

Running head: MOVING ACCRA'S PASSENGERS FROM TROTROS TO
TRAINS

ASHESI UNIVERSITY COLLEGE

Moving Accra's passengers from the trotro to the train: An assessment of the current state
of passenger rail transport in Ghana and a discussion of the associated challenges and
benefits of establishing a city rail system for Accra.

THESIS

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ASHESI UNIVERSITY COLLEGE

Moving Accra's passengers from the trotro to the train: An assessment of the current state of passenger rail transport in Ghana and a discussion of the associated challenges and benefits of establishing a city rail system for Accra.

By

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Thesis to be submitted to the department of Business Administration, Ashesi University College in partial fulfillment of the requirement of the award of Bachelor of Science degree in Business Administration.

April 2016

DECLARATION

I hereby declare that this thesis 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:.....

Candidate's Name:.....

Date:.....

I hereby declare that the preparation and presentation of the thesis were supervised in accordance with the guidelines on supervision of thesis laid down by Ashesi University College.

Supervisor's Signature:.....

Supervisor's Name:.....

Date:.....

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Abstract

Accra has a population of 4 million growing at nearly 4% annually. An increasing population is typically coupled with an increasing demand for paved roads to support motorized transportation. However, this demand for paved roads has not been met.

Road transport seems to be the only effective transportation option in Accra as it carries over 70% of passengers. The most common form of public transport by road is the minibus (trotro). Although most people in Accra use the “trotros”, there is still heavy traffic. Mass transportation is available in the form of buses but it has not solved the city's transportation problem. Since Accra is not traversed by water bodies, transportation by water is also not a viable option. It is therefore reasonable to argue that mass transportation by rail may help improve transportation in Accra.

Using information from questionnaires administered to and interviews conducted on inhabitants of Accra, this research documents the state of Accra's passenger railway system and outlines potential benefits and challenges associated with improving it. The results show that Accra's railway system is in a poor state. There are only two lines that run (Accra-Tema and Accra-Nsawam). Additionally, the physical condition of the trains on these lines is deplorable. It would be expensive but ultimately beneficial to develop a railways system for Accra. If the private and public sectors work together, the cost could be effectively split by both sectors and the system can be made effective and efficient.

Key words: Accra, Railway transportation, Benefits, Cost.

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CHAPTER 1: INTRODUCTION

*Background**The transportation in problem Accra and the need for railways*

Accra is the capital of Ghana and is very densely populated, despite being just a part of the Greater Accra region, it is the smallest of the country's ten regions. Accra is located in the southern part of Ghana and has a population of about 4 million (Government of Ghana, 2016).

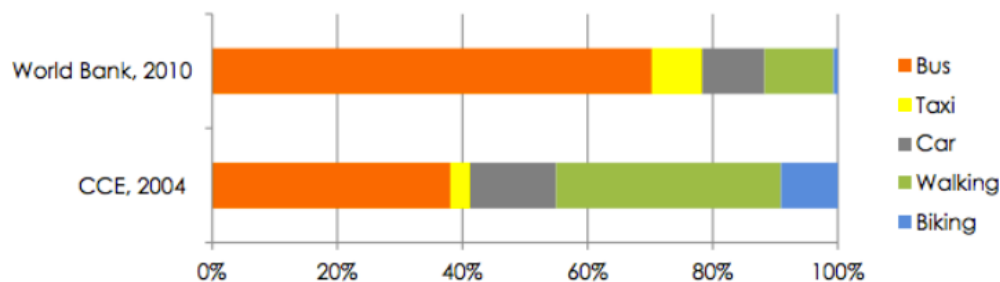
The city's population is growing at nearly 4% a year and, concurrently there is an increasing demand for motorized traffic which has not been matched by an increase in road network (Møller-Jensen, Kofie, & Allotey, 2012). This is causing a big transportation problem in the city which gets worse during rains. Rains remove mud and other materials used to fill pot-holes leaving grave-like holes on otherwise paved roads creating headaches for drivers.

Nonetheless, road transport is almost the only transport option for Accra as it carries 97% of Accra's passengers from one point to another (Mensah, Annan, & Andoh-Baidoo, 2014). Since Accra is not traversed by rivers or lakes, boat, barge and ferry transportation are not viable options. Accra has one airport for city to city and international travel but not intra-city travel. Helicopters are also too expensive an option for travel within Accra.

Focusing on road transport, although some people do travel by road in their private cars a large percentage of the population uses public transportation. About 84% of the road trips made in Accra are done using public transport (Armah, Yawson, & Pappoe, 2010).

The most common form of public transport is the minibus (trotro). It transports almost 60% of Accra's passengers while taxis transport about 15% (Armah, Yawson, & Pappoe, 2010). Although most people in Accra use public transport, there is still a lot of traffic. This is because the trotros are small and cannot carry many people at a time. As such, there are many of them on the roads. These trotros are also not very reliable mechanically and are not always driven safely (Blaustein, 2010). They compete with each other for passengers, sometimes block rivals from getting ahead and often stop in the middle of the road to pick passengers.

Figure 2: A breakdown of road transportation in Accra.



Source: Centre for Cycling Expertise (2004), World Bank (2010).

It is reasonable to argue that mass transportation by rail may help improve transportation in Accra as it has done in cities in South Africa, United Kingdom and Japan. With trains running, there will be less traffic on roads because trains can carry many people at a time thus decreasing the number of cars on the roads.

Additionally, there is evidence to back the claim since cities like London, Seoul and Cape Town made rail an option for transport and it helped them significantly. For

instance, in London, rail has provided better access to the capital for over 700,000 workers who commute into London (Crossrail Ltd, 2016).

Research problem

Public transportation is one of the biggest problems Accra faces because options for transportation are limited to road transport, creating heavy congestion on the road and hence, acute traffic problems. Since no water bodies traverse the city, barge, ferry and boat transport are not feasible transportation options. Further, the significant expense involved in moving only few people around by helicopter rules out that option as well. In fact, there are very few helipads in Ghana and these mostly belong to the Air force and some private health facilities.

There is a mass bus transport system which is operated by road in Ghana but traffic and management problems make it an inefficient option. This state-run mass transportation system still faces problems with traffic congestion and may not be able to serve the entire populace despite the government's claims that it had purchased almost 300 large buses to supplement the sector (Ghana News Agency, 2014).

The lack of public transport options leaves the rail system as possibly the only viable means of public transportation that can be used to move a lot of people around the city in a short time by avoiding traffic. There is an existing rail system. However, nowadays, the rail system is hardly visible in Ghana's transportation system especially in the urban areas like Accra.

At the moment, the usual mode of transportation in the cities is by road with public transportation dominated by taxis and the infamous "trotro" which is Ghana's version of

the jitney. The trotros make the transportation problem worse by the undisciplined manner in which they operate. The drivers drive recklessly, stop any and everywhere to pick and drop passengers and do not maintain their vehicles to cut costs. The trotros regularly break down worsening traffic jams as drivers often leave them for long hours wherever they broke down.

In terms of private transport, a good number of people own cars and so usually drive from one place to another. Transportation by car and buses (both private and public) account for 97% of passenger traffic movements (Mensah, Annan, & Andoh-Baidoo, 2014).

In Accra, 70% of passengers use minibuses (trotros) to get from one end of the city to another. The trotros which are the most affordable and common means of transport in Accra, come with other pressing problems. First, trotros are buses that take about 10-19 passengers and they stop anywhere, at any time, right in the middle of the street to pick or offload passengers. A passenger capacity of 10-19 means not many people can fit in one trotro and hence there is a need for many of them to carry 70% of Accra's population of about 4 million (Blaustein, 2010).

With many trotros on the roads, there is usually a lot of vehicular congestion. Further more cars increase the amount of carbon emissions (air pollution). Also, although there are so many trotros on the roads, it is not guaranteed that a person can get a trotro at a bus stop within 30 minutes of waiting. Additionally, in the trotro, the seats can be very uncomfortable and dirty.

To avoid these problems, some people use taxis to get around Accra. However, taxis are expensive and just like the trotros there is no way of determining how quick it is

to find a taxi. This is because the taxis do not follow a strict time table dictating departure times.

Although there are taxis which leave fixed destinations as long as they have a full set of passengers, most of them prefer to drive around till they are hailed for “dropping.” Dropping is a kind of taxi-provided transportation service where the taxi driver will take the passenger to his or her destination of choice usually at a steep cost. Taxis are not affordable to majority of the populace.

After 59 years of independence, it is clear that Ghana still has pressing transportation problems. In fact, some of its transportation options, like the railway sector, have sharply retrogressed. Furthermore, despite a ballooning population (Ghana's population will hit 50 million by 2050 at current population growth rates) and very serious rural-urban migration which is swelling up the urban population, not enough has been done to guarantee access to transportation in the cities (Vidal, 2011).

The rail system has enjoyed tremendous success in the urban regions of the world such as London, New York, and Tokyo and will potentially facilitate transportation and help mitigate Accra's perennial traffic problems. At the moment however little investigation has been done about (i) the feasibility of implementing a passenger rail system for Accra and (ii) whether such a system will solve Accra's transportation problems in a cost effective way.

Research questions

- What is the current state of Accra's railway system and why?
- How can railway transport in Accra be improved?

- How easy will it be to set up an effective railway system in Accra?
- What are the benefits of developing an effective railway system in Accra?
- Which sector will efficiently provide passenger railway transport in Accra (public and private)?

Research Objectives

- To document the current state of Accra's railway system and try to understand the different reasons for the current state of passenger rail transport in Accra.
- To outline the potential benefits and describe the challenges in setting up an effective passenger rail in Accra.
- To determine whether the public or the private sectors will be more efficient in operating the railway lines in Accra.
- To find ways to improve railway transportation in Accra.

Relevance of the research

A country is able to develop effectively when it improves the welfare of a society through appropriate social, political and economic conditions (Rodrigue & Notteboom, 2013). One way of improving these conditions is by improving human capital (education) and physical capital (infrastructure). Ironically transportation is important not in education but in the provision of services such as health as well as in productive manufacturing processes. This means with effective transportation infrastructure, economic activities can also more effectively take place.

