ADDIS ABABA UNIVERSITY

COLLEGE OF BUSINESS AND ECONOMICS

SCHOOL OF COMMERCE

DEPARTMENT OF LOGISTICS AND SUPPLY CHAIN MANAGEMENT

THE IMPACT OF TRANSPORTATION IN LOGISTICS PERFORMANCE: THE CASE OF MAJOR GENERAL HAYLOM ARAYA MILITARY ACADEMY

BY

Yalew Mersha Gelaye

May, 2018
Addis Ababa Ethiopia

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A thesis submitted to college of business and economics school of commerce department of logistics and supply chain management; in partial fulfillment of the requirements for the degree of masters of art in logistics and supply chain management.

BY
Yalew Mersha Gelaye

Advisor
Busha Temsegen (PhD candidate)

May, 2018
Addis Ababa Ethiopia

DECLARATION

I, the undersigned, declare that this paper is my original work and has not been presented for degree in any other university, and that all sources of materials used for this study have been duly acknowledged.

Declared by:

Name: Yalew Mersha Gelaye

Signature:_____

Date:_____

Confirmed by:

Name: Busha Temsegen (PhD candidate)

Signature:_____

Date:_____

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DEPARTMENT OF LOGISTICS AND SUPPLY CHAIN MANAGEMENT

STATMENT OF CERTIFICATION

This is to certify that the thesis prepared by Yalew Mersha Gelaye entitled "**The role of transportation in logistics performance: the case of Major General Haylom Araya Military Academy**", which is submitted in partial fulfillment of the requirement for the degree of master's in Logistics and Supply Chain Management (LSCM)**,** complies with the regulations of the university and meets the accepted standards with respect to standards to originality and quality.

Approved by Board of Examiners:

Busha Temsegen (PhD candidate) _____ _____

Advisor Signature Date

_____ _____ _____

Internal Examiner Signature Date

_____ _____ _____

External Examiner Signature Date

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Glory to the almighty God I started with this word because without fatherly support from our heavenly father not only the paper but every step of my life will and definitely be meaningless I ones again would like to thank the almighty God.

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TABLE OF CONTENT

CONTENT PAGE

LIST OF TABLES

LIST OF CHARTS AND FIGURES

ABBREVIATIONS AND ACRONYMS

ADRP	Army doctrinal reference publication
ADP	Army doctrinal publication
BTRE	Bureau of Transport and Regional Economics
C2	Command and control
DTS	Defense Transportation System
FDRE	Federal Democratic Republic Of Ethiopia
FM	Field Manual
JFC	Joint Force Commander
JP	Joint Publication
LOC	Line of Communication
MGHAMA	Major General Hayalom Araya Military Academy
MOND	Ministry of National Defense
NATO	North Atlantic treaty organization
USAID	United States Agency for International Development
USDOD	United States Department of Defense

ABSTRACT

The purpose of this study was to examine the role of transportation in logistics performance. Effective logistics management has different core functions in military activities, these are: deployment and distribution, supply, maintenance, operational contract support (OCS), engineering, and health services (HS). By considering this fact and central role of transportation at every military logistics activity, the researcher performed the study by identifying roles of transportation in logistics performance dimensions (logistics differentiation, effectiveness and efficiency); and to see the relationship between transportation and logistics performance. Explanatory research design was employed with mixed method. A total of 114 questionnaires were distributed to respondents; 104 were returned and refined for analysis. Interview questions were prepared for logistic sub unit head, transport heads, warehouse keepers, and purchasing and supply head of the military academy. The role of transportation was analyzed using descriptive statistics like mean and standard deviation. As per the result weakness observed in areas of service cost efficiency, the overall quality of transportation, transportation cost and some human and non human factors affecting performance of transportation is identified. The relationships proposed in the framework were tested using Pearson correlation, and the causal relations were analyzed using regression analysis. From the result of the analysis, it is concluded that there is strong causal relationship between role of transportation and logistics performance. From the finding, it was recommended that, increase transportation performance (by providing safe and secure movement of personals and materials, fast travel time and finical/economical management) is better for the military academy to improve the logistics performance. Because most of logistics function is transportation dependent.

Key words: Logistics, Transportation, Role

CHAPTER ONE

INTRODUCTION

This section is to introduce the basic information of the main elements in the study. It includes logistics performance and role of transportation. It comprises background of the study, statement of problem, research questions of the study, objective of the study, significant of the study, scope of the study, limitations of the study, organization of the study and definition of terms. The details are presented as follows:-

1.1. Background of the Study

Logistics was initially applied to military operations; it's most significant impact is being felt through the functions of production, distribution and consumption (Rodrigue and Slack, 2002). According to M. Hesse (2016), the origin of the modern logistics goes back to the emergence of the capitalist economy, the development of specific modes of industrial production and the unfolding of a particular division of labor. This created a distinct sphere of circulation, situated between production and consumption (Marx, 1953). To a certain extent, circulation allowed for the transition from use value to exchange value, and thus made possible the large-scale capitalization of commodities. Mass distribution and marketing became incorporated in the practice of modern management (Chandler, 1977) and have been significant factors of wealth generation. The organization and technology of modern distribution are embedded in a changing macro and microeconomic framework. This mass distribution and marketing activity of commodities is logistics function.

The probable origin of the term logistics is the Greek *logistikos*, meaning 'skilled in calculating' (BTRE, 2001). According to FM (63-3), military definitions typically incorporate the supply, movement and quartering of troops in a set. Logistics is the bridge between the deployed forces and the industrial base that produces the weapons and materiel that the forces need to accomplish their mission. According to NATO (2012), logistics is the science of planning and carrying out the movement and maintenance of forces. In its most comprehensive sense, the aspects of military operations which deal with:

- design and development, acquisition, storage, movement, distribution, maintenance, evacuation and disposal of materiel;

- transport of personnel;
- acquisition or construction, maintenance, operation and disposition of facilities;
- acquisition or furnishing of services; and
- Medical and health service support.

According to USDOD (2014), logistics has different core functions, these are: deployment and distribution, supply, maintenance, logistic services, operational contract support (OCS), engineering, and health services (HS). Logistic services, food service, water and ice service, contingency base services, hygiene services, and mortuary affairs. To perform the above logistics function transportation plays a vital role.

Transportation is an integral part of the reception, staging of, onward movement, and integration (RSO&I) of forces (FM 4-01). Transportation involves safe, efficient, reliable and sustainable movement of persons and goods over time and space. It is required in the whole logistics operation processes. It plays an important role in connection between various military operations. During a military operation, the deployed combat unit consumes a variety of supplies that range from basic services like food and clothing to weaponry and ammunition. The wide range of supplies also means varying levels of demands for the supplies. The demand for basic services like food and clothing is relatively stable, as it is dependent on the number of troops deployed, which generally remains constant. The demand for supplies like ammunition, on the other hand, is highly scenario-dependent and as a result, has a larger variance. Another dimension that contributes to the high variance of the demand is the high risk nature of the combat environment where supply lines may be interdicted. In such situations demand may not be satisfied and thus will accumulate. Therefore demand in any military operation is random, non stationary and affected by possible (random) attrition. To satisfy this demand logistician must perform different logistic activity like transportation. Without well developed transportation systems, logistics could not bring its advantages into full play. Besides, a good transport system in logistics activities could provide better logistics efficiency, reduce loss of injured soldier, and promote service quality (food service, water and ice service, contingency base services, hygiene services, and mortuary affairs).

The army transportation motto, “Nothing happens until something moves!” captures the important role army transportation plays in unified land operations (FM 4-01).

According to US army field manual (2013), there are core principles that guide transportation in obtaining the sustainability of unified operations. Principles used to guide the role of transportation in military logistics activities; like secure movement of army, on time arrival/delivery of supply, fast and safely transport of injured soldier, and economy of scale. These principles are:

Integration is combining all of the sustainment elements (tasks, functions, systems, processes, organizations) within operations assuring unity of command and effort (ADRP 4-0). Army forces integrate sustainment with joint forces and multinational operations to maximize the complementary and reinforcing effects from each Service and national resources.

Responsiveness: A responsive transportation system or operation must be adaptable to changing situations and environments and capable of flexibility. As operational missions and operational tempo changes, transportation must also change. This may mean the ability to reroute and divert assets in response to a priority of need. A responsive transportation system includes the capability to use multiple forms of assets (organic, contracted), establishing a variety of routes, including main and alternate supply routes, and forming transportation networks (hubs, transfer points) to enhance responsiveness.

Economy: An important aspect to obtaining economy in transportation is the effective use of assets. This can be accomplished by properly managing assets, configuring loads for optimal carrying capacity and for planning multi-modal operations nearer to an area of operation. Effective use of assets includes the disciplined use of transportation assets returning from forward areas to support retrograde or repositioning of equipment, personnel and supplies. This also includes the prompt return of commercial transportation assets to ensure their availability for follow-on missions which avoids penalty or detention charges against the government. Additionally, the fast off-loading of assets and returning them to the transportation system increases capability for later operations.

Survivability is all aspects of protecting personnel, weapons, and supplies while simultaneously deceiving the enemy (JP 3-34). Survivability for transportation operations also includes a redundancy of capabilities. Transportation system redundancy is the resiliency that enables the system to compensate for losses and allows the system to function even when the infrastructure is damaged or destroyed. Redundancy offers alternate solutions incase infrastructure elements (roadways, rail lines, waterways) or assets are damaged or become disrupted.

The above principles show the role of transportation in logistics performance during military operations. If there is well integration between transport and other departments, responsiveness, economy, and survivability, the performances of logistics will be better in deferent military operations.

Major General Hayelom Araya Military Academy Transport Department is organized under the logistics department of the academy. Before saying something about the military academy transport department, we must know FDRE ministry of defense policy. The FDRE ministry of defense transportation policy (defense, 2010) has been prepared to create and develop the defense forces combat capability, and to use the existing combat power in any moment and situation leading our logistics activities in modernized and effective way. The FDRE defense logistics policy (1st edition) described the transport role as follows. "The function of transport is moving the force, equipment, and supply from the initial location to its destination and back to the initial location." during the operation, it also engages in supporting the movement of the force by providing transportation and carrying out the transport activity. It plays the force multiplier role and ensures effective utilization of force by moving the force to the needed place with in short time. Major General Hayelom Araya Military Academy transport department also apply the defense logistics main command transportation police and it provides transport service for the academy logistics and training department. During field training; transportation plays a vital role by providing different support. It delivers food, ammunition, weapon and water to the cadets (trainee).

1.2. Statement of the Problem

Transportation plays a vital role in military logistics functions. Transportation is the life line of military operations. The movement of personnel, equipment and sustainment supplies from origin to destination, in order to meet the commander's intent, ensures freedom of action, extended strategic and operational reach and prolonged endurance (ADP 3-0). As a military institution Major General Hayelom Araya Military Academy performed movement of personals and materials by using transportation. To do this it faces many transportation related problems.

Even if such kind of research has not been undertaken in the military academy, by the preliminary interview conducted with the logistics and transport personnel of the military academy, there were transportation related problems in the day to day activities of the military academy. These problems are clearly visible when we compare it with the role that transportation

play in logistics performance (like travel time, safety, security, economic/financial viability, mobility & accessibility). The problems were due to human and non human factor. The human factors were due to poor performance of some employees in transport area as a result of negligence, not understanding the value of team work and inadequate training. The non human factors were due to lack of adequate and modern equipments, substandard trucks, infrastructure problems, missed schedules, higher rate of loss and damage, excessive loading and unloading time.

In addition, based on the researcher's observation, Major General Hayelom Araya Military Academy (MGHAMA) transport department lacks integration with other departments, the employees lack responsiveness, the vehicles and other assets are not properly utilized. These problems affect the role of transportation in logistics performances in the academy mission accomplishment.

The main intention of the study was to examine to what extent the above mention problems really affect the transportation services, look on the specific management practices, and also the assessed the relationship between transportation services and logistic performance to make the academy missions successful. Based on that, the researcher focused on the following research questions.

1. 3. Research Questions

1. What is the role transportation playing in logistics performance in Major General Hayelom Araya Military Academy?

2. What are the problems of transportation practices in Major General Hayelom Araya Military Academy?

3. What are the factors that affect the effectiveness of transportation operation in Major General Hayelom Araya Military Academy?

1.4. Research Objective

1.4.1. General Objective

The main objective of the study was to examine the role of transportation in logistics performance in Major General Hayelom Araya Military Academy.

1.4.2. Specific Objectives

- To determine the contribution of transportation towards logistics performance Major General Hayelom Araya Military Academy.
- To assess the problems of transportation practice in Major General Hayelom Araya Military Academy.
- To identify factors that affects the effectiveness of transportation operation in Major General Hayelom Araya Military Academy.

1.5. Significant of the Study

In today‘s competitive environment and growing military technology, excelling in every aspect of operation is important to mission accomplishment. In military organization like Major General Hayelom Araya Military Academy, where logistics effectiveness have a great deal of impact on mission accomplishment as well as academy community satisfaction, it is essential to identify problems related to transportation which have great impact on logistics performance. The study also provides solutions for problems in the transport department of the academy.

- It helps researchers for future research and reference in this field of study.
- It has a great importance to Major General Hayelom Araya Military Academy transport department. and
- **It** helps the overall transport service users of the academy.

1.6. Scope of the Study

The study was delimited geographically to Major General Hayelom Araya Military Academy. This academy is found in Holeta Genet town Finfine Zurya Liyu Zone of Oromia Regional State which is 40 km to the west of Addis Ababa. The military academy is selected for the research because of two reasons: first it is unique that, the academy train cadets and graduates with a lieutenant and first degree (it is the only academy which graduate with this military rank in the country). Second, the researcher is a member of that academy and can get the required access of data easily. Conceptually, the study was delimited to analyze the role of transportation in the military academy supply and logistic services functions of logistics. The study focused on assessing; the role of transportation on logistics performance by identifying factors or problems that hinder transportation from playing a healthy role in logistics especially supply and logistics service (food service, water service, contingency base services, and hygiene services) functions. Methodologically, it was delimited mixed research design and census sampling technique. Statistically, this research was delimited to mean and standard deviation. Periodically it was delimited and studied within 5 month, from January to Jun, 2018.

