REGIONAL MARITIME UNIVERSITY

EVALUATION OF MULTIMODAL TRANSPORT OPERATIONS OF CARGO MOVEMENT IN GHANA

BY

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(10360000)

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I, Susan Durowaa Sakyi, hereby declare that except for the references to other people’s work, which I have duly acknowledged, the work presented here was carried out single-handedly at Regional Maritime University. I also declare that this work has never been submitted partially or wholly to any institution for award of a certificate.

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Dedication

To my family.
I express my deep appreciation for everyone connected to this study.

I thank my family for their solid foundation, moral support, encouragement and resilience that are *sine-qua-non* for this type of work.
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Abstract

The study evaluates multimodal transport corridors employed for transport operations. The study focused mainly on shippers and consignees with cross-references to policy makers. Seventy-one respondents including officials from transport regulatory agencies, freight forwarders and logistics service providers were selected for data collection. They participated in the study either completing a questionnaire or interview. The analysis took the form of descriptive analyses. The findings indicated that the dominant mode of transport is road. Many respondents felt that they had no choice in the selection of transport modes when trading locally with road transport considered as the only mode for access. Rail transport is a viable option but needs to be pursued more aggressively. There are also many physical and non-physical barriers that hinder the smooth flow of goods from origin to destination. It was found that freight transported within Ghana is also subject to seasonal variations, which divert traffic from road transport to inland waterways in certain areas. The study concludes that traders and logistics operators must learn to re-evaluate their routing strategy for export and import of cargo to and from destination by systematically considering a numbers of factors such as speed (transit time), reliability (confidence index), and cost.
CHAPTER 1
INTRODUCTION

1.1 Background to the Study

Transport is understood as the action or effect of carrying one thing from one place to another. Goods are transported to and from Tema and Takoradi ports and by road and rail to other parts of Ghana and landlocked countries such as Burkina Faso, Mali and Niger. In Ghana, the Western and Eastern corridors of Ghana, goods are transported Tema and Takoradi ports to Bolgatanga and Wa respectively. Goods transportation is done in many ways: either road, rail to some point, and waterways to some point. The carriage of goods by involving a number of different modes of transport (e.g. road and sea, road and rail, or road and air) is referred to as multimodal transport system (Mahaney, 1986).

From an economic point of view, transport is an activity based on the demand for goods and its main function consists of carrying goods from places where the usefulness is low to others where it is high. In this context, it is obvious that trade will develop in places where efficient modes of transport with reasonable prices exist. In order to increase the level of trading between different places, towns, regions or countries, it is necessary to reduce transportation costs.

According to Mooy (1999), the development of transport and communication technologies has revolutionised production and distribution processes, and has created the ‘global’ market. He stressed that it is within this competitive environment that shippers and consignees require efficient transport services that can get their goods at the right place, at the right time, and at the right price. Another issue that has been
presented in his statement relates to the importance of strengthening regional linkages among neighbouring countries in order to facilitate trade and transport.

The improvement of Ghana’s transport sector can provide the foundation for further growth. However, for many countries in the region, inadequate transport infrastructure and high service cost have constrained economic development. Adequate transport and communications facilities are also considered major determinants of trade performance and of the costs and profitability of trading domestically and internationally. Efficient multimodal transport corridors could play an important role in increasing the region’s trade competitiveness.

Multimodal transport is used to describe carriage where one operator assumes liability for the carriage of goods by a route involving a number of different modes of transport, e.g. most commonly road and sea, road and rail, or road and air. Multimodal transport is generally known in the USA as ‘intermodal transport’, and in Europe it has also often been referred to as ‘combined transport’, although this terminology appears to have been displaced to some extent by the term ‘multimodal transport’ (Pedersen and Gray, 1998:109).

Multimodal transport corridors are major transportation facilities, such as road, waterways, air, etc. linking traders within Ghana or to traders worldwide. A limited number of studies have been conducted on transport facility in the African region (Leinbach and Chia, 2008). The main purpose of these studies was to identify the main non-physical impediments as well as to promote cross-border trade facilitation. One of the major limitations of the studies was the fact that they did not assess alternative scenarios for transport facility selections. The other limitations were that none of these
Some authors (Beresford and Dubey, 1990; Levander, 1992; Christopher, 1998; Beresford, 1999a) have modelled freight cost structure and transit time of European or North American multimodal transport corridors. Very little equivalent work has been carried out in West Africa states such as Ghana, which is why there is a need for research to be conducted on multimodal transport corridors in Ghana. This research, therefore, presents new data and empirical insights into the selection of modal choices and route choices along multimodal transport corridors in Ghana while proposing a conceptual model for logistics decision-making for routing and mode selection.

1.2 Problem Statement

The improvement of Ghana’s transport sector can provide the foundation for further growth. However, inadequate transport infrastructure and high service cost have constrained trade competitiveness. Adequate transport and communications facilities are also considered major determinants of trade performance and of the costs and profitability of trading internationally (ESCAP, 1996a). Efficient multimodal transport corridors could play an important role in increasing Ghana’s trade competitiveness. There is therefore the need to evaluate the transportation system and explore freight forwarders’ deployment of various modes of transport.
1.3 Objectives of the Study

The objective of this study is to examine how multimodal transport can be used to improve efficiency in cargo movement across Ghana. Specifically, the study addresses the following objectives:

1. To examine freight forwarders’ selection of transport modes in terms of
   i. Efficiency
   ii. Affordability
   iii. Reliability

2. To examine constraints associated with transportation of goods via various transport modes;

1.4 Research Hypotheses

The purpose of this study is to explore the two (2) main hypotheses:

1. The selection of particular transport modes or combination of transport modes for goods transport to, from and within Ghana is constrained by a number of factors that are related to transport infrastructure, the nature of the product being transported, the transport decision-maker, the transport service offered and the prevailing commercial environment.

2. The most frequently utilised multimodal transport facility for Ghana domestic and international trade may not be the most efficient or reliable, or even the cheapest or the most competitive.
1.5 Significance of the Study

It is hoped that this research will be of significance to academics, traders and policy makers in areas such as trade, transit, transport and logistics because the study will probably provide an insight into the impact of an efficiently managed multimodal transport corridor with regard to supply chain implications. Such information can:

- Be of assistance to shippers and consignees when choosing a particular mode, or a combination of modes, of transport or a freight forwarder for export and/or import routing;
- Help forwarders and logistics operators to identify the most competitive multimodal transport corridors with the logistics decision-making model;
- Show segments and links where national and regional policy makers can improve regional multimodal transport corridors. This can be done by eliminating infrastructure and institutional impediments.

The study would also help stakeholders to recognize any need (if there is) to make tailor-made multimodal transport system to easy access to transporting goods. It would also help in public policy making on how to improve the sector’s efficiency.

1.6 Organization of the Study

The study is organized into five chapters. Chapter 1 sets for the context of the study, profiling multimodal transport systems. Chapter 2 takes a closer look at the articles on development in cargo handling methods and the multimodal transport systems. Chapter 3 details the methodology applied to carry out the study. Chapter 4 provides the main findings and discussion of findings of the study. The concluding chapter five presents the summary of the major findings, conclusions and recommendations.
CHAPTER 2
LITERATURE REVIEW

2.1 Introduction

This chapter presents the literature on multimodal transport operations and its applicability in Africa. The literature covers definition of multimodal transport operation systems. This is followed by development in cargo handling methods, and transport policies in Africa and implication for transport planning.

2.2 Definition of Multimodal Transport Operation (MTO)

The terms ‘Through Transport’, ‘Combined Transport’, ‘Intermodal Transport’ and ‘Multimodal Transport’ are all used in the context of cargo movement, from origin to destination. These four terms have very similar meanings, i.e. the transportation of goods.

