



ST.MARY'S UNIVERSITY
SCHOOL OF GRADUATE STUDIES

**DETERMINANTES OF FUEL DISTRIBUTION
EFFECTIVENESS IN ETHIOPIA**

BY
SERKALEM DAMTEW

JULY, 2022
ADDIS ABABA, ETHIOPIA

**DETERMINANTES OF FUEL DISTRIBUTION
EFFECTIVENESS IN ETHIOPIA**

BY

SERKALEM DAMTEW

SGS/0367/2013A

Advisor:

Mesfin Workneh (PhD)

**ATHESIS SUBMITTED TO ST. MARY'S UNIVERSIY, SCHOOL OF
GRADUATE STUDIES IN PARTIAL FULFIIMENTOF THE
REQUIREMENT FOR THE DEGREE OF MASTER OF MARKETING
MANAGEMENT**

JULY, 2022

ADDIS ABABA, ETHIOPIA

**ST. MARY'S UNIVERSITY
SCHOOL OF GRADUATE STUDIES
FACULTY OF BUSSINESS**

**DETERMINANTES OF FUEL DISTRIBUTION
EFFECTIVENESS IN ETHIOPIA**

SERKALEM DAMTEW

SGS/0367/2013A

APPROVED BY BOARD OF EXAMINERS

Dean, Graduate Studies

Signature and Date

Advisor

Signature and Date

External Examiner

Signature and Date

Internal Examiner

Signature and Date

DECLARATION

I, SERKALEM DAMTEW, declare that this thesis is my original work, prepared under the guidance of Dr. Mesfin Wrkneh. All source of materials used for the thesis have been duly acknowledged. I further confirm that the thesis has not been submitted either in part or in full to any other higher learning institution for the purpose of earning any degree.

SERKALEM DAMTEW

ST. MARY'S UNIVERSITY, ADDIS ABABA JULY, 2022

ENDORSEMENT

This thesis has been submitted to St. Mary University, school of graduate studies for examination with my approval as a university advisor.

Mesfin Workneh (PHD)

Advisor

Signature and Date

ST. MARY'S UNIVERSITY, ADDIS ABABA JULY, 2022

Acknowledgments

I am most grateful to the Almighty God for his infinite mercy and love that guided me throughout my life, and I would like to thank his mother Saint Mary.

Next, I would like to thank my advisor Mesfin Workneh (PhD.) for his useful comments, remarks and advises. Many thanks also deserved for all Ethiopian Petroleum supply Enterprise, all fuel distributor oil companies and fuel stations employees for their willingness to give necessary information and fill questionnaires by spending their invaluable time.

I extend my thanks to my family, my lovely husband Gashaw Wubante and my kids Etsehiwot Gashaw and Biruk Gashaw, for their unreserved love and moral support to complete this post graduate program successfully.

TABLES OF CONTENTS

Contents	Page
Acknowledgments.....	i
TABLES OF CONTENTS.....	ii
List of Tables.....	v
List of Figures	vi
Acronyms and Abbreviations.....	vii
Abstract	viii
CHAPTER ONE	1
INTRODUCTION	1
1.1 Background of the Study.....	1
1.2 Statement of the Problem.....	3
1.3 Research Questions	5
1.4 Objectives of the Study	5
1.5 Significance of the Study	6
1.6 Scope of the Study	6
1.7 Limitation of the Study	6
1.8 Organization of the Study	7
1.9 Definition of Terms.....	7
CHAPTER TWO	9
REVIEW OF RELATED LITRATURE.....	9
Introduction	9
2.1 Theoretical Review	9
2.1.1. Theories of distribution.....	9
2.1.2. Models of physical distribution.....	10
2.1.2.1. Inventory models.....	10
2.1.2.2. Warehousing models.....	11
2.1.3 Distribution Management.....	13
2.1.4 Evaluation of Distribution Channels Performance and Effectiveness	14
2.1.5 Factors Affecting Distribution Channels Performances	15
2.1.5.1 Integration	17
2.1.5.2 Experience.....	18