In Accra, the transportation infrastructure (both roads and rail) are poor. Recently, the minister of roads and highways indicated that 20% of the roads in the whole of Ghana is in poor conditions; 30% are in fair conditions while 50% are in good condition (Osam, 2015). However, in Accra, about 45% of the roads which transport most passenger (97% of passengers) are in poor condition and get worse during the rainy season (Accra Metropolitan Assembly, 2006). This means, economic activities in Accra are not running at their fullest capabilities.

Improving the transportation infrastructure in Accra will significantly improve economic activity. Rail transport is a potentially viable option for Accra but it has been neglected. This research investigates the state of railway transportation in Accra to find out why it is currently ineffective and suggests ways to improve it. The results of the research should provide useful lessons to policy makers not just in Ghana but in other African countries suffering from choking traffic and considering rail as a viable option to solve the mass transport problem.

Relevant stake holders who will benefit from this research

- The government of Ghana: The findings from this research can be used to advice the government of Ghana on how it can improve the transportation in Accra. With an improved transportation infrastructure, economic activity will improve hence Ghana can develop better.
- The population of Accra: The findings from this research have suggestions that will make it more effective and efficient for people in Accra to move from one place to another.

- Businesses in Accra: Using the findings in this research to improve transportation can help Businesses carry out their activities more efficiently.
- The population of Ghana: With efficient and effective economic activity in Accra, the capital of Ghana, the GDP per capita of Ghana can significantly increase.

CHAPTER 2: LITERATURE REVIEW

Introduction

A number of papers have been written on rail transportation in developing countries like Ghana. In these papers, the authors recounted the history of railway in developing countries and also examined their current state. Armah, Yawson, & Pappoe (2010) considered the urban planning problems faced by Accra. In their research, they found that there were many negative environmental externalities like air pollution associated with road transport. They suggest that light railway transit system is an appropriate alternative to road transport.

Current literature has examined the effects of railway transport in different countries. Darroch (2012) describes how railway was developed in England to ease flowing traffic in residential areas. According to him this has benefited England over time. However, there are only few papers that focus on railway transport in Ghana and specifically in Accra.

In one of these papers, Adaquay (2014) discusses the potential contribution of high speed rail to Ghana's economic development efforts. He executes a cost and benefit analysis of a national high speed railway by assuming a system that carries both passengers and freight. He then makes assumptions about the possible number of passengers and goods that will be transported by the high speed railway. Using those assumptions, he estimates what it will cost to lay the tracks and buy the trains. He then compares it to the possible revenue stream from ticket sales over time (Addaquay, 2014).

This paper has some similarities to Adaquay (2014)'s analysis because this paper also seeks to outline the benefits of rail transport on Ghana's development. However, this

paper exclusively focuses on passenger railway in Accra. To add to the literature, this paper seeks to examine the current state of railway transport in Accra; to find out why it is in the state it is in; identify ways to improve it; to determine whether the public or the private sectors will be more efficient in operating the railway lines in Accra; and to outline the benefits of a good railway system to Accra and consequently to Ghana as a whole.

Transportation as a major problem for large cities

There is a lot of congestion on roads in large cities and the cost of expanding the roads is high. As a result, large cities worldwide are struggling with the problem of transporting their increasing populations (Edwards & Smith, 2008).

Additionally, the necessity to reduce greenhouse gas emission creates a challenging transport policy environment (Edwards & Smith, 2008). This means expanding roads for more cars may not be the best solution to the transport problems.

The increasing population of cities is placing more demands on transport infrastructure and hence on already congested roads and crowded public transport vehicles (Edwards & Smith, 2008). Looking for parking spaces on roads may also add to the congestion on roads especially where the city authorities are not effective in marking out parking spaces and the police are too corrupt to implement it (Rodrigue J.-P. , 2016). With many cars in cities, it can be very difficult to find parking space. Also, cars and car parks consume valuable urban space (Edwards & Smith, 2008).

In some countries, large cities are sprawling and becoming less dense meaning many people are moving to the suburbs and travel longer distances to get to work in the city centers. With poor public transport systems, more people will prefer to make the longer

journeys with their private cars (Edwards & Smith, 2008). Furthermore, transport systems in cities tend to be radial in nature. They are efficient at moving people from the suburbs to the city center and back but moving people from suburb to suburb is not efficient (Edwards & Smith, 2008).

In all, cities all over the world face many similar transport problems which include traffic congestion, pollution and aging transport infrastructure. Similarly, Accra faces such problems. Some of the transport infrastructure like railway lines and trains are old. Also there is a lot of congestion on the corridors of Accra's roads.

A discussion on proposed solutions to the transportation problem in large cities

Identifying transport problems in large cities is easy. However, developing solutions or best practices is difficult. For example, public transportation by road may be said to be a good solution for road congestions. Nonetheless, in Ghana the trotros, which are a means of public transport, have only added to the road congestion. Some best practice suggestions for large cities are mentioned below.

To solve transportation problems in large cities, the use of public transportation has been encouraged (Edwards & Smith, 2008). Public transportation has however not solved transportation problems. For example, in London, public transport has not kept pace with the city's growth and so infrastructure in metro and railway service is aging (Edwards & Smith, 2008). Similarly, in Ghana many people use public transportation but there are still many transportation problems.

One strategy that can be employed to reduce congestion on the road in large cities is road charge (Edwards & Smith, 2008). With road charge, people will have to pay fines

if they bring cars into the city center at certain periods. In London there has been a 5% modal shift from the use of car to buses with this charge (Edwards & Smith, 2008).

Other types of mass transportation like buses may help solve transportation problems. However, in Accra with a growth rate of about 4% larger mass transport means (rail transport) may be needed.

The emergence of railway as the dominant solution for the transportation problem of large cities

Large cities are usually tightly built especially in their centers. As a result, it may be difficult to choose an efficient transport system (Alku, 2002). Such cities cannot only depend on motor vehicles as a result of lack of space for road expansions and also the current worries over global environmental issues (Okamoto & Tadakoshi, 2000).

Also with cities that have large populations, metro mass systems that can transport many people at the same time are needed. As a result of their larger population sizes and lack of spaces, railway lines became dominant in large cities. For example, London was the first to build an intercity railway link in the mid-19th century when its population increased to 4.5 million (Okamoto & Tadakoshi, 2000).

History of railway lines in the international context

According to Dr. Michael J T Lewis in his book Early Wooden Railways, a rail is a prepared track which guides the wheels of the vehicles running on it (Lewis, 1974 as cited in (Coulls, 1999)). Railway transport uses vehicles on tracks to carry passengers or

goods from one place to another. The main vehicle used for rail transport is the train and hence it is usually referred to as train transport.

Passenger railway transportation is basically, using trains to carry human beings from one place to another. For many years, trains have carried people around cities like London, Seoul and Cape Town.

London Underground (The Tube Line)

The underground railway lines in London are the oldest in the world (Darroch, 2012). The first underground railway line in London opened in 1863 and since then many lines have been opened (Darroch, 2012).

These railway lines were built to revolutionize England's national transport system. The railway lines were built underground (under the public highway) following sources of existing traffic in the form of omnibus routes from the residential areas into the central business district (Darroch, 2012).

Over the years, the railway transport has positively transformed transportation in London (it is efficient and effective). One of the oldest underground lines built in London is the Victoria line. The Victoria Line is an underground railway line from Victoria in the south of London to Walthamstow in the north-east of London (Foster & Beesley, 1963).

It connects the north of London to the south, making it easy for people to move from one end of the city to the other. Train transport in London may be effective and efficient but there were problems when it was being constructed and there are still problems with it now. The British government also faced funding issues when they planned to build the Victoria line hence it was built in 1962 instead of 1955 as planned (Government of the

United Kingdom, 2015). In the same way, railway systems may revolutionize transportation in Accra but they come with their respective problems.

Figure 3: Victoria Line.



Source: Google images

Australia (The Bellarine railway)

Train transport has also been beneficial to other countries like Australia. Australia has the Bellarine railway which was built in 1978 to provide services to Great Geelong in Australia (Nichol & Moore, 2010).

Since 1978, this railway line has been very beneficial to Great Geelong. This railway line gave people jobs and also the purchase of its service added to the GDP of

Australia (Nichol & Moore, 2010). Improving the current railway system in Accra may also create jobs and add to the GDP of Ghana.

City rail transport in the African context (Cape Town, South Africa)

The oldest line in South Africa was opened in 1860 (South African History Online, 2015). It was a short line between Durban and The Point (Atlantic Rail, 2015).

The second oldest rail line in South Africa is a line from the main city of Cape town to Eerste River in the suburbs which was opened on 13th February in 1862 (Atlantic Rail, 2015). The discovery of diamonds in South Africa in 1866 led to increased railway construction throughout the country (South African History Online, 2015).

Over subsequent years, more lines were built to connect the city to other areas like Wellington, Muizenberg, Wynberg and Kalk (Atlantic Rail, 2015). The railway line is publicly owned and is the most efficient in Africa. Maybe, Ghana can develop the railway line in Accra stage by stage just as South Africa did in Cape Town since there are not enough funds to develop all of it together.

Figure 3 Map of the existing Cape Town railway network



Source: Google images

The challenges of mass transportation in Accra, Ghana's capital

Accra is the capital of Ghana and is located in the southern part of the country. The city has a population of about 4 million and is growing at nearly 4% a year (Index Mundi, 2015). Over the past 20 years, its population has increased significantly and hence, the demand for transportation (specifically road transport) in Accra has also increased. The

increasing levels of motorized traffic on the roads have not been matched by an increase in road network to meet demand (Møller-Jensen, Kofie, & Allotey, 2012). Some new roads like the George Bush Motorway (the N1) and the Legon-Adenta highway have been constructed and expanded but they still are not enough to match the increase in demand for paved roads in Accra. Urban areas are growing but roads are not being provided to ease accessibility in these areas (Møller-Jensen, Kofie, & Allotey, 2012). Additionally the existing roads in newly developed areas and many roads in Accra in general are in a poor state (Møller-Jensen, Kofie, & Allotey, 2012).