1.7. Definition of Terms

1. **Military Logistics** encompasses activities such as transportation of forces and their equipment, feeding and sheltering, maintaining, and others that are indispensable to equip and sustain the force. It also includes resource acquisition, stocking and storing, preserving, maintenance/repair, transportation, and delivery of the required support to the fighting force (FDRE defense logistic police 2010).
2. **Transport** is moving the force, equipment, and supply from the initial location to its destination and back to the initial location (FDRE defense logistic police 2010).

1.8 Limitations of the study

Some of the limitations that were influenced the study were:-

1. The researcher was facing an obstacle on easily finding secondary data, because of poor filing system and lack of well-organized availability and negligence in handling of secondary data in the department.
2. Although a number of resource and studies made on the transport management practices in other regions of the world, the researcher didn't get an access and prior study resources regarding Major General Hayelom Araya Military Academy.
3. It was carried out only in one military academy. Hence, this may limit the ability of the research to generalize the findings for other organizations within the Ethiopian ministry of national defense force.

1.9. Organization of the Study

The paper has five chapter which deals with different subject. The first chapter is the introductory part and it contains background of the study, statement of the problem, objective of the study and significance of the study. Chapter two contains review of related literature in the subject matter in chapter three methodology employed were discussed in detail. The forth chapter deals with the analysis and presentation of the data collected. In the final chapter the data collected and analyzed in the previous chapters were summarized; and conclusions and recommendations were made based on the summary.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1. Introduction

Under this chapter the researcher has broadly discussed the definition of logistics and transport specifically on logistics performance and the role of transportation. He has also reviewed theoretical and empirical studies conducted by different researchers on the role of transportation and its role on Major General Hayelom Araya Military Academy logistics performance.

2.2. Definition of Logistics

There have been many studies in investigating the definitions of logistics; however, there is no universal accepted definition of logistics reached as it is still a late academic domain. Besides, logistics management crosses the multiple areas of manufacturing, transportation and also business management. Each area studied based on various purposes, and it still lacks academic integration.

Lambert et al (1998) noted that, the concept of logistics has evolved over time in response to factors such as changes in the business environment. The primary goal of logistics in any organization is to maintain the organization's customer service goals in an effective and efficient manner. A firm's development of a logistics strategy should therefore first identify the most wanted performance levels. This decision will incorporate aspects of the firm's broader competitive strategy, such as the price or quality positioning of its products.

According to Tilanus (1997), *l*ogistics is the process of planning, implementing and controlling the efficient, cost-effective flow and storage of raw materials, in-process inventory, finished goods, and related information from point-of-origin to point-of consumption for the purpose of conforming to customer requirements. Tilanus's definition provides a point of view basically from manufacture procedures. The main emphasis of logistics management is efficiency. According to Broeke et al.(1989), logistics is defined as, the organization, planning, implementation and control of the acquisition, transport, and storage activities from the purchase of raw materials up to the delivery of finished products to the customers. Its scope covers both the upstream supply chain and the downstream distribution chain.

Johnson and Wood (1993) used five significant key terms, which are logistics, inbound logistics, materials management, physical distribution, and supply-chain management, to interpret those:

logistics explain the entire process of materials and products moving into, within, and out of the firm. Inbound logistics are the movement of materials from suppliers to the firm. Materials management describes the movement of equipment and components within a firm. Physical distribution refers to the movement of goods outward from the firm to the customer. Finally, supply-chain management is somewhat broader than logistics, and it links logistics more directly with the user's total communications network and with the firm's engineering staff.

Cooper (cited in Tilanus 1997), tried to summarize the widened scope and purpose of logistics management in the 1990s by the following definition: logistics is the strategic management of movement, storage and information relating to materials, parts and finished goods in supply chains, through the stages of procurement, work-in-progress and final distribution. Its overall goal is to maximum current and future profitability through the cost effective fulfillment of customer orders. This complies with what Cooper et al. (cited in Tilanus 1997), said logistics refers essentially to the management of supply chains in commerce and industry.

According to TALM's (Taiwan Association of Logistics Management), definition logistics is a behavior of physical circulation of materials. In the process of circulation, effectively combine with functional activities, such as transportation, warehousing, loading and unloading, packing, manufacturing and information, by means of management to create values and satisfy customers as well as social demands.

According to the Council of Logistics Management (1991), logistics is a part of the supply chain processes that plans, implements, and controls the efficient, effective forward and reverse flow and storage of goods, services, and related information between the point of origin and the point of consumption in order to meet customers' requirements.

According to NATO (2012), Logistics is the science of planning and carrying out the movement and maintenance of forces. In its most comprehensive sense, the aspects of military operations which deal with:

- design and development, acquisition, storage, movement, distribution, maintenance, evacuation and disposal of materiel;
- transport of personnel;
- acquisition or construction, maintenance, operation and disposition of facilities;
- acquisition or furnishing of services; and
- Medical and health service support.

2.3. Logistics Activities

According to USAID (2014) major activities in the logistics cycle are:

Serving customers: everyone who works in logistics must remember that they select, procure, store, or distribute products to meet customer needs. Storekeepers do not store drugs just for the purpose of storing; they store products to ensure that commodity security exists for every customer to obtain and use the health commodities when they need them. In addition to serving the needs of the end customer the customer seeking health services each person in the process is also serving the needs of more immediate customers. Storekeepers provide customer service when they issue medicines to the health facility, and the central medical stores provide customer service when they issue commodities to the district. The logistics system ensures customer service by fulfilling the six rights. Each activity in the logistics cycle, therefore, contributes to excellent customer service and to ensuring commodity security.

Quantification: After products have been selected, the required quantity and cost of each product must be determined. Quantification is the process of estimating the quantity and cost of the products required for a specific health program (or service), and, to ensure an uninterrupted supply for the program, determining when the products should be procured and distributed. See the suggested reading list at the end of the handbook for sources of additional information about quantification of health commodities.

Procurement: After a supply plan has been developed as part of the quantification process, quantities of products must be procured. Health systems or programs can procure from international, regional, or local sources of supply; or they can use a procurement agent for this logistics activity. In any case, procurement should follow a set of specific procedures that ensure an open and transparent process that supports the six rights. Inventory management: storage and distribution. After an item has been procured and received by the health system or program, it must be transported to the service delivery level where the client will receive the products. During this process, the products must be stored until they are sent to the next lower level, or until the customer needs them. Almost all businesses store a quantity of stock for future customer needs.

According to Tseng (2004), there are five major groups of activities of logistics these are; production processes, materials and other inputs, transport and storage, product support, and reverse flows and disposal. Based on fig.2.1 in the next page those groups inter flow to each

other. Basically, production processes, materials inputs and product support compose the main activity structure. The direction is from materials and other resources inputs to production processes, and then to product support. If unsatisfying situations happened, the flow could be converse through the activity group of reverse flows and disposal. The transport and storage group certainly plays the role of delivery and relay stations for goods.

2.3.1. Production Processes

Tseng (2004) stated that, production processes include production flow management, inventory management, packaging, order processing and demand forecasting. These processes were traditionally regarded as the core functions of a firm, and were often undertaken in-house. Production flow management includes production planning and materials handling. The holding of inventory facilitates access to economies of scale (through longer production runs), handling of seasonal variations in demand, and rapid response to changes in demand.

Effective inventory management can improve customer service and reduce holding costs, although at some point there is a trade-off between these two aspects of performance. Packaging protects products from deterioration, damage, pilferage and tampering. Order processing is the system through which a firm receives orders from customers, tracks the filling of the orders, and dispatches them. Forecasting incorporates predictions of future demand for a firm's output, and affects production planning, the quantities of inputs ordered from suppliers, and the amount of products to be transported or stored in each market.

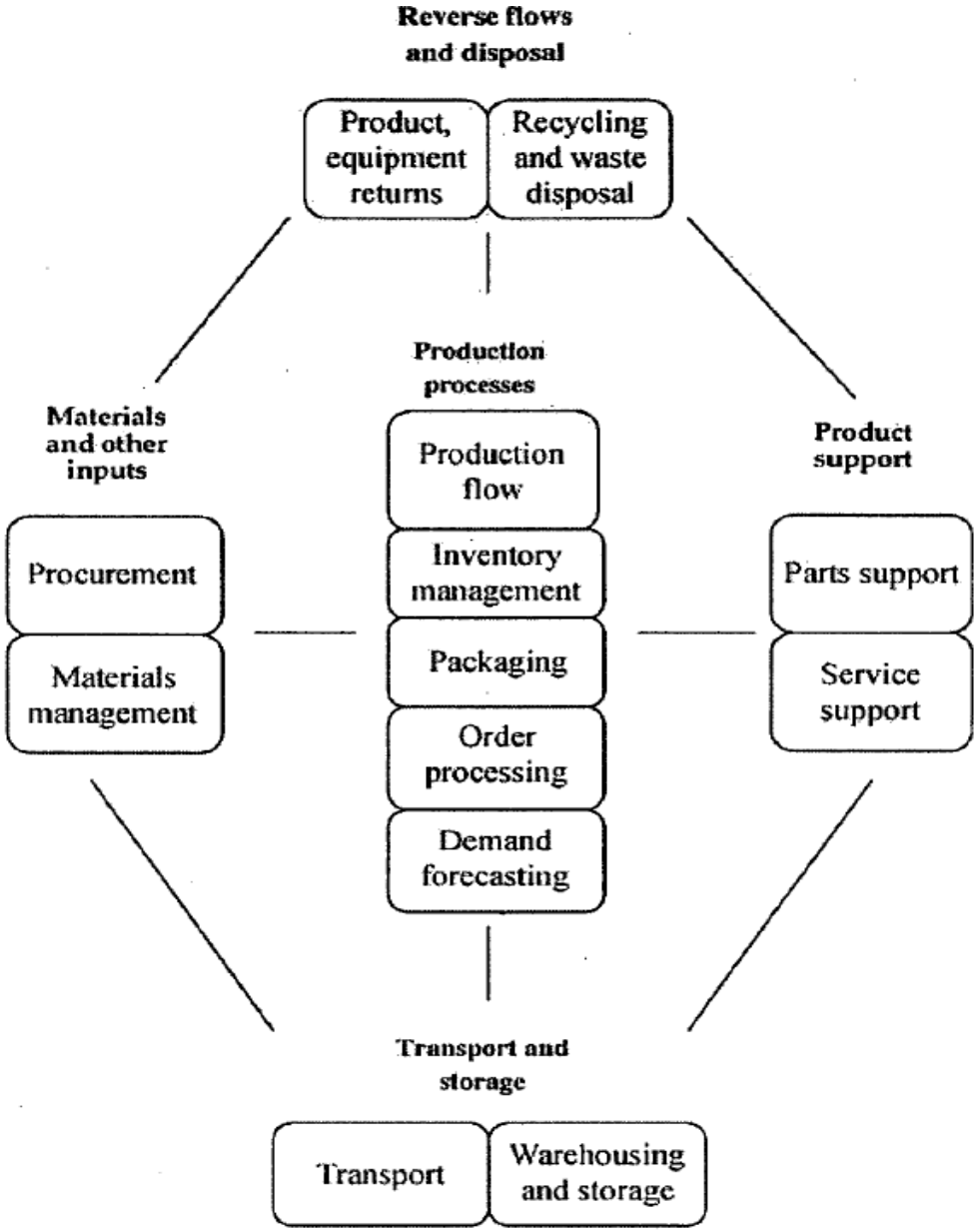
2.3.2. Materials and Other Inputs

According to Tseng (2004), procurement and materials management potentially have a major impact on the competitive position of a firm and a product. Procurement is defined as the purchase of goods and services from outside suppliers for use in the firm's production, sales and distribution activities. It has evolved from an operational process to a strategic activity, with a key role in managing and optimizing logistics expenditure and supplier performance. Greater outsourcing of logistics activities has increased the importance of the procurement function in many firms.

While products are received, stored, and distributed (and when customers receive them), it is important to monitor their quality. Furthermore, the quality of the storage conditions and transportation mechanisms should be monitored. The inventory control system must be designed

so that, if followed, customers will receive the products they need, at the time they need them. We can easily see the five major groups of activities of logistics in the following figure 2.1

Figure. 2.1. Logistic activities



Source: BTRE(2001)

2.3.3. Product Support

Tseng (2004) stated that, product support is a key component of many firms' competitive strategies with the increased emphasis on service quality in many sectors of the economy. Parts and service support (including installation and maintenance) can be used to enhance the attractiveness and reputation of a firm and its products. These activities are particularly important in situations where any hindrances or equipment down-time would impose significant costs on the firm's customers.

2.3.4. Reverse Flows and Disposal

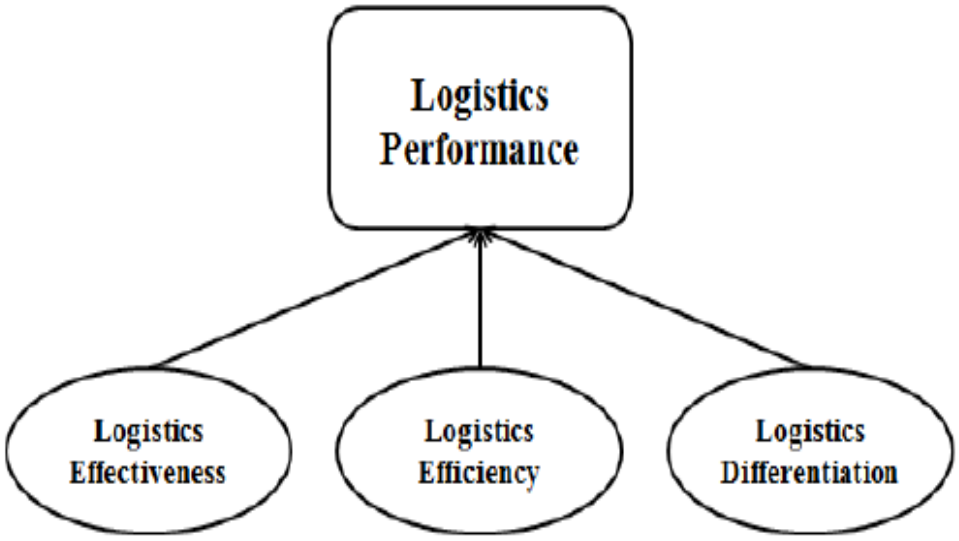
According to Kasilingam (1998), reverse logistics comprises the handling, storage and movement of material that flows from the end customer back to the seller or supplier. Proper handling of product returns helps a firm to improve its relationship with customers and to discover problems in production processes or product design. Efficient practices in equipment returns (e.g. empty containers, pallets) facilitate cost savings and sufficient availability of equipment. Reverse flows and disposal reflect environmental question, including regulatory requirements and cost considerations (e.g. savings through re-use of off-cut resources generated in the production process). Poor performance in reverse flows and diposal may harmfully affect public perceptions of a firm and therefore weaken its market position. Different Activities that maximize the significance of returned products may make an important contribution to a firm's profitability (Andel 1997). The products may be returned to finished goods inventory, restored for resale, or sold on the secondary market rather than being destroyed. Some hazardous materials and other waste products may be resold to other manufacturers or sent as scrap to recyclers.

2.4. Logistics Performance (LP)

Overall coordination of logistics should be the main objective in logistics performance (P. Andersson, 1989). Porter (1990) highlights that, improvement and innovation would result in nation’s competitiveness. Therefore, measuring the logistics performance is currently becoming a high priority (Cooper, 2007), thus bringing a challenge to the organizations (Forslund, 2007). Logistics performance has been commonly discussed as early as in 1985 at a seminar in Netherland by The Netherlands Association for Logistics Management. In this seminar, the

performance indicators model was produced and the indicators have been applied in several companies. Logistics performance (LP) is defined as; analysis of both effectiveness and efficiency in accomplishing a given task (Mentzer & Konrad, 1991). Other scholar refers LP as a metric used to quantify the efficiency and/or effectiveness of an action (Platts, 2005). This topic continues and LP has been seen as multi-dimensional and is defined as the degree of efficiency, effectiveness and differentiation associated with the accomplishment of activities (Stank, 2010) Researchers have always found difficult to define LP because organizations have multiple and frequently conflicting goals (Henriksson, 1993). In the context of this study, efficiency is a measure of how economically the firm's resources are utilized (Mentzer & Konrad, 1991). Several critical areas in LP effectiveness as described by Langley & Holcomb (1992) are product guarantee, availability and fulfillment time. They also extended the definition of effectiveness by adding differentiation as the ability to create value for the customer through the uniqueness and distinctiveness of logistics services. As mentioned earlier that LP plays a vital role in achieving the organizational goals. The evaluation is based on how well goal is met (Mentzer & Konrad, 1991) and to what extend the overall productivity and performance would reflect LP (Stabler, 1992). Consequently, LP helps the fulfillment of the organization's objectives and strategy as well as satisfying the customers (Kayakutlu & Buyukozkan, 2011).

Figure2. 2. A Model for Logistics Performance



Source: Fugate 2010

Efficiency refers to an organization‘s ability to provide the desired product/service mix at a level of cost that is acceptable to the customer. This concept implicitly identifies the need for managing organizational resources wisely so as to minimize the expenses incurred in providing a service and ensuring that the service delivered meets customer requirements. Therefore, the customer takeaway is economic value in terms of low price (Langley and Holcomb, 1992).

Effectiveness refers to an organization‘s ability to meet customer requirements in certain critical performance areas of logistics. For example, L.L. Bean has identified seven customer services called key result areas, namely product guarantee, in-stock availability, fulfillment time (turnaround), convenience, retail service, innovation, and market standing (image). Therefore, the customer takeaway is market value which in the L.L. Bean‘s case is assortment and convenience. (Bowersox *et al*., 2000)

Differentiation or relevancy manifests itself in the ability of logistics to create value for the customer through the exceptionality and distinctiveness of logistical services (Langley and Holcomb, 1992; Bowersox *et al.,* 2000).

In general logistics performance should be assessed from the point of view of customer and society. The micro view focuses on the level of happiness of individual users, including manufacturers, traders, and other commercial enterprises. The macro view focuses on the input to a country’s economic and social development, and the satisfaction of public needs. Individual logistics users are concerned about cost, efficiency, and service quality (including safety, transit time, and reliability), and demand that logistics enterprises reduce cost and improve speed and service quality. From the macroeconomic and social perspectives, however, logistics is concerned with more than just achieving economic efficiency. It should also reduce external costs (e.g., safety hazards and pollution), conserve energy, and optimally utilize the country’s resources.

2.5. Achieving Logistics Efficiency and Effectiveness

The efficient and effective operation of the logistics system depends on consistent and timely information flows, involving both supplier and customer of services. Improved efficiency of each mode of transport; Coordination and seamless interchange of different transport modes; Effective integration of all supply chain management functions (including demand management, supply

management, manufacturing, storage, transport, distribution, and value-added services); and Enhanced collaboration among supply chain partners (e.g., suppliers, manufacturers, distributors, and end users). All the above activity can achieve logistics efficiency and effectiveness

2.6. Definitions of Transport

Transport or **transportation** is the movement of humans, animals and goods from one location to another. Modes of transport include air, land (rail and road), water, cable, pipeline and space. (https://en.wikipedia.org/wiki/Transport).

Transportation can be divided into infrastructure, vehicles and operations. Transport is significant because it facilitate trade between people, which is essential for the development of the society. Transportation is a central constituent in the time and spatial economic utility of products and services and it is a core element of logistics, moving goods between different points in the supply chain (Asian Development Bank 2012). Logistics is a process of planning, implementing, and controlling the efficient flow of products, information, and funds to conform to the client's requirements (Manila, 2012).

According to Fair and Williams (1981), Transportation plays a connective role among the several steps that result in the conversion of resources into useful goods in the name of the ultimate consumer. It is the planning of all these functions and sub-functions into a system of goods movement in order to minimize cost and maximize service to the customers that constitutes the concept of business logistics.

As per Coyle et.al, (2011), transportation service is very frequently important for the selection of a particular mode operating between two points. The dimensions of transportation service would include reliability, accessibility, and security. These factors are looked at in terms of their cost impact as well as the actual transportation cost itself in selecting a particular model. Transportation is a significant link in the overall supply chain, which has become an important perception for organizations in the 21st century. Transportation can be viewed as the stick that helps to hold the supply chain together.

Transportation is one of the most observable element of logistics operation it provides two services product movement and storage. It is the movement of people, animals and goods from

one location to another. Modes of transport include air, rail, road, water, cable, pipeline and space.

According to Kumar (2014), transportation is virtually inconceivable in today's economy for a firm to function without the aid of transportation. Transportation is a crucial and a major sub-function of logistics that creates time and place utility in goods. In general the backbone of the entire supply chain is the transportation management that makes it possible to achieve the well known seven Rs of supply chain those are:-the right product in the right quantity and the right condition, at the right place, at the right time, for the right customer at the right cost. Transportation is a critical part of any global logistics effort because of the long distances that can separate a firm from its customers. A transportation system can be inbound and outbound. A transportation system must fit within other logistics activities. Historically, national governments have exercised tight economics control over transport organizations, either through direct company ownership or through laws intended to regulate the way those businesses were run. This governmental involvement in the business of transportation is gradually waning as nations move to privatize state-owned businesses and deregulate privately held firms. For the logistics manager, the competitive nature of goods movement today means greater opportunities for obtaining better service and lower costs for transport providers. The five primary modes of transportation are rail, road, pipeline, water and air.

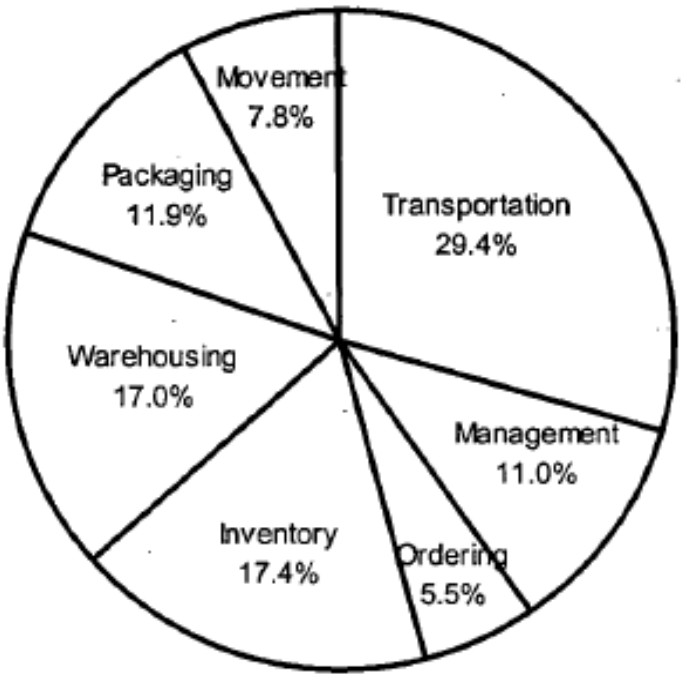
2.7. Transport Costs

According to Chang (1998), Transport system is the most significant economic activity among the components of business logistics systems. Around one third to two thirds of operating cost of enterprises /logistics costs/ are used for transportation. According to the investigation of National Council of Physical Distribution Management (NCPDM) in 1982; Chang (1988), the cost of transportation, on average, accounted for 6.5% of market revenue and 44% of logistics costs.

Figure 2.3 shows the components of logistics costs based on this estimation. The highest cost in logistics is transportation cost, which almost occupies 30%, and then in order by inventory, warehousing cost, packing cost, management cost, movement cost and ordering cost. The ratio is almost one-third of the total logistics costs. The transportation cost here includes the means of transportation, corridors, containers, pallets, terminals, labors, and time. The figure shows not

only the cost structure of logistics systems but also the importance order in improvement processing. The improvement from the item, which has higher operation costs, can get better effects.

Figure 2.3. Cost ratio of logistics components



Source: Chang (1998)

According to the above studies, transport is generally the largest single component of logistics costs. It occupies an important ratio in logistics activities. Hence, logistics managers must comprehend transport system operation thoroughly.

Transport system creates goods and products changeable operation from one place to another and facilitates timely delivery of product. It also creates regional efficacy by promoting value-added practice under the least cost range. Transport affects the outcome of logistics activities like production and sale. In the business logistics system, transportation cost could be considered as a determination factor of the target market. Cost of transportation varies based on type of industries. For those industries which produce small volume, low weight and high value prodact, transportation cost simply occupies a very small part of sale and is less regarded; For those industries which produce big, heavy and low-valued products, transportation occupies a very big part of sale and affects profits more, and therefore it is more regarded.

2.8. Relationship between Transportation and Logistics

According to the above explanation, without well organized and developed transportation systems, logistics could not bring its return into the economy. A high-quality transport system in logistics activities could afford superior logistics efficiency, decrease operation cost, and encourage service quality. The enhancement of transportation systems needs the effort from both public and private sectors. A well-operated logistics system could increase both the competitiveness of the government and enterprises.

According to Asian Development Bank (2012), transportation is a central component in the time and spatial economic utility of products and services. Multimodal transport, which combines the advantages of each mode, can be a particularly efficient and effective approach. Logistics is a process of planning, implementing, and controlling the efficient flow of products, information, and funds to conform to the client‘s requirements. Transport is a core component of logistics, moving goods between different points in the supply chain. Logistics encompasses the storage of raw materials, work-in-process parts, and finished products, as well as a variety of value-added services.

As mentioned above the importance of transportation would be defined in different terms and also the authors explained the relationship between logistics and transportation as follows based on Thomas (2014), Logistics is defined as; that part of supply chain management that plans, implements, and controls the efficient, effective forward and reverse flow and storage of goods, services and related information from the point of origin to the point of consumption in order to meet customers’ requirements. Transportation is represented in this expression through the word flow. Transportation provides the flow of inventory from point’s of origin in the supply chain to destination or points of use and consumption. Practically in military logistics, more of outbound logistics is exercised.

According to Thomas, et al (2014), Inventory sometimes flows in the reverse direction. Reverse logistics refers to “the role of logistics in product returns, source reduction, recycling, materials substitution, reuse of materials, waste disposal, and refurbishing, repair, and remanufacturing.” So transportation not only delivers material and products to customers, but also moves reusable and recyclable content to companies that can use it.

2.9. The role of transportation in logistics

Because of more frequent and successful world commerce, the development of logistics affects the progression of economy more and more. Brewer et al. (2001) stated that, when the economy is growing, both production and consumption will grow, hence leading to an increase in the demand for transport, and vice versa. Well-managed logistics system improves efficiency and benefits of business while decreasing logistics costs increases profits of products. In order to reduce the cost of logistics, good management of transportation is the key issue due to that it occupies a big part in the logistics activities. The development of an exchange or market economy, one in which goods are transferred from points of production to points of sale and consumption, depends upon the ability to move goods, that is, on the availability of transportation service (Fair & Williams, 1981).

Transportation is required by the whole logistics operation processes. It plays a significant role in connection between various processing stages. For example, the raw materials from the place of production are transported to the industries for manufacturing. It is operated in various patterns, e.g. convey or belt during the producing procedures. Even in the final stage of business process, transportation is still necessary for delivering products from factories to wholesaler/ retails. The cost of transportation occupies a huge part within logistics total costs. Transportation cost proves the importance of transportation in logistics activities. Transportation is essential because no modern firm can operate the movement of its raw materials or its finished products without transportation. This importance is emphasizing by the financial strain placed on many firms by such disasters as a national railroad strike or independent truckers' refusal to move goods because of rate disputes. In these circumstances, markets cannot be served, and products back up in the logistics pipeline to deteriorate or become obsolete.

According to Sloggett and Woods (1989), transportation plays a significant role in making location decisions for new business or industry. Generally, two transportation objectives are taken into consideration while making a business location decision: 1) low transportation cost and 2) satisfactory transportation service. So for any logistics activity transportation play a vital role.

2.10. The Role of Transport on military Logistics

According to US army FM-4, army transportation plays a key role in ensuring that Army and joint forces can execute global force projection and sustain forces in operations. Supporting the joint force commander (JFC) and the defense transportation system (DTS), Army transportation is essential to effective and efficient force generation and sustainment. Army transportation functions as a partner in the defense transportation system to deploy, sustain, and redeploy forces in all military operations. Transportation gives vital support to the Army forces across the strategic, operational, and tactical levels of conflict. It is an unspoiled system that unites the levels of war with coordinated movement control, terminal operations, and style operations. Army transportation incorporates military, commercial, and host nation capabilities. It involves the total Army (active and reserve sections). More detailed information on Army transportation is in the US Army FM 4-01-series of manuals.

The variety and complexity of military operations require the Army to establish a transportation system that is expandable and tailor able. The objective is to select and fit required transportation capabilities at the operational and tactical levels to achieve total integration of the system. These capabilities include movement control, terminal operations, and style operations.

At the theater strategic and operational levels, sufficient force structure deploys early to conduct reception, staging, and onward movements, which includes opening ports, establishing inland line of communication (LOC), and providing C2 for movements. An important aspect of building combat power during the reception, staging, and onward movement phase of the operation is receiving the force and sustainment supplies at the ports of embarkation. This transportation force structure is required to redeploy the force when operations conclude. Ports, terminals, and inland LOC are critical nodes in the distribution system (FM 4-0, FM 100-10).

Planning mechanisms and technical procedures for all vehicle use are necessary to ensure that vehicles are used in an efficient and cost-effective manner. Vehicle planning relies upon the cooperation and participation of everyone who manages, operates, or uses vehicles. The facility manager should appoint a transport officer to coordinate vehicle planning. Transport Officers must have the full support and confidence of their managers to fulfill their key responsibilities including: Vehicle planning follows a three-step process: period movement plan, period transport schedule, and seven-day transport schedule.

US Army field manual 4-01 stated that, transportation operates as a partner in the defense transportation system to deploy, sustain, and redeploy forces in all military operations and its objectives as follows. First, transportation provides vital support to the Army across the strategic, operational, and tactical levels of war. Second, it is designed as a seamless system that assuring a function of synchronized movement of control troops in all types of operations. Third, Army transportation incorporates military, commercial, and supporting nation capabilities based the given mission. Fourth, transportation system is aimed to provide rapid movement of forces. And fifth it provides essential military equipment to Armed forces and support resources where and when required.

According to Ethiopian army FM and teaching materials in Command and Staff College (2013), primary task of the Ethiopian defense transportation system is to provide support to the army and thereby to execute all military operations effectively. MGHAMA transportation system basically operates as an integral part of the defense transportation system. The defense transportation system consists of military and commercial assets, services and systems that are originally contracted or controlled by the transport department of the national defense. Working the defense transport system involves the management of a complex amount of interrelationships within the defense and among diverse federal and commercial activities. All military transportation activities, regardless of the function they carry out must follow the agenda of the defense transportation system**.** In planning maintain for military operations, military transportation planners and operators at the joint and service level must consider the diversity of the defense transportation system and its complementary coordinating challenges. Planners must also understand that the defense policy permit government intervention in to the private sector only to the degree necessary to ensure the civil transportation system is responsive to military needs. This means the national defense activates private sector assets to augment defense transport system capabilities only to meet the short falls to the defense transportation capacity.

According to the Ethiopian army Transport operational planning (2013); The Logistics department head of Ethiopian National Defense coordinated the planning and distribution of all the logistics (supplies) to the Army. All of the services provided, like transportation of material, personnel and water are very significant. Army transportation is not profit oriented as any private transportation business. Its main objective is to provide the army requirements and make possible the army successfully accomplish its missions. Among the specific everyday jobs of the defense

transport department, one is to provide well-organized water transport service for troops in all fronts by synchronizing its transport departments under the different commands and make sure delivery of material supply to the armed forces in both peace and conflict times. It is clear that troops should obtain the necessary daily and monthly food materials, daily water supplies, fuel supplies, medical supplies, standard guns and its bullets, on time, at the right place by the exact quantity.

Based on Ethiopian army field manual, motor vehicle combat readiness transport plays important roles to assist the mobilization of the army when the demand to move from place to place is obligatory and has to be carried out instantaneously with in and out of the command region. The National defense forces of Ethiopia basically use all different types and modes of transportation such as air, vehicle transports, animal, and personnel to facilitate the flow of goods and services to the end consumer. Although it utilizes different means of transportation, vehicle transport play the greatest role from any other types of transportation. Ethiopian defense transportation system has a main responsibility of transporting bulk amount of military equipment, goods, and service as well as man power within the nation and also out of the nation to regional and international peacekeeping operations. The Transport department of Ethiopian defense force has been equipped with different types of motor vehicle and heavy trucks which are used to mobilize human and material resources from their initial points to the destination points. The transport service is give to serves the army wants at all corners of the nation such as training main command, communication main command, East Command, West Command, North Command, Central Command, Air Force, peace keeping main command and other main departments of the head office and also on the peace keeping operational areas of our armed forces. MGHAMA is also one of the organizations under Ethiopian defense force so it follows the rule and regulation of defense transport department.

2.11. Empirical Findings

According to Michael Tracy (2004), in his work which has a title of “transportation effectiveness and manufacturing firm performance” stated that quick and successful response in moving materials and information within short period is fundamental, and transportation is a key element in making this occurring. Transportation system that provides a reliable service level reduces supply chain uncertainty and the amount of inventory required throughout the chain which in

turn reduces holding cost which finally reduces the overall cost of ownership of a product and the certainty of supply chain will build customer loyalty. On the other hand, poor transportation performance causes too much goods cost and increased stock holding cost and is a main barrier in implementing and realizing gains from aggressive manufacturing strategies such as lean production. Empirical findings supports the notion that superior delivery service has a positive impact on a manufacturers performance in terms of transactions growth, return on assets, market divide gain and on the whole competitive position.

According to Sreevinas and srivani (2001),logistics system has to a greater extent significant position in the public activities and transportation and logistics systems have interdependent relationships that logistics management needs transportation to perform its activities and meanwhile, a successful logistics system could help to improve passage environment and transportation development since transportation contributes the maximum cost among the related components in logistics systems, the improvement of transport competence could change the overall performance of a logistics system. It is also stated that transportation plays a significant role in logistics system and it action appears in various sections of logistics processes. Without the involvement of transportation, a dominant logistics strategy cannot bring its capability into full play. The evaluation of transport systems provides a clearer notion on transport applications in logistics activities. It is also stated that transportation is fast becoming a key factor in determining the difference between profit and loss. It is the essential link between the extraction of natural resources; the fabrication of industrial, commercial, and consumer products; and the final distribution of goods to wholesalers, retailers, and end users.

In all of the empirical findings problems that hinders transportation from playing its role is not mentioned therefore the findings of this paper is giving some explanation on the problems of transportation in Major General Hayelom Araya Military Academy along with the solutions that is recommended in order for the logistics performance improvement.

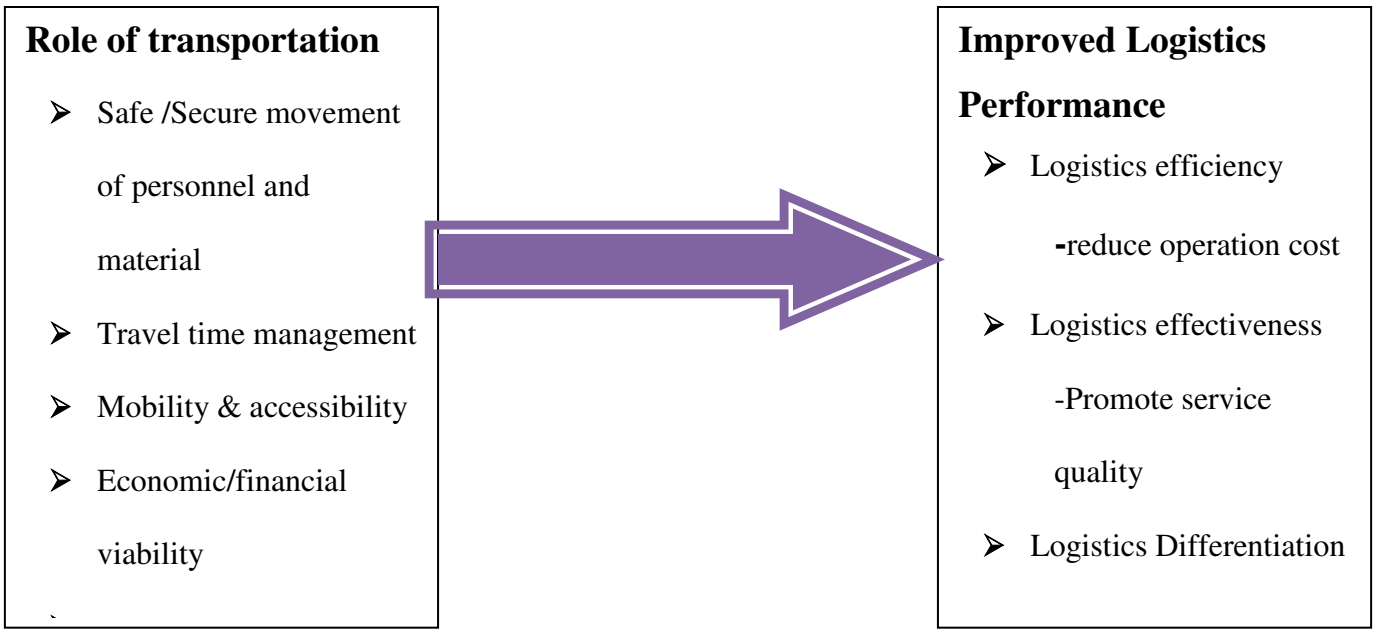
2.12. Conceptual Framework

The previous sections demonstrated that, the importance of transportation based on the views of economics, logistics activities and business competitiveness. Without well organized transportation systems, logistics could not bring its performance into full applied. On the

contrary, good transport activities in logistics system could provide improved logistics effectiveness, reduce operation cost, and promote service quality.

Transport activity in Major General Hayelom Araya Military Academy generally focused on two core activities which are providing internal and external transport services to the academy community. From this point of view, common benefits of transport are, timely delivery of commodities, safety movement of commodities, secure movement commodities, improve service quality (by mobility & accessibility, economic and financial viability) and assessing technology. This benefit leads to Major General Hayelom Araya Military Academy improving overall logistical effectiveness, efficiency and its performance which leads to ensure end users satisfaction (training staff and academy community). But these benefits are not achieving without challenges, the main challenges of transport are human and nonhuman. From this we conclude that, if there is good transportation practice in the academy, there will be better logistics performance. A well-operated logistics system in the academy could increase efficient mission accomplishment of the academy and the defense as large.

Figure. 2.4. Conceptual frame work



Source: Based on literature review

CHAPTER THREE
RESEARCH METHODOLOGY

3.1. Description of the Study Area

This study was conducted in Major General Hayelom Araya Military Academy which is found in Holeta genet Finfine Zuria Liyu Zone of Oromia Region. This town has altitude and longitude of $9^0$3' N & $38^0$30'E and altitude of 2391 meters above sea level. Holeta Genet comes into existence with the construction of Addis Abeba-Ambo road. It is best known as location of Holeta Military Academy opened in January 1935 and staffed with 5 Swedish officers the first class of 120 cadets. They did not complete their studies due to the second Ethio- Italian war. It was reopened once again Emperor Hailesselassie returned to Ethiopia and continues up to derige regime (the Nordic Africa institute website). After a murder of major general haylom araya (one of the hero leader of EPRDF) in February 1996 the academy was reopened and named by him. The academy has a mission to generate well qualified and capable lower level unites and equivalent level leader for defense force by providing quality education and training. The academy has capacity to take on 300 cadets every year and graduate with diploma and degree programs and military rank of second lieutenant. To support this mission the academy has six departments that are logistics, training, human resource, general service, short term training and finance.

3.2. Research Approach

The researcher used mixed research approach. Mixed research method is an approach to inquiry that combines or associates both qualitative and quantitative forms. It involves philosophical assumptions, the use of qualitative and quantitative approaches, and the mixing of both approaches in a study. It is more than simply collecting and analyzing both kinds of data; it also involves the use of both approaches in tandem so that the overall strength of a study is greater than either qualitative or quantitative research (Creswell & Plano Clark, 2007).

Tashakkori and Teddlie (2003), discussed the mixed methods approach to research, which emerged in the mid-to-late 1900s. Johnson and Onwuegbuzie (2004), hoped that the mixed methods approach to research provided researchers with an alternative to believing that the

quantitative and qualitative research approaches are incompatible and, in turn, their associated methods “cannot and should not be mixed”. With the mixed methods approach to research, researchers incorporate methods of collecting or analyzing data from the quantitative and qualitative research approaches in a single research study (Creswell, 2003). That is, researchers collect or analyze not only numerical data, which is customary for quantitative research, but also narrative data, which is the norm for qualitative research in order to address the research question(s) defined for a particular research study. As an example, in order to collect a mixture of data, researchers might distribute a survey that contains closed-ended questions to collect the numerical or quantitative data and conduct an interview using open-ended questions to collect the narrative or qualitative data.