2.1.5.3 Stores Location.....	19
2.1.5.4 Financial capacity.....	19
2.2 Empirical Review.....	20
2.2.1 Factors Determining Fuel Distribution Effectiveness in Ethiopia	20
2.3 Conceptual Framework	23
CHAPTER THREE.....	24
RESEARCH METHDOLOGY	24
3.1 Research Approach	24
3.2 Research Design.....	24
3.3 Data Type and Data Source.....	24
3.3.1 Data Type	24
3.3.2 Data Source	25
3.3.3 Population of the study	25
3.4 Sampling Procedure	26
3.4.1 Sample Size.....	26
3.4.2. Sampling Unit	28
3.4.3 Sampling Technique.....	29
3.5 Data Gathering Instruments	29
3.6 Data Analysis Technique	29
3.7 Reliability and validity.....	30
3.8 Ethical Consideration.....	30
CHAPTER FOUR.....	31
RRESULT AND DISCUSSION.....	31
4.1 Data Cleaning and Coding	31
4.2. Demographic Analysis of Respondents	31
4.3 Test of Reliability and Validity.....	34
4.4 Descriptive Statistics of Variables	35
4.5 Inferential Statistics.....	36
4.5.1 Correlation Analysis	36
4.6 Tests for Linear Regression Model Assumptions	37
4.6.1 Normality Assumption.....	37

4.6.3 Assumption of Homoscedasticity	39
4.6.4 Testing Multicollinearity.....	40
4.8 Hypothesis Testing and Interpretation of Results	44
CHAPTER FIVE.....	46
SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS	46
5.1 Introduction	46
5.2 Summary of Finding	46
5.3 Conclusion	47
5.4 Recommendation.....	47
5.5 Area for Further Study	48
REFERENCE.....	49
APPENDICES	54
Appendix-1.....	54
Appendix.2.....	60
Appendix -3.....	61

List of Tables

Table 3.1 Population Characteristics.....	25
Table 3.2 List of sample fuel distributor oil companies selected from the first stratum.....	27
Table 3.3 List of sample fuel stations selected from the second stratum.....	27
Table 4.2 Demographic Analysis of Respondents	32
Table 4.3 Reliability Analysis of Variables	34
Table 4.4 Mean and standard deviation for determinants of distribution effectiveness.	35
Table 4.5.1 Correlations Analysis Result.....	36
Table 4.6.4 Multicollinearity Test Result	41
Table 4.7.1 Model Summary.....	42
Table 4.7.2 ANOVA Analysis	42
Table 4.7.3 Coefficient Matrix.....	43

List of Figures

Figure 2.1: Conceptual framework	23
Figure 4.1 Normality test result	38
Figure 4.2 Linearity test result	39
Figure 4.3 Homoscedasticity test result	40

Acronyms and Abbreviations

EPSE - Ethiopian Petroleum Supply Enterprise

MGR-Regular Gasoline

AGO/AGO-Gasoil

HFO- Heavy Fuel Oil

LFO- Light Fuel Oil

EOQ- Economic Order Quantity

EPQ- Economic Production Quantity Model

JELS- Joint Economic Lot-sizing

FRP- Forward-Reserve Problem

SLAP- Storage Location Assignment Problem

PDM-Physical Distribution Management

SCM-Supply Chain Management

Sig - Level of Significance

SPSS- Statistical Package for Social Science

VIF- Variance Inflation Factor

MRM- Multiple Regression Model

Abstract

The purpose of this study was to identify factors that affect Ethiopia's fuel distribution effectiveness. Both descriptive and explanatory research designs were used in this study. The researcher employed both quantitative and qualitative research methods. The population of the study was divided into two strata. The first stratum contained the 38 fuel distributor oil companies which perform the wholesale distribution of fuel in Ethiopia and the second strata contained 1237 retail fuel stations found in Ethiopia. Out of the 38 fuel distributors, 10 companies that have a market share of 1% and above were selected from the first stratum by using purposive sampling technique. 110 fuel stations found in Addis Ababa were selected from the second stratum through convenience sampling technique. A structured questionnaire was employed as a primary source of data by the researcher. Out of 120 questionnaires distributed, 96 were returned which representing a response rate of 80%. To describe the extent of the relationship between the variables of interest, a correlation and regression analysis was used. Additionally, descriptive statistics (such as mean and standard deviation) and the Statistical Package for Social Scientists (SPSS) version 20 were utilized to evaluate the data. Tables and figures were also employed to present the study's findings. Integration, experience, fuel stations location and financial capacity are variables that have positive and significant impact on the country's fuel distribution effectiveness. The findings also show that the most significant influences on distribution effectiveness is due to financial capacity and integration followed by experience and fuel stations location. Disintegrated processes, lack of experience, land accessibility problem and inadequate financial capacity of the key distribution chain actors are main reasons for the country's ineffective fuel distribution system identified by the study. If the country wants to improve its fuel distribution, the study's findings suggest that integration, experience, fuel stations location and financial capacity must be prioritized.