Article 1.1. of the United Nations Multimodal Convention (which has not yet, and may never enter into force) defines multimodal transport as follows: ‘International multimodal transport' means the carriage of goods by at least two different modes of transport on the basis of a multimodal transport contract from a place in one country at which the goods are taken in charge by the multimodal transport operator to a place designated for delivery situated in a different country' (United Nations Convention on International Multimodal Transport of Goods, 1980:8). However, the United Nations made a distinction between each term and introduced definitions of transportation terminology in their Multimodal Transport Handbook (1995):
• Modes of Transport: The method of transport used for the movement of goods, e.g. by rail, road, sea or air.

• Means of Transport: The vehicle used for transport, e.g. ship, truck, or aircraft.

• Types of Means of Transport: The type of vehicle used in the transport process, e.g. wide-body, tank truck, passenger vessel, etc.

• Unimodal Transport: The transport by one mode of transport only, where each carrier issues his own transport document (airway bill, consignment note, etc.).

• Combined Transport: The transportation of goods in one and the same loading unit or vehicle by a combination of road, rail, and inland waterway modes.

• Intermodal Transport: The transportation of goods by several modes of transport where one carrier organises the whole transport from one point or port of origin via one or more interface points to a final port or point. Depending on how responsibility for the entire transport is shared, different types of documents are used. There are also different definitions for intermodal transport. The ECMT (European Conference of Ministers of Transport) and the European Committee for standardisation (CEN) use the following definition for intermodal transport: 'the movement of goods in one and the same loading unit or vehicle which uses successively several modes of transport without handling of the goods themselves in changing mode'. The EC definition goes beyond the ECMT/CEN definition, and corresponds with the ECMT/CEN definition of multimodal transport: 'the movement of goods whereby at least two different modes are used in a door-to-door transport chain'. For Mahoney (1986), 'Intermodality' means the movement of freight via two or more dissimilar means of modes of transportation while for Hayuth (2007), 'Intermodality'
means the movement of cargo from shipper to consignee by at least two different modes of transport under a single rate, through-billing, and through liability. The term ‘intermodality’ has been widely adopted by European Union policy-makers.

- **Multimodal Transport**: Where the carrier organising the transport takes responsibility for the entire door-to-door transport and issues a multimodal transport document.

Multimodal transport is therefore a concept which places the responsibility for transport activities under one operator, who then manages and co-ordinates the total task from the shipper’s door to the consignee’s door, ensuring the continuous movement of the goods along the best route, by the most efficient and, cost-effective means, to meet the shippers requirements of delivery. This means simplified documentation, and increasingly by electronic means such as electronic data interchange.

### 2.3 Development in Cargo Handling Methods and the MTO System

Technological developments have brought about improvements in cargo handling methods in maritime transport over the last two decades. Perhaps the most important among such developments is the unitization of cargo. Unitization refers to methods used either in combining individual small packages into larger units or in breaking large ones into smaller units for purposes of mechanical handling (Fowkes, Nash and Tweddle, 2002). Unitization can be achieved in several ways such as palletization, pre-strapping and pre-slinging, containerization, the use of barge carrying ships or roll-on/roll-off (Ro-Ro) vessels. Each of these methods facilitates cargo handling and has
brought about faster and more efficient movements of cargo from one mode of transport to another. Of particular significance here is the development and use of containers for the carriage of goods. Containerization of cargo has tremendously increased the possibility of moving international cargo on door-to-door basis with ease of transshipment.

Efforts at finding a rational basis for coordinating transport modes and facilitating cargo movement have largely rested on the different conventions (legal regimes) enacted to govern each mode of transport both at the national and international levels. Such conventions include the Warsaw Convention regulating the carriage of goods by air, the CIM which is the International Convention on the carriage of goods by rail, the CMR Convention for the carriage of goods by road and the Brussels Convention (the Hague Rules) for the carriage of goods by sea. These conventions have traditionally catered for the interests of all parties involved in the movement of cargo in international trade - the carriers, the shippers (cargo owners) and the trading partners (Donner, 2006).

There have also developed certain entities who, relying mainly on these conventions, provide the effective organization or machinery necessary for the transportation of international cargo. Generally these entities have been referred to as Freight Forwarding and Clearing Companies who act as agents of the cargo owners when cargo is in transit. Goods are then shipped from one country to another by two or more modes of transport on the basis of several documents or contracts, each dealing with that segment of the journey for which it is responsible. This type of movement through segmented (fragmented) transport systems operated until the last two decades when
multimodal transport operators came into being. These operators have since been responsible for international multimodal transportation of goods.

International multimodal transport involves 'the transportation of goods from one country to another by two or more modes on the basis of a single contract - the Multimodal Transport (MT) document or contract-issue by the person or enterprise organizing such services' (UNCTAD, 1995). The Multimodal Transport Operators (MTO) are the organizers of these services. Their main role relates to the nature of the contractual relationship between them and the shippers. The MTOs act as independent legal entities assuming full responsibility for the whole operation connected with the movement of goods from the premises of the seller to those of the buyer.

Although there is yet no written international convention regulating multimodal transport operations the existing MTOs have been operating on the legal basis of such single contracts. Most of these MTOs who are located in developed countries are either shipping companies or consortia of shipping lines. In Western Europe some railway companies and road haulage enterprises also act as MTOs while in Northern Europe some Freight Forwarding Companies have been performing functions similar to multimodal operations.

At present there are no Multimodal Transport Operators in tropical Africa. However, a few Freight Forwarding and Clearing Companies do regularly organize cargo transportation to and from Africa on a warehouse-to-warehouse basis. Some of the Companies who are mostly subsidiaries of foreign-based multinationals issue their own 'Through' Bills of Lading but they act as agents of the shippers and not as principals as the case is with MTOs.
2.4 The MTO System and Transport Policies in Tropical Africa

In developed countries, for purposes of effective door-to-door carriage of goods, Multimodal Transport Operators have found it necessary to exercise firm control on the entire transport line. In order to accomplish this task, the MTOs have created their own subsidiary companies who monitor the movement of the cargo from the beginning to the end. If and when Multimodal Transport Operators start operating in tropical Africa, assuming full responsibility for the entire cargo journey with liberty to subcontract or buy services, wide-ranging implications for national transport policies can be envisaged.

Due to the fact that MTO system involves the carriage of goods on door-to-door basis, the effectiveness of such an operation depends on an integrated system of transport involving the marine sector, the port, and inland transportation systems of trading partners. This type of integration is at present lacking in tropical African countries. Inland transportation systems are quite inadequate for the satisfactory movement of the present small units of break-bulk cargo. Under the MTO system cargo is moved mostly through unitization, particularly containers which demand stronger and wider roads, specialized trucks or train wagons.

According to McGinnis (2009), one of the main reasons which could prevent companies in Africa from becoming full-fledge MTOs is the unreliability of the inland transport system. With the existing situation it is very difficult for an MTO to assure either his clients (the shippers) or himself that the goods being transported would arrive at their destination and, if they do arrive, that they would be in good condition. Good roads are few within the individual countries and international connections are not common.
Road densities are generally low as typified by the situation in West Africa where the average road density is one kilometer of road to about twenty four square kilometers of area. In some cases, as in Niger Republic, the density is as low as one kilometer of road to more than three hundred square kilometers of area. Few of the roads, bridges and culverts could take regular loads in the 20 ton range without very considerable upgrading (Minh, 2004). In the whole of West Africa with more than 300,000 km of road less than 30,000 or 10% are surfaced.

The railway systems which could facilitate multimodal operations also consist of very few networks. Total rail kilometrage for the countries vary from as low as 120 in Liberia to about 5,800 km in Zaire. In fact, some countries such as Gambia and Niger have no rail lines. Most of the networks consist of single tracks with few branch and connecting lines which are narrow and winding, preventing fast and easy movement. Railway gauges vary from 0.8 m to 1.067 m and only very few are of the 1.435 m standard gauge most suitable for heavy traffic (Pedersen and Gray, 1998).