3.3. Research Design

Research design is the blueprint for fulfilling research objectives and answering research questions. In other words, it is a master plan specifying the methods and procedures for collecting and analyzing the needed information. It ensures that the study is relevant to the problem and that it used economical procedures. In order to describe and examine the role of transportation in logistics performance of Major General Haylom Araya Military Academy, the researcher used explanatory type of research design. The main aim of explanatory research is to identify any causal links between the factors or variables that pertain to the research problem. Causal studies may play an instrumental role in terms of identifying reasons behind a wide range of processes, as well as, assessing the impacts of changes on existing norms, processes etc. Causal studies usually offer the advantages of replication if necessity arises. This type of studies is associated with greater levels of internal validity due to systematic selection of subjects. In general the researcher used explanatory type of research design to assess the causal relation between role of transportation and logistics performance.

3.4. Population and Sampling design

All logistics personnel and others department which has direct relation with transport were taken as study population. Due to the small number of the target population, which was 164 in number, it has been decided to consider the entire population in the study. The military academy had a total of 114 training staff and 50 logistics staff excluding the guard platoon and other platoon

which have not directly involved in logistics and transportation and the researcher assumes that those platoons were irrelevant for data of this study. Based on the above information, the population was 164 is taken and was not necessary to take a sample from a mentioned census. Besides three logistics sub unit head, one transport heads, five warehouse keepers and one purchasing and supply head were taken for interview and group discussion. So the researcher used a census techniques for questionnaire and purposive sampling techniques for interview.

Table 3.1 Sampling Techniques

Respondent	Population	Sample size	%	Sampling Techniques
Logistic department	40	40	100	census
Training department	114	114	100	census
Logistic sub unit head	3	3	100	census
Transport head	1	1	100	census
Warehouse keeper	5	5	100	census
Purchasing and supply head	1	1	100	Census
Total	164	164	…..	……..

Source: Human resource department of the academy

3.5. Data Collection Procedure

The researcher was used both primary and secondary data. Primary data were collected by using a pre designed open and close ended questionnaires, personal observation and interviews. These research questionnaires were developed by the researcher. The procedure involved in the selection of individuals purposively for the interview included that took place in the Major General Haylom Araya military academy with different department like logistics, transportation, warehouse, supply and training. Secondary data were collected from Major General Hayelom Araya Military Academy logistics and transport department annual evaluation reports, the department quarterly and monthly reports, plans, and other relevant documents.

3.6. Data Analysis

In order to achieve the stated research objectives, the collected data were analyzed based on the nature of the study objective. After the data were collected, the data entry and cleaning were done as well as the researcher used a statistical package for the social sciences (SPSS) for the data analysis. And the results of the data analysis were presented by using tables, figures and graph. In order to have the required result the researcher used a descriptive statistics in terms of percentages, mean score, standard deviation, tables and graphs.

The paper has employed regression and correlation analysis method since it used to capture a cause and result relationship model. That means well-organized transportation system was positively contribute to logistics performance. Those factors that affect transport system were organized and calculate their regression on transport performance and logistics as well. In order to see transportation practice of the academy, descriptive statistics was employed.

3.7. Validity and Reliability

The researcher assured and considers the following points in his procedure in order to meet the requirements of the objectives of this study.

Content Validity

Content validity test was conducted to ensure that the measure includes sufficient coverage of the investigated questions, meanwhile the face validity were conducted to validate the items of research questionnaire and to ensure that the items were more consistent. Before the main study the researcher carried out the pilot survey to minimize errors due to improper design elements, such as question wording or sequence. So it is important to discovered confused interview instructions; learning and ensures validity of the questionnaire whether it is too long or too short of the information, the researcher was used Cronbach's Alpha pre-testing technique, by using a 15 small sub-sample, may determine whether the data collection plan for the main study is an appropriate one or not.

Scale Reliability

In the main study phase, the researcher were made briefing for respondents to give a serious attention for providing necessary information and completing the questionnaire presented; and

assure them their feedback were kept secure. Questionnaires were modified from similar topic and then test as described below.

Reliability test has been done to check whether the Questionnaire consistently reflect what it mean measure or not. For the test of reliability Cronbach's alpha was used as a measure of internal scale consistency using SPSS software and the result is as follow:

Table 3.2 Reliability taste

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.728	0.705	30

Source: Researcher's survey result 2018

From the above table the item characteristics of each sub scale of the questionnaire was Cronbach's Alpha of 0.728 and greater. After the pilot test, confusing and ambiguous words of questions from original questionnaires were corrected and irrelevant questions were avoided

3.8. Ethical Considerations

The study considered some ethical issues. As such, each respondent was aware of having the right to respond or not, the respondent has the right to participate or not, respondents were informed the purpose of the questioner and the study considers the confidentiality of the response by not asking to state their name.

The information collected from academy is going to be kept confidentially in order to keep their ethical value. Institutional secured data are not required for the analysis, and this in turn encouraged the academy representatives to freely respond for the items under study.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS, AND INTERPRETATION

4.1. Introduction

This chapter contains the data analysis, the research findings (results), and based on the results the researcher gives discussion on the findings and also gives some interpretation of the result. In order to interpret findings and the discussion about the role of transportation in logistics performance of the military academy; the researcher used different form of tables, graphs and figures; and qualitative analysis is done. The chapter has three parts. The first part is concerned with characteristics of respondents; the second part is concerned with analysis and interpretation of main data by descriptive data analysis; and the third part is concerned with analysis and interpretation of main data by correlation and regression modals.

4.2. Characteristics of Respondents

The characteristics of respondents included; sex, educational background, military rank, current occupation and service year in the military academy. Depending on sample of the study, a total of 164 questionnaires were prepared. But only 114 were distributed to respondents 50 of them were not, because 50 of the respondents were not present in the military academy due to international peacekeeping mission. From those 114 questionnaires only 104 were collected; but from the collected questionnaires 4 were not fit for analysis as a result of incompleteness. So the total number of questionnaires used for analysis was 100. The demographic data is summarized in table 4.1.

Table 4.1 indicated that, 88% of the sample respondents were male and 12% were female. This implies that the study consists of more male than female respondents and this is not intentionally done, because female respondents have given an equal chance to be selected, but the actual number of male in the target population was greater than female.

Regarding the educational qualification of the respondent, 14% were certificate, 25% were diploma, 53% were BA/BSc and 8% were MA/MSc holders.

Table 4.1: Characteristics of Respondent

Variables	Characteristics categories	Respondent	
		Frequency	%
Sex	Male	88	88
	Female	12	12
	Total	100	100
Educational qualification	Certificate	14	14
	Diploma	25	25
	BA/BSc	53	53
	MA/MSc	8	8
	Total	100	100
Rank	Ato/Wro	3	3
	NCO	20	20
	Line officer	62	62
	Higher officer	15	15
	Total	100	100
Service year	1-5 years	12	12
	6-10 years	40	40
	11-15 years	20	20
	16-20 years	17	17
	Above 20 years	11	11
	Total	100	100

Source: researcher's survey result, 2018

***Note: NCO**: - Non-Commissioned officer: from corporal to sergeant major; line officer: from 2nd lieutenant to captain and higher officer: major to colonel.*

As table 4.1 showed, the majority of respondents 62% were line officers (includes second lieutenant, lieutenant and captain), and 20% of respondents were non commissioned officers (NCOs), 15% of respondents were higher officers (Majors- Full colonels), 3% of respondents

were a civil servant. This result indicated that NCOs and line officers were the greatest number of the respondents in this study.

Concerning the respondent's service year in the organization described as follows, around 12% of the respondents had less than 5 (<5) years work experience and about 40% of them had experience ranging from 6-10 years, 20% of the respondents had 11-15 years work experience, about 17% of the respondents have worked in the organization from 16-20 years and 11% have the highest work experience of 21 years and above. The result indicated that, 88% of respondents have above 5 years working experience in the department. This illustrates that the majority of respondents have a good work experience to provide the relevant information for the study.

4.3 The extent to which transportation practice is understand by community of the military academy

Respondents were asked questions regarding practice, system, timely delivery, safety, economies of scale, flexibility, and cost competitive of the military academy's transpiration. As indicated in the next four consecutive tables the respondents were asked to rating their level of agreement with highest mean value of five and lowest one, taking 2.5 as an average of the two. Accordingly, the responses of the respondents were presented as follows:

4.3.1. Safety /security during the movement of personals and materials

The respondents asked practice or system of transportation provides security during the movement of personnel and material. Their response with mean scores (M=1.59, SD=1.20) indicated that, the military academy transportation system is not provide security during the movement of personal and materials.

Regarding the second item of table 4.2, the respondents were asked whether transportation systems safety and security; satisfy community of the academy or not. The responses for this question with mean scores (M= 4.11, SD=0.77) showing that, transportation increases academy's community satisfaction by timely and safe delivery of supply. Even if there are safety problem in transportation, it satisfy the military academy's community.

Regarding the third item of table 4.2, the respondents were asked whether the overall quality of the academy's transportation is very high or not. The responses for those questions with mean

score (M= 1.72, SD=0.81) indicated that, the overall quality of the academy's transportation isn't very high.

Table 4.2 Safety /Security during the movement of personals and materials

No	Items	Frequency Table			N	Mean	SD
			Frequency	Percent			
1	Practice or system of transportation provides security.	Strongly disagree	55	55	100	1.59	1.20
		Disagree	41	41			
		Neutral	2	2			
		Agree	1	1			
		Strongly agree	1	1			
		Total	100	100			
2	Transportation systems security and safety; satisfy community of the academy	Strongly disagree	2	2	100	4.11	0.77
		Disagree	3	3			
		Neutral	4	4			
		Agree	64	64			
		Strongly agree	27	27			
		Total	100	100			
3	The overall quality of the academy's transportation is very high	Strongly disagree	45	45	100	1.72	0.81
		Disagree	43	43			
		Neutral	8	8			
		Agree	3	3			
		Strongly agree	1	1			
		Total	100	100			
4	The military academy's transportation secure in moving materials and information.	Strongly disagree	5	5	100	3.21	1.10
		Disagree	25	25			
		Neutral	26	26			
		Agree	32	32			
		Strongly agree	12	12			
		Total	100	100			

Source: researchers survey result, 2018

Unlike the three items describes above, transportation secure in moving materials and information which have mean value of (M=3.21, SD=1.10) indicated their response was positive with the practice of those items in the military academy. To sum up there were safety /security problems during the movement of personals and materials.

4.3.2. Travel time management

Table 4.3 Travel time management

No	Items	Frequency Table			N	Mean	SD
			Frequency	Percent			
1	The academy's transportation gives on time service for different requests.	Strongly disagree	44	44	100	2.11	1.33
		Disagree	32	32			
		Neutral	1	1			
		Agree	15	15			
		Strongly agree	8	8			
		Total	100	100			
2	Military academy's transportation delivers training materials at the right time.	Strongly disagree	33	33	100	1.92	0.81
		Disagree	46	46			
		Neutral	17	17			
		Agree	4	4			
		Strongly agree	-	-			
		Total	100	100			
3	Military academy's transportation delivers supply (ration, ammunition and etc.) to trainee on time.	Strongly disagree	5	5	100	3.21	1.10
		Disagree	25	25			
		Neutral	26	26			
		Agree	32	32			
		Strongly agree	12	12			
		Total	100	100			
4	Military academy's transportation achieves its goal, by on time delivery of materials.	Strongly disagree	40	40	100	1.74	0.71
		Disagree	48	48			
		Neutral	10	10			
		Agree	2	2			
		Strongly agree	-	-			
		Total	100	100			

Source: researcher's survey result, 2018

Table 4.3 describes respondents' response on transportation role with regards to time. In item 1 of the table, the respondents were asked whether academy's transportation provide on time service for different requests or not. The respondents' response with mean score of (M=2.11, SD=1.33) shows that, the academy have a problem on providing on time service for different requests. As the same procedure of item one, military academy's transportation delivers training materials at the right time, with mean of (M=1.92, SD=0.81) indicated, there is a problem on the role that, transportation delivers training materials at the right time.

Other item in the above table 4.3 is whether military academy's transportation delivers supply (ration, ammunition and etc.) to trainee on time or not. The response of the respondents for those questions with (M=3.21, SD=1.10) indicated, most respondents have a dilemma whether this role is properly practice or not.

In item 4 of table 4.3, the respondents were asked whether the military academy's transportation achieves its goal, by on time delivery of materials or not. Their response with mean scores of (M=1.74, SD=0.71) shows that the academy have a problem on achieving its goal, by on time delivery of materials

4.3.3. Mobility and accessibility of transportation

Table 4.4 Mobility & accessibility of transportation

No	Items	Frequency Table			N	Mean	SD
			Frequency	Percent			
1	Transportation service of the academy is flexible.	Strongly disagree	7	7	100	3.35	1.10
		Disagree	17	17			
		Neutral	21	21			
		Agree	44	44			
		Strongly agree	11	11			
2	Academy's transportation service gives quick response to special requests.	Strongly disagree	28	28	100	2.28	1.12
		Disagree	39	39			
		Neutral	12	12			
		Agree	19	19			
		Strongly agree	2	2			
3	Academy's community has high access in transportation service.	Strongly disagree	26	26	100	2.31	1.11
		Disagree	38	38			
		Neutral	19	19			
		Agree	13	13			
		Strongly agree	4	4			
4	Academy's transportation can move bulky load within a short period of time.	Strongly disagree	28	28	100	2.37	1.29
		Disagree	40	40			
		Neutral	9	9			
		Agree	13	13			
		Strongly agree	10	10			

Source: researcher's survey result, 2018

Table 4.4 describes respondents' response on mobility and accessibility of transportation. In item 1 of the table, the respondents were asked whether transpiration service of the academy is flexible or not. The responses for this question with mean score (M= 3.35, SD=1.10) indicated that, they haven't understanding or they have un-clarity on those items. As the same procedure of item one, academy's transportation service gives quick response to special requests, with mean of (M=2.28, SD=1.12) indicated, transportation service did not gives quick response to special requests.

Regarding the third item of table 4.4, the respondents were asked whether the military academy's community has high access in transportation service or not. The responses for those questions with mean scores (M= 2.31, SD=1.11) indicated that, there wasn't high access in transportation service. In item 4 of the same table, the respondents were asked whether the military academy's transportation can move bulky load within a short period of time or not. Their response with mean scores of (M=2.37, SD=1.29) shows that, the military academy transportation did not moving bulky load within a short period of time.

4.3.4. Economic/financial viability

Table 4.5 in the next page depicted respondents' response on economic/financial viability. In item 1 of the table, the respondents were asked whether military academy's transportation service is cost effective or not. The responses for those questions with mean scores (M= 1.98, SD=0.97) indicated that, there is high cost in the military academy transportation practice, because it is not cost effective. As the same procedure of item one, the military academy reaches economies of scale and economies of distance to reduce cost, with mean of (M=2.06, SD=0.87) indicated, there is problem on reaching economies of scale and economies of distance to reduce cost.

Regarding the third item of table 4.5, the respondents were asked whether the military academy's transportation cost is competitive in comparison with the market or not. The responses for this question with (M= 1.83, SD=0.62) mean score indicated that, the cost that encore by the military academy isn't competitive with the market. In item 4 of the same table, the respondents were asked whether the military academy's transportation prevent logistics cost by providing fast and on time service or not. Their response with mean score of (M=1.57, SD=0.53) shows that, the

military academy have a problem on preventing logistics cost by providing fast and on time service.

Table 4.5 Economic/financial viability

no	Items	Frequency Table			N	Mean	SD
			Frequency	Percent			
1	The military academy's transportation service is cost effective.	Strongly disagree	31	31	100	1.98	0.97
		Disagree	52	52			
		Neutral	10	10			
		Agree	2	2			
		Strongly agree	5	5			
		Total	100	100			
2	The military academy reaches economies of scale and economies of distance to reduce cost.	Strongly disagree	24	24	100	2.06	0.87
		Disagree	55	55			
		Neutral	14	14			
		Agree	5	5			
		Strongly agree	2	2			
		Total	100	100			
3	The military academy's transportation cost is competitive in comparison with the market.	Strongly disagree	27	27	100	1.83	0.62
		Disagree	65	65			
		Neutral	6	6			
		Agree	2	2			
		Strongly agree	27	27			
		Total	100	100			
4	The military academy's transportation prevent logistics cost by providing fast and on time service.	Strongly disagree	45	45	100	1.57	0.53
		Disagree	53	53			
		Neutral	2	2			
		Agree	-	-			
		Strongly agree	-	-			
		Total	100	100			

Source: researcher's survey result, 2018

To sum up the above four consecutive table finding, the military academy is faced a problem on safety /security during the movement of personals and materials, travel time, mobility & accessibility of transportation and economic/financial viability. Especially areas of transportation

practice like transportation cost efficiency, the overall quality of transportation service and cost competitive in comparison with the market. The military academy must work on those dimensions in order to improve the transportation practice which in turn improves the overall logistics efficiency; it also improves organizational mission accomplishment.

In addition to the questionnaires distributed to the academy's community, the researcher has conducted an interview with logistic sub unit heads, transport head, warehouse keepers, and purchasing and supply head regarding the practice of transportation. Their response was similar with the above analysis that the academy transportation system has a problem on safety /security during the movement of personals and materials, travel time, mobility and accessibility of transportation and economic/financial viability. The transportation cost efficiency, the overall quality of transportation dissatisfies the community of the military academy.

Besides the researcher has checked if the academy transport department has a document of transportation practice but except report, there were no well written, articulated and developed documents of transportation practice. Therefore; the researcher collects data from report documents only. In this document also describe the above analyzed problems.

4.4. Factors that affect transportation Performance and their degree of effect on transportation activity in the military academy

4.4.1 Human factors affecting transportation performance

Table 4.6 describes respondents' response on human factors that affect transportation performance. The respondents were requested to respond the questions on a 5 point Likert scale and indicate the extent of effect with the statements that is: 5-Very high, 4-High, 3-Modarate, 2-Low, and 1-Very low. A mean (M) score of 0-1.5 is Very low, between 1.51 to 2.50 means low, 2.51 to 3.50 means moderately affect 3.51-4.50 means high and mean of above 4.51 is very high.

In item 1 of table 4.6, the respondents were asked the degree to which lower performance of employee affecting transportation performance. Their response with mean score of (M=4.21, SD=0.78) shows that, lower employee performance in the academy have a higher degree of effect on transportation performance. As the same procedure of item one, employee negligence with mean of (M=4.33, SD=0.71) indicated, there were higher negligence of employees in the

military academy transport department which have an effect in the smooth operation of the transportation activity.

Table 4.6 Human factors affecting transportation Performance

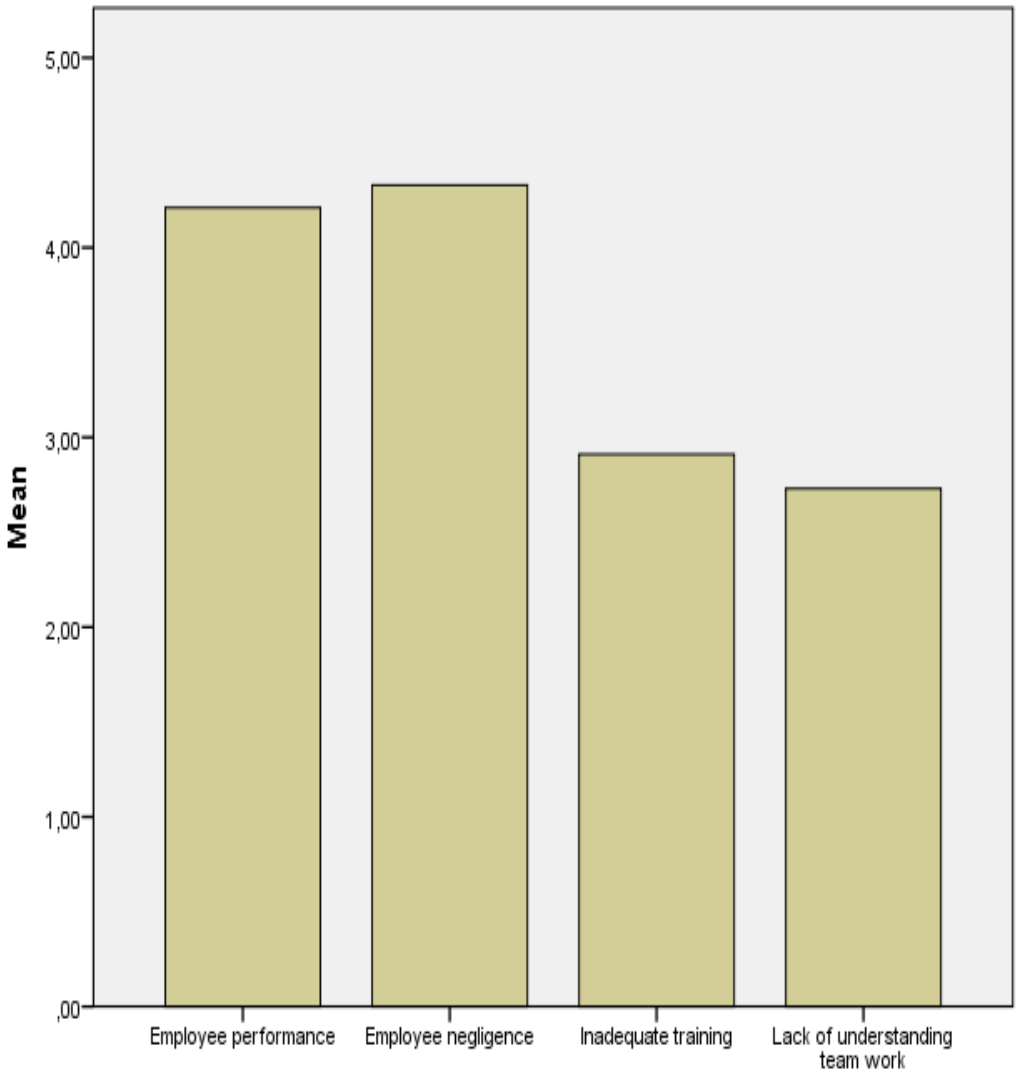
no	Items	Frequency Table			N	Mean	SD
			Frequency	Percent			
1	Lower performance of Employee	Very low	1	1	100	4.21	0.78
		Low	1	1			
		Moderate	13	13			
		High	46	46			
		Very high	39	39			
		Total	100	100			
2	Employee negligence	Low	2	2	100	4.33	0.71
		Moderate	8	8			
		High	45	45			
		Very high	45	45			
		Total	100	100			
3	Inadequate training	Very low	9	9	100	2.91	1.06
		Low	27	27			
		Moderate	35	35			
		High	22	22			
		Very high	7	7			
		Total	100	100			
4	Lack of understanding team work	Very low	18	18	100	2.73	1.17
		Low	26	26			
		Moderate	26	26			
		High	25	25			
		Very high	5	5			
		Total	100	100			

Source: Researcher's survey result, 2018

Other questions in the above table 4.6 are the level of affecting transportation activity, factors like inadequate training and lack of understanding team work. The response of the respondents for those questions with mean score (M=2.91, SD=1.06 and M=2.73, SD=1.17) respectively indicated, there were inadequate training and lack of understanding team work in the military academy but they affect moderately the smooth operation of the transportation activity.

To generalize the human factors effect in the academy transportation practice; lower performance of employee and employee negligence significantly affect transportation performance. Whereas inadequate training and lack of understanding team work affect moderately. For more interpretation see the following graph.

Graph 4.1. Human factors affecting transportation Performance



Source: Researcher's survey result, 2018

4.4.2 Non Human factors affecting transportation performance

Table 4.7 depicted respondents' response on non human factors that affect transportation performance. the respondents were requested to respond the statements on a 5 point Likert scale and indicate the extent of effect with the statements that is: 5-Strongly affect, 4-Affect, 3-modarate, 2-Disaffect, 1-Strongly disaffect. A mean (M) score of 0-1.5 means that strongly

disaffect, between 1.51 to 2.50 means disaffect, 2.51 to 3.50 means moderately affect 3.51-4.50 means affect and mean of above 4.51 is strongly affect

Table 4.7 Non Human factors affecting transportation performance

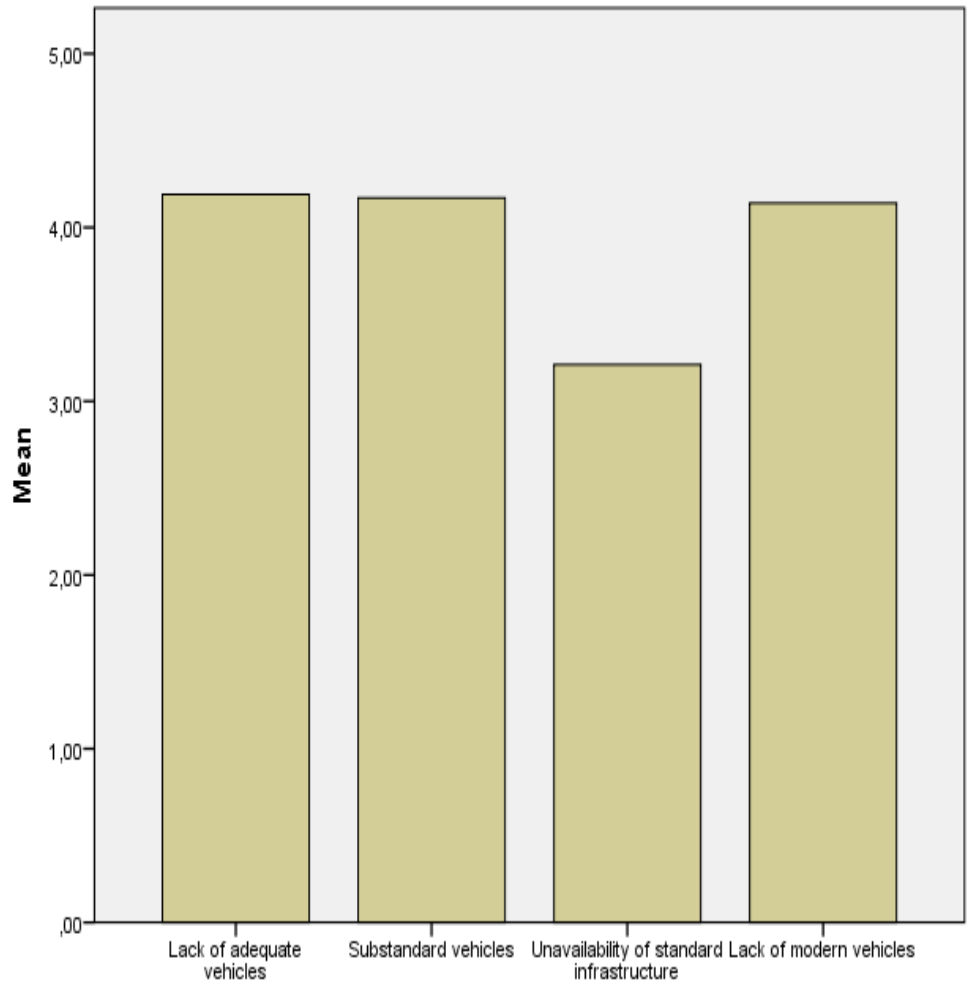
no	Items	Frequency Table			N	Mean	SD
			Frequency	Percent			
1	Lack of adequate vehicles	Strongly disaffect	2	2	100	4.19	0.88
		Disaffect	5	5			
		Moderate	4	4			
		Affect	50	50			
		Strongly affect	39	39			
		Total	100	100			
2	Substandard vehicles	Strongly disaffect	2	2	100	4.17	0.92
		Disaffect	3	3			
		Moderate	14	14			
		Affect	38	38			
		Strongly affect	43	43			
		Total	100	100			
3	Unavailability of standard infrastructure	Strongly disaffect	9	9	100	3.21	1.28
		Disaffect	25	25			
		Moderate	23	23			
		Affect	22	22			
		Strongly affect	21	21			
		Total	100	100			
4	Lack of modern vehicles	Strongly disaffect	2	2	100	4.14	0.97
		Disaffect	8	8			
		Moderate	5	5			
		Affect	44	44			
		Strongly affect	41	41			
		Total	100	100			

Source: Researcher's survey result, 2018

According to the above table 4.7, respondents agree on the existence of non human factors that affect transportation operation of the military academy. Items like lack of adequate and modern vehicles, and substandard vehicles which have mean (M=4.19, SD=0.88, M=4.14, SD=0.97 and M=4.17, SD=0.92 respectively), significantly affect transportation operation of the academy. Items like Unavailability of standard infrastructure which has a mean and standard devotion

(M=3.21, SD= 1.28,) indicated, it affects transportation operation of the academy moderately. For more interpretation see the following graph.

Graph 4.2. Non human factors affecting transportation Performance



Source: Researcher's survey result, 2018

The non human factors stated in the above table and graph, affects the smooth operation of transportation in the military academy. Especially lack of adequate vehicles, lack of modern vehicles and substandard vehicles significantly determine performance of the transportation service coupled with the human factors mentioned earlier as most of the operation of the military academy.

In addition to the questionnaires distributed to the academy's community, the researcher has conducted an interview with logistic sub unit heads, transport head, warehouse keepers, and purchasing and supply head regarding the factors that affect the transportation system in the

academy. Interview respondents also argued that there were human and non human problems in transportation department. According to them the human factors were due to poor performance of some employees in transport area as a result of negligence, not understanding the value of team work and inadequate training. The non human factors were due to lack of adequate and modern equipments, substandard trucks, unavailability of modern infrastructure.

4.5. The role of transportation in logistics performance and relationship between transportation and logistics performance

To analysis relationship between transportation and logistics performance; and to determine the causal relation between role of transportation and logistics performance; the researcher has employed correlation and regression model analysis.

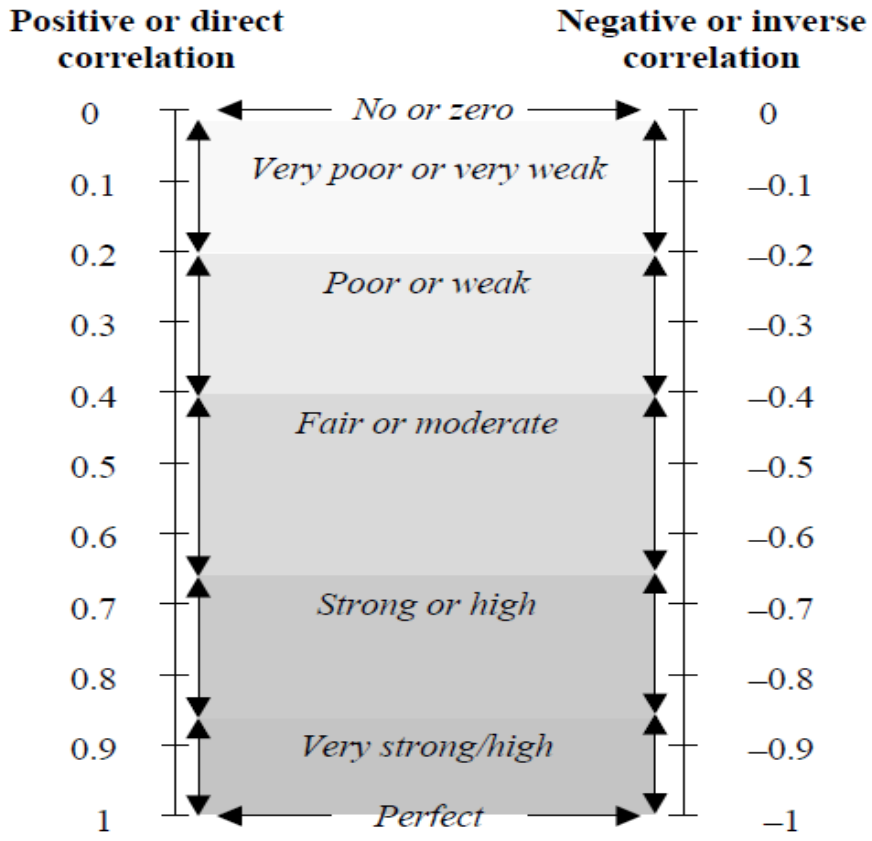
4.5.1. Correlation analysis

Correlation measures the extent of correspondence between the ordering of two random variables. In this study it measures the extent of correspondence between transportation role and logistics performance. The researcher was made use of the linear product-moment correlation coefficient, also known as Pearson's correlation coefficient (r), to express the strength of the relationship. The value of r always lies between –1 and 1 inclusive, that is, $-1 \leq r \leq 1$. If Y & X two variables and Y increase when X increases, we say that there is positive or direct correlation between them. However, if Y decreases when X increases (or vice versa), then we say that they are negatively or inversely correlated. We must have noticed that direct and inverse are terms that are used in the context of variation or proportionality.

The extreme values of r, that is, when $r = \pm 1$, indicate that there is perfect (positive or negative) correlation between X and Y. However, if r is 0, we say that there is no or zero correlation. Note When r = 0, we may not assert that there is no correlation at all between X and Y. Pearson's correlation coefficient is meant to measure linear relationship only. It should not be used in the case of non-linear relationships since it will obviously lead to an erroneous interpretation. The remaining values, falling in subintervals of [–1, 1], describe the relationship in terms of its strength. Fig. 4.1 below may be used as a guideline as to what adjective should be used for the values of r obtained after calculation to describe the relationship.

To identify the relationship between role of transportation and logistics performance, correlation analysis is employed. The role transportation plays like safety /security, travel time management, mobility and accessibility, and economic/financial viability were taken as the independent variable and logistics chain performance is considered as the dependent variable the indicators for logistics performance are logistics effectiveness, efficiency and differentiation.

Fig. 4.1 Interpretation of correlation coefficient



Source: http://pages.intnet.mu/cueboy/education/notes/statistics/pearsoncorrel.pdf

To test relationship between the dependent variable-logistics performance which have a dimensions, like logistics differentiation, Logistics efficiency and logistics effectiveness with the independent variable role of transportation(Safety /Security, Travel Time, mobility & accessibility and economic/financial viability) which is transportation efficiency in moving material and information, practice of using transportation as a storage facility, providing inputs timely, delivering products to customers timely, delivery accuracy in respect of place and timely delivery of products to customers. The finding of the analysis is clearly depicted below:

Table 4.8 Correlation Analysis between role of transportation and Logistics performance

Correlations

		Safety /Security	Travel Time	mobility & accessibility	economic /financial viability	Logistics Differentiation	Logistics Efficiency	Logistics Effectiveness
Safety /Security	Pearson Correlation	1	.550**	.610**	.526**	.531**	.651**	.702**
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000
	N		100	100	100	100	100	100
Travel time management	Pearson Correlation		1	.562**	.329**	.322**	.705**	.703**
	Sig. (2-tailed)			.000	.001	.001	.000	.000
	N			100	100	100	100	100
mobility & accessibility	Pearson Correlation			1	.568**	.571**	.571**	.611**
	Sig. (2-tailed)				.000	.000	.000	.000
	N				100	100	100	100
economic/financial viability	Pearson Correlation				1	.994**	.466**	.465**
	Sig. (2-tailed)					.000	.000	.000
	N					100	100	100
Logistics Differentiation	Pearson Correlation					1	.464**	.458**
	Sig. (2-tailed)						.000	.000
	N						100	100
Logistics Efficiency	Pearson Correlation						1	.698**
	Sig. (2-tailed)							.000
	N							100
Logistics Effectiveness	Pearson Correlation							1
	Sig. (2-tailed)							
	N							

**. Correlation is significant at the 0.01 level (2-tailed).

Source: Researcher's survey result, 2018

As it is shown in the table 4.8 above, safety /security during the movement of personals and materials role of transportation is positively related to indicators of logistics performance logistics differentiation with a Pearson correlation coefficient of 0.531 and significance value is

less than 0.001, logistics efficiency with a Pearson correlation coefficient of 0.651; and logistics effectiveness with a Pearson correlation coefficient of 0.702 and significance value of less than 0.001. This significance tells that there is strong positive relationship between safety /security during movement of personnel and material role of transportation; and logistics performance dimensions of logistics differentiation, efficiency and effectiveness.

In the same table, travel time management role of transportation is positively related to indicators of logistics performance of logistics differentiation with a Pearson correlation coefficient of 0.322 and significance value is less than 0.001; logistics efficiency with a Pearson correlation coefficient of 0.705 and logistics effectiveness with a Pearson correlation coefficient of 0.703 and significance value of less than 0.001. This significance tells that there is strong positive relationship between travel time management role of transportation and logistics performance dimensions, like, logistics efficiency and effectiveness; and weak positive relationship with logistics differentiation.

Mobility and accessibility and economic/financial viability role of transportation is positively related to indicators of logistics performance of logistics differentiation with a Pearson correlation coefficient of 0.571 and 0.994; logistics efficiency with a Pearson correlation coefficient of 0.571 and 0.466; and logistics effectiveness with a Pearson correlation coefficient of 0.611 and 0.465 respectively and significance value is less than 0.001. This significance tells that there is strong relationship between role of transportation mobility & accessibility and economic/financial viability and logistics performance dimensions of logistics differentiation, logistics efficiency and logistics effectiveness.

From the above analysis the researcher can generalized that there is strong positive relationship between the role of transportation (safety /security, travel time management, mobility and accessibility, and economic/financial viability) and logistics performance dimensions, like logistics differentiation, efficiency and effectiveness. That is if the academy improve the role of transportation, it can also improve logistics performance (logistics differentiation, efficiency and effectiveness).

An interview have been conducted with logistic sub unit heads, transport head, warehouse keepers, and purchasing and supply head regarding the relationship between transportation and logistics performance. To generalize their responses, they said that without well developed transportation systems, logistics could not bring its good performance. Besides, a good transport

system in logistics activities could provide better logistics efficiency, reduce loss of injured soldier, and promote service quality (food service, water and ice service, contingency base services, hygiene services, and mortuary affairs).

To generalize the above analysis, the role of transportation (safety/security, travel time management, mobility & accessibility and economic/financial viability) and logistics performance of (logistics differentiation, logistics efficiency and logistics effectiveness) have a strong positive relationship.

4.5.2. Regression Analysis between role of transportation and logistics performance

Regression is a statistical technique to determine the linear relationship between two or more variables. Regression is primarily used for prediction and causal inference. In its simplest (bi-variant) form, regression shows the relationship between one independent variable (X) and a dependent variable (Y). As we discussed in the literature part of this paper, transportation plays a great role in the logistics performance. To prove this and determine the variation in logistics performance as a result of transportation, a linear regression analysis was conducted.

The ANOVA table is used to determine the adequacy of the model specified. The Assumptions weather to accept the model or not is stated as follows:

HO: The model is not adequate to explain the dependent variable

H1: The model is adequate to explain the dependent variable

Table 4.9 ANOVA table for model adequacy test

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	79.882	4	19.971	29.687	.000[b]
	Residual	63.908	95	.673		
	Total	143.790	99			

a. Dependent Variable: Logistics performance

b. Predictors: (Constant), economic/financial viability, travel time, safety/security, mobility and accessibility

Source: Researcher's survey result, 2018

As indicated in table 4.9, the model is adequate with 1 percent significance level. Therefore, we reject the null hypothesis (H0) and we accept the alternative hypothesis (H1) and can say the model is adequate to explain the dependent variable.

Table 4.10. Model Summary

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.783[a]	.613	.597	.70197

a. Predictors: (Constant), economic/financial viability, Travel time management, Safety /Security, mobility & accessibility

b. Dependent Variable: Logistics performance

Source: Researcher's survey result, 2018

As per the adjusted R square result in the table above, 61.3 percent of variation in logistics performance of the military academy can be attributed to effect of predictor variable which is transportation role. This means, 38.7 percent changes in logistics performance can be attributed to other factors while 61.3 percent of the variation in logistics performance is as a result of the role that transportation plays in the logistics.

Table 4.11 Regression Beta Coefficients

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.425	.262		1.621	.108
	Safety /Security	.297	.090	.292	3.293	.001
	Travel time management	.424	.073	.471	5.771	.000
	mobility & accessibility	.052	.083	.058	.626	.533
	economic/financial viability	.105	.068	.125	1.545	.126

a. Dependent Variable: Logistics performance

Source: Researcher's survey result, 2018

Table 4.11 shows that there exists significant association between the independent variables safety /security and travel time management and the dependent variable logistics performance of the military academy, since the p-value of those roles of transportation indicator variables are less than 0.05.

4.5. Summary of Interview response

As per the interview conducted with logistic sub unit head, transport heads, warehouse keepers, and purchasing and supply head of the military academy, the role that transportation plays is very important. Almost every activity in logistics operation is dependent on transportation. Military logistics operation needs quick and flexible transportation practice because its mission is scenario based. Even if the positive contribution of transportation is supported by the respondents, there are problems related with transportation that hinders the smooth operation. Some of the problems are related with the human factors like lower performance of, employee negligence and the like but the main problems raise are cost of transportation. Even if there are problems in the transportation activity, the contribution of it is rated as the core activity in the logistics performance of the military academy which is supported by the finding of the paper. In addition, the interview respondents said that, transportation lacks integration with other departments, the employs lake responsiveness, the vehicles and other assets are not properly handle.

CHAPTER FIVE

SUMMARY, CONCLUSION, AND RECOMMENDATIONS

5.1. Introduction

The objective of this study was to examine the role of transportation in logistics performance in Major General Hayelom Araya Military Academy. To fulfill the study objective, this chapter deals with the summary of finding, conclusion reached, the recommendation and suggestion for further study forwarded based on the finding.

5.2. Summary of Findings

To achieve the general and the specific objectives of this paper that stated in chapter one, different methods and data sources were used. The collected data were properly analyzed and it shows that there are several problems with different degree. The researcher used respondents in this study to respond close ended and open ended questions by using their knowledge, understanding, and believe. The purpose of this study was to examine the role of transportation in logistics performance in military academy. To attain this purpose the following basic questions have been developed.

1. What is the role transportation playing in logistics performance in Major General Hayelom Araya Military Academy?

2. What are the problems of transportation practices in Major General Hayelom Araya Military Academy?

3. What are the factors that affect the effectiveness of transportation operation in Major General Hayelom Araya Military Academy?

To this end an explanatory research design was employed in this study with an assumption that it is helpful to identify any causal links between the factors or variables that pertain to the research problem. Assuming that the population is manageable, the researcher took the whole population for the study. Accordingly questionnaires were distributed to a total of 114 and 104 of them were returned. Besides; interviews with logistic sub unit heads, transport head, warehouse keepers and

purchasing and supply head was done and documents related to transportation and logistics performance were analyzed.

The quantitative data collected by using questionnaires were tallied, tabulated, analyzed and interpreted by descriptive statistics (by mean scores and standard deviation); and correlation and regression using SPSS version 20. Percentage was also employed to analyze the background information of the respondents. The qualitative data collected through interview and secondary data source was also analyzed in line with the quantitative data. Therefore; based on the analyzed data, the finding of the study is summarized as follows:

1. The first question of the study was regarding the role transportation playing in logistics performance. The respondents were asked if there is relationship between role of transportation and logistics performance. To respond this question the researcher used correlation and regression modal of analysis, so the result of the correlation analysis suggest that, there is strong positive relationship between the role of transportation and logistics performance dimensions of logistics differentiation, efficiency and effectiveness (the result of this analysis was a Pearson Correlation of as an average 0.622). The results of the regression analysis suggest that, there is causal relationship between the role of transportation and logistics performance (the R square of the analysis result is 61.3%). That is; if the quality of transportation improved, like safety movement of commodity ,fast travel time, secure movement of commodity, mobility & accessibility and economic/financial viability; it also improves logistics performance like reduction operation cost and promote service quality. From interview and secondary data source, the researcher summarized the respondents' response as follows: Without well developed transportation systems, logistics could not bring its good performance. Besides, a good transport system in logistics activities could provide better logistics efficiency, reduce loss of injured soldier, and promote service quality (food service, water service, contingency base services, hygiene services, and mortuary affairs).
2. The second question asked respondents the problems of transportation practices in the academy. For this question the researcher developed questions regarding; practice, system, timely delivery, safety, economies of scale, flexibility, and cost competitive of the academy's transpiration. For those questions the researcher used descriptive statistics like mean and standard deviation analysis. The respondents respond on practice or system of

transportation provides security is negative (M=1.59, SD=1.20), that is it isn't provides security. In the other questions like the academy reaches economies of scale and economies of distance to reduce cost has mean score (M=2.06, SD= 0.87) negative response indicated the military academy wasn't reached economies of scale and economies of distance to reduce cost. Transportation service cost effectiveness, the overall quality of transportation and transportation cost is competitive in comparison with the market have M=1.98, SD=0.97, M=1.72, SD=0.81 and M=1.83, SD=0.62 respectively. Based on their response, those activates were the main problem of the academy transport department. Safety /security during the movement of personals and materials and economic/financial viability role of transportation are the major problem in transportation performance. From interview and secondary data source, regarding to the second question is that, transportation lacks integration with other departments, the employs lake responsiveness, the vehicles and other assets are not properly managed.

3. The third research question was the factors that affect the effectiveness of transportation operation in the military academy. Before developing questionnaires for this question, the researcher made a preliminary interview for the logistics and transport personnel. According to the preliminary interview the main factors that affect the effectiveness of transportation operation can be divided in to two. Those were human factor and non human factor. The questions in the human factor include lower performance of employee, employee negligence, inadequate training, and lack of understanding team work. The response of the respondents for lower performance of employee and negligence of employees in the academy were significantly affecting the smooth operation of the transportation activity (which have a mean and standard deviation M=4.21, SD=0.78 and M=4.33, SD=0.71 respectively). Inadequate training and lack of understanding team work in the academy moderately affect the smooth operation of the transportation activity (which have a mean and standard deviation M=2.91, SD=1.06 and M=2.73, SD=1.17 respectively). In the non human factor side question like, lack of adequate and modern vehicles, substandard vehicles and unavailability of standard infrastructure were developed. From those lack of adequate vehicles, substandard vehicles and lack of modern vehicles which have mean (M=4.19, SD=.88, M=4.17, SD=0.92 and M=4.14, SD=0.97 respectively) significantly affect transportation operation of the academy. Unavailability of standard infrastructure which

have a mean and standard devotion M=3.21, SD= 1.28 moderately affect transportation operation of the military academy. Interview respondents also argued that there were human and non human problems in transportation department. According to them the human factors were due to poor performance of some employees in transport area as a result of negligence, not understanding the value of team work and inadequate training. The non human factors were due to lack of adequate and modern equipments, substandard trucks, infrastructure problems, missed schedules, excessive loading and unloading time.

Therefore; it can be conclude that the academy has transportation problem. This transportation problem also has a direct impact on logistics performance. The role of transportation in logistics performance is very significant.

5.3. Conclusion

Based on the findings stated in chapter four, the following conclusions are drawn:

- The academy has transport related problems; those problems are due to human factors and non human factors.
- Human factors are employee negligence, lower performance of employee, inadequate training and lack of understanding team work.
- The non human factors are lack of adequate and modern vehicles, substandard vehicles, infrastructure problems, missed schedules, higher rate of loss and damage, excessive loading and unloading time.
- Even if those listed above problems were affected the transportation function, transportation service of the military academy is providing logistics efficiency.
- Transportation of the military academy is flexible as supported by majority of respondents because the demand for supplies like ammunition is highly scenario-dependent and has a larger variance.
- The transportation practice is not cost efficient as per respondents 'response.
- The transportation service isn't giving timely reply to special enquiry from academy community and trainee.
- There is a strong and positive relationship between role of transportation and logistics performance. The relationship between transportation (the role transportation plays) and

logistics performance is very strong and positive. It shows that role of transportation have a strong influence on logistics performance.

- The academy transport department has a mismatch between number of vehicle and number of derivers. Even if the academy has not adequate and modern vehicles, it has larger number of vehicles than derivers.
- Transportation lacks integration with other departments, the employs lake responsiveness, the vehicles and other assets are not properly utilized.

5.4. Recommendations

Based on the findings and conclusion, the following recommendations were made to enhance the role of transportation in logistics performance and solve the challenges in the practice or system of transportation department of the military academy.

1. The finding of the study revealed that there are strong relationship between transportation and logistics performance. Therefore; to increase the benefits that the military academy obtain from logistics performance, it has to give emphasis for transportation practice.
2. The finding of the study revealed that there are transport related problems in the military academy. These problems are due to human and non human factors. Therefore; to improve transportation performance and enhance its role on logistics performance, the military academy must remove or minimize human and non human problems. Those human problems are avoided by; providing adequate training, increasing employee performance, and changing the attitude of the employee. The non human problems also minimized or avoided by; replacing outdated and substandard vehicles by modern and standard vehicles, and eliminating infrastructure problems.
3. According to the finding, the performance of the military academy in logistics area isn't effective. Therefore; increase transportation performance (by providing safe and secure movement of personals and materials, fast travel time and finical/economical management) is better for the military academy to improve the logistics performance. Because most of logistics function is transportation dependent.
4. Finally, it is recommended that the academy has to train new derives to balance the number of vehicles and number of derives. It must aware the employees about handling of vehicles and the disadvantage of negligence. The other finding is the researcher

observed poor filling system of necessary documents in transport department. So the department must improve document handling and data filling system.

5.5. Suggestion for Further Study

Even if transportation has the highest impact in logistics activity, there are also factor that influence logistics performance in the academy. Those are like procurement, warehousing, distribution and also the relation of logistics with other operation of the academy like marketing, finance and the like all have an impact on the performance of logistics. Therefore, the implication for further study is to include all other dimensions including the influence from other departments in the academy in order to have a full picture of factors having significant role on performance of logistics.

In order to be more accurate of transportation role, it will also be an interest to conduct the study on Ethiopian national defense logistics main department as their operation is largely transportation dependent.

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Appendix

Appendix 1

ADDIS ABABA UNIVERSITY SCHOOL OF COMMERCE

LOGISTICS AND SUPPLY CHAIN MANAGEMENT

Questionnaire to be filled by Respondents

Dear respondents:

I would like to express my deep appreciation for your cooperation and honesty in answering the following research questions. The aim of collecting information and data through this Questionnaire is to conduct academic research on the title **"The Role of Transportation in Logistics chain Performance: the Case of Major General Hayelom Araya Military Academy**" for the partial fulfillment of MA degree in Logistics and supply chain management. Your critical response has a great role to the outcome of the study. Thus, you are requested to completely and objectively answer all the questions. And I confirm that your answers will be used only for academic purposes, and it will be entirely anonymous. Finally I thank you once again in advance for indispensable cooperation.

Instruction: - Before answering the questions please read the instructions;- Don't write your name in this questionnaire. Please try to answer the following questions openly by marking as (√) on the space provided along each questions according to your point of view on the following demographic information and likert five scale questions as per the specified choices given.

Yalew Mersha

Graduate Student at AAU

E-mail yalewmresha@gmail.com

Mobile No = +251913416192

Part One-Respondents profile

1. Sex, Male_____, Female_____

Work experience in academy(in year)		**Rank**		**Education**		**Position**	
Less than 5		General officer		Master & above		logistcis dep't	
5 -10		Higher officer		BA/B.sc		training dep't	
11 – 15		Middle officer		Diploma		Heads of dep't	
16- 20		NCO		Certificate/TEVT		Support Staff	
21 & Above		Private		Other		Driver & Mechanic	

Part Two: Questionnaires focusing on the role of transport in MGHAMA the case of transport department.

Key: - 1 = Strongly Disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly Agree

No	Role of transportation		1	2	3	4	5
1	**Safety /Security during the movement of personals and materials.**						
	1.1	Practice or system of transportation provides security.					
	1.2	Transportation systems security and safety; satisfy community of the academy.					
	1.3	The overall quality of the academy's transportation is very high.					
	1.4	The military academy's transportation practice is secure in moving materials and information.					
2	**Transportation role with regards to Time.**						
	2.1	The academy's transpiration gives on time service for different requests.					
	2.2	Military academy's transportation delivers training materials at the right time.					
	2.3	Military academy's service delivers supply (ration, ammunition and etc.) to trainee on time.					
	2.4	Military academy's transportation reaches its goal, by on time delivery of materials.					

3	**Mobility and accessibility of transportation**						
	3.1	Transportation service of the academy is flexible.					
	3.2	The academy's transportation service gives quick response to special requests.					
	3.3	The academy's community has high access in transportation service.					
	3.4	The academy's transportation can move bulky load in short period of time.					
4	**Economic/financial viability**						
	4.1	The military academy's transportation service is cost effective.					
	4.2	The military academy reaches economies of scale and economies of distance to reduce cost.					
	4.3	The military academy's transportation cost is competitive in comparison with the market.					
	4.4	The military academy's transportation prevent logistics cost by providing fast and on time service.					

Part Three – Questions related to Transportation practice Challenge

I. Human factor that challenges transportation practice

Human factors that challenge transportation performances are stated below. Please show their degree of effect on transportation practice in your academy.

Challenges	Rating				
	Very low	Low	Moderate	High	Very High
	1	2	3	4	5
Lower performance of employee					
Employee negligence					
Inadequate training					
Lack of understanding team work					

If there are any other challenges, please specify it

_____

_____

II. Non-human factors that challenge transportation practice

Non-human factors that challenge transportation performances are stated below. Please show their degree of effect on transportation operation of your company

Challenges	Rating				
	Very low	Low	Moderate	High	Very High
	1	2	3	4	5
Lack of adequate vehicles					
Substandard vehicles					
Unavailability of standard infrastructure					
Lack of modern vehicles					

If there are any other challenges, please specify it

_____

_____

Part four – Questions related to three dimensions of Logistics Performance

I. Logistics Differentiation

The following items are asked to know whether your academy logistics practice differs from other organization in Ethiopian defense force.

Logistics Differentiation	Rating				
	Far below Other	Below Other	Neutral	above Other	Far above Other
	1	2	3	4	5
Percentage of on time delivery					
Total inventory					
Percentage of Damage free deliveries					
Stock of finished goods inventory					
Forecasting accuracy					
Lead time(time between order and delivery)					

II. Logistics Efficiency

The items listed below are asked to measure efficiency of logistics operation of your company. Please answer the questions by putting the sign/√/ on the ratings provided

Logistics Efficiency	Rating				
	Very poor	poor	Neutral	good	Very good
	1	2	3	4	5
Number of order shipped on time					
Percent of shipment requiring expedite					
Inventory turn per year					
Average order cycle time(time in between order and delivery)					

III. Logistics Effectiveness

The items listed below are asked to measure effectiveness of logistics operation of your company. Please answer the questions by putting the sign/√/ on the ratings provided.

Logistics Effectiveness	Rating				
	Very poor	poor	Neutral	good	Very good
	1	2	3	4	5
Vehicles rent cost					
Transportation cost					
Warehousing cost					
Inventory cost					

Appendix 2

Interview Guide Questions

1. How do you describe the transportation practice of the military academy?
2. What are the main transportation challenges in the military academy?
3. Do you think that transportation has a role on logistics performance?
4. Are there modern and standard vehicles in the military academy?
5. Is the military academy transport department preparing training program for the employees?
6. Do you think drivers and other transport department employees competent and happy while they perform their task at any time?
7. What you think about the relation among employees? Is there team work?
8. How do you describe the ration between transportation and logistics performance in the military academy?