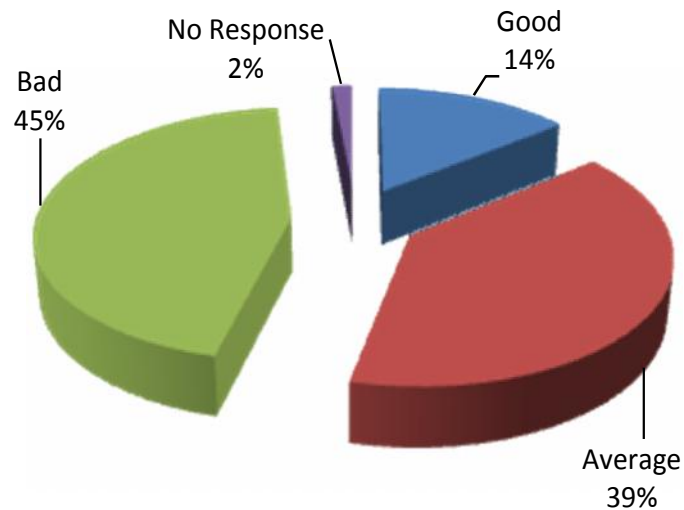


Figure 4: Assessment of facilities available at vehicle terminals

Source: Fieldwork (2015)

Respondents were given a number of statements to indicate the extent to which they either agreed or otherwise to these as the effects of siting vehicle terminal on the environment. Vehicle terminals affect the environment through the emission of carbon mono oxide from the exhaust pipes of vehicles was one of the statements posed to the respondents. Out of the 196 respondents involved in the study, 92.3% agreed that carbon mono oxide is one of the most impacts of vehicle terminals on the environment as against 7.1% who disagreed. Respondents who were not certain (undecided) comprised 0.5% (Table 5).

In view of this finding, it is clearly seen that carbon mono oxide has an impact on the environment and the findings are in line with the findings of Rodrigue (2009) that emission carbon mono oxide is an immediate impact of vehicle terminals on environment.

Table 5: Challenges of Vehicle Terminals on stakeholders and environment

Challenges	Agree	Undecided	Disagree	Total
Carbon Mono Oxide affects living things	92.3	0.5	7.1	100
Lack of waste collection bins spread diseases	90.8	2.0	7.1	100
Noise and fumes from exhausts affect human health	89.3	2.0	8.7	100
Access to land for vehicle Terminals creates conflicts	54.6	15.8	29.6	100
Aesthetic value of the environment is destroyed	69.4	4.6	26.0	100
Siting of terminals can create Accidents	56.6	11.7	31.6	100
Congestion at vehicle terminals increases travel time	88.8	3.1	8.2	100

N = 196

Source: Fieldwork (2015)

The study also showed that vehicle terminals in the Cape Coast Metropolis have no waste collection facilities and hence spread diseases. As a result of this, users normally dump waste at any place that is convenient to them which bring disgusting odour in areas affected. The survey indicated that

about 90.8% agreed and attested to the fact that generally vehicle terminals in the metropolis lack waste collection facilities at vantage places to cater for waste generated by both drivers and commuters. Based on the percentage of the respondents who agreed, it can be established that lack of waste collection facilities has a significant impact on the environment. In order to find out how operators of vehicle terminals take care of their wastes, a terminal master explained as follows:

We manage to keep our own waste by either burning or digging a hole and burying it, (terminal master, 47 years, Kotokuraba, 19th February 2015, 11:20 AM).

Noise generated by the engines of vehicles coupled with fumes from exhaust has health implications on the environment causing respiratory and hearing problems to humans. The study indicated that 89.3% of the respondents interviewed agreed, 8.7% disagreed and 2.0% were undecided that vehicle terminals could cause health problems to living things. Findings from the study (Table 5) indicated that Vehicle Terminals in the Metropolis generally lack safety measures to control noise and fumes making their use unsafe. This is consistent with the results of Wasiu (2010) and Rodrigue et al., (2006) that safety issues are rare to find in vehicle terminals of developing countries.

Conflict over land with community members is also another impact of the siting of vehicle terminals on the environment. This occurs at places where access to land becomes a problem due to land tenure systems in our part of the

world. The study result (Table 5) indicated that 54.6% agreed to the fact that land accessibility is a basic problem when it comes to siting of terminals. Although 29.6% disagreed while 15.8% of the respondents neither agreed nor disagreed, on the whole, the percentage of respondents who agree outweighs the percentage of people who disagreed. This corresponds to the findings that emerged out of the interview with some operators because there have been conflict over ownership and use of the land where their terminals have been sited. For instance a terminal manager said:

This place was given to us to operate; however, we have been encountering problems with another man who claims this land belongs to him. We have been solving this issue for some time now but has not yielded any result as of this moment am talking to you. (Terminal manager, 51 years, UCC East gate, 21st February, 2015, 9:27 AM)

Still on the environment, the study again sought to find from the perspective of the respondents whether vehicle terminals destroy the aesthetic nature of the land. The study showed that the presence of vehicle terminals destroys the environment through the spill of fuels and engine oil when mishandled as being indicated by about 69.4% of respondents who agreed. Twenty-six percent (26.0%) of the respondents disagreed while 4.6% represent the category of respondents neither agreed nor disagreed.

With respect to issue of severe accidents occurring as an environmental impact of vehicle terminals, 56.6% of the 196 respondent agreed, while

31.7% disagreed that unplanned siting of terminals could create accident scenes. The result is in line with the findings of Afukaar, (2003) that road related accidents occurs at vehicle terminals. Also, during an interview section on the same issue, one terminal master said:

There used to be accidents during the inception stage of our terminal but have being controlled to some extent in recent periods. Most often than not, we help a lot in rescuing people involved in accidents (terminal master, 43 years, Pedu, 19th February, 2015, 1:00 PM).