Roads can be expanded and reconstructed but while they are being constructed, traffic problems arise (Møller-Jensen, Kofie, & Allotey, 2012). This means building more roads or expanding roads may not be the best solution to the current transportation problem in Accra.

Additionally, there is little mass-transport system in Accra. The main mode of public transportation in Accra is the minibus (trotro). These trotros operate in ways that cause chaotic road conditions and take road space (Møller-Jensen, Kofie, & Allotey, 2012).

Not more than 5% of the Ghanaian population own private vehicles (Armah, Yawson, & Pappoe, 2010). However, about 270,000 vehicle trips are made into and out of Accra central on a weekday and about 84% of these trips are made by public transport vehicles (Armah, Yawson, & Pappoe, 2010). 56% of these passengers are carried by trotros and 15% by taxis (Armah, Yawson, & Pappoe, 2010). Since the trotros are not a mass transport system, many of them are needed to make the 270,000 trips and so they take a lot of space. Also many of the trotro drivers do not drive well since they often do not possess

licenses or (acquire them illegally when they do) hence they lack knowledge about road signs and end up disregarding them (Nelson, 2010). This causes chaos on the roads.

Probably, mass transportation by rail may help improve transportation in Accra since the vehicles used will take no road space and can be more efficient. With trains running, there will be less traffic on roads because trains can carry many more people and so the number of cars needed on roads to carry people will decrease. Also with an efficient train system, predicting transportation time can be easier. With trotros, it is difficult to predict transportation time because it is difficult to tell what time they arrive at a bus stop and what time they take off (Blaustein, 2010).

Furthermore, road congestion can be perceived as unavoidable consequences of scarce and poor transport facilities such as road space (Rodrique et al, (2009) as cited in (Harriet, Poku, & Emmanuel, 2013)).

In Accra and most parts of Ghana, road conditions are for the most part poor (Kwakye, Ofusu-Dorte, & Fourarce, 1997). Almost half of the road lengths have no engineered surface and those that have surface dressing have an extensive degree of deterioration (Kwakye, Ofusu-Dorte, & Fourarce, 1997).

To improve the transportation congestion caused by the bad roads, construction has to be done. The bad roads cause problems like environmental pollution since a lot of particles and dust are released into the environment. There are also health issues as apart from dust, as pools of water collect in pot holes on roads when it rains and breed mosquitoes. The female anopheles mosquitoes are well known vectors that transmit malaria by transmitting the dreaded plasmodium parasite.

Environmental pollution as a result of this traffic congestion is increasing and air quality in Accra is a health risk (Armah, Yawson, & Pappoe, 2010). Heavy metals like lead and gasses like Sulfur dioxide are emitted from the many vehicles on the roads (Armah, Yawson, & Pappoe, 2010). Sadly, the enforcement of pollution regulations by the police is ineffective as the police can be easily bribed to look the other way.

Road expansion adds to pollution because particulate matter is emitted during construction (Armah, Yawson, & Pappoe, 2010). Expanding roads may ease congestion but it also feeds into the problem of environmental pollution (Armah, Yawson, & Pappoe, 2010). Other modes of transport like rail and bicycle that will release less emission should rather be promoted.

History of railway transport in Ghana

The rail transport system was invented in the 1820s (Coulls, 1999). However, it was introduced in Ghana in 1903 (African Rail Ghana Ltd, 2014). During the colonial rule, the British colonists developed the first railway line in Ghana to transport heavy equipment from the harbor in Takoradi to the gold mines in Tarkwa and to transport heavy gold ore in the opposite direction. They also put down rail lines to transport bauxite from Nsuta to the Takoradi port (African Rail Ghana Ltd, 2014).

At first, the trains were used to carry only heavy equipment (freight trains), but in 1906, trains also started transporting people. In those days, many people in Ghana used trains to get around the country. Passenger traffic on rail was heavy with about 1.5 million passengers using trains in 1926 (African Rail Ghana Ltd, 2014). By then, Ghana had a population of less than 10 million people which means about 15% of Ghana's population used trains. However, in modern Ghana, less than 1% of passengers are carried by railway

and only about 2% of freight is transported by rail (Ghana National Commission For UNESCO, 2009).

Ghana has a railway network of 1,300 kilometers which is mostly made of single track rail of 1.067m (3feet 6inches) gauge (Ghana National Commission For UNESCO, 2009). All the railway lines in Ghana are located in the southern part of the country. Most of these lines are no longer operational. The freight trains move on the western lines which are in the western part of Ghana and the passenger trains on the main lines in the south eastern part of Ghana: Accra-Nsawam and Accra-Tema lines (Ghana National Commission For UNESCO, 2009).

As at 2008, only 36% of the railway network in Ghana was in operation. However, in 2010 and 2013, some track sections of the railway line in Tema were opened to traffic (Bentil, 2014). From 2003-2008 freight volume and passenger traffic respectively shrunk by about 83% and 60% (Ghana National Commission For UNESCO, 2009).

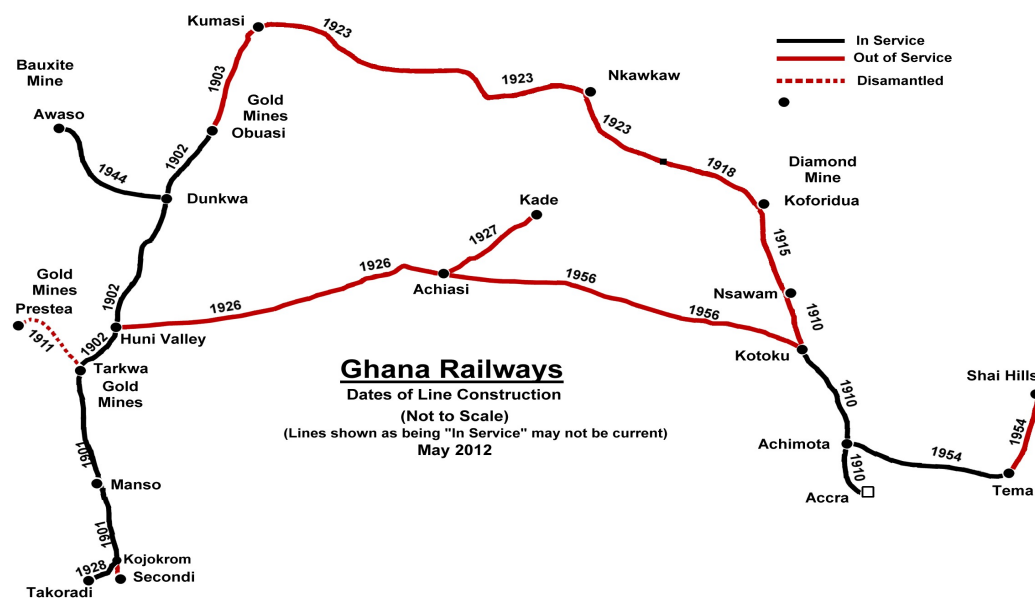
This decline in service was as a result of the deteriorating railway lines due to poor maintenance which in turn was the result of ineffective management and insufficient funds. Currently, the railway lines in Ghana are run by the state owned Ghana Railway Corporation which is responsible for the efficient management of the national rail system (Ghana National Commission For UNESCO, 2009). Also, the track sections opened in 2010 and 2013 are not being maintained well and are becoming unsafe for passengers (Bentil, 2014).

Figure 4: A map of the railway lines which are only in southern Ghana



Source: Google Images

Figure 5: A map of Ghana railway lines showing the active and inactive lines



Source: Google Images

Proposed solutions to Accra and similar cities' transport problems

Not much attention has been paid to the transportation problems in African cities (Godard as cited in (Konings, 2006)). Nonetheless, there have been some proposed solutions.

One main problem with transportation in Accra and other similar cities is road traffic congestion. To help ease road traffic, the use of other vehicles like motor bikes has been employed. The use of motor bikes in African cities is very beneficial because they provide forms of transport well adapted to road conditions and are also affordable (Konings, 2006).

However, many people complain that these vehicles are driven recklessly and cause many accidents (Konings, 2006). They are also typically used to commit crimes such as murder for hire because they are a very convenient get-away vehicle. Moreover, there are safer solutions to the traffic congestion in Accra and similar cities.

There does not appear to be a quick easy fix to the traffic problems in Accra but there are some measures that can be put into place to ease traffic in the short and long terms. Good government policies, planning and demand and supply management can help ease traffic congestion (Armah, Yawson, & Pappoe, 2010).

In Accra, the number of private cars has significantly increased due to urbanization. Cars take a lot of road space and cause congestion while they carry a few people (Armah, Yawson, & Pappoe, 2010). The number of vehicles registered in Ghana increase by about 23% every year (Business and Financial Times, 2013). Hence there must be government policies and planning control to prevent further increase in car use and also encourage more people to use public transportation (Armah, Yawson, & Pappoe, 2010).

Although the public transport system in Accra has improved over time with the introduction of the metro mass buses, the traffic problem has not been solved. A public railway system may help ease traffic while producing affordable, safe and fast transportation for the public (Armah, Yawson, & Pappoe, 2010).

Furthermore, to improve transportation, the demand for private transportation in Accra can be managed. High import tax on cars and high registrations fees can be used to control the number of private own cars (Armah, Yawson, & Pappoe, 2010). However, placing high taxes and fees on vehicles may not solve the problem because there is no existing substitute for road transport in Ghana. Road transport is the main transport mode for people in Ghana accounting for 97% of passenger transport (Mensah, Annan, & Andoh-Baidoo, 2014).

Rail as a viable option for Accra

The use of motor bikes and the expansion of roads like the N1 have not solved the transportation problems like road traffic in Accra. There is still a lot of traffic congestion around Accra and also public transportation is not very reliable. Not much has been done to improve the railways system in Accra but railway transport can ease the congestion on roads (Gardner & Kuhbn, 1992).

Hence using trains may just be the perfect solution for the current transport problems in Accra. Trains can carry many passengers (up to 3000 passenger per train) and hence can solve the mass transit problem in developing countries (Gardner & Kuhbn, 1992).

The minibuses (trotro), which is the main mode of public transport in Accra, can only carry about 12 to 30 people at a time (Kwakye, Ofusu-Dorte, & Fourarce, 1997). This means with one train plying a single route, about 250 trotros can be taken off the road and traffic congestion will be reduced.

Traffic congestion can be reduced with the introduction of an efficient train system in Accra but the primary disadvantage of introducing it is the high cost associated with constructing railway lines (Gardner & Kuhbn, 1992). Another challenge is the potential increase in unemployment that will come with trotro drivers losing their jobs and the political cost to the incumbent government.

In 2015, Addis Ababa opened a light rail system which cost \$475 million and 85% of the cost was funded by loans from China (Railway Gazette, 2015). It may be expensive but the government can encourage multi-economic sectors to help fund a railway project or get loans from other countries and organizations like the International Monetary Fund (Armah, Yawson, & Pappoe, 2010).

This means the private sector can be allowed to invest in and run the railway system in Accra with the government. This way, the cost of setting up and maintaining the railway system will not be solely on the government or from loans. Additionally, it will be very good and advisable for the Ghana government to start a railway project because the vast majority of people in Accra will continue to rely on public transport (Gardner & Kuhbn, 1992). Considering that buses still take up space on the road and have not been very effective in Accra, maybe more trains should be introduced.

The current state of Accra's railway system

As mentioned above, there are only two main railway lines running in Accra (Ghana National Commission For UNESCO, 2009). Subsequently, only two trains run on these lines. This means most parts of Accra are not connected by railway system.

Over the past 10 year, very little has been done to develop these lines further. In 2010 and 2013, some track sections of the Accra-Tema railway line were expanded and opened to traffic (Bentil, 2014). The track sections that were opened have not been maintained well and are becoming unsafe for passengers (Bentil, 2014). This research hopes to further investigate the state of Accra's railway system.

Cost and benefits of implementing an effective railway system in Accra

Just as railway transport has been beneficial to other countries it can be beneficial to Ghana. A good railway system running in Accra will reduce traffic, create employment and add to Ghana's GDP. The trains can take many cars off the roads and hence reduce traffic and also maintenance workers and drivers will be hired and this will create employment.

The railway lines can also add to Ghana's GDP since income will be raised from the sale of tickets. Also there will be tax income from the railway employees. An effective railway system can also help with the transport of agricultural produce and this will help improve the agriculture system which forms a significant part of Ghana's GDP (about 22% of GDP) (Ghana Statistical Service, 2015).

Additionally, with more people using trains, greenhouse gas emissions in Accra can be reduced. On the average, trains release less carbon into the atmosphere than cars do; for

every passenger mile, light rail releases 0.41 pounds of carbon dioxide while private cars release 0.96 pounds (Hodges, 2009). Of the 270,000 vehicle trips are made into and out of Accra central on a weekday, about 84% are made by public transportation vehicles (Armah, Yawson, & Pappoe, 2010). Hence if more trains are introduced to Accra and less trotros and private cars are used, there will be less pollution in Accra. Subsequently, trains can carry many passengers (up to 3000 passengers per train) and hence can solve the problem of traffic congestion on roads since many cars will be taken off the roads if people use trains (Gardner & Kuhbn, 1992).

Some people may argue that implementing an effective and efficient train transport system in Accra will cause trotro and taxi drivers to become unemployed. However, introducing an effective railway system creates employment. For instance in India, the railways system employs 1.36 million people a year (Trivedi, 2012). The trotro and taxi drivers may become train drivers or work at train stations. Hence developing an effect and efficient railway system in Accra could increase employment in Accra.

Although there are these benefits from improving train transport in Accra, it will be expensive to set up. Ghana has a railway network of 1,300 kilometers which is mostly made of single track rail of 1.067m (3feet 6inches) gauge. All the railway lines in Ghana are located at the southern part of the country. Most of these lines are not operating anymore. As mentioned before, the freight trains move on the western lines which are in the western part of Ghana and the passenger trains on the main lines in the south eastern part of Ghana (Accra-Nsawam and Accra-Tema lines). Moreover, only 36% of the railway network in Ghana was in operation as at 2008 (Accra-Tema and Accra-Nsawam lines) (Ghana National Commission For UNESCO, 2009).

This means more rail lines would have to be built and more trains would also have to be bought. This will be very expensive and considering that Ghana has a lot of debt, it may not be feasible. It will also be extremely expensive to build underground rail lines. The government of Ghana can encourage the private sector to invest in railways since it does not have sufficient funds.

Gaps in existing literature

Armah et al (2010) and others have written about the benefits and challenges of developing a good railway system in places like Accra. However, very few people have talked about the benefits of private owned or public owned railway systems. Unlike other research papers, this research does not only seek to understand the state of railway transport in Accra and suggest ways to improve it. It also seeks to determine whether the public or the private sectors will be more efficient in operating the railway lines in Accra. In order to determine the better sector to handle the burden of managing the railway lines, research has been done on the effects of both sectors on railway systems and respondents have been asked to comment on and explain why either the private or public sector should be in charge of managing Accra's railways. The information from this research will be added to current literature.

CHAPTER 3: METHODOLOGY

Overview

In this chapter, the research design, scope, operational variables used, sampling methods, research strategy and details about the kinds and sources of data used have been discussed. The tools and methods for collecting and analyzing data have also been explained and justified.

Key variables

The main variables in this research are passenger railway transport and benefits to Accra. The purpose of the research is to assess the state of the passenger railway transport in Accra and to compare the costs and benefits to Ghana of improving the status quo. A related objective is to determine whether it is better to institute a public or private railway system in Accra.

- a. Accra: Accra is the capital of Ghana, a country in West Africa. It is a city located in the southern part of Ghana. Accra has a population of about 4 million (Index Mundi, 2015).
- b. Railway Transport: According to Dr. Michael J T Lewis, in Early Wooden Railways, a rail is a prepared track which guides the wheels of the vehicles running on it (Lewis, 1974 as cited in (Coulls, 1999)). Railway transport uses vehicles on tracks to carry passengers or goods from one place to another. The main vehicle used for rail transport is the train and hence it is usually referred to as train transport.

- c. Passenger Railway Transport: It is a means of transportation by which trains carry human beings from one place to another. They are also referred to as commuter rail and they operate between city centers and suburbs.
- d. Benefits: The benefits gained from implementing an effective and efficient railway system in Accra have been discussed and categorized in terms of the economic and social benefits.
 - Economic benefits: These are the benefits that Ghana's economy will enjoy if there is a good rail system operating in Accra. These benefits can be quantified in terms of revenue, income or GDP (Wells, 2015). In this research, the economic benefits have been discussed in terms of terms of GDP. Other factors like the ease of transportation of goods are also economic benefits Ghana will enjoy should the railway system be improved.
 - Social benefits: These are the benefits that the Ghanaian society and specifically Accra society will gain from running a good railway system. Social benefits include private benefits and external benefits (Pettinger, 2013). In this paper the social benefits have been analyzed in terms of traffic reduction, pollution reductions and job creation. Also the safety of passengers as a result of an improve railway system is a social benefit.

Research design

A research design is a general plan of how the research questions will be answered and the research objectives achieved (Saunders, Lewis, & Thornhill, 2009). For the purpose of this study, an exploratory approach was used. An explorative study is a valuable means

of understanding and assessing a problem especially if there is uncertainty about the nature of the problem (Saunders, Lewis, & Thornhill, 2009). This research aims to assess the current state of passenger rail in Accra. As a result, an explorative study has been done to properly assess and understand the problem with passenger railway transport in Accra.

Aside documenting and understanding the current state of Accra's railway system, the research also outlines the potential benefits and describes the challenges in setting up an effective passenger rail in Accra. Additionally, the study was done to determine which sector can best run the railway system (the private or public sector).

To achieve these objectives semi-structured interviews were conducted on people who live in Accra and use the trains. The director of regulations and assurance at Ghana Railway Development Authority was also interviewed to gain insight on the state of the railway system in Accra and also to determine what sector can best run the railway system. Online questionnaires were also administered to people who live in Accra and do not use trains since it was an easy way to reach many of them.

Research scope

Study area

The research is in the context of Ghana, specifically Accra. A lot of focus is in the area of central Accra where the main train station is (Accra central, Kwame Nkrumah Avenue). Many different areas in Accra are also reflected in the data collected because people who live at these different places were part of the research participants.

Study population

The population of the study is basically inhabitants of Accra (people who use any of the trains to move around and people who do not use trains at all but will likely use trains should the service be easily made available to them).

In order to best understand the railway system in Accra the different groups of people in Accra were interviewed (train passengers and non-train passengers). The train passengers have been interviewed to find the current challenges they face when they use the trains and the non-passengers to find out what prevents them from using the trains.

Knowing the challenges both groups have with the train transport will help understand the state of the system. For the people who use the trains, interviews were conducted to collect data. Since very few people use the trains, it was difficult to identify train passengers by sending out questionnaires on online platforms. Hence participants were interviewed at the train station in Accra where it was easy to identify passengers. In the interviews, they were asked questions that helped identify the problems they have with the railway system and how it can be improved.

On the other hand, questionnaires were administered to people who do not use the trains using online platforms. This was an easy way to reach many people within a short time. The questionnaire contained questions that helped identify why these people do not use the trains and sought out what would encourage them to use the trains.

A director at Ghana Railway Development Authority was also part of the study population. As the director, he has a lot of information about the state of the railway service and the challenges and benefits associated with improving it. As a result, an interview with him was helpful in achieving the research objectives.

Sampling strategy

Sampling technique

For the purpose of this research, most data collected was from people using interviews and through questionnaires. The primary data needed, was collected using purposive non-probability sampling. The main goal of purposive sampling is to focus on particular characteristics of a population that are of interest to the research (Leard Dissertation, 2012).

The research focused on railway transport in Accra and so the people that were interviewed had to have certain characteristics. They had to be residents of Accra and also some respondents needed to be passengers of the existing railway system. In order to reach the particular participants needed, purposive sampling had to be done.

Furthermore, a semi structured interview was conducted to get information from the director of Ghana Railway Development Authority who was also purposively sampled. A person had to have knowledge about the railway system in Ghana in order to be eligible to be interviewed and since he had this characteristic, he was selected as a participant.

Sample size

A sample of 11 people who use the trains in Accra was obtained and then interviewed. Since it was qualitative data that was collected during these interviews, a large number of interviewees was not necessary. In qualitative research, there is a point of diminishing return to a qualitative sample because as the study goes on, more data does not necessarily lead to more information (Mason, 2010).

To obtain a reasonable sample size for the sub-population of Accra that do not use trains some assumptions was made. However, it was recognized that those that do not currently use trains could use trains when the rail service improves. The working population of Accra was thus assumed to be 2 million out of a total population of 4 million.

Using a population of 2 million, a confidence interval of 7 and a confidence level of 95%, a sample size of only 196 people is required to achieve generalizable results. However, to reduce the risk of insufficient data due to a low response rate, questionnaires were administered online to over 400 people and 221 people responded yielding a response rate of 55.5%.

Given that 84% of Accra's population currently uses public transportation and 70% of them use trotros and buses, it is possible that at least 50% of the population will use the trains if the railway system is improved and connects many areas in Accra. Finally, the director of Ghana Railways Development Authority was also interviewed via a semi-structured interview.

Data collection

Collection instruments

Questionnaires and interviews were used to collect primary data. The questionnaire design employed both open ended and closed ended questions. The research questions, objectives and key variables were used to develop questions that were used in the questionnaire and interviews guides. Copies of all questionnaires and interview guides are included in the appendices. Secondary data was also collected from journal articles and relevant literature and databases. To collect data from online databases the research

questions and objectives were used to develop variables. These variables were used to search online.

Data collection procedure

To collect the data, the researcher went to the Accra railway station which is located in central Accra at the Kwame Nkrumah Avenue where both the Tema and Nsawam trains stop. The prospective participants who are people who were waiting for trains to move were approached and the purpose of the study explained to them. Those who agreed to be a part of the research signed a consent form and were interviewed. Similarly, questionnaires were administered to people in Accra who do not use the trains. They also signed consent forms and filled the questionnaire after the purpose of the research was explained to them.

Also a meeting was set and held with Mr. Quansah the director of regulations and assurance at Ghana Railway Development Authority. The researcher called Ghana Railway Development Authority and explained the purpose of the research. Then a meeting was set and during this meeting, a semi-structured interview was conducted.

Data preparation, collation and processing

As mentioned before, data was collected using a questionnaire and a semi-structured interview guide. Confidentiality was assured as all data was processed solely by the researcher. Also due credit has been given to all online databases from which secondary data was collected for the purpose of the research. All data collected was sorted by the researcher and an interpretive and descriptive analysis has been made using the data collected. Based on the analyses, a conclusion on the state of the railway system has been made.

Data analyses

Since the data collected from the interviews and research was qualitative, a descriptive and interpretive analysis was done. The analysis was done to describe people's experiences on trains and at train stations. An inferential and interpretive analysis was also done to outline the reasons why people do not use the trains. The two groups of people were interviewed to collect sufficient information about the state of Accra's railway system. The people who use the trains gave information about the problems it has and those who did not use it gave information about how inefficient it is.

Validity and Reliability

Validity is concerned with whether the findings are relevant and accurate (Saunders, Lewis, & Thornhill, 2009). Reliability refers to the extent to which your data collection and analyses techniques are consistent (Saunders, Lewis, & Thornhill, 2009). To test reliability, the same test is administered twice to the same group of people over a period of time. There was not enough time to administer the same questions to respondents twice. However, a good representative of respondents was used and there was consistency in their responses.

The secondary data collected online for the research was from valid sources such as academic articles and journals. As a result, they are accurate and valid. Moreover, no data used in the research was tampered with hence, all information in the study is a true reflection of the data collected. Some information was also gotten from an interview with the director of Ghana Railway Development Authority and so that information should be

valid. The instruments that were used to collect data were developed from the research objective and questions and so all findings are relevant.

Limitations

Accessing data about the country of study (Ghana) was difficult. Online databases provided very little information about Ghana and Accra. Additionally, many of the online databases do not update information and so it was difficult to find information that reflects the current state of the railway system in Ghana. Also traveling from one place to another to conduct interviews was expensive.

Ethical considerations

Confidentiality of information collected from primary data has been ensured. Also all people that were interviewed for the purpose of the research were briefed on the nature and purpose of the research. They were all given consent forms to sign before they participated in the study. Furthermore, the authors of books, articles and other information sources have been acknowledged. Additionally, the research was approved by the Institutional Review Board of Ashesi University College which ensures ethical research and the safety of human subjects.

CHAPTER 4: FINDINGS AND DISCUSSION

Introduction

In this chapter, the data collected from the interviews and questionnaires have been analyzed to solve the research problem and answer the research questions. The respondents of the research are divided into two groups: train passengers and people who do not use trains.

A director at Ghana Railway Development Authority also forms part of the respondents. The information that was collected from the participants was transcribed and used to generate charts and graphs and has also been used to answer the research questions. The data collected from the different groups of passengers are discussed separately. Below, each research question has been tackled and answered.

Research questions

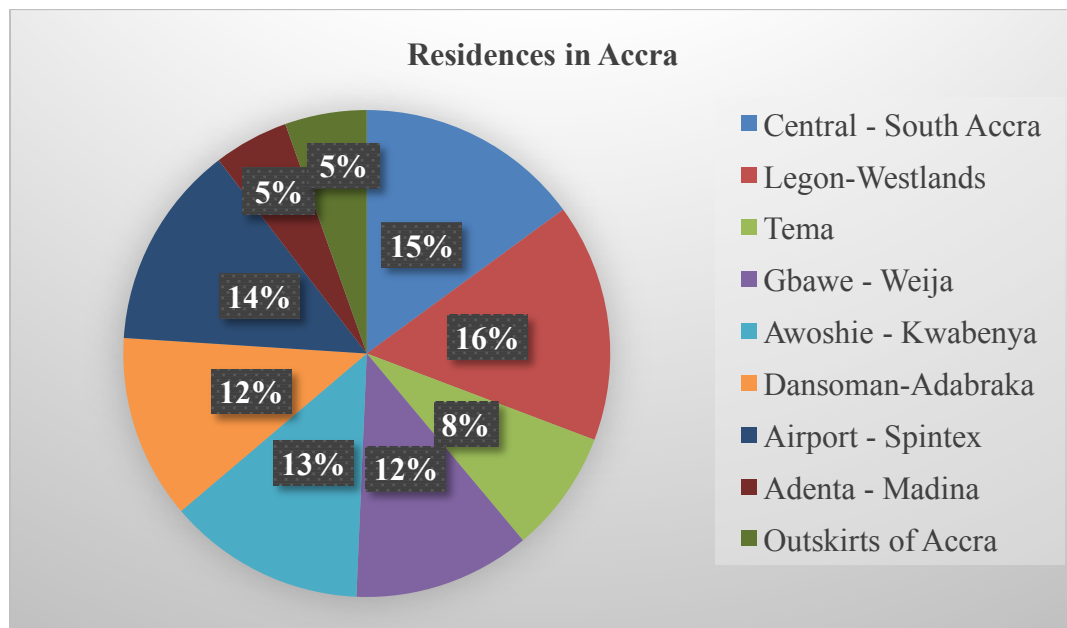
- What is the current state of Accra's railway system and why?
- How can railway transport in Accra be improved?
- How easy would it be to set up an effective railway system in Accra?
- What are the benefits from developing an effective railway system in Accra?
- Which sector will efficiently provide passenger railway transport in Accra (public and private)?

Demographics of the respondents who do not use trains

There were 221 respondents and the data collected from them showed that they lived in over 70 different towns all over Accra. They were respondents from the Central, Northern, Western and Eastern parts of Accra. The total number of areas represented has been grouped into nine (9) main large areas. Most of the respondents live close to or in

Accra (central Accra). Less than 20% of the respondents live at the outskirts of Accra and in Tema. Since the respondents were from all over Accra, they are a good representative of people living in Accra.

Figure 6: A pie chart showing the areas in Accra where the respondents who do not use trains live.



Source: Field data

What is the current state of Accra's railway system and why?

To determine the current state of railway lines, respondents were asked about how often they use the trains and also about how many trains run. These included train passengers, residents of Accra who do not use the trains and the director of regulations and assurance, Mr. Lord Quansah, at Ghana Railway Development Authority.

Number of trains

According to Mr. Quansah, there are currently two mainlines that run in Accra; one from Central Accra through Achimota to Tema, and the other from Central Accra through Achimota to Nsawam. Additionally, just two trains run on these lines (the Tema train, twice daily and the Nsawam train, three times daily).

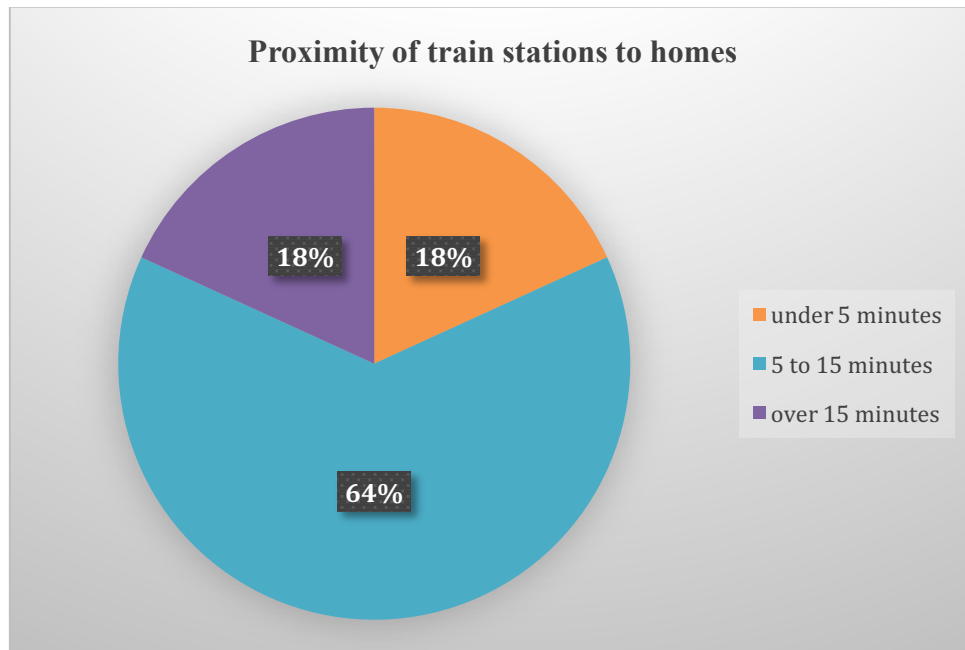
The Tema train has three (3) coaches, can carry 134 people each and the Nsawam train (8 coaches) can carry 100 people each. However, the trains are sometimes very full and so carry many more than the 402 and 800 people they are supposed to carry.

Despite this, these trains still carry less than 1% of passengers in Accra (Ghana National Commission For UNESCO, 2009). Assuming that all trains reached their capacity every time they run, they would be carrying 3,204 people a day which is significantly less than Accra's population of 4 million.

Efficiency of trains and train network

Passengers on the Nsawam train mentioned that the train breaks down often and does not always work after rains due to bad tracks. They also complained that the train does not always leave on time and sometimes may not leave at all. Moreover, the train stations are not very close to where they live. Most of the passengers (82%) have to walk for over 5 minutes to 30 minutes to get to train stations. The chart below shows the proximity of stations to the homes of the respondents who take the trains.

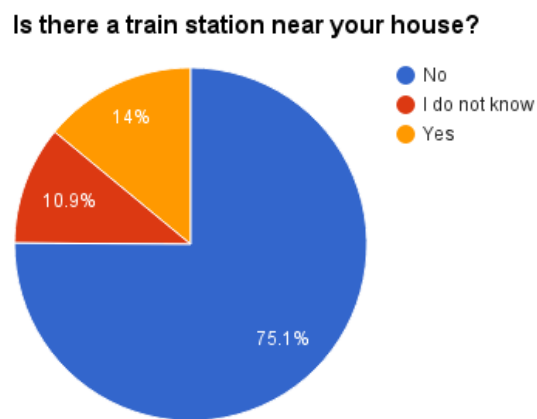
Figure 7: A pie chart showing how long long respondents walk to access trains



Source: Field data

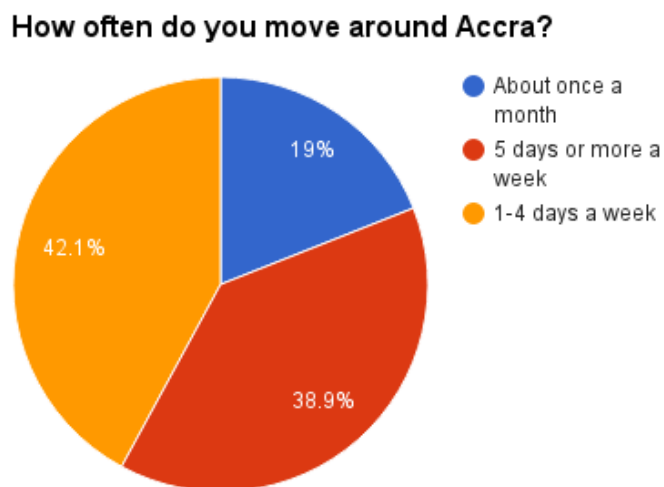
Furthermore, participants who do not use the trains were asked questions to help understand why they did not take the trains. They were asked if they lived near trains stations and about 75% of them said that there are no train stations near their homes while about 10% do not even know if there are any train stations in their areas. The charts below show the respondents knowledge about trains stations in their residential areas and how they move around Accra.

Figure 8: A pie chart showing respondents knowledge about train stations near their houses



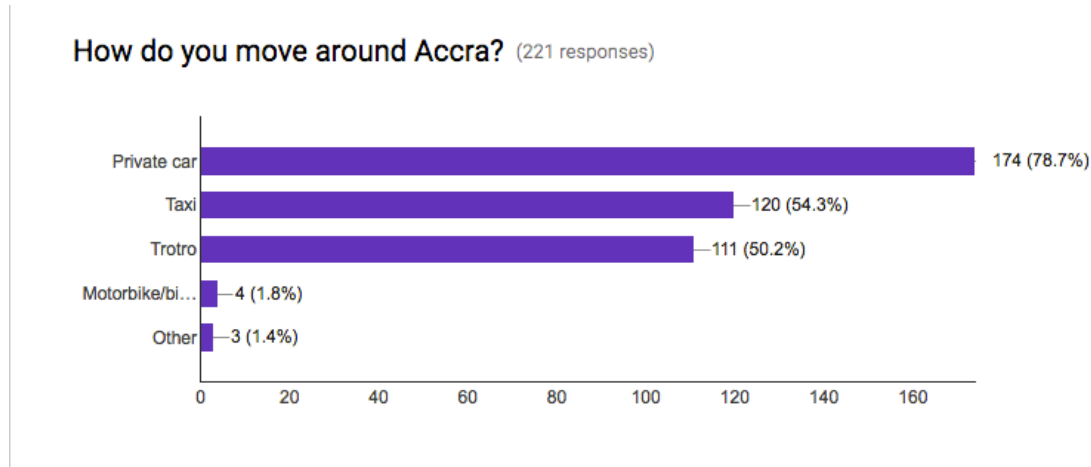
Source: Field data

Figure 9: A pie chart showing the transportation patterns of respondents who do not use trains



Source: Field data

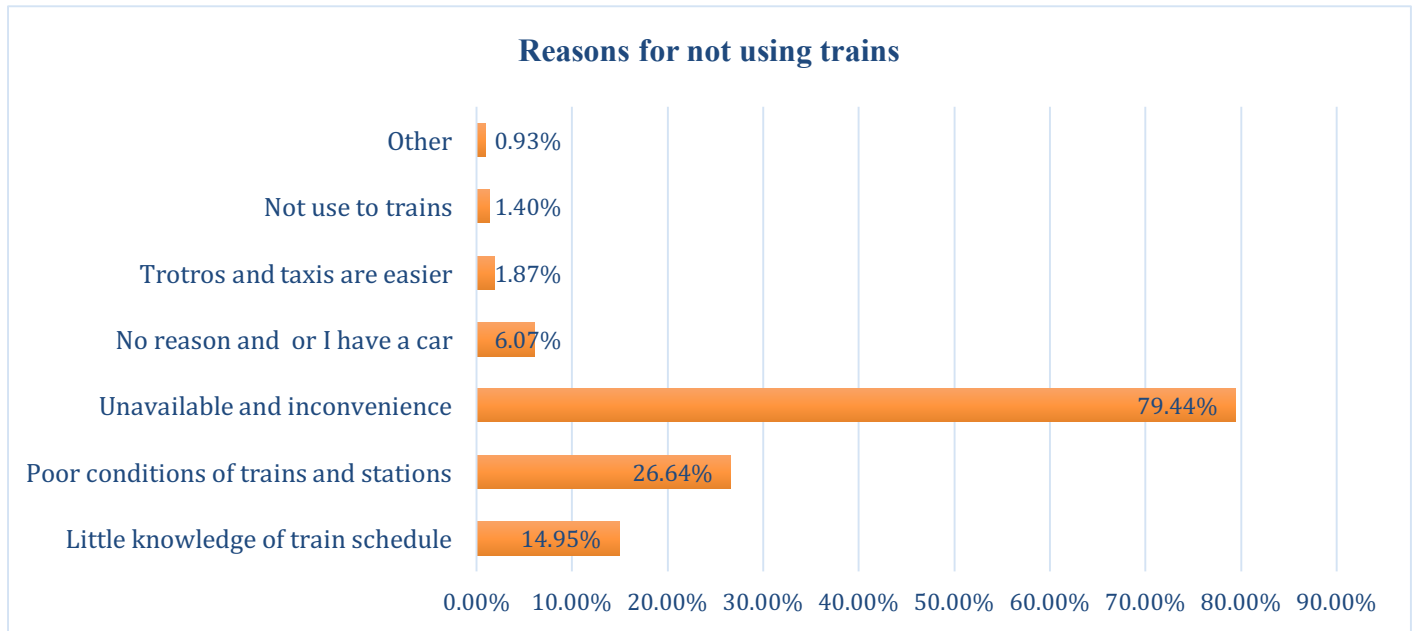
Figure 10: A bar graph showing the means of transport of respondents who do not take the trains



Source: Field data

Aside the fact that participants did not have access to railway stations, the trains do not get them to their desired destination. Most of the participants who are Accra residents and do not use trains said the trains were unavailable and inconvenient to them. They said they would not only have to travel far to access trains but the trains did not go to areas they needed to get to (trains have a poor network). The following graph illustrates the various reasons why some respondents do not use the trains.

Figure 11: A graph showing the reasons why some participants do not use the trains.



Source: Field data

Recent development of railway network

Mr. Quansah was also asked about the development of railway lines and stations over the past five years. According to him, over the past five years, no new lines have been built and just two parts of the Tema line have been redeveloped (the tracks leading to the harbor and to community one). Accra has had its railway line being about 70km long for a long time. The Accra-Tema line is about 30 km and Accra-Nsawam 40 km making a total of 70 km.

Based on the information collected from participants, it can be said that Accra's railway system is not in a good state. Considering that there are not enough trains running (only 2 trains) and also not many trains stations around, the system cannot be used by many people. The network of the railway lines is also bad. There are only two main lines and so

the trains do not go to many places. As a result, many people may not want to use the trains since they do not get them to where they need to go. Moreover, not much has been done in the past five years to improve the poor state of the railway system.

How can railway transport in Accra be improved?

To gain information that would help improve rail transport in Accra, respondents were asked about problems they have with the current system and also about what would encourage them to use trains. The Ghana Railway Development Authority director was also asked about plans to improve and expand the system.

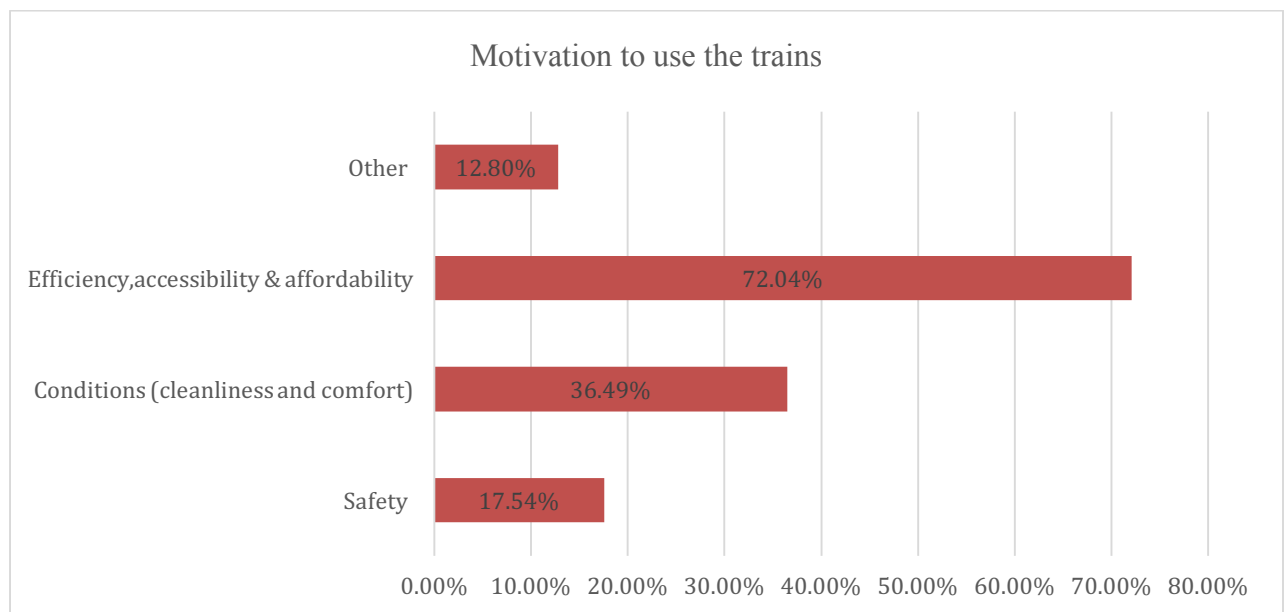
Interestingly, the train passengers did not really seem to have many problems with the state of the railway system and so did not think there were many things that could be done to improve it. Nevertheless, they had a few issues they thought should be addressed. Many of them complained that the engines of the train should be replaced so that the trains would stop breaking down halfway through trips. They also said that the railway tracks needed a better drainage system to ensure smooth train rides even when it rains.

Meanwhile, while conducting the interviews on the train, there were many concerns that arose. The train had holes in the floor which is dangerous and also the seats were old and dirty. To get onto the train, there was no platform and so people have to take a high step in order to board. To move from one coach to another is also dangerous because a person can fall off the train.

On the other hand, the respondents who are not passengers had many issues with the train system. Most of them said the train network was poor and so more lines and stations should be built around Accra so that it would be more accessible to them. A good number of them also suggested that making the trains safer, clean and more comfortable

would improve the system. They complained that the trains were old, dirty and looked rickety and unsafe. Hence getting newer trains with good engines and more comfortable seating would make train transport better and even encourage them to use the trains. Overall, the participants suggested that to improve the railway system, the trains should be made safe, efficient, accessible and comfortable. The graph below shows the suggestions the participants gave to help improve the railway system.

Figure 12: A bar graph showing participants motivations for taking the trains (suggestions to improve the system)



Source: Field data

Mr. Quansah also explained that to improve the railway system more railway lines have to be built in Ghana. As at 2008, only 36% of the railway network in Ghana was in operation. In Accra only two trains run, one from Tema to Accra and the other from Accra to Nsawam (Ghana National Commission For UNESCO, 2009). Which means the

government will have to develop more lines for the system to be efficient. From interviewing Mr. Quansah, it was understood that the government plans to develop more lines. This plan of development has been broken down into stages which the government plans to achieve over certain periods. The diagram below shows a plan to expand railway lines in Ghana over the next 30 years.

Figure 13: Ghana Railway Master Plan



Source: Ghana Railway Development Authority

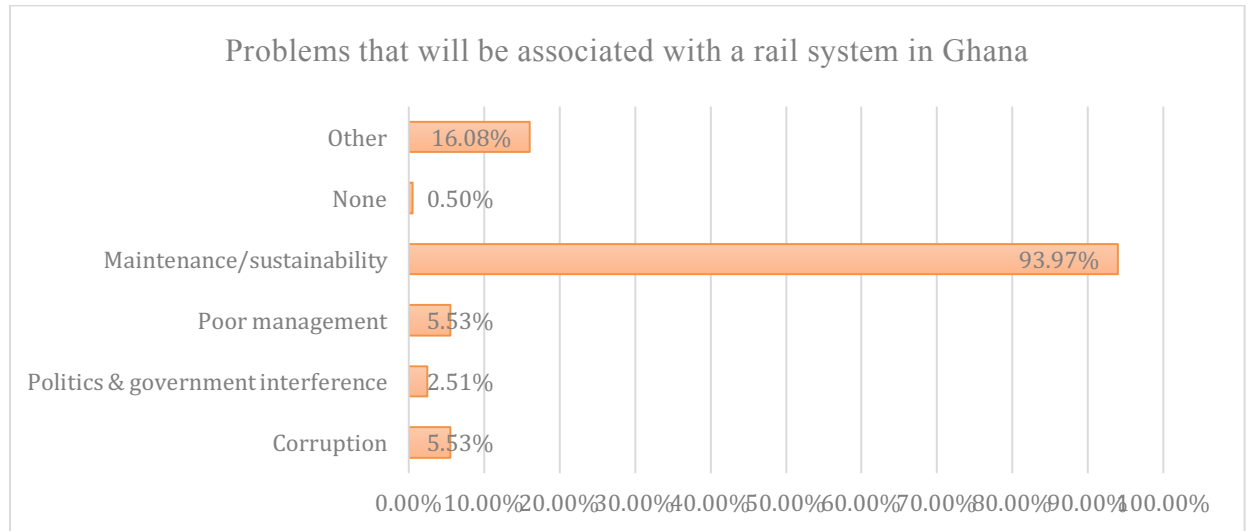
How easy would it be to set up an effective railway system in Accra?

The respondents mostly talked about increasing the railway network (building more railway lines) to improve the system. Although they believe this will help make the railway system effective, most of them believe that raising funds will be very difficult. According to the regulations and assurance director at Ghana Railway Development Authority, as a developing country, the budget for railway development in Ghana is very small. He also said that and it has been very difficult to raise funds over the past few years.

Aside the problem of raising funds, many of the respondents were concerned that Ghanaians have a bad maintenance culture and so setting up and maintaining an effective railway system would be difficult.

They believe that as a result of bad management and corruption, it would be difficult to set up and maintain since the little funds for the railway project might be misused. Some respondents also mentioned that government policies and intervention could also make it difficult to set up an effective railway. The graph below shows the problems respondents perceive are associated with setting up an effective railway system.

Figure 14: A bar graph showing the problems respondents identify as associated with setting up an effective system



Source: Field data

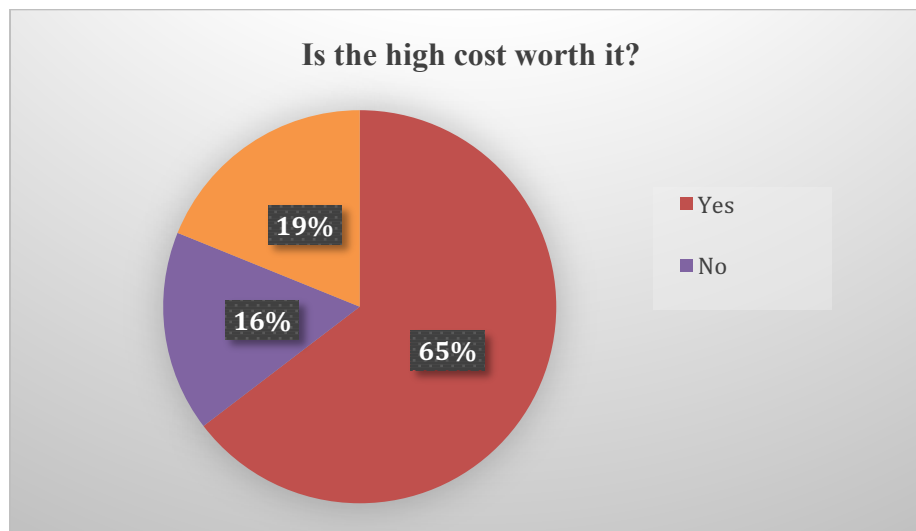
Mr. Quansah said that, when the government changes after a ruling term, a new government may have different priorities and so may fail to continue railway projects that were started by previous governments. As a result, to set up and maintain an effective railway system, the plan has to be longer than a government's term and also strictly followed.

Subsequently, railway lines that have been abandoned have been encroached upon by people who have settled very close to them. According to Mr. Quansah, 100 feet should be left from both sides of the rail to allow for expansion plans. In order to set up an effective railway system, some tracks will have to be expanded but since people have settled in the expansion area, the project will take longer than it should because they have to be moved. People have also laid water pipelines around the tracks and these will have to be removed

during expansions. All of these will inflate the cost of setting up an effective system and also delay the project.

Since it will be very expensive to build railway lines and stations and Ghana does not have sufficient funds, it will be quite difficult to set up an effective railway system in Accra. Also given the poor maintenance culture it will be difficult to keep the system efficient after it is set up. Given that it will be expensive to set up an effective system, some participants did not think the benefits from the railway system would be worth the high cost associated with developing it. The diagram below shows participants' perceptions about the costs associated with developing the rail system.

Figure 15: A pie chart showing what some participants think about the high costs associated railway development



Source: Field data

What are the benefits from developing an effective railway system in Accra?

In the interview with the director, he mentioned that rail transport currently adds insignificantly to Ghana's GDP. However, if it is properly developed, it can add more to the GDP of the country. Mr. Quansah also mentioned that an effective railway system in Accra can significantly reduce road congestion. This benefit was also outlined in Gardner and Kuhbn's paper in the literature review where they mentioned that trains could carry up to 3000 passengers in one trip and hence could solve the problem of traffic congestion on roads in Accra. With less congestion on the roads, people will be able to make their trips faster. Also with no traffic on railway lines, people can travel faster using the trains.

The regulations and assurance director said that an effective train system would conserve fuel since the trains will use less fuel. He said that the trains could use one gallon to cover about 300 km while the cargo cars use one gallon for just about 65 km. Hence if the railway system is made effective and efficient, less fuel will be used not only to transport passengers but also goods around the city. Fast and easy transportation will also be good for conducting business in city of Accra.

Moreover, on the average, trains release less carbon into the atmosphere than cars do; for every passenger mile, light rail releases 0.41 pounds of carbon dioxide while private cars release 0.96 pounds (Hodges, 2009). This means there will be less air pollution. Finally, workers will be needed to maintain and run the system hence there will also be employment benefits. Example, in London, the Cross-rail system created employment opportunities for people (Crossrail Ltd, 2016). Also in India, the railways system employs 1.36 million people a year (Trivedi, 2012). Many employment opportunities can be created in Accra if there is an effective railway system.

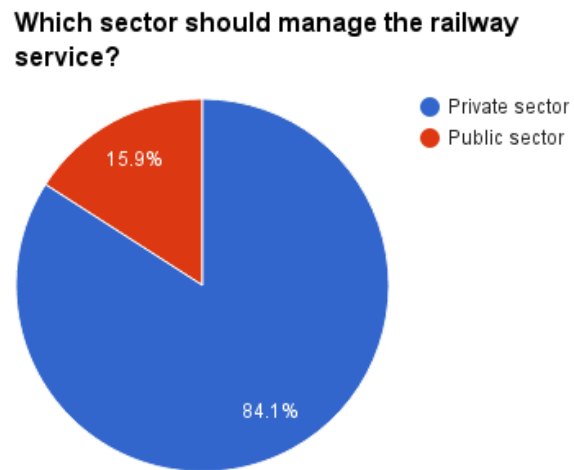
Which sector will efficiently provide passenger railway transport in Accra (public and private)?

The respondents were asked for their opinions on which sector could best run an efficient railway system in Accra. 84% of the participants who do not use the trains suggested that the private sector should run the system. They believe that the private sector has a better track record than the public sector when it comes to running and maintaining systems. Also, they said that competition and the profit motive in the private sector would help maintain an efficient and effective railway transport system. This means if the railway system is run by the private sector, different companies will have to run the different vehicles so that there will be competition.

Mr. Quansah said in his interview that both sectors should run the system together for it to be efficient. The public sector should provide the tracks while private companies run the vehicles (the trains). Maybe for every main line example (Tema-Accra) one company will be in charge of running the vehicles on it. The private sector will be monitored to ensure that they do not transfer too much of their cost to the passengers so that the system will be affordable. Mr. Quansah also believes that with enforcement and proper regulations the public sector can perfectly run the railway transport system in Ghana.

The other 16% of respondents however believe that the system will be affordable if it is managed by the public sector. Some of them said that it is the government's responsibility to provide the train transport and so it should be run by them. The diagram below shows the respondents' sector preferences.

Figure 16: A pie chart showing what sector the participants believe should run the system



Source: Field data

CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

In this chapter, the findings of the research and contributions to current literature are summarized. Recommendations based on the research findings are also made in this chapter and suggestions for further research as well. The limitations of the research are also mentioned in this chapter.

Findings

As expected, it was found that the railway system in Ghana is in a very poor state. Currently, there are only two mainlines that run in Accra; one from Accra to Tema and the other from Accra to Nsawam. Additionally, the Nsawam train is a very old train and hence the engine often has problems. Since there are just main lines and trains, the network of the system has a very limited reach and so the trains do not connect many parts of Accra.

These two trains running carry not more than 3500 people a day. As mentioned in the literature review, the trains in Ghana carried less than 1% of passengers in 2008 (Ghana National Commission For UNESCO, 2009). It seems it has not improved at all. Accra's population is 4 million and so 3500 people is certainly not good enough for the whole train transport system in Accra. Moreover, passengers complained that the trains break down a lot and the tracks also have a very poor drainage system and so during the rainy season the train rides are not smooth. All of these factors show how poor the state of the railway system in Accra is.

Furthermore, it was found that it will be expensive and difficult to develop and maintain the railway system in Accra and make it more efficient and effective. To develop and maintain an effective railway system, more railway lines will have to be built and the old ones expanded. Aside the fact that it will be expensive to build and expand the railway

lines, encroachers that have settled near railway lines will have to be compensated. This will inflate the cost of developing the railway lines and also increase the duration of an expansion project.

Regardless of the high cost to set up and maintain the system, many people are also concerned that Ghanaians have a poor maintenance culture and as such it will be difficult to maintain the place. It was also realized that due to corruption, funds meant for managing the system might be misused and so the system would not be properly maintained. However, if the system is set up and well maintained, it will be very beneficial to Accra. More passengers will be carried with the trains and so it will ease congestion on roads. It will also create employment and add more to the GDP of Ghana. People will be needed to drive the trains and work at the stations and hence an effective system gives many people jobs.

It was also anticipated that many people may want the private sector to run the system based on the track record of the public sector. About 84% of the participants who do not use the trains suggested that the private sector ought to run the system. Nonetheless, the director of Ghana Railway Development Authority advised that both sectors should run the system. The government can provide the railway lines and the private sector the vehicles. However, to avoid a monopoly, different private institutions can be assigned different lines to run. Also the government may need to regulate them to ensure that they are affordable for the public. It is disappointing how badly people think of the public sector and lack confidence in it. Nonetheless it is also understandable given the track record that the public sector has.

Limitations

Accessing data about the country of study (Ghana) was difficult. Online databases provided very little information about Ghana and Accra. Additionally, many of the online databases do not update information and so it was difficult to find recent information about the railway system in Ghana. Also traveling from one place to another to conduct interviews was expensive. Moreover, workers at Ghana Railway Corporation did not want to be interviewed and it was impossible to find any of their contacts (phone number or email). As a result, a director at Ghana Railway Development Authority was interviewed. He did not have all the information needed to answer the research questions but he had most of it.

Recommendations

Based on the information collected from the research, this paper recommends that the railway system in Ghana should be improved. It may be expensive to improve the system but if the government allows the private sector to engage in the development of the system, the cost burden on the government will not be so much. The government can provide the railway lines and the private sector, the trains. Additionally, if possible, the budget for the railway sector should be increased. If the railway sector is improved, the benefits that it will bring Ghana will outweigh the cost and so regardless of the cost, investments should be made to develop the system.

Subsequently, a maintenance culture must be developed so that when the system is developed it does not deteriorate. There should be strict rules and regulations to guide how the system is run in order to keep it efficient. Railway service employees should be paid

well and maintenance work should be done on the tracks and trains very often. Also the laws on the encroachment of railway land should be enforced.

Suggestions for further research

In this paper, the focus was on the current state of the railway system in Accra, how it can be improved, costs and benefits of improving it and the sector (private or public) that can best develop it. For further research, the costs and benefits associated with developing and improving the system can be analyzed, measured and quantified. This will help determine how significant the benefits will be over the costs.

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APPENDICES

Guide questions to interview people who use the trains

1. Where in Accra do you live?
2. How often do you move around Accra?
3. Where do you usually go to with the train? To get to work or another place?
4. If you use the trains just to get to social occasions or work, why?
5. Which train station do you usually travel from?
6. Is this station near your house?
7. How do you get to the train station?
8. If you use a taxi or trotro to get to the station, why don't you take the taxi or trotro for your full trip?
9. Do you have any problems with the train services? What are they?
10. What do you think can be done about the problems?

Questionnaire for people who do not use the trains.

1. Where in Accra do you live?
2. How often do you move around Accra?
5 days or more a week 1-4 days a week About once a month
3. How do you move around Accra?
Private car Taxi Trotro Motorbike/bicycle Walk
Other.....
4. Is there a train station near your house?
Yes No I do not know
5. Why do you not take the trains?
6. What would encourage you to take the trains?
7. Do you think a rail system in Accra will be worth the high costs associated with it?
Explain.
8. What challenges for sustainability of the system do you anticipate?
9. What sector do you think should manage the railway system? (private or public)
Why?

Guide questions to interview the CEO of Ghana Railway Authority

- **What is the current state of Accra's railway system and why?**

1. Are all the railway lines in Accra in operation?
2. If no, why not? Which ones work and which ones do not work?
3. How often is maintenance work done on the railway lines?
4. How many people in Accra use the trains?
5. Has this number increased or decreased over the past 5 years? Why?

- **How can railway transport in Accra be improved?**

1. Are there any plans to expand and improve the railway system in Accra? What are they?
2. Is there anything else that is not included in the expansion plan that can be done to improve the railway system in Ghana?
3. What things have been done in the past to improve the railway service? Did they work efficiently and effectively?

- **How easy would it be to set up an effective railway system in Accra?**

1. What are some of the challenges the railway system currently faces and what is being done about them? Which is the biggest challenge?
2. If there is an expansion plan, to implement it, are there any challenges that would be faced? What are they?
3. Given the current economic condition of the country, how possible will it be to buy at least 5 more trains and build more railway lines to cover more parts of Accra in the next 5 years?

- **What are the benefits from developing an effective railway system in Accra?**

1. How much does the railway sector currently add to Ghana's GDP? Would that amount significantly increase if the railway service is improved and made effective?
2. What are some other benefits (economic and noneconomic) that the railway sector has for Accra and Ghana at large?
3. When an effective railway system is developed, what other benefits will Ghanaians enjoy?

- **Which sector will efficiently provide passenger railway transport in Accra (public and private)?**

1. Has Ghana ever tried to include the private sector in running the railway system? Why or why not?
2. Can the private sector significantly add to efficiency and effectiveness of the railway services? Why or why not?
3. Can the public sector on its own effectively and efficiently run the railway system? Why or why not?
4. Will it be more effective if the railway system was run by both the private and public sector? Why?