Both rail and road systems in tropical Africa consist mainly of large numbers of separate local and national networks. Interregional or international linkages are few. In the whole of West Africa, for example, there are only two international rail lines. These are the 1,200 km rail linking Abidjan (Ivory Coast) with Ouagadogou (Upper Volta). The other is the line connecting Dakar (Senegal) with Bamako (Mali). While the former facilitates the carriage of goods meant for landlocked Upper Volta, the latter is beneficial to landlocked Mali (Kent and Parker, 1999).

International rail connections are much better among the East African countries where the East African railways connect the port of Mombasa (Kenya) with landlocked
Uganda and facilitate the movement of goods from the port of Dar-es-Salaam (Tanzania) to landlocked Rwanda and Burundi. Traffic destined for the Suez Canal is facilitated by the rail line linking Djibouti with Addis-Ababa. Railways connect Beira and Maputo (Mozambique) with Zimbabwe Botswana and South Africa. In southwestern Africa, the Benguela railway offers an outlet to copper from the Shaba (Katanga) region in Zaire through Lobito (Angola) and serves as an alternative to the route to Beira for Zambian copper. Angola also has rail links with landlocked Malawi and Zimbabwe (Rhodesia).

Like the railways, international and interregional road linkages are still few. Notable exceptions include links between Mauritania and Senegal, Gambia and Senegal, Togo and Ghana, the Republic of Benin and Nigeria - all in West Africa. Road linkages also exist among Kenya, Uganda and Tanzania in the East African sub-region. All these are more or less ad hoc connections rather than planned regional or sub-regional networks (Jeff and Hills, 1990). In recent years, however, major projects have been initiated under the auspices of the OAU to link several parts of Africa together by road.

Such projects include the Trans-African Highway from Mombasa to Lagos, the Trans-Saharan Highway from Dakar to N'Djamena (Chad), the West Coast Motorway from Nouakchott (Mauritania) to Cairo, and the Trans-Saharan Highway linking West Africa with North Africa, the construction of which is at an advanced stage. Apart from these, international road transport agreements exist among some African countries to facilitate the movement of international traffic. An example is the agreement between French-speaking countries of Senegal, Ivory Coast, Benin and Togo which are coastal countries and landlocked Niger and Upper Volta).
2.5 Implications for Transport Planning

It is clear from the above that the existing inland transport situation in tropical Africa is unsuitable for multimodal transport operations. Thus, any possible future adoption of the system for international cargo movement has several implications for individual country’s transport policies. Such implications would occur largely in the areas of policies on transport development and coordination both within and between countries. Specific aspects of such policies include investment, cargo insurance matters, ownership and control of transport modes and systems and international or regional cooperation in transport matters.

2.5.1 Investment

Individual countries in tropical Africa have national objectives and policies towards the creation of transport infrastructure to facilitate economic progress. These policies fall mainly into two broad groups. These are the desire to upgrade existing internal transport networks to meet the demands of expanding economies and accommodate technological changes in the transport field and the desire to participate in international transportation by developing viable shipping lines and airways and building modern ports. The former objective is characterized by the attempt to mobilize all internal productive resources and encourage equitable distribution of the fruits of national development. The latter is meant to facilitate international movement of passengers, import and export products and to increase an individual country’s share of such traffic.
The degree of commitment to these objectives is reflected in part in the various countries' National Development Plans in which the transport sector consumes between 20 and 40% of all public sector investment. If the transport system of these countries were to be developed in order to meet the requirements of the MTO system, these percentages will increase. Increases will occur not only as a result of upgrading and increasing the internal networks but also in constructing more modern ports to accommodate unitized cargo, particularly containers, and also in acquiring new equipment including cellular ships, containers and container handling equipment. The 1975 UNCTAD Secretariat's report lists the main types of transport equipment and infrastructure necessary for multimodal transport operations, particularly with respect to handling containerized cargo. The report also contains information on the indicative unit cost of such equipment and infrastructure. For example, prices of containers (in 1975) range from about $2,000 to $15,000 each depending on size and whether refrigerated.

Attempts already made by some countries at modernizing their ports to cope with unitized cargo have involved millions. The adaptation of trucks and train wagons to suit port-hinterland movement of such cargo is also necessary. By October 1977 in the United Republic of the Cameroun, 30 train wagons originally meant for carrying logs had been converted to container transporting wagons, each costing roughly 2,500.

The introduction of the MTO system will undoubtedly accelerate such expenditures. Given the limited financial resources of tropical African countries and competition of other sectors of their economies for capital investment, the immediate consequence of such huge expenditure is further dependence on foreign loans. All African countries
still depend to a large extent on foreign loans for the execution of the projects in their National Plan and adding to the magnitude of loans may be detrimental to the overall national interest of individual countries. Policies should, therefore, be carefully formulated so that while attempting to incorporate technological developments in transport, other sectors of the economy are not unduly neglected.

2.5.2 Cargo Insurance

At present in many African countries cargo is frequently insured only up to the port of entry. In a few cases cargo is insured on a warehouse-to-warehouse basis. This situation occurs largely because of the poor standard of inland transportation and loss of goods moving inland 5). Since there are increased insurance risks, insurance companies are understandably reluctant to cover cargo beyond the ports. African importers have had to accept this condition most especially since until recently all insurance is done in the country of cargo origin. The MTO system will definitely emphasize cargo insurance on a warehouse-to-warehouse basis. This is likely to increase cargo insurance premiums since the higher the risk, the greater the premium charged by insurers.

The Multimodal Transport Operator may be compelled to transfer the increased premium charges to the cargo owners in terms of higher freights. However, with increasing use of containerization and significant improvement in the inland transport these risks will be minimized and ceteris paribus, such initially high premiums will be reduced. There is an increasing trend towards modifying or changing certain aspects of trade between developed countries and some African countries particularly with respect to the insurance of both imports and exports. Until recently, all countries used to import CIF and export FOB. In other words a significant proportion of imports and
exports are insured abroad and this constitutes some drain on the African countries' limited foreign exchange earnings. In many West African countries today this position has been radically changed. For instance in Nigeria, the United Republic of the Cameroun and Ghana all imports must by law be insured locally. A similar regulation obtains in Zaire; other countries such as Angola, Ivory Coast and Senegal are in the process of enacting such regulations (Gilmour, 2006).

With respect to exports such general regulation is not yet common. However, in Zaire, the law requires all exports to be insured locally while in Ghana such a regulation refers to the export of cocoa, the country's main export crop. All these countries reported that, so far, they have not experienced any difficulties from their trading partners.

With the introduction of the MTO system such laws will be strengthened and emulated by other African countries if only to save on their foreign exchange earnings and protect the interests of their indigenous insurance companies. However, such protection presupposes the financial capability of the African insurance companies for the insurance of cargo. Experience so far shows that sufficient financial capability is largely absent. For example it is a government policy in Cameroun that all ships owned by the National Shipping Line should be insured locally. However, due to financial limitations, the National Insurance Company (SOCAR) can only handle 20% of the financial requirements and the remaining 80% is handled by other largely non-indigenous companies who must reinsure in foreign countries to increase their capacity. In Tanzania, where the only insurance company is state-owned, only 18% of the country's import and 20% of the exports could be insured annually by the company.
Hopefully, this situation will improve as the financial capability of the companies become stronger.

2.5.3 Ownership and Control of Transport Modes

Policies on the control and ownership of transport modes in tropical Africa vary from countries where there has been complete nationalization to those in which such modes as the rail, air and inland waterways are state-owned but the road transport industry is still in private hands. In the latter case governments provide the way (roads) and maintain regulatory and supervisory control on the modes, their owners and the drivers. It is this latter case that requires careful examination with reference to its implications for the MTO system.

In many countries there are no specific legal restrictions on entry into the road transport industry (excluding some urban services). This free-for-all entry can encourage foreign MTOs to participate actively in the inland trucking industry. With their financial resources they could become so powerful as to exercise some measure of control on the inland movement of individual country's imports and exports. Such control may be both economically and politically risky.

On the other hand, nationalization of the trucking industry might not be the best answer to prevent such external controls. In fact nationalization may be counterproductive because foreign MTOs and their subsidiaries would be reluctant to take responsibility for the inland sector of cargo movement in countries where they are prevented by law from using carriers of their own choice for the movement of their goods. Policies should therefore be evolved to encourage indigenous ownership of large trucking business or to make government participate indirectly through
shareholding in the activities of the MTOs or to oblige such multinational companies to open their shareholdings to African nationals.

Another major area of policy decision is the nationality of the Multimodal Transport Operators themselves. Existing MTOs are nationals of developed countries and all their major operational bases are located in those countries. Since MTOs are free to choose their own carriers or may be carriers themselves, it is possible for them to discriminate against African carriers (national shipping lines) when allocating traffic meant for African countries. Such discrimination could be detrimental not only to the international trade of African countries but also jeopardize the development of African shipping lines. At present most of these lines carry less than 15% of their individual country's international traffic. This low percentage share of traffic is at present due to most of the lines being very young, having a paucity of vessels and limited financial capability. Any action threatening this low share would mean heavy loss of revenue to the lines. It is necessary for each country to so couch its transport policies in such a way as to assure a percentage share of traffic carried by its national shipping line. Such a policy should be subjected to readjustment from time to time depending on the availability of vessels, manpower and the required technological expertise.

African companies should also be encouraged to organize multimodal transport operations. At present it may be difficult to achieve this since African shipping companies lack the necessary network of agents and correspondents for successful and efficient monitoring of the movement of cargo from one carrier to another at different stages along the journey. MTO operations also require possession of adequate means of transport such as trucks, containers and cargo handling equipment for assembling and
distribution of cargo. These require a substantial amount of capital which very few countries or companies can now afford. It may therefore be necessary at the initial stage for African governments or companies to join hands with foreign based MTOs and multinational companies who already have subsidiaries operating in the continent. The ultimate objective, however, should be the establishment of indigenous Multimodal Transport Operators to serve the interests of tropical African countries.

2.5.4 Port Development and Consolidation

The effectiveness of multimodal transport operations would depend to a large extent on the availability of modern, well-equipped ports. Some countries have already embarked on port development projects to cope with new technological developments in maritime transport. In Nigeria, for example, the Lagos port has been expanded with the construction of 10 new berths at Tin Can Island, two of which are mechanically equipped for container traffic.

Container berths are being constructed at Mombasa, while Luanda and Lobito are being prepared to handle containerized cargo. Substantial developments are at advanced stages in Maputo, Dar-es-Salaam and Douala. All these are welcome developments showing the awareness of various countries for the need to create facilities that can accommodate technological changes in transport. However, proliferation of ports may not be conducive to the operations of multimodal transport systems. The existing port proliferation has resulted from the political fragmentation of the continent encouraged by the necessity of protecting an individual country's sovereignty. After independence
some countries have so limited a population, and hence purchasing power, that they can hardly support a modern port and make it economically viable. For example, the Republics of Togo and Benin with a combined population of 4.6 million people could be adequately served by one deep-water port instead of the two ports at Lome and Cotonou (Hayuth, 2007). There is a need for port consolidation not only to reap economies of scale but to make for an efficient organization for the distribution of imports and exports in tropical Africa.

It must be noted, however, that port consolidation will be fraught with difficulties in present-day tropical Africa. Each country is quite sensitive to its political independence and there is every likelihood that cooperation in port development will be viewed as compromising sovereignty. Such a feeling, however, is not unique to coastal countries since landlocked countries have always depended on others for the movement of their international cargo which come through the ports. When, in trans-national operations traffic for one country passes through one or more intervening countries, the smooth flow of this traffic depends on the relations between the countries. Recent Nigerian and Ugandan experiences illustrate this point very well. In Nigeria, decongestion of the port of Lagos in 1975/76 was accomplished through use of Ghanaian ports, with transshipment by road through the Republics of Togo and Benin. However, the outbreak of hostilities between Benin and Togo almost ruined these decongesting efforts. Thus, even though the two partners (Ghana and Nigeria) who made the original agreement were not involved in the hostilities, shipment was disrupted for some days until Nigeria strongly intervened between the two factions. Likewise, the breakdown of diplomatic relations between Uganda and Kenya in early 1976 prevented the
movement of Uganda's cargo through Mombasa. Uganda, a landlocked country, had to airlift imports and exports, a very costly experience. In multimodal transport operations such problems cannot be treated lightly. It may be worthwhile therefore for the emerging regional economic groupings such as the ECOWAS to begin examining the possibility of building common ports.

2.6 Comparison of Transportation Modes

Transport modes are the means by which people and freight achieve mobility. They include land (road and rail), water (shipping and waterways transport), and air:

Road transportation. According to Pederson (2001), road infrastructures are large consumers of space with the lowest level of physical constraints among transportation modes. However, physiographical constraints are significant in road construction with substantial additional costs to overcome features such as rivers or rugged terrain. Road transportation has an average operational flexibility as vehicles can serve several purposes but are rarely able to move outside roads. Road transport systems have high maintenance costs, both for the vehicles and infrastructures. Goods transportation via road is slow. Yet, with containerization, road transportation has become a crucial link in freight distribution.

Rail transportation. According to Pederson (2001), railways have an average level of physical constrains linked to the types of locomotives and a low gradient is required, particularly for freight. Heavy industries are traditionally linked with rail transport systems, although containerization has improved the flexibility of rail transportation by linking it with road and maritime modes. Rail is by far the land transportation mode offering the highest capacity with a 23,000 tons fully loaded coal unit train being the
heaviest load ever carried (Pederson, 2001). Goods transportation via rail is the safest. It also secured, but delivery is slow compared to road.

**Maritime transportation.** Because of the physical properties of water conferring buoyancy and limited friction, maritime transportation is the most effective mode to move large quantities of cargo over long distances (Pederson, 2001). Main maritime routes are composed of oceans, coasts, seas, lakes, rivers and channels. However, due to the location of economic activities takes place on specific parts of the maritime space. Maritime transportation has high terminal costs, since port infrastructures are among the most expensive to build, maintain and improve. High inventory costs also characterize maritime transportation. Maritime transportation is characterized by its reliability, flexibility and slow nature in terms of delivery.

**Air transportation.** Air routes are the fastest means of transporting goods. Air transport constraints are multidimensional and include the site (a commercial plane needs about 3,300 meters of runway for landing and take-off), the climate, fog and aerial currents (Pederson, 2001). Air activities are linked to the tertiary and quaternary sectors, notably finance and tourism, which lean on the long distance mobility of people. More recently, air transportation has been accommodating growing quantities of high value freight and is playing a growing role in global logistics.
## Assessment of the Qualities of Different Modes of Transport

<table>
<thead>
<tr>
<th></th>
<th>Road</th>
<th>Rail</th>
<th>Maritime</th>
<th>Air</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>Very high</td>
</tr>
<tr>
<td>Reliability</td>
<td>Very high</td>
<td>High</td>
<td>High</td>
<td>Very high</td>
</tr>
<tr>
<td>Security</td>
<td>Very high</td>
<td>High</td>
<td>High</td>
<td>Very high</td>
</tr>
<tr>
<td>Safety</td>
<td>high</td>
<td>Very high</td>
<td>Very high</td>
<td>Very high</td>
</tr>
<tr>
<td>Flexibility</td>
<td>Very high</td>
<td>Low</td>
<td>Low</td>
<td>Very high</td>
</tr>
<tr>
<td>Availability</td>
<td>Very high</td>
<td>Low</td>
<td>Very high</td>
<td>Very high</td>
</tr>
<tr>
<td>Economies of scale</td>
<td>High</td>
<td>Very high</td>
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<td>High</td>
</tr>
<tr>
<td>Cost</td>
<td>High</td>
<td>Low</td>
<td>Very high</td>
<td>Very high</td>
</tr>
</tbody>
</table>

Source: Author's Own Compilation
CHAPTER 3
METHODOLOGY

3.1 Introduction
Chapter 3 presents the plan of how the research was conducted. This section includes the type of research design employed, the measuring instrument, the sampling procedure, data management and data analysis techniques.