Key Words: *integration, Experience, fuel stations location, financial capacity and distribution effectiveness.*

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The process of planning, implementing, and controlling the physical flow of materials, finished goods, and related information from point of origin to point of consumption in order to meet customer requirements profitably is known as distribution (Kotler and Armstrong, 2001). Distribution, according to Schewe and Smith (1980), is the physical movement of items to their final customers. Products are worthless unless they are made available to those who need them, and production is not complete until things reach to final consumers. As a result, the distribution basis in a marketing strategy is the process of making things available to those who require them. According to Rechar.R, Edward W., Norman A.P., and Sandeep (2017), product accessibility is a critical component of marketing strategy that helps businesses be successful. The majority of businesses rely on middlemen to get their products to market. Marketing channels are made up of these intermediaries. Marketing channels (also known as Distribution Channels or Trade Channels) are a collection of interconnected businesses involved in the delivery of goods and services to end users. Inventory management, physical distribution, bulk breaking, marketing communication, financial risk reduction, guidance, and technical support are among the key roles performed by distribution Channels (Rechar.R. et al, 2017)

Oil, gas, and petrochemicals are produced in a few locations across the world, but they are in high demand all over the world since they are a vital source of energy and a raw ingredient for many other industries (Raed, Tiravat, & Basheer, 2006). The increase in global oil demand, along with the ease of international trade and the inflexibility of the petroleum sectors, has made fuel distribution management increasingly complex and difficult (Coia 1999). Fuel distribution encompasses all processes involved in fulfilling a customer's request, whether directly or indirectly (Chopra & Meindl, 2001). Fuel distribution, as defined by John et al. (2013), is an extended activity that spans the linked activities of all enterprises involved in the distribution of fuel. The necessity for everyone to work together in the same direction is critical (Handfield, 2016).

The fuel supply chain has traditionally been divided into three parts: the upstream component, which is responsible for generating or purchasing crude and transporting it to the refinery (Röthlisberger, 2005). According to Röthlisberger (2005), the refining process is regarded a separate component because of its complexity and as it is the core where crude from multiple production sites meets and refined goods diverge on their path to the ultimate consumer. Crude oil is extracted and delivered to a refinery, usually by ship or pipeline, where it is refined into petroleum products of the requisite quantity and quality, which are then transported to storage facilities near ultimate markets. Marine tankers, pipelines, road tankers, rail, and barges are all options for getting from refineries to secondary storage. Finally, the downstream portion of the business is concerned with transporting refined products from refineries to terminals and then to wholesalers or retail outlets such as fuel stations. Ethiopia's petroleum industry is classified as downstream marketing and services since the country's fuel requirements are imported from midstream countries (oil producing corporations) and then sold to end consumers.

In today's market environment, a solid distribution strategy is critical to the success of many industrial companies around the world. According to Christopher and Towill (2002), the capacity to plan and execute the movement of the appropriate goods to the right place at the right time can also improve supply chain efficiency by eliminating expedited freight and the manufacture and repositioning of unnecessary inventory. Furthermore, George and Iravo (2014) mentioned that an effective distribution strategy is critical for delivering high-quality items to customers. Developing and maintaining existing relationships while meeting specific customer service criteria around products and services can help grow market share. Not only does the efficiency and effectiveness of the logistics operation have an impact on the business success of manufacturers, but it also has an impact on the customer's view of the quality of the plant's products and services.

Ethiopia is a country that is fully reliant on fuel imports from other countries. Ethiopian Petroleum Supply Enterprise (EPSE) is a government-owned company with monopolized responsibility for fuel importation and distribution, as well as the management of the national fuel reserve. The products imported by the EPSE are divided into two categories: refined

petroleum products and coal. Gasoline (MGR), gasoil (ADO/AGO), kerosene or Jet-A1, heavy fuel oil (HFO) and light fuel oil (HFO) are refined petroleum products, while standard steam coal and sized steam coal are classified as coal. Fuel is procured in two ways: through international competitive bids and through bilateral government agreements. Currently, all fuel is imported through Djibouti Port on a rental basis. Horizon Terminal is a privately owned company that rents out its services for discharging the fuel from ships, warehousing, and loading to vehicles. Trucks transport the fuel from the port to inland retail outlets, and fuel distributor oil corporations are in charge of this. According to the EPSE report, currently the inland distribution of fuel is performed by 38 international and domestic oil companies EPSE report (Dec. 2021).

1.2 Statement of the Problem

Now a day's Ethiopia does not have its own crude oil resource, due to this all the country's fuel demand is covered by imported fuel. Gasoline (MGR), gasoil (ADO/AGO), kerosene or Jet-A1, heavy fuel oil (HFO) and light fuel oil (HFO) are refined petroleum products imported by the country. According to EPSE report (July,2016 up to June, 2021), the country paid 10,225,199,871.70 USD Dollars for the importation of petroleum products. In addition Birr41,097,303,933.93 was expensed by the country for fuel price stabilization within the last five years. The procurement system of petroleum products is divided in to two; through international competitive bid and bilateral Government agreement. Furthermore now, Ethiopia is one of the countries that have not its own port and all the fuel required for the country consumption is imported through Djibouti port. Horizon Terminal is the sole UAE private company that performs the discharging, warehousing and loading activities to the imported fuel at Djibouti port.

Ethiopian Petroleum Supply Enterprise (EPSE) is a government-owned company which has two main responsibilities in the fuel supply chain. The first is to import and sale the required fuel to the inland distributors (oil companies) at Djibouti port based on their market share and the second responsibility is to administer the strategic fuel depots which are found in different regions of the country. When problem occurs on fuel importation process, EPSE continues to distribute the required fuel amount from inland strategic reserve it holds until the problem has been solved.

Ethiopia is a highly populated country in the horn of Africa and mostly its inland transportation system is depending on vehicle transportation service. Gasoline (MGR) and gasoil (ADO/AGO) are petroleum products that dominantly used in vehicle transportation service. Those two products have a great role to the society's economic and social interaction throughout the country.

Addis Ababa is the capital city of the country, the seat for Africa Union and different national and international organizations. There are also above 115 embassies of different countries found in the city and its population estimated to be above 4 million (W. B, 2021). In general speaking, the city is the center for the country's economic, political and social interaction. The city energy consumption is mainly depending on fuel. According to W. B (September, 2021) above 630,000.00 registered fuel consuming vehicles are found in the city. From the total volume of the country's fuel consumption Addis Ababa take the lion share of the amount. This indicates supplying the required fuel for the city should be the prime focus for the distribution chain participants. Despite this, the city experience disruption and inconsistency fuel supply in the last years. Fuel scarcity in the city is not a result of lack of it; instead lack of integrity, lack of experience, location of fuel stations and financial capacity of fuel distributor oil companies and retailers contributes more to the inadequacy of fuel supply (own observation).

On the one hand, the country invests a large portion of its foreign and domestic currency in the fuel supply, but on the other side, society suffers from fuel supply disruption and inconsistency. The consumer's right to get the right volume of fuel at the right time and right place is violated. It has been proved by long vehicles queues around retail fuel stations, city taxis go there and back from on station to another for searching of fuel after loading their customers. It is also frequent head line news to mass medias to report the societies complain about the shortage of fuel in the city and many journalists goes to the channel members office in order to get answer for the society's complain about the shortage of fuel but the answers given by each channel member contradicts each other and creates confusion.

Effective fuel distribution is a major problem in the nation, but no one has conducted study on this topic with the suggested variables. Earlier researches attempts to ascertain the effects of integration on the performance of fuel distribution on a single company's case, experience, stores'

locations, and financial capacity for other products, in addition to a single company's specific cases.

This research tries to fill the gap of the study by conducting a study on determinants of fuel distribution effectiveness in Ethiopia by including integration, experience, fuel stations location and financial capacity

1.3 Research Questions

The study has been conducted to answer the following main and sub research question.

Main research Question

What are the determinants of effective fuel distribution in Ethiopia?

Sub Research Questions

1. How integration affect fuel distribution effectiveness in Ethiopia?
2. How experiences affect fuel distribution effectiveness in Ethiopia?
3. To what extent fuel stations location affects fuel distribution effectiveness in Ethiopia?
4. How financial capacity of fuel distributor oil companies and retailers does affect fuel distribution effectiveness?

1.4 Objectives of the Study

General Objective

The general objective of the study is to identify factors that affect fuel distribution effectiveness in Ethiopia.

Specific Objective

The specific objectives of the study are:

1. To identify that integration affect fuel distribution effectiveness in Ethiopia.
2. To assess whether experience affect fuel distribution performance in Ethiopia.
3. To analyze that fuel stations location affects fuel distribution effectiveness in Ethiopia.

4. To examine the impact of fuel distributor oil companies and retailers financial capacity on fuel distribution effectiveness.

1.5 Significance of the Study

The study may generate valuable information on factors affecting the fuel distribution chain. First, the result of the study may be useful to the government to think strategically on the issues of effectiveness of fuel distribution in the country in respect to the growing demand of the country's fuel consumption. In addition the study might help to the ministry of trade to evaluate and take appropriate action on the current requirement applicable to give license to the entrants of the fuel distribution chain. Further the findings of the study might also useful to the channel members including consumers to understand the problems on the fuel distribution chain and to make their respective decisions. Finally the study may also serve as a reference for further researches on similar and related subjects on the industry,

1.6 Scope of the Study

There may be many factors affecting the fuel distribution effectiveness in Ethiopia, out of them this study concentrates on the variables of integration, experience, location of fuel stations and financial capacity of channels members which operates in the fuel distribution chain of Ethiopia. The study was conducted by using the mixed research method (qualitative and quantitative). There are many stake holders and channel members that participate in fuel distribution chain in Ethiopia, but this study was focused on the wholesale and retail distribution processes and the data for the study were collected from fuel distributor oil companies that operate in the country and retail fuel stations which operate in Addis Ababa.

1.7 Limitation of the Study

The study covers the effectiveness of fuel distribution in Ethiopia and it considers only the fuel distribution sector. Beside this, there may be many factors determining the fuel distribution effectiveness in Ethiopia, this study was focused on the variables; integration, experience, depots location and financial capacity of fuel distributor oil companies. In addition there are many participants and channel members in the fuel distribution chain in Ethiopia, data for the study were collected from fuel distributor oil companies operate in the country and retail fuel stations which operate in Addis Ababa due to convenience problem.

Further limitations were respondents may withholding information due to fear of being victimized, unwillingness of respondents to fill questionnaires, the selected sample in some extent may not be represent the total population character and the method selected for the data analysis may have its own impact on the quality of the research result.

1.8 Organization of the Study

The study consists of five chapters, a reference and annexes. The first chapter discuss about the background of the study, problem statement, research questions, its objectives, the significance of the research, the scope and limitation of the research. The second chapter deals with the review of related literatures and further presents the conceptual and empirical frameworks that served as a base line for providing a solution for the basic research questions. Chapter three addressed research methodology used by the researcher incorporating the research design, research approaches used, instruments, sampling methods and data analysis techniques that are used to reach to a conclusion. Reliability, validity and ethical considerations are also part of this chapter. Chapter four is the result and discussion of the research. The Final chapter, the fifth chapter, gives summery, conclusions and recommendations from the research findings

1.9 Definition of Terms

Distribution: According to Philip kotler& Armstrong 2001, Distribution is the process of planning, implementing and controlling the physical flow of materials, final goods and related information from point of origin to points of consumption to meet customer requirements at a profit.

Depot: premises used for the storage and sale in bulk of solid or liquid or gaseous fuel, but does not include a service station and specifically exclude the sale by retail in to vehicle for final use of such fuel from the premises

Fuel: is any material that can be made to react with other substances so that it releases energy as heat energy or to be used for work.

Ports: an area of water, land and buildings surrounding it, where ships can take on and off goods and passengers.

Oil Industry: Oil Industry in Ethiopia is a sector engaged in petroleum product distribution.

Terminal: Oil terminals are storage depots of oil, other fuels and petrochemicals

Retail fuel station: is a facility that sells fuel and engine lubricants for motor vehicles.

Marketing channels (also called Distribution Channels or Trade Channels): are a set of interdependent organizations that involved in the process of delivering goods and services to end users.

Distribution Chain: It refers to the distributors system of organization of sales of products to the customers through its Distributors, sub-distributor and retail outlets

CHAPTER TWO

REVIEW OF RELATED LITRATURE

Introduction

This chapter has three sections namely, theoretical review, empirical review and conceptual framework. In the theoretical review the researcher obtains information from different sources and sorted under main themes and theories, highlighting agreements and disagreements among the authors and identifying the unanswered questions, gaps or outlook of the researcher. In the empirical review the researcher review empirical evidence refers to evidence verifiable by observation or experience, thus, the research studies with conclusions based on empirical evidence.

2.1 Theoretical Review

2.1.1. Theories of distribution

✓ The System Theory

Physical distribution can be thought of as a system of interconnected components that allows for the efficient flow of goods. Customer service, transportation, warehousing, order processing, inventory control, protective packaging, and materials handling are all components of physical distribution as described by a system approach. Because these elements are interconnected, actions taken in one area have an impact on the relative efficiency of others. For example, a small business that provides customized personal computers could prefer to ship finished goods by air rather than truck because faster delivery times allow for cheaper inventory costs, which would more than balance the greater cost of air transportation. Taking a systems approach to physical distribution can help you provide a set level of customer care at the lowest possible cost (Alderson, 1957).

✓ The Bargaining Theory of Distribution

Bargaining over terms of trade between producers and retailers is a common feature of many distribution systems. Manufacturer-retailer relationships are frequently based on the importance of negotiation and its impact on each party's portion of the tart, as well as channel

coordination. Participants' negotiating power plays a role in distribution systems across a wide range of businesses (Illas-Boas and Iyer, 2003).