When respondents were asked to indicate the extent to which they agree that congestion that emanates due to siting of vehicle terminals lengthens or increases the travel time of commuters, about 88.8% agreed while 8.2% disagreed (Table 5). This clearly indicates that when people stay in long queues at terminals because there is no way for vehicle to take off it affects the traveling time of commuters. This situation is very common around the Central Business District (Kotokuraba area) and Abura. Therefore, congestion that mostly occurs at vehicle terminals increases the travel time of commuters and this confirms the ideas of Biliyamin and Abosede (2012).

The Role(s) of stakeholders in mitigating the impacts of Vehicle Terminals

This section presents efforts made by stakeholders in the transport sector in terms of mitigating the negative effects of vehicle terminals in the

Cape Coast Metropolis. In ascertaining from respondents the effectiveness in the roles of various institutions responsible for managing congestions resulting from siting of vehicle terminals in the Metropolis, about 38.8% said institutions are effective in managing situations at vehicle terminal. On the contrary, 59.2% believed that they are ineffective in ensuring that there is decongestion at vehicle terminals (Table 6).

Table 6 : Effectiveness of institutions in addressing indiscriminate siting of vehicle terminals

Response	Frequency	Percentage
Effective	76	38.8
Not Effective	116	59.2
No Response	4	2.0
Total	196	100.0

Source: Fieldwork (2015)

In order not to assess the roles of institutions from the perspective of the respondents only, other key informants from the Motor and Transit Unit and the Road Safety Commission were also interviewed to ascertain their roles when it comes to siting of terminals and ensuring safety in such public places. In an interview with the Assistant Planning Officer of the Road Safety Commission, she said that:

There is no law that binds operators when it comes to siting of vehicle terminals. However, in ideal situations operators need to consult us so that we advise them on safety issues as to whether to continue such projects or stop. In view of this, there

is no policy document that states categorically what operators should do when it comes to siting of terminals. Besides, before Road Safety Commission came to the Metropolis, most of the terminals have being put up. Also, the Assembly most often than not do consult us on safety issues (Cape Coast, 17th February, 2015, 10:15 AM).

According to the key informant, despite all these challenges they play a major role in educating the operators of vehicle terminals in and even appoint Road Safety Officers among them. The key informant noted again that

We also have standards for drivers to comply with and a notable example is pre-departure checks of vehicles. We also ensure that newly terminals are well assessed before giving them approval to operate (ibid).

On the same issue, a key informant from the MTTU (The Regional Commander) also said,

We are not consulted before putting up terminals; however, we enforce laws and make sure that drivers who do not adhere to rules and regulations are dealt with accordingly (Bakano, 19th February, 2015, 11:20 AM).

The opinion of the respondents (passengers, private and commercial drivers) were inconsistent with that of the key informants (Assistant Planning Officer

of Road Safety Commission and the MTTU Regional Commander) was inconsistent with that of the key informants and this could be attributed to the fact that people are not fully aware of the roles they play or because they are not doing much. The findings from the interview with key informants indicate that there is a collaborative effort by various institutions in curbing the situation and this also confirms the findings of Rahaman and Hossain (2009), however, this is contrary to the results obtained from the respondents.

Although about 60.4% of the respondents assessed the roles of the various institutions in the Cape Coast Metropolis (Table 6), it was necessary to find the percentage of each category of respondents regarding the decision of stakeholders being effective in performing their duties or not. Therefore, a cross tabulation was used to explore the differences that exist in the category of respondents and their responses. Out of the 192 respondents, who agreed that institutions are effective, 36.8%, 9.2% and 53.9% were for commercial drivers, Private drivers and Commuters/passengers respectively. In the case of respondents who said the roles of institutions are ineffective, there were 27.6% commercial drivers, 28.4% private drivers and 44.0% commuters/passengers. In all, 31.3% commercial drivers, 20.8% private drivers and 47.9% commuters were involved (Table 7). The findings indicate that for commercial drivers and commuters who are regular users of vehicle terminals, the roles of institutions in ensuring sanity in and around vehicle terminals is much noticed and acknowledged. On the contrary, private drivers do not often go to vehicle terminals and hence are not likely to notice the roles of institutions at such places.

Table 7: A cross tabulation between category of respondents and their responses with regards to the effectiveness of institutions

Effectiveness of Institutions	Commercial Driver (%)	Private Driver (%)	Commuter /Passenger (%)	Total (%)
Effective	36.8	9.3	53.9	100.0
Not Effective	31.3	20.8	47.9	100.0
Total	31.3	20.8	47.9	100.0

N= 192

Source: Fieldwork (2015)

Again, finding out from respondents about their opinion on the current situation of vehicle terminals in the metropolis, 22.4% were of the view that the terminals should be relocated, while 68.4% thought they should rather be renovated, about 7.7% said they have no idea about what should be done about the situation (Figure 5).

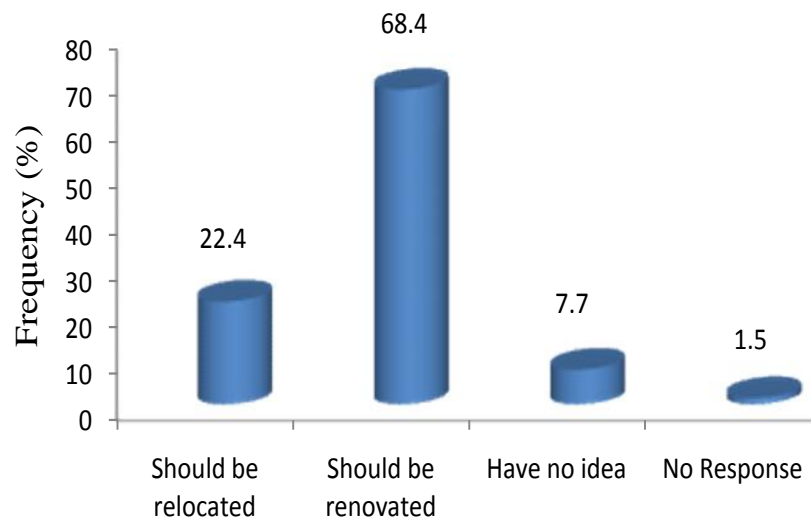


Figure 5: Respondents' opinions on conditions at vehicle terminals in the metropolis

Source: Fieldwork (2015)

The result is in line with an interview with a key informant (Terminal master at UCC East gate) who added that:

We want to maintain the sites of our vehicle terminals because our main target is to get access to passengers particularly students so for me relocating to a different place is not a best option because we will not go

With regards to respondents' opinions on whether vehicle terminals should be relocated or renovated, about 15.9%, 20.5% and 63.6% representing commercial, private drivers and passengers respectively said terminals should be relocated. This result indicates that commercial drivers do not want to relocate but want to maintain their terminals despite challenges facing them. In the case of renovation, 39.6% commercial drivers, 21.6% private drivers and 38.8% passengers were of the view that vehicle terminals need renovation. Out of this, commercial drivers constituted the majority, followed by passengers because they frequently use vehicle terminals as compare to private drivers who are not frequent users (Table 8).

Table 8: A cross tabulation between the category of respondents and their opinions on vehicle terminals

Respondents opinion on Vehicle Terminals	Commercial Driver (%)	Private Driver (%)	Commuter/ Passenger (%)	Total (%)
Relocation	15.9	20.5	63.6	100.0
Renovation	39.6	21.6	38.8	100.0
No idea	31.1	20.7	48.2	100.0
Total	31.1	20.7	48.2	100.0

Source: Fieldwork (2015)

The results in Table 8 imply that as private drivers want relocation because they are not frequent users of vehicle terminals, majority of the commercial drivers think otherwise regardless of the challenges being faced. Commercial drivers prefer renovation to relocation while in the case of pedestrians, safety and proximity issues are of primary concern to them and hence prefer renovation to relocation.

A segment of the respondents (commercial drivers) were also interviewed to find out what operators of vehicle terminals and the Assembly are doing about the ongoing situation in the vehicle terminals. For instance a commercial driver at Tantri said that,

Drivers and the public are being educated through the mass media on the need to adhere to rules and regulations to ensure the safety of all and sundry.

One driver also said

City guards also check and monitor the activities of drivers in the metropolis especially in the central business district like Kotokuraba and Abura. However, these city guards are not many to extend their services to other areas and hence the need to increase the number of personnel (driver, 30 years, Kotokuraba, 13th February 2015, 9:30 AM).

A woman at Abura also added that

The Abura vehicle terminal is being renovated with some stones to reduce the muddy nature of the place

(15th February 2015, 12:35 PM).

Although owners of vehicle terminals are trying their best to improve the situation, however, most of the drivers also complained that the Assembly is silent about the situation and is only interested in collecting taxes and tolls from drivers. Despite all these complaints, a commuter at Tantri terminal said that

Occasionally the Assembly has been doing a decongestion exercise by engaging the police to assist in controlling the on-going situation and a typical example is the Tantri terminal (Commuter, 27 years, Tantri terminal, 17th February 2015, 1:00 PM).

The findings indicated that generally stakeholders are making efforts to curb the unpleasant situation at the vehicle terminals in the Metropolis, challenges exist. Therefore, there is need for them to work harder to improve the situation at hand.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

This chapter summarises the major findings that emanated from the study. It aimed at ensuring the best approach to siting vehicle terminals in the Cape Coast Metropolis. The chapter also makes suggestions for further research.

Summary of the study

The main objective of the study was to examine issues and challenges involved in siting of vehicle terminals in Cape Coast Metropolis. Specifically, it examined factors that account for siting of vehicle terminals; assessed the effects of siting of vehicle terminals on the safety of the environment; ascertained challenges facing all stakeholders as a result of siting vehicle terminals and finally examined the roles of stakeholders in the transport sector in mitigating the adverse effects of vehicle terminals in the Metropolis.

A total of 196 respondents took part in the study and out of this number, 40 were private drivers, 60 commercial drivers, 96 Commuters or passengers and 5 key informants. The respondents were selected using a simple random sampling while the key informants were purposively selected.

Key findings

- Out of the 196 respondents (passengers, private and commercial drivers) who took part in the field survey, 72% were males and 28% were females. In the case of the age distribution, about 72.5% of the respondents were within the age group of 20-39 years. In the case of

marital status and religion, half of the respondents 50% were married and about one third 73.5% were Christians. With respect to their level of education 88.2% had formal education.

- The survey results showed Private unions like the GPRTU, Progressive Transport Operators Association (Protoa) sited vehicle terminals in the Metropolis. Interview with key informants (Terminal masters) confirmed that individuals and groups sited terminals without involving other stakeholders at the planning stage but later on seek approval from the Assembly to be registered.
- The main factors that accounted for siting of vehicle terminals in the metropolis were passenger demand, availability of space, limited space in the Central Business District, demand from community members, availability of passengers, increasing demand for vehicles, and emergence of new private unions.
- It also emerged that vehicle terminals were not technically planned.
- Among the causes of congestion that occurs at vehicle terminals in the Metropolis from the perspective of the people who took part in the study included: indiscipline on the part of drivers (87.2%); indiscipline on the part of commuters (59.2%); and congestion (91%).
- The study indicated that vehicle terminals in the metropolis lack adequate facilities that also affect the environment.
- In ascertaining possible challenges that vehicle operators, passengers and city authorities face due to the unplanned siting of vehicle terminals, more than half of the respondents 56.6% said it can create accident scenes. Also, the majority which is represented by 88.8%

indicated that it increases travel time of travelers and 80.6% said it reduces national output as people are delayed in long queues at vehicle terminals.

- In the case of roles played by stakeholders in curbing the effects that emanates from siting of vehicle terminals, about 60.4% of the respondents were of the view that the roles played by the various institutions in terms of ensuring safety and comfort at vehicle terminals and helping alleviate the problem of indiscriminate siting of terminals in the metropolis are not effective.

Conclusion

The findings of the study reveal that siting of vehicle terminals did not follow any laid down principles but merely based on passenger availability and among other factors. Vehicle terminals lack adequate facilities and these pose a challenge to the environment and safety of all users. Although Stakeholders in the Road Transport sector are making efforts to mitigate the negative effects associated with indiscriminate siting of vehicle terminals, however, their efforts are inadequate. Hence, there is the need to strengthen their efforts through capacity building to ensure that vehicle terminals in the metropolis meet international standards.

Recommendations

In relation to the main findings of the study, the following recommendations have being suggested.

1. The metropolitan Assembly should ensure that there is coordination between all the other various institutions such as the Metropolitan Assembly, Road Safety Commission, and the Motor Traffic and

Transport Unit in order to ensure that siting of various vehicle terminals by the various operator follow appropriate laid down rules and regulations in the Metropolis to ensure sanity in the metropolis.

2. There should also be some standards set by the Ministry of Transport the Motor and Traffic Unit, Road Safety Commission and the Town and Country planning departments, for owners of vehicle terminals to comply. This is because there is no policy document that states clearly the requirements for siting vehicle terminal. This will go a long way to ensure the effectiveness in their operations.
3. Vehicle Terminals in the Metropolis lack basic infrastructure facilities like parking spaces, Proper offices rest rooms, and among others, therefore much priority should be given to the provision of such facilities by operators, the Assembly and other donor agencies to ensure the smooth operation and comfort of passengers and drivers. The safety of passengers and drivers is a key factor that needs much attention; hence vehicle terminals should have adequate facilities like good lightening systems and other security services especially at night.
4. There should be regular decongestion exercise by the Metropolitan Assembly and the MTTU, especially on roads around vehicle to terminals to ease the movement of goods and services because this situation is very alarming in the Metropolis needs to be reduced to its minimum level. The Metropolitan Assembly should also issue permits to Vehicle terminal operators on a condition that their sites will not pose any threat to humans and the environment whiles ensuring that terminals that are sited at wrong locations are forced to relocate.

5. Operators of Vehicle terminals in the metropolis should put up adequate measures that will help protect the environment and human health. This should include waste collection bins and adequate personnel to ensure that such places are well cleaned. They can also be assisted by the Metropolitan Assembly as well.
6. Stakeholders including National Road safety Commission, Motor Traffic and Transport Unit, and the Metropolitan Assembly should ensure that drivers and vehicle terminal operators adhere to safety rules and regulations. Offenders should be made to face sanctions and appropriate punishment in order to deter others from doing same. In addition narrow roads in the Metropolis should be expanded where necessary by the department of urban roads.

Areas for further studies

This study focused on issues and challenges emanating from the siting of vehicle terminals in Cape Coast Metropolis Assembly. Further studies can be undertaken to examine the effects of vehicle terminals on residents. This will help to bring to the fore the effects of vehicle terminals on residential locations within the Metropolis.

REFERENCES

- Abane, A. M. (1993). Tackling traffic congestion in Accra, Ghana: A road user's perspective. *Journal of Advanced Transportation* , 193–206.
- Adegoke, A., Adedayo, V. C., Aderinto, A., Adeniyi, T., & Yesufu, A. R. (2010). *Methods of Social Research*. Lagos: National Open University of Nigeria.
- Adesanya, A. A. (1984). *Location and Design of Inter-City Road Passenger Terminals: A case Study of Abeokuta, Ogun State Unpublished Masters Degree Centre for Urban and Regional Planning*. University of Ibadan.
- Ayotunde, A. (2013). *The Effects of Traffic Congestion on the Residents of Akobo-Ojurin Ibadan*. Nigeria: <http://gadget2kfc.wordpress.com>.
- Bakare, G. A. (1985). *The Planning and Design of Ibadan Road Transport Terminals, Unpublished Masters of Urban and Regional Planning Dissertation University of Ibadan*. Ibadan.
- Banister, D., Crist, P., & Perkins, S. (2015). *Land Transport and How to Unlock Investment in Support of "Green Growth, OECD Green Growth Papers, No. 2015/01*,. Paris: OECD Publishing.
- Bernard, R. (2006). *Research Methods in Cultural Anthropology*. Oxford: AltaMira.
- Biliyamin, A. A., & Abosede, B. A. (2012). Effects of congestion and travel time variability along Abuja-Keffi Corridor in Nigeria. *Global Journal*

of Researches in Engineering Civil and Structural engineering, volume 12, Issue 3 , 2249-4596.

Cape Coast Metropolitan Assembly Annual Composite Report. (2012). *Medium Term Development Plan (2010-2013) Under Ghana Shared Growth and Development Agenda*. Cape Coast: Metropolitan Planning Coordinating Unit.

Cape Coast Metropolitan Assembly. (2014, September 20). *Roads, Transport and Information Communication Technology*. Retrieved from Ghana Districts:

http://capecoast.ghanadistricts.gov.gh/?arrow=atd&_=50&sa=436

Cape Coast Municipal Assembly. (2013, June 1). *Ghana Districts*. Retrieved March 6, 2014, from Cape Coast Municipal Assembly: <http://www.capecoast.ghanadistricts.gov.gh>

Creswell, J. W. (2003). *Qualitative, quantitative, and mixed methods approaches (2nd ed.)*. Thousand Oaks, CA: Sage.

Department of Feeder Roads. (2012, February 2). *Cape Coast Minicipal Assembly*. Retrieved January 13, 2015, from Ghana Districts: ghanadistricts.com

Development, Organisation for Economic Co-operation & Transport European Conference of Ministers. (2007). *Managing Urban Traffic Congestion*. Bedfordshire: Joint Transport Research Centre.

- Duffy, S. (2009). *The Effect of Social and Environmental Factors on Transportation Mode Choice in Southeast Michigan*. Michigan: University of Michigan.
- Economic Commission for Africa. (2009). *The Transport Situation in Africa. Sixth session of the Committee on Trade, Regional Cooperation and Integration*. Addis Ababa, Ethiopia.
- Enger, E. D., & Smith, B. F. (2000). *Environmental science: A study of interrelationships (7th ed.)*. Boston, Mass: McGraw-Hill.
- Eniola, O. J., Njoku, I., Seun, A. E., & Okoko, E. (2013). Traffic Management Problems in Lagos: A Focus on Alaba International Market Road, Ojo, Lagos State Nigeria. *Journal of Economics and Sustainable Development* , 145-153.
- Fadairo, G. (2013). Traffic Congestion in Akure, Ondo State, Nigeria: Using Federal University of Technology Akure Road as a case study. *International Journal of Arts and Commerce* , 1929-7106.
- Fisher, A. A., Laing, J. E., Stoeckel, J. E., & Townsend, J. W. (1998). *Handbook for Family Planning Operations Research Design*. New York: Population Council.
- Frimpong, E. D. (2013, March 21). *Graphic Online*. Retrieved May Saturday, 23, from Graphic Website: <http://graphic.com.gh/news/general-news/8792-achimota-terminal-a-model-lorry-station.html>

- Gairhe, B. R. (2013). *Transportation Development and Challenges in Nepal: Case Study of Air Transportation Security*. Centria: Central University of Applied Sciences.
- Gerbase, M. (2010). Impact of road traffic noise annoyance on health-related quality of life: Results from a population-based study. *Quality of Life Research*, 19(1), 37-46.
- Ghana News Agency. (2014, September 15). *Ghana News Agency*. Retrieved from Ghana News Agency: <http://www.ghananewsagency.org/social/cape-coast-school-children-face-danger-71643>
- Ghana Statistical Service. (2012). *2010 Population and Housing Census final Report*. Accra: Ghana Statistical Service.
- Gibson, J. E. (2009). *Using Data from Primary Care to Investigate the Epidemiology of Motor Vehicle Crashes*, Doctor of Philosophy thesis submitted to the University of Nottingham. Nottingham.
- Gifford, J. L. (2005). 2005. "Congestion and its Discontents." In Access to Destinations. *Elsevier*, 39–61.
- Hall, John. "Cross-Sectional Survey Design." In Encyclopedia of Survey Research Methods. Paul J. Lavrakas, ed. (Thousand Oaks, CA: Sage, 2008), pp. 173-174.
- Hazaymeh, K. (2009). GIS-Based Safety Bus Stops-Serdang and Seri Kembangan Case Study. *Journal of Public Transportation*, Vol. 12, No. 2, 39-51.

- Hong, Y., & Huapu, L. (2001). A Study on the Planning Model and Method of Passenger Transportation Terminal Distribution. *9th World Conference on Transport Research*, (pp. 4-10). COEX, Seoul, South Korea.
- Hymely, K. (2009). "Does Traffic Congestion Reduce Employment Growth?". *Journal of Urban Economics Vol. 65/2* , 127-135.
- Iacono, J., Brown, A., & Holtham, C. (2009). Research Methods – a Case Example of Participant Observation." . *The Electronic Journal of Business Research Methods Volume 7 Issue 1* , 39 - 46.
- Kiunsi, R. B. (2013). A Review of Traffic Congestion in Dar es Salaam City from the Physical Planning Perspective. *Journal of Sustainable Development; Vol. 6, No. 2* , 94-103.
- Krathwohl, D. R. (2009). *Methods of educational and social science research: The logic of methods* . Longrove: Waveland Press.
- Mahama, F. (2012). *Study of Vehicular Traffic Congestion in the Sekondi-Takoradi Metropolis*. Kumasi: (KNUST)Institute of Distance Learning.
- Masood, M. T., Khan, A., & Naqvi, H. A. (2014, December 9). *Transportation Problems in developing countries, CCSE, Toronto*. Retrieved from ABI Journal: <https://proquest-portal.cou.fi/docview/906290356?accountid=10007>
- McCalla, R., Slack, B., & Comtois, C. (2001). *Intermodal Freight Terminals: Locality and Industrial Linkages*. *Canadian Geographer*. Canada: Academic Research Library.

- Mckinsey Global Institute. (2012). *Urban World: Cities and the rise of consuming class*. Mckinsey and Company.
- Ministry of Food and Agriculture. (2013). *Ministry of Food & Agriculture, Republic of Ghana*. Retrieved September 23, 2014, from Ministry of Food and Agriculture, Cape Coast Metropolis: http://mofa.gov.gh/site/?page_id=1453
- Modern Ghana News. (2014, January 23). *Kumasi Metropolitan Assembly demolishes Kejetia Lorry Terminal*. Retrieved May 2015, 16, from Modern Ghana.com: http://www.modernghana.com/news/517661/1/kma-decongests-kejetia-lorry-terminal.html?utm_source=twitterfeed&utm_medium=twitter
- Monzón, A., & Guerrero, M.-J. (2004). Valuation of social and health effects of transport-related air pollution in Madrid (Spain) . *Science of the Total Environment* , 334– 335.
- Morgan, L. (2014, September 9). *The Effects of Traffic Congestion*. Retrieved from USA Today: <http://traveltips.usatoday.com/effects-traffic-congestion-61043.html>
- Murphy, D. M. (2005). Something in the Air. *Science* , 1888-1890.
- National Cooperative Highway Research (NCHR). (2001). *Economic Implications of Congestion*. U.S.A: Transportation Research Board.

- Neitzel, R., Gershon, R., Zeltzer, M., Canton, A., & Akram, M. (2009). Noise Levels Associated With New York City's Mass Transit Systems . *Am J Public Health, 99* , 1393–1399.
- Neuman, W. R. (2003). *Social research method (5th ed)*. Boston: Pearson.
- Noland, R. B., & Quddus, M. A. (2006). Flow improvements and vehicle emissions: Effects of trip generation and emission control technology. *Transportation Research Part D, 11(1)* , 1-14.
- Ogundipe, O. M. (2007). Appropriate Traffic Congestion Mitigation Strategies for an Unplanned Urban City. *The Social Sciences 2 (2)* , 167-174.
- Oliver, P. (2006). *Purposive Sampling*. The Sage dictionary of social research methods.
- Organization for Economic Cooperation and Development. (2007). *Managing Urban Traffic Congestion*. USA: OECD Publishing.
- Oyesiku, K., & Olaseni, B. (2012). Spatial distribution of intercity passengers terminals in Lagos: Implications for transport policy. *The role of urban mobility in (re)shaping cities* (pp. 2-10). Addis Ababa (Ethiopia): CODATU XV.
- Pal, D., & Bhattacharya, D. (2012). Effect of Road Traffic Noise Pollution on Human Work Efficiency in Government Offices, Private Organizations, and Commercial Business Centres in Agartala City Using Fuzzy Expert System: A Case Study. *Advances in Fuzzy Systems*.

- Patten, M. (2005). *Understanding Research Methods: An Overview of the Essential*. USA: Pycyak Publishing.
- Payer, P. (2007). The age of noise: Early reactions in Vienna, 1870-1914. *Journal of Urban History*, 33(5), 773-793.
- Pech, S., & Sunada, K. (2008). Population Group and Natural Resources Pressures in the Mekong River Basin. *Ambio*, 219-220.
- Rahaman, K. R., & Hossain, M. Z. (2009). *Utilising Urban Space for Better Traffic Management :A Study of Khulna Central Business District, Bangladesh*. 26-38: Management Research Practise.
- Rodrigue, J. (2009). *Geography of transport system, The environmental impacts of transportation, 2nd edition*. UK: F books.
- Rodrigue, J.-P., Comtois, C., & Slack, B. (2013). *The Geography of Transport Systems, 3rd Edition*. Routledge.
- Rubin, R., & Babbie, E. (2009). *Essential Research Methods for Social Work (2nd Edition)*. California: Brooks-Cole, Belmont.
- Sánchez-Triana, E., Afzal, J., Biller, D., & Malik, S. (2013). *Greening Growth in Pakistan Through Transport Sector Reforms: A Strategic Environmental, Poverty, and Social Assessment*. Washinton, DC: World Bank Publications.
- Sarantakos, S. (2006). *Social Research (4th Ed)*. London: Macmillan Press Ltd.
- Schweitzer, L., & Zhou, J. (2010). 'Neighborhood Air Quality, Respiratory Health, and Vulnerable Populations in Compact and Sprawled

- Regions'. *Journal of the American Planning Association*, 76: 3 , 363-371.
- Silva, R., Kang, S., & Airoidi, E. M. (2015). Predicting traffic volumes and estimating the effects of shocks in massive transportation systems. *Proceedings of the National Academy of Sciences of the United States of America*, 112(18) , 5643–5648.
- Sirikijpanichkul, A., & Ferreira, L. (2005). *Quantifying Air Quality Impact: A Review of Literature*. Brisbane: Queensland University of Technology.
- Sweet, M. (2011). Does Traffic Congestion Slow the Economy? *Journal of Planning Literature* 26(4) , 391-404.
- Tahzib, B., & Zvijáková, L. (2012). *Environmental Impact of Land Transport*. Košice, Slovak republic: Transfer inovácií.
- Thompson, N. (2014, September 9). *Useful Community Development: The Effects of Urban Sprawl on Costs, Health, and the Environment*. Retrieved from <http://www.useful-community-development.org/effects-of-urban-sprawl.html>
- Trochim, W. (2000). *The Research Methods Knowledge Base, 2nd Edition*. Cincinnati, OH: Atomic Dog Publishing.
- U.S. Department of Transportation, Research and Innovative Technology Administration. (2010). *U.S. Department of Transportation, Research and InBureau of Transportation Statistics, Freight Transportation: Global Highlights*. Washington DC: Department of Transportation, Research and Innovative Technology Administration.

- Ukpata, O., & Etika, A. (2012). Traffic Congestion in Major Cities of Nigeria. *International Journal of Engineering and Technology* , 2049-3444.
- United Nations International Children Educational Fund. (2012). *Cities and Children:The Challenge of Urbanisation in Tanzania*. Dar es Salaam, Tanzania: United Nations Children's Fund.
- United Nations. (2013). *Millennium Development Goals Report*. New York: United Nations.
- Vogel, M., & Pettinari, J. L. (2002). *Personal Safety and Transit: Paths, Environments, Stops, and Terminals*. Minneapolis, Minnesota: Center for Transportation Studies.
- Wasiu, S. A. (2010). *Effects of Road Traffic Congestion on Goods Distribution in Starcomms PLC*. Nigeria: Nigeria Institute of Technology.
- West, N., & Kawamura, K. (2005). *Location, Design and Operation of Future Intermodal Rail Yards: A Survey*. Transport Research Board.
- Wiwanitkit, V. (2011). *Respiration Disorders: Advances in Research and Treatment: 2011 Edition*. Scholarly Editions.
- World Bank Group. (2006, March 4). *Urban Bus Toolkit*. Retrieved June 1, 2015, from Public-Private Infrastructure Advisory Facility (PPIAF): <http://www.ppiaf.org/sites/ppiaf.org/files/documents/toolkits/UrbanBusToolkit/assets/3/3.7/3.5%28vii%29a.html>
- World Health Organisation. (2009). *Global Status Report on Road Safety: Time for Action*. Seattle: WHO.

- World Health Organization. (2011). *Burden of disease from environmental noise: Quantification of healthy life years lost in Europe*. Copenhagen: WHO Regional Office for Europe.
- Yalley, P. P., Poku, G. O., & Adjarko, H. (2013). Sanitary, Health And Safety Management Of Intra -City Transport Terminals Of Ghana. *International Refereed Journal of Engineering and Science (IRJES)* , 56-62.
- Yokota, T., & Yamanaka, K. (2004). *Guidelines for Raodside Terminals "Michinoeki"*. Kenya: The World Bank.
- Zhang, W. (2011). *Managing Traffic Congestion- Case study of Hangzhou*. China: European Spatial Planning and Regional Development.

APPENDICES

APPENDIX 1

Questionnaire for respondents

Category of Respondent..... Date:

UNIVERSITY OF CAPE COAST

DEPARTMENT OF GEOGRAPHY AND REGIONAL PLANNING

**SITING OF VEHICLE TERMINALS: SAFETY ISSUES,
CHALLENGES AND WAY FORWARD IN CAPE COAST
METROPOLIS**

This questionnaire/interview schedule is designed for the study on siting of vehicle terminals: safety issues, challenges and way forward in Cape Coast Metropolis. It examines the impacts of siting of vehicle terminals in Cape Coast Metropolis. The findings will address inadequacies in location of vehicle terminals as a major cause of congestion in the Metropolis. The information you will provide will be used solely for academic purposes. Please, be objective and precise as possible.

Section A: The socio-demographic characteristics of respondents

In this section, we would need data on your demographic background.

Please provide us with truthful information and also be as objective and precise as possible and precise.

[Please tick where appropriate [] and write where necessary]

1. Sex a. Male [] b. Female []
2. Age of respondent a. 19 and below [] b. 20-29 [] c. 30-39[] d. 40-49 [] e. 50-59 [] f. 60 and above []
3. Marital status a. Single [] b. Married [] c. Divorced [] d. Separated [] e. Widowed []

4. Religion. a. Christian [] b. Islam [] c. Traditional [] d. other, please specify.....
5. Level of Education a. No formal Education [] b Basic/Middle/JHS [] c. Secondary/A' Level/Voc/Tech [] d. Tertiary [] e. other, please specify.....

Section B: Factors that account for siting of vehicle terminals

This section of the questionnaire is to explore your knowledge on factors that account for the siting of vehicle terminals in the Cape Coast Metropolis. Please, briefly respond to the following questions.

6. In your opinion, which institution established the vehicle terminals in the metropolis? **[Tick all that apply]**
 - a. The metropolitan Assembly [] b. Private Unions such as the GPRTU and “PROTOA” [] c. Individuals [] d. No Idea []
7. To what extent do you agree with the following statements as factors that led to the siting of vehicle terminals in the Cape Coast Metropolis?

No	Factors	SA	A	U	D	SD
1	Passenger Demand					
2	Availability of Space					
3	Limited space in CBD					
4	Demand from community members					
5	Availability of Passengers					
6	Increasing demand for vehicles					
7	Emergence of new private unions					
8	Other (please specify)					

8. To what extent do you agree that operators of the sited vehicle terminals did not follow the laid down rules and regulations a. Strongly Agree [] b. Agree [] c. Disagree [] d. Strongly Disagree [] e. Neutral []
9. Do you agree that these terminals have served the purpose in which they were established? a. Strongly Agree [] b. Agree [] c. Disagree [] d. Strongly Disagree [] e. Neutral []
10. If you agree to question 9, in which way have the vehicle terminals served their purposes?

.....

.....

.....

11. In your own opinion, to what extent do you agree that the following are among the salient causes of congestion in these terminals?

No	factors	SA	A	U	D	SD
1	Indiscipline on the part of drivers					
2	Indiscipline of passengers or commuters					
3	Inadequate parking spaces					
	Other (please specify)					

Section C: Effects of siting of vehicle terminals on the safety of road users and the environment

This section of the questionnaire seeks information on how the siting of vehicle terminals affects users and the environment.

12. Which of the following facilities are available at the newly sited terminals? a. Pavements [] b. Parking space [] c. Direction signs [] d. Rest stops [] e. No facility provided [] f. Other (please specify).....
13. How would you assess the current state of facilities in the vehicle terminals? a. Very Good [] b. Good [] c. Average [] d. Bad [] e. Very Bad [] f. Neutral []
14. The following statements indicate the extent to which vehicle terminals affect the environment. Indicate the extent to which you agree or otherwise with each of them.

No	Factors	SA	A	U	D	SD
1	Emission of carbon dioxide from the exhaust pipes					
2	Lack of waste collection facilities spread diseases					
3	Noise and fumes have health implications					
4	Conflict over land access with community members					
5	The aesthetic nature of the land is destroyed					
6	The locations of terminals can create severe accidents					

Section D: Challenges that vehicles operators, passengers and city authorities face as a result of siting of vehicle terminals

15. This section seeks information on challenges that stakeholders in the road transport sector face in the metropolis as a result of siting of vehicle terminals. To what extent do you agree with the following statements in the table?

No	Statement	SA	A	U	D	SD
1	Congestion at vehicle terminals lengthens or increases the travel time of commuters.					
2	Congestion at vehicle terminals reduces productivity and affects national output as people remain in long queues due to blockage of roads.					
3	Roads that link vehicle terminals in the metropolis do not have walk ways for pedestrians.					
4	Other (please specify)					

16. To what extent do you agree that congestion at vehicle terminals depends on the following factors?

No.	Factors	SA	A	U	D	SD
1	Dysfunctional road signals					
2	Drivers' indiscipline					
3	Pedestrians' indiscipline					
4	Vehicle breakdown on roads.					
5	Other (please specify)					

Section E: Role(s) of stakeholders in mitigating the negative effects of siting of vehicle terminals in Cape Coast Metropolis.

This part of the study examines the role(s) played by stakeholders in the road transport sector to dealing with the negative impacts associated with the siting of vehicle terminals in Cape Coast Metropolis. Kindly respond to all the questions in this section

- 17. What are stakeholders doing about the current congestion situation that occurs at the various vehicle terminals?
- 18. What are the measures being put in place by the operators who have these terminals?
.....
- 19. How effective are the various institutions responsible for managing congestions resulting from siting of vehicle terminals in the metropolis? a. Very Effective [] b. Effective [] c. Not Effective [] d. Not Effective at all []
- 20. What is your opinion on the situation of these terminals in the metropolis? a. Should be relocated [] b. should be renovated [] c. have no idea []
- 21. What other possible suggestions would you give as an individual towards improving the current state of vehicle terminals in the Metropolis?
.....
.....

Please thank you for your time, patience and contributions

APPENDIX 2

In-depth interview guide for key informants

Place of interview..... Date:

UNIVERSITY OF CAPE COAST

DEPARTMENT OF GEOGRAPHY AND REGIONAL PLANNING

SITING OF VEHICLE TERMINALS: SAFETY ISSUES,
CHALLENGES AND WAY FORWARD IN CAPE COAST

METROPOLIS

This interview guide is designed for the study of siting of vehicle terminals: safety issues, challenges and way forward in Cape Coast Metropolis. It examines the impacts of siting of vehicle terminals (Abura, Pedu, Kotokuraba and Tantri) in Cape Coast Metropolis. The findings will help in addressing the inadequacies of location of vehicle terminals as a major cause of congestion in the Metropolis. The information you will give us will be used solely for academic purposes and will be treated confidentially. Please try as much as possible to be objective and precise in your response.

The socio-demographic characteristics of respondents

In this section, we would need data on your demographic background.

Please provide us with truthful information and also be as objective as possible and precise.

1. Sex.....
2. Age of respondent.....
3. Marital status.....
4. Religion.....

5. Level of Education.....
6. Place of work (name of institution).....
7. Current position occupied at work place.....

Indebt interview for terminal masters

1. Who established the vehicle terminals in the metropolis?
2. In your opinion, outline the factors that led to the siting of vehicle terminals in the Cape Coast Metropolis?
3. Did the siting of vehicle terminals in the Metropolis follow the Town and Country Planning rules and regulations?
4. Do you think vehicle terminals have adequately served the purposes for which they were put up?
5. If yes to question 4, in which ways have the terminals served their purpose?
6. What challenges do vehicle operators, passengers and city authorities face in the metropolis as a result of the bad nature of vehicle terminals?
7. What are the measures being put in place by the operators who own terminals in mitigating the challenges of vehicle terminals on humans and the environment?
8. What is the Metropolitan Assembly doing about the congestion situation that occurs at vehicle terminals?
9. Do you think stakeholders (such as MTTU, National Road Safety Commission, Town and Country Planning Department and Department of Urban Roads) responsible for managing congestions in vehicle terminals are performing their duties well?

10. Do you think these vehicle terminals should be relocated or maintained?
11. What other possible suggestions would you give as an individual towards improving the current state of vehicle terminals in the Metropolis?

Indebt interview for National Road Safety Commission

1. Do you play any roles when it comes to siting of vehicle terminals in the Cape Coast Metropolis?
2. If yes to question 1, outline the roles you play with regards to siting of vehicle terminals.
3. What measures have you put in place to ensure safety at the environs of vehicle terminals?
4. Do you have any policy document that states clearly the basic requirements needed by operators for siting of vehicle terminals?
5. If yes to question 4 name this policy document and what it entails?

Indebt interview for Motor Traffic and Transport Unit

1. Are the Motor Traffic and Transport Unit involved in policy making during siting of vehicle terminals?
2. What key roles do you play in terms of ensuring sanity and safety at terminals and on roads?
3. Is there any coordination between the MTTU and other institutions related to the transport sector in managing congestion at vehicle terminals?

4. Do you face any challenges in managing the impacts associated with siting of vehicle terminals in the Metropolis?
5. If yes to question 4, what are the challenges that you encounter in the course of discharging your duties to ensure that there is decongestion at the environs of vehicle terminals?
6. To what extent have you being able to manage the impacts of siting of vehicle terminals in the Metropolis?

Indebt interview for the Town and Country planning department

1. Outline the factors that you consider when siting vehicle terminals?
2. What standards have you set for owners of vehicle operators to comply with when siting vehicle terminals?
3. What criteria do you use to issue permits to operators of vehicle terminals to site terminals?
4. Considering the congestion situation at vehicle terminals in the Metropolis, how have you being addressing this issue?

Thank you for your time and contributions

APPENDIX 3

OBERVATION CHECK LIST ON SITING OF VEHICLE TERMINALS

PLACE..... DATE..... TIME.....

UNIVERSITY OF CAPE COAST

DEPARTMENT OF GEOGRAPHY AND REGIONAL PLANNING

**SITING OF VEHICLE TERMINALS: SAFETY ISSUES,
CHALLENGES AND WAY FORWARD IN CAPE COAST
METROPOLIS**

The following check list was used as a guide during the field observation

Section A

The layout of vehicle terminals	Comments from observation
1. Vehicle terminals are well sited	
2. Vehicle terminals are well built	
3. Vehicle terminals are just sited under erected structures	
4. Vehicle terminals are so close to main roads	
5. Traders and hawkers use terminals for their activities	

Section B

Causes congestion at vehicle terminals	Comments from observation
6. Indiscipline on the part of passengers or commuters	
7. Indiscipline on the part of drivers	
8. Inadequate parking spaces at vehicle terminals	

Section C

Facilities available at vehicle terminals	Comments from observation
9. Adequate seats for terminal users	
10. Presence of security services	
11. Provision of wash rooms and toilets	
12. Availability of waste collection bins	
13. Availability of parking lots	

Section D

Vehicle terminals impact on human and environment	Comments from observation
14. Excessive noise at vehicle terminals	
15. The presence of fumes from exhaust pipes	
16. Commuters and drivers often get stack in queues at congested terminals	

Section E

The role (s) played by stakeholders in reducing congestion at terminals	
17. Police help to direct the free flow of traffic at terminals	
18. City guards help to direct the flow of traffic at terminals	
19. Drivers help themselves to direct the flow of traffic at terminals	
20. Terminal operators assist to direct the flow of traffic at terminals	