3.2 Research Area
The research used Accra as a case study city and involved a visit to the city to interview officials of agencies responsible for transport matters. The visit also involved collection of data relevant to the problem and afforded the physical inspection of the infrastructural facilities in place. Accra was used considering the size of the study area, time and financial limitations. Moreover, there was the need to narrow down the focus of the research to specific study sites for an in depth analysis. In order to obtain the most relevant answers, the study population was directed to the following actors and institutions: Volta Lake Transport Company (VLTC), Ghana Airports Company (GAC), Ghana Railway Development Authority (GRDA), Ghana Shippers Authority (GSA), and the logistics and transport service providers. The headquarters of these actors and institutions were selected on the basis of transport service delivery or demand for them. In many ways, VLTC and GSA are the main actors in water transport. GRDA is concerned with the management of rail sector in Ghana whereas GAC oversees the operations of air transportation.
3.3 Population and Sample Size

The population for this study encompasses providers of transport facilities and users of various transport networks. Transport facility providers include Volta Lake Transport Company (VLTC), Ghana Airports Company (GAC), Ghana Railway Development Authority (GRDA), Ghana Shippers Authority (GSA), and the logistics and transport service providers. The users are the exporters, the importers, and the logistics and transport service providers operating in Ghana.

To access whether users of transport facilities use one or more networks in their operations, it was necessary to gather data from exporters and importers, who are key user of various transport modes in Ghana. The respondents were selected based on their usage of a particular transport infrastructure for commerce.

To access whether providers of transport facilities are offering the needed transport services to the users, it was necessary to gather data from VLTC, GRDA, GAC, GSA and the logistics and transport service providers. They were selected based on their involvement with transport infrastructure, transport policies, and trade facilitation.

The population has experience in transport service delivery and has access of day-to-day activities of cargo movement and these made them more eligible to provide information concerning their selection of transportation modes and the constraints they face.

The study involved the participation of 75 respondents comprising 8 officials involved in provision of transport services and 67 users who access these transport services. The selection of respondents was based on the stratified sampling strategy where participants were divided into 2 strata: transport facility providers and users. The table
1 below provides the sample distribution as discussed above for each category of respondents.

<table>
<thead>
<tr>
<th>Participants</th>
<th>Sample size (respondents)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GSA</td>
<td>2</td>
</tr>
<tr>
<td>VLTC</td>
<td>2</td>
</tr>
<tr>
<td>GAC</td>
<td>2</td>
</tr>
<tr>
<td>GRDA</td>
<td>2</td>
</tr>
<tr>
<td>Importers</td>
<td>38</td>
</tr>
<tr>
<td>Exporters</td>
<td>20</td>
</tr>
<tr>
<td>Logistics and transport service providers</td>
<td>9</td>
</tr>
<tr>
<td>Total</td>
<td>75</td>
</tr>
</tbody>
</table>

3.4 Sampling Methods Used

Purposive and snowball sampling were used to select the sample for this Phronetic research. The reason was to select cases that were informative and assumed to be familiar with some fundamental issues concerning urban water supply in the Accra Metropolis. At VLTC, GRDA, GAC and GSA, the managers were purposively selected. This is because the managers were strategically placed in the sense that they are responsible for the management of transport service delivery. They were thus sampled for this study and are believed to be enough to provide the in-depth, rich data that were required in the study. At the logistics and transport service provider level, purposive sampling was used to select service user representing importers and exporters. The purpose was to choose logistics and transport service providers in the aforementioned categories that adequately represented the characteristic of each category and whose experiences with transport operations may be representative.
3.5 Research Design

The study primarily on primary and secondary data. The primary data was collected through questionnaire and interview.

3.5.1 Questionnaire

In order to generate data from the primary sources, a written and self-administered questionnaire (see Appendix) which was relatively cheap, time-efficient and free from interviewer bias was developed and administered to logistics and transport service providers. Considering the time and costs involved in other instruments, this instrument was chosen despite objections from several authors on the ground that it yields incomplete responses, contains confused questions and lacks spontaneity. However, given the circumstances that constrained the use of other efficient instruments, it was believed that the advantages of a self-administered questionnaire far outweighed the disadvantages associated with it.

Questions based on close-ended and open-ended were administered to selected respondents. Close-ended questions contained a range of answers from which respondents could choose from. This form of questions was used to make analysis easier. Open-ended questions were used to enable respondents to freely express their opinions by providing their detailed information. With respect to close-ended questions, they were specific with a fixed range of answers. They had multiple-choice questions in which the researcher provided a choice of answers and respondents were asked to select one or more of the alternatives, and questions that had only two response alternatives, yes or no. 'Likert Scale' (considered on 1-5 points scale) was also
used to measure the respondents’ perceptions based on few statements to perceive the existing transportation systems and their associated deficiencies.

The contents of the questionnaire include:

- Part 1: analyses transport usage according to the modes of transport available to exporters and importers, factors affecting their choice of transport modes, and whether they use a combination (i.e. multimodal) of transport facilities. Shortcomings of the transport systems are also discussed with open ended questions.
- Part 2: looks into the characteristics associated with the modes of transport available to exporters and importers.

3.5.2 Interview

The qualitative research method was considered as a means of gaining access to unquantifiable facts. This method uses ‘words as data’ and it allows the researcher ‘to share in the understanding and perceptions of others’. Qualitative methods unfold events over time which provides additional information often untapped by static quantitative methods. As a part of the qualitative research method, interviews were conducted by the researcher with respondents from GSA, GRDA, VLTC, and GAC to examine whether importers or exporters access rail, inland waterways, sea, air transports, and the constraints facing each sector. The study employed face to face unstructured interview to collect data from GSA, GRDA, VLTC, and GAC officers.

The interviews/questionnaires were personally administered to the identified respondents. It took a much longer period of about 20 minutes to gather information
from each participant. This was mainly due to the fact that the questions had to be explained to ensure clarity for respondents since most of them were not formally educated or had low educational background. However, proficiency in the local dialect facilitated the data collection process. In the third stage, various transport users were approached and briefly introduced to the study after which questionnaires were given out to be filled. It took the researcher a total of seven working days to gather data from all 71 participants. Seventy-one questionnaires were usable and used for the analysis.

3.5.3 Documentation

Documentation represents a great part of the sources of this report as it is relevant to every study topic. It includes a variety of documents which in most cases are exact or have a broad coverage. The documents used in this project were as numerous as we could possibly process. The reason for using as many documents as possible was to generate a description as would be used for the theoretical framework. Every document was however, thoroughly examined since all documents are written for some specific purpose and target readers. Therefore, the writer had to be careful of bias. Various websites concerning the project were also visited. Websites of institutions such as GSA, GRDA and VLTC were used to source information.

3.6 Data Analysis

Data for the analysis were extracted from the field survey. Descriptive statistics were employed in the presentation and analysis of results. The study employed Microsoft EXCEL programme to generate statistical figures. Since this study is exploratory in nature, no rigorous statistical technique was used in analyzing the data.
CHAPTER 4

PRESENTATION OF FINDINGS

4.1 Introduction

The main concern of this section is to present the findings which will hopefully contribute to a better understanding of how multimodal transport system can be used to improve efficiency in cargo movement. Initially, the characteristics of the respondents are provided. This is followed by presentation of perspectives on transport infrastructure. The questionnaires administered to the respondents yielded a wealth of information.

4.2 Profile of Respondents

This section provides information on the backgrounds of the respondents in the study. The age, sex, and position of respondents have been analyzed in the proceeding pages.

Fig. 4.1 shows the sex distribution of respondents sampled in the study. Of the 40 respondents sampled, 22 (55%) constituted males and 18 (45%) females, indicating a high proportion of males in the sample.
The ages shown in Table 4.1 are those reported by the respondents. Respondents between the age brackets of 26-35 years olds formed the majority constituting 52.1 percent of total number of respondents. This was followed by the respondents in the age bracket of 36-45 years old constituting about 46.5 percent of the respondents. The least was the respondents who were age 20 years or less. They formed only 1.4 percent of the respondents (see Fig. 4.1).

<table>
<thead>
<tr>
<th>Response</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 or less yrs</td>
<td>1</td>
<td>1.4</td>
</tr>
<tr>
<td>26 - 35 yrs</td>
<td>37</td>
<td>52.1</td>
</tr>
<tr>
<td>36 - 45 yrs</td>
<td>33</td>
<td>46.5</td>
</tr>
<tr>
<td>Total</td>
<td>71</td>
<td>100.0</td>
</tr>
</tbody>
</table>

The age pattern suggests that administrative personnel aged 26-35 years were predominantly sampled out of the total number of administrative personnel. The mean age of administrative personnel is 27.6, with the youngest administrative personnel being 23 years and the oldest 45.
4.3 Selection of Transport Modes

Respondents were again asked questions regarding transport usage. As observed, a large proportion of the respondents rated road haulage as the most mode of transport of goods. This was followed by sea and inland waterways. Railway transport received the least ratings as mode of haulage of goods. Air transport received the lowest rating.

Figure 4.2: Ratings of Usage of Transport Modes for Haulage of Goods

When asked about the number of transport networks employed to transport goods, a large proportion of the respondents (i.e. 70 percent) revealed that they employed road and sea transport facilities. Twenty (20) percent of the respondents indicated that they used rail and sea for transporting their goods. About 5 percent employed rail and road to transport their goods. Few respondents (i.e. 4 percent) made use of inland waterways and road. Only 1 percent of the respondents employed air and road for transporting their goods. The result suggests that multimodal transport system (i.e. combination of transport modes) for goods haulage is not readily employed by users of various transport networks. The destination or origins of the goods transported are mainly road and sea.
When asked about the reasons for their choice of combination of these transport networks, a large proportion of the respondents (43) cited the main purpose of road haulage was to complete the inland leg to and from seaports in Tema and Takorasi. More goods transported, in transit, are done through the ports. Some respondents (22) indicated that the use of inland waterways is minimal even though a lot of rivers in Ghana offer lots of potential. Some respondents (17) saw air transport as more as an emergency mode of transport by exporters, especially when a delay in production causes the goods to miss shipping connections or for perishables. Five respondents indicated that rail usage was also minimal, even though there is a railway connection away in Eastern and Western corridors that can be used for transit to Tema and Takoradi ports. River transportation in Ghana is active only on the Volta River. The Volta River runs through Greater Accra, Volta, Eastern, Brong Ahafo and Northern Regions. The River run through Ghana with a total length of 400 km is presently navigable.

When respondents were asked about affordability of the modes of transport, it was observed that waterways transport was perceived as the cheapest followed by sea and rail transports (see Figure 4.3). However, road and air transports were perceived to be
the most expensive modes of transporting goods. When comparing the costs involved in these routes, sea transport is as expected the cheapest per cost/km, rail is intermediate and road transport is the most expensive. It is also worth noting that the various other charges are still a burden to the competitiveness of Ghanaian exports.

Figure 4.3 Perception of Affordability

![Chart showing affordability perceptions]

Source: Fieldwork, 2011

When respondents were asked about speed of delivery of the transport modes, it was observed that air transport was perceived as the fastest followed by road and rail transports (see Figure 4.4). Delivery time for waterway transport was perceived to be low. Sea transport was considered as the slowest for goods transportation.

Figure 4.4 Perception of Speed of Delivery

![Chart showing speed of delivery perceptions]

Source: Fieldwork, 2011
When respondents were asked about reliability of the transport modes, it was observed that air transport was perceived as the most reliable followed by sea and rail transports (see Figure 4.5). Waterway transport was perceived to be less reliable compared to sea and air transports. Road transport was considered as the least reliable for goods transportation.

![Figure 4.5 Perception of Reliability](image)

Source: Fieldwork, 2011

When respondents were asked about availability of the transport modes, the results revealed that road transport was perceived as the most available means of transport followed by sea and rail transports (see Figure 4.6). Waterway transport was perceived to be less available compared to sea and air transports. Air transport was considered as the least available for goods transportation.
Respondents were also asked to rank the safety of using various transport modes. The results revealed that air transport was perceived as the safest means of transport followed by sea and rail transports. Waterway transport was perceived to be less safe compared to sea and air transports. Road transport was considered as the least safe for goods transportation (see Figure 4.7).

Respondents were also asked to rank the capacity of various transport modes. The results revealed that sea transport was perceived by the respondents as having the highest capacity for goods transport perceived as the safest means of transport followed by rail and air.
transports. Waterway transport was perceived to be less safe compared to sea and air transports. Road transport was considered as the least safe for goods transportation (see Figure 4.8).

![Figure 4.8 Perception of Capacity](image)

Source: Fieldwork, 2011

4.3.2 Road Transport

When asked what the factors taken into consideration for using road transport, a large proportion of the respondents ranked availability followed by reliability as the most important ones. Flexibility and cost control come in as third and fourth in this ranking. Price was least considered important factor in their choosing road transport. The result suggests that with road transport, respondents have access to transportation services without being subjected to the availability constraints as in the case of other transport networks. It is crucial to understand that in Ghana, road infrastructure is not in good condition, and seasonal rains make road transport impossible during certain periods of the year, especially during the rainy season. Therefore, availability of other modes of transport such as rail could go a long way to help those who depend more on road transport in rainy seasons.
When asked about the problems in relation to road haulage, large proportion of respondents (26) felt that there were deficiencies in the road haulage service offered in Ghana. The biggest complaint is related to the fact that there is no real competition among the road haulers thus making freight rates relatively high in relation to the distance even though haulers do not control over prices. The bad road conditions and transit time are also cited among the deficiencies of road haulage services. One respondent complained about pilferage during road transport.

Respondents were further asked about how they perceived the future usage of road haulage. More than half of the respondents felt that, in the future, they were expecting to maintain their level of use for road haulers. Some 28 percent of the respondents were more optimistic because they expected their business to grow thus increasing their demand for road transport services. A minority of respondent (i.e. 5 percent) foresaw a drop in their road transport usage.
4.3.2 Inland Waterways

As observed in Figure 4.2, inland waterways form the third key mode of transport in Ghana. As waterway, the Volta Lake could play a key role in the Ghana’s Eastern corridor transportation by providing a useful and low cost alternative to road and rail transport between the north and the south. However, few respondents use this mode of transportation. They were asked about the factors taken into consideration for using this mode of transport.

As observed in Figure 4.11, a large proportion of the respondents ranked affordability followed by reliability as the most important factors they considered in using this
means of transport. Capacity and security come in as third and fourth in this ranking. Availability was least considered important factor in their choosing road transport.

When asked about the problems faced in using this mode of transportation, some 5 respondents indicated that this mode of transportation was not regular. One of them complained that when the pontoon breaks down they find it difficult to transport their goods from Afram plains.

Even these respondents said they expect to reduce their use of this transport network in the near future because when the Donkorkrom road is constructed it would serve as another means of transport. However, during the rainy season, the river could be used as an alternative to road transport as many of the land routes become bad to transport goods with. During the dry season, road transport becomes the predominant mode of transport. There are a few river ports that could be developed to handle cargo coming from Western part of the country.

4.3.3 Sea transport

It is worth noting that sea transport is a very important segment of the transport chain but it is a segment that is out of their control. This is represented in the way international sales contracts are negotiated with the foreign seller or buyer. The majority of goods that are imported into Ghana come from seaports either through Tema or Takoradi ports. Therefore, sea transport remains one of the important means for transporting goods. Respondents were asked about the factors taken into consideration for using this transport as modal choice. As observed in Figure 4.12, a large proportion of the respondents ranked availability followed by capacity as the most important factors they considered in using this means of transport. Reliability and
security were the third and fourth factors considered by respondents in using sea ports. Flexibility was least considered important factor in their choosing road transport.

Figure 4.12 Reasons for Selecting Sea Transport

When asked about the problems faced in using this mode of transportation, all the respondents indicated they encounter problems in clearing their goods at the ports. They revealed that they always get frustrated. Therefore, they have to pay bribe to clear their way through. Bribery is considered by all respondents as an integral part of running their business activities. One respondent indicated that:

'If bribe is not paid to the relevant officials then there is a great chance that the goods will be delayed, lost or even pilfered'.

Bribe is paid not only for the cargo but also for the approval of import and export related documents. The bribery invariably increases transaction costs for importers and exporters.

Relating to the future use of sea transport, half of the respondents felt optimistic. Some 32 percent of the respondents felt that, in the future, they were expecting to maintain their level of use for road haulers. A minority of respondent (i.e. 13 percent) foresaw a
drop in their sea transport usage. Among those that envisage possible future increases in their use of sea transportation use are the wood product exporters while those who feel more pessimistic are from fruit and vegetable industry.

![Figure 4.13 Future Usage of Sea Transport](image)

4.3.4 Air Transport

One respondent, an exporter, was using air transport for their goods. Reasons that were provided for this modal choice was an increase in the amount of perishable products exported. Some vegetables or fruit products can get rotten in few days if delayed. Lack of delay can only be achieved if the perishable products are air freighted into their destinations. Perishability, special handling characteristics and types of packaging emerge as more important factors for this foodstuff importer in choosing this mode of transportation.

He expects an increase in his level of use of air transport.

4.3.5 Rail Transport

Respondents were asked about the factors taken into consideration for using rail as modal choice. As observed in Figure 4.14, a large proportion of the respondents ranked price as a factor that affect modal choice followed by capacity. Flexibility and security
were the third and fourth factors considered by respondents in using sea ports. Availability was least considered important factor in their choosing road transport.

Figure 4.14 Reasons for Selecting Rail Transport

Relating to the future use of sea transport, majority of the respondents felt optimistic. Some 25 percent of the respondents felt that, in the future, they were expecting to maintain their level of use for rail transport. A minority of respondent (i.e. 5 percent) foresaw a drop in their sea transport usage. Among those that envisage possible future increases in their use of sea transportation use are the wood product exporters while those who feel more pessimistic are from fruit and vegetable industry.

Figure 4.15 Future Usage of Rail Transport
The two most important attributes affecting modal choice relate to service are speed (transit time); reliability and cost respectively. From the analysis of this section, it can be observed that air transportation is the fastest but the most costly. Road transport is faster and more costly compared to rail or maritime transport. Rail transport was considered faster and costly compared to maritime transport.

Figure 4.1 Attributes affecting modal choice

The findings indicated that road transport is the dominant mode of transport for transit to sea ports. All the respondents understand that sea transport is the main transport leg, but long distance trucking to seaports is the only mode of transport they are really familiar with. All the respondents acknowledged that transport infrastructure in Ghana is a major constraint on the selection of modal choice. The basic transport infrastructure that is in place in Ghana and neighbouring countries is more adapted for road transport, and therefore making competition with other modes is difficult. Even when rail transport is a possible option, trucking will be preferred. However, rail transport is only functioning in the Western parts of the country. The rail lines on other parts of the country are not functioning and therefore the service is seen as unreliable.

The subject of modal choice decisions, and discovered that cost/price/rate was ranked first with service-level and transit time reliability closely behind. Speed or transit time
is considered the most important attribute in Ghana because of the existence of many physical and non-physical impediments when exporting or importing. The frequency of transport services has also been quite low in response to marginal freight flows and due to the nature of the country; shipments must transit through third countries. This increases the bureaucratic process, thus increasing delays in delivery. This fear of delays is reflected in the survey result with 'speed' or transit time in service being the most important factor in the modal choice selection. This finding is consistent, with the result of Jeffs and Hills (1990) study on the determinants of modal choice in freight transport where transit time is considered the most important aspect of 'service'.

It has usually been assumed that 'cost' was the most determinant factor in the selection of modal choice. The main body of the literature acknowledges that 'cost' is a very important factor but it is not the most important. The shipper's decision as where to ship and by what mode of transport will depend not only on direct transport charges, but also on the indirect and service-induced costs. According this study, services such as guaranteed transit time and reliability are also important.

Safety of goods is equally important. Any loss or damage, because of theft, mishandling, poor quantity packaging or physical damage caused by accident, will result in the non-availability of the goods at the expected time and place, and in the expected conditions. The financial consequences of such non-availability, in addition to the cost of loss or damage, are similar to the time reliability consequence mentioned above.

The ranking of factors affecting the modal choice in Ghana has provided a useful insight on how Ghanaian exporters, importers and logistics service providers select
their mode of transport but this selection is ultimately based on the available transport infrastructure and services in Ghana.

4.4 Perception of Constraints faced in the Transport Operation

Transport providers were asked questions relating to constraints hampering transport operations in Ghana.

Respondent from GSA indicated that Tema and Takoradi ports have been the only ports in use and there are plans for development of the inland transport. However, these plans have never been realised.

Respondent from GRDA opined that:

'The rail system is almost dead. The railway system has contracted with only the western line still carrying freight of any importance (primarily minerals and logs)'.

The respondent from VLTC mentioned that there have been several attempts to develop an inland shipping corridor at Lake Volta, but it has not taken off as expected for number reasons.

All the interviewees agreed that inland transport today is completely dominated by road transport. However, the efficiency of the trucking industry is low. This is partly due to a combination of old trucks, poor management and a system of traffic coordination which limits competition. Five respondents showed that there are also a number of structural reasons for the low efficiency, such as an unbalanced and seasonal market which makes it difficult to obtain return freight, and a poor road and communication infrastructure, which results in low speed and makes it difficult to link supply and demand. One respondent indicated that:
In spite of the low efficiency, the transport rates apparently have been decreasing during the 1990s due to the strong competition caused by oversupply of second-hand trucks in combination with decreasing government transport rates, even though they are not binding.

All the respondents agreed that many large industries in Ghana still operate their own distribution systems (for instance the Lever Brothers operate their own nation-wide distribution system in Ghana while in Zimbabwe they have outsourced both storage and distribution of their products), and lack of a reliable open distribution system appears to be one of the constraints for development of small and medium-sized enterprises (for instance small oil mills) which do not have the resources to develop their own distribution system.

Interviewees revealed that the country is faced with shortages in skilled labour. Most of the labour is comprised of low-skilled and low-cost workforce. The respondents have many difficulties in finding a suitable workforce for their activities. It is usual for the respondents to train their staff in the handling of export/import and transport procedures. Human resource development is considered to be the most important issue by all the respondents. Respondent from GSA stated that:

'Human resource development policies in Ghana were adequate for the country but that they were not good enough for the transport sector'.

This is a big problem when his staffs have to deal with international trade and transportation issues. Increasing staff capability through formal training is a priority, which has been recognised by all those involved in the country’s international trade, for the sustainable economic development of the economy.
All respondents acknowledge infrastructure as a major impediment to the facilitation of Ghana’s internal and international trade. Road quality is poor and only 15 percent of roads are paved. During the ‘wet season’ some roads are rendered non-usable thus diverting traffic to rail or inland waterway in the Western and Eastern corridors. As indicated earlier, inland waterway infrastructure along the Volta and its tributaries is insufficient as it is still mostly in its natural state without improvement.

Ghana’s infrastructure limitations are seen by almost all the interviewees as a major constraint to the economic development of the country, and as a bottleneck for trade expansion and transport facilitation.

All the respondents felt that there was no consistency in governmental rules and regulations relating to trade and transit practices, and that all the existing procedures were cumbersome. Interviewees in-charge of exports, felt that exporters were losing their competitive edge in export markets due to administrative bureaucracy. Interviewees in-charge of logistics and transport operators complain about customs procedures relating to transit traffic at Ghana’s borders.
CHAPTER 5
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction
The objective of the research was to assess and evaluate a number of multimodal transport corridors that are being used or may be used by traders. This chapter summarizes findings from the perspectives of users of various modes of transport and regulatory agencies, draws conclusion and provides recommendations. The study was mainly focused on shippers and consignees with cross-references to policy makers, freight forwarders and logistics service providers in Ghana.

5.2 Summary of Findings
The findings showed that the selection of modal choice in Ghana seems to be flawed, as there is no 'real' choice. There is little rail, inland waterway use is minimal and air transport is usually considered only as an emergency channel. Rail transport is only functioning at the western corridor, but due to the low freight volume and the unreliability of service, rail cannot compete with road haulage. It is also a result from the lack of interest relating to freight transport on the part of the Ghana Railway Corporation's management as well as policy-makers. The importance of sea transport is acknowledged for the main transport leg. The majority of the respondents clearly felt that there was no choice for the selection of transport modes or carriers as the regulatory framework covering international transit is very restrictive. Physical and non-physical barriers to the smooth flow of goods are present at every level, such as infrastructure constraints and bureaucratic operational and administrative procedure. This has also led to a sub-optimum selection of modal choices in the inland leg. A better
co-ordination of policies with neighbouring countries will help ease some international transit problems. Nonetheless, the choice of transport mode in a developing country such as Ghana is still a very complex one.

Most of the respondents are not aware of other possible modal alternatives for the transportation of their goods, it would be interesting to illustrate the various modal combinations that may exist within logistics channels for export and import in Ghana. The comparison of the various combinations can also be done in order to find the most competitive logistics channel that will benefit Ghanaian traders. This might help in demonstrating possible alternatives that are available in the modal selection process.

As a developing country, access to the local and global market is very important in order to sustain economic development for the country. Sub-optimal modal and route selection is impeding the country’s trade capabilities on the local and international market. To achieve better market access, all alternative transport combinations must be examined in order to select the most efficient and competitive logistics channel in terms of cost, time and reliability.

5.3 Conclusions

The study concludes that it is very difficult in Ghana to have competition among transport modes. Due to its particular location, the dominant mode of transport is road. It is also part of the government policy to promote the use of road transport for international and transit cargo. Many respondents felt that they had no choice in the selection of transport modes when trading locally with road transport considered as the only mode for sea or air access. This is due, to a certain extent, to the fact that there is almost no information on other modes of transport. Rail transport is a viable option but
needs to be publicized more aggressively. There are also many physical and non-physical barriers that hinder the smooth flow of goods from origin to destination. It must not be forgotten that freight transported within Ghana is also subject to seasonal variations, which divert traffic from road transport to inland waterways in certain areas.

Traders and logistics operators must learn to re-evaluate their routing strategy for export and import of cargo to and from destination by systematically considering a numbers of factors such as speed (transit time), reliability (confidence index), and cost. Transit time, reliability and costs are of fundamental importance when traders are competing on the global market. The option, with rail, via waterways needs to be marketed more widely as it is under-utilised. Though it has been in operation since 1920s, the road-rail combination offers potentially the best option, when weighing speed, cost and reliability.

5.4 Recommendations

Based on the findings, the study provides the following recommendations:

1. Multimodal transport systems enable economies of scale within a transportation system where modes are used in the most productive manner. The globalisation of trade is largely dependent on transportation systems with reliable transit times and costs. Exporters and logistics service providers must re-evaluate their strategies for freight transportation as all modes and all possible transfers between modes must be considered.

2. Ghanaian exporters are not really aware of the multimodal alternatives that are offered to them. This might be due to the fact that most of these garment
exporters prefer to sell their product, thus not controlling the transport chain. If Ghanaian exporters want to benefit from the various route options that are offered to them, then they need to negotiate their international trade under ‘delivered’ trade terms. These ‘delivered’ trade terms will assist in the control of the transport chain, as Ghanaian exporters will be able to nominate the main carriers and choose the most suitable route.

3. Exporters, importers and logistics service providers must re-evaluate their strategies for freight transportation, as all modes and all possible transfers between modes must be considered.

4. Transport providers should analyse such factors in terms of both threats and opportunities while establishing their strategic marketing plans.

5. There should be improved accountability mechanism in the offices to check corruption and bribery incidences normally associated in multimodal operations.
REFERENCES


Jeff, V. P. and Hills, P. J. (1990), Determinants of modal choice in freight transport: a case study. *Transportation*, 17, 29-47.


Appendix

QUESTIONNAIRE FOR THE TRANSPORT USERS

Introduction

I am conducting an academic research on how multimodal transport system can be used to improve efficiency in cargo movement across Ghana. Your answers to the questions will be used solely for the purpose of my research and would be treated absolutely confidential. You are therefore, not required to disclose your name. Your participation in the research is voluntary but I hope you will feel able to provide the required assistance. Kindly indicate whether you shall require a copy of the key findings of the research to be forwarded to you, in which case you have to provide a name and address.

Respondent’s Profile

Age

Sex

Position

Which of the following mode of transport do you usually use to transport your product/goods?

- Road haulage
- Inland waterways
- Rail
- Sea transport
- Air transport
Which of the following combination of transport facilities do you use to transport your product/goods?

- Road haulage
- Inland waterways
- Rail
- Sea transport
- Air transport

Which of the following mode of transport is more affordable?

- Road haulage
- Inland waterways
- Rail
- Sea transport
- Air transport

Which of the following mode of transport is more available for your transport business?

- Road haulage
- Inland waterways
- Rail
- Sea transport
- Air transport

Which of the following mode of transport is more reliable?

- Road haulage
- Inland waterways
- Rail
- Sea transport
- Air transport

Which of the following mode of transport provide excess capacity for haulage?
Which of the following factors affected your choice of road as means of transport?

- Price
- Availability
- Reliability
- Flexibility
- Capacity
- Safety

Which problems do you face in using road to transport your goods?

____________________

____________________

____________________

Do you expect your usage of road transport in the future to?

- Increase
- Decrease
- Remain the same

Which of the following factors affected your choice of maritime as means of transport?

- Price
- Availability
- Reliability
- Flexibility
Which problems do you face in using maritime to transport your goods?


Do you expect your usage of maritime transport in the future to?

- Increase
- Decrease
- Remain the same

Which of the following factors affected your choice of rail as means of transport?

- Price
- Availability
- Reliability
- Flexibility
- Capacity
- Safety

Which problems do you face in using rail to transport your goods?


Do you expect your usage of rail transport in the future to?

- Increase
- Decrease
- Remain the same
Which of the following factors affected your choice of air as means of transport?

- Price
- Availability
- Reliability
- Flexibility
- Capacity
- Safety

Which problems do you face in using air to transport your goods?


Do you expect your usage of air transport in the future to?

- Increase
- Decrease
- Remain the same
Appendix B

Interview Questions for Transport Providers

1. What are the development in the transport facilities?
2. Has any major change occurred in the last five years in the mode of transport that you provide?
3. If Yes, what was the nature of and reasons for this change?
4. Which obstacles hamper transport modes or combination of transport modes for freight transport?