2.1.2. Models of physical distribution

2.1.2.1. Inventory models

✓ The Order Quantity Model

According to Bartmann and Beckmann (1992), the economic order quantity (EOQ) model is the most well-known of the fixed order size inventory models. The basic EOQ model is a formula for calculating the ideal order size that minimizes the total cost of transporting and ordering. The model is built around a set of constraints, which are as follows:

- Demand is known with certainty and is constant over time.
- No shortages are allowed.
- Lead time of orders is constant.
- The order quantity is received all at once.

✓ The Economic Production Quantity Model

By balancing the inventory holding cost and average fixed ordering cost, the Economic Production Quantity model (EPQ) predicts the quantity a company or store should order to minimize overall inventory expenses. E.W. Taft established the EPQ model in 1918. The traditional economic quantity production model has been widely employed. Several research projects have been done to extend the basic EPQ model by removing or adding additional assumptions, allowing the model to better reflect real-world conditions. Because of the scarcity of natural resources and the rising cost of raw materials, re-work activities have recently gotten a lot of attention (Beckmann, and Bartmann, 1992).

✓ The Joint Economic Lot-sizing Model

Inventory models that address issues of inventory coordination between a buyer and a seller have been extensively studied in the literature. This class of inventory models is commonly referred to as joint economic lot-sizing (JELS) models. The objective of these models is the

development of a jointly coordinated buyer-seller inventory strategy that is more beneficial to each member's non-coordinated inventory strategy (Bartmann, and Beckmann, 1992).

✓ **The Single Period Model**

The newsvendor model is a single-period probabilistic inventory model whose goal is to find the order quantity that minimizes expected underage (scarcity) and overage costs (costs due to holding inventory). The so-called fuzzy newsboy problem is investigated, in which the scarcity cost is ambiguous and given by a L shape fuzzy number. The entire projected profit function was then seen as a hazy figure. The optimal ordering number for the non-fuzzy newsboy problem was compared to the optimal ordering quantity for the fuzzy max order of the profit function (fuzzy min order considering the profit function) (Bartmann, and Beckmann, 1992)

✓ **Multi-Period Model**

The main difference between the single-period and multi-period models is that the multi-period model may include stock leftovers from previous periods, making the optimal order quantity selection more difficult.

Inventory and production choices are interrelated and temporal in real-world applications. Multi-period lot-sizing models have benefited from fuzzy logic (Bartmann, and Beckmann, 1992).

2.1.2.2. Warehousing models

✓ **The Storage Allocation and Assignment Model**

The division of the warehouse into a forward and a reserved area is a typical method of decreasing the amount of work associated with order picking. Order selecting takes place in the forward area. The bulk storage is kept in the reserve area, which is used to restock the front area and pick products that aren't assigned to the forward area. The forward and reserve regions may be separate areas within the warehouse, or they may both be located in the same (pallet) rack. The lower levels indicate the forward area, whereas the higher levels represent the reserve area in the latter instance. In some facilities, the reserve area is once again subdivided into two separate areas: one for order-picking and one for replenishing (Berg and Zijm, 1999)

According to Berg and Zijm (1999), the forward-reserve issue (FRP) is the difficulty of selecting which products and in what quantities should be stored in the forward area. If a product isn't assigned to the forward area, it is chosen from the reserve. It is described as a heuristic for the FRP that aims to reduce total picking and restocking costs. The expenses of picking and restocking in the front region are determined by the size of the forward area in the model.

It is possible to reduce the number of replenishments during busy periods by executing replenishments during quiet periods. This not only improves throughput during peak periods, but it also minimizes the likelihood of traffic congestion and accidents. A distribution center, for example, might load trucks in the afternoon so that the labor is available for restocking the forward region in the morning. It is a picking phase during which the order-picking procedure is carried out. The front area is restocked in advance of the harvest season. Their goal is to complete product quantity allocation to the forward region, reducing projected labor time throughout the picking period (Berg and Zijm, 999)

✓ **The Storage Location Assignment**

The storage location assignment problem (SLAP) is an issue in which incoming merchandise is assigned to storage facilities. For automated storage-retrieval systems, Berg and Zijm(1999) present three storage location assignment policies: .class-based storage, randomized storage, and dedicated storage. The class-based storage strategy divides the products into numerous classes based on their demand rates and allocates a region inside the storage space to each class. As a result, an incoming load is placed in an open position within its class at random.

The class-based storage strategy and the dedicated storage policy both aim to lower mean storage/retrieval times by storing high-demand products in easily accessible areas. Berg and Zijm (1999) try to keep the total expenses of picking and replacing as low as possible. The expenses of picking and restocking in the front region are determined by the size of the forward area in the model. The expenses of picking and restocking in the front region are determined by the size of the forward area in the model.

According to Berg& Zijm (1999), it is possible to reduce the number of replenishments during busy periods by executing replenishments during quiet periods. This not only improves throughput during peak periods, but it also minimizes the likelihood of traffic congestion and

accidents. A distribution center, for example, might load trucks in the afternoon so that the labor is available for restocking the forward region in the morning. It is a picking phase during which the order-picking procedure is carried out. The front area is restocked in advance of the harvest season. Their goal is to complete product quantity allocation to the forward region, reducing projected labor time throughout the picking period.

2.1.3 Distribution Management

Choosing a marketing channel is one of the most essential decisions that management must make nowadays. Really, when considering the major strategies of the marketing mix (product, price, promotion, and distribution), distribution today has the greatest potential for establishing a competitive advantage. The term "distribution management" refers to a system of operations involving the transfer of economic products between producers and consumers. To put it another way, one of the most important functions of distribution management is to convey products from the manufacturing facility to the point of sale, i.e., to the customer, or to place items in the hands of potential customers at the appropriate time and location (Roosta, et.al. ,2009).

To be successful, each firm must have a good distribution management system in place to get finished products from the manufacturer to the end users. This is because the best product will not be delivered without distribution, and the marketing mix will fail. As a result, businesses are increasingly turning to supply chain management to cut costs, grow market share and sales, and strengthen customer relationships (Ferguson, 2000).

Furthermore, it entails the coordinated preparation of manufactured goods according to their type and amount, as well as space and time, in order to meet supply deadlines (order fulfillment) or efficiently satisfy predicted demand (when producing for an anonymous market) (Domschke& Schield, 1994).

Competitive distribution management, according to Koshy (2014), is critical for market penetration and concentration, as well as long-term profitability through internal and external customer satisfaction. According to Kazi et al. (2012), a distribution management system is a process that streamlines and manages each phase of the distribution chain, including customers, ordering, delivery, and payment, inventory, and services management. Effective distribution management, according to Pravin (2010), oversees the transportation of

commodities from supplier or producer to point of sale. It is a broad phrase that encompasses a wide range of activities and operations, including packaging, inventory, warehousing, supply chain management, and logistics.

2.1.4 Evaluation of Distribution Channels Performance and Effectiveness

Modernization of commercial activities, rising levels of competition and globalization in the worldwide economy all have a significant impact on distribution channel management and performance, as well as any organization's success. Manufacturers' success cannot be reached from their own effort alone; their success or failure is determined and increasingly dependent upon their marketing channel members or distributors' (e.g., agents, wholesalers and retailers etc.) performance and how effectively and efficiently their products are reaching to the intended consumers or sold (Singh & Imran, 2014). That is, the competitiveness and success of a company are determined by the performance and effectiveness of the distribution channel or a company to gain a competitive edge, the level of performance achieved by distribution channel members is critical. As a result, in order to survive and grow in a highly competitive manufacturer environment, organizations must have well-performing distribution channels with no problems at any stage along the distribution chain (Hanaa, 2013).

The basic goal of distribution channels, also known as distribution networks, is to get items into the hands of potential buyers at the correct time and location. As a result, delivery time is critical in product distribution. One of the measures used to evaluate distributor performance is the delivery of products in the quickest period possible (Kiumars Sharifi, Nazanin Zandi, and Roshanak Rezvani, 2013). Other possible performance criteria to consider include maintaining adequate inventory, selling capabilities, channel intermediary attitudes toward the product, competition from other intermediaries and from other product lines carried by the manufacturer's own channel members (Rallabandi, 2014). Besides these, issues such as delivery or distribution plan, storing and depot facilities, transportation, and order administration are high priority in product distribution activities (Koshy, 2014). Positive performance and effects on company profitability are predicted if such services are given via distribution channels properly and in harmony with quality items for consumers or users; otherwise, profit crises are expected.

Manufacturers and enterprises may examine what they achieve, quantify and define their effectiveness, find possibilities for improvement, and compare their performance to competitors by assessing and monitoring distribution performance. As a result, in order to be successful and survive in a competitive marketing environment, intermediaries/distribution channels must strive to properly perform a large number of distribution activities in order to achieve the marketing goal, as well as evaluate and measure their distribution performance on a regular basis (Salih and Emel, 2013). Because the firm's success is so closely dependent on the channel members' performance, the manufacturer who also sells all of its product through intermediaries/distribution channels is more likely to analyze their channel members' performance more comprehensively.

We must monitor and analyze various indicators in order to evaluate and identify the performance of distribution channels in offering quality services in the process of product distribution (Hanaa, 2013). Traditionally, financial elements or minimum logistic costs have been used to evaluate distribution channel success. However, as the global market becomes more competitive, non-financial factors of distribution network and supply chain management performance, such as customer service quality and happiness, or how to improve customer value while reducing expenditures, are becoming more important (Wihdat, Yousef & Sang-Heon, 2013).

Most recent distribution network studies (Koshy, 2014, Huda, Karim, & Khan, 2012, Kiumars, Nazanin, & Roshanak 2013, Wihdat, Yousef, and Sang-Heon, 2013, Salih and Emel, 2013, etc.) have emphasized the importance of using some non-financial parameters (such as customer service level and satisfaction, service coverage area, inventory level, delivery or lead time and costs) as well.

2.1.5 Factors Affecting Distribution Channels Performances

Marketing channels evolve and operate in a dynamic, ever-changing environment. The modifications have a significant impact on marketing channels. Consumer buying behavior, Economic, political, and legal reasons, technology advances, international macro effects, and channel member preferences are all influenced by macro environmental forces or variables. Companies must analyze and monitor the performance of their distribution channels on a

regular basis due to the dynamic nature of these aspects. For improved results, evaluation and monitoring must be done on a frequent basis.

In the developments of these economic trends, channel managers face a basic challenge: assisting channel managers in navigating difficult economic situations. Not only domestic, but also international competition must be considered in the competitive environment. Because the structure of marketing channels reflects the socio cultural environment in which they exist, the socio cultural environment has a substantial impact on marketing channels. To assess the influence of technical developments on marketing channels, the technological environment must be closely studied. The internet, computerized inventory management, computer purchasing, and other technological advancements have had, and will continue to have, a significant impact on marketing channel strategy. Channel managers must also consider the political-legal context, which is complicated by laws and precedents that change frequently. How decisions are made in other marketing areas, such as product, price, and promotion, can also influence distribution strategy and performance. The channel concept in the distribution domain emphasizes the efficiency and effectiveness of distributing goods and services (Wilders, 2006). Each of the aspects in these channels has its own set of requirements, which the producer, as well as the final customer, must consider (Stem et al., 2006).

The requirement to evaluate distribution channel success is equally as vital as evaluating other marketing activities. Clearly, the marketing mix is highly interrelated, and the failure of one component can result in the entire marketing mix failing (Michael, 2012). As a result, determining what factors affect or challenge the distributors' performance and effectiveness is critical when evaluating their performance and efficiency in product distribution.

Producers should figure out what distinguishes the best intermediaries to make channel member selection easier. They should consider the number of years in company, other lines carried, development and profit history, financial strength, cooperativeness, and service reputation, among other things. Producers should assess the number and kind of other lines carried, as well as the size and quality of the sales force, if the intermediaries are sales agents. If the intermediaries are department stores looking for exclusive distribution, the producer

should consider the locations, future growth prospects, and clientele type (Rechard.R. et al, 2017).

While reviewing literatures and study articles focused on the distribution channels, (that of Wihdat, et.al (2013), Kiumars et.al (2013),Kazi, et.al. (2012), Koshy, (2014), Hamid, & Seydeh, (2014) and Rechard.R. et al, (2017), the following main factors discussed below have been identified by the researcher of this study as prominent in affecting the performance of distribution channels and to employ them as indicator identifying and measuring performance of distribution of petroleum products in Ethiopia.

2.1.5.1 Integration

Integration in different functions within companies allows companies to increase productivity, customer satisfaction, and financial performance. Characteristics that show an integration successfully carried out can be seen from the increasing performance, while Ellinger et al (2000), argues that performance cannot be improved without integration in the organization. Paiva et al (2010), examined the integration of two departments namely manufacturing and marketing and found that companies achieved better performance when manufacturing and marketing worked together.

The realization that "the whole is greater than the sum of the parts" was a common aspect of various approaches. According to Amarpreet, S.,& John, B. (2010), collaboration allows businesses to "exploit each other on an operational basis so that they perform better together than they did independently."Internally and externally, collaborative partnerships are a must for success.

A dynamic collaboration capability, according to John, C. John, Rober, & Brain (2013), should enable a corporation to quickly access, transfer, and use resources in order to respond to a changing competitive environment. To exist, channel members must agree that they have mutual concerns; work together to achieve those aims, and together have the ability to develop logistical and transactional routes that will enable the channel as a whole to compete in the market places. (Coia.A, 1999).

Integration is extremely beneficial to a firm, particularly in terms of enhancing its performance. Integration research has been widely conducted, with different limits discovered in each of these investigations. This paper is a review of the literature to determine the limits of researches conducted by numerous integration studies. This limitation is a research opportunity for academics who want to do study to address the gaps left by prior research.

2.1.5.2 Experience

Experiences have been shown in the literature to have a substantial impact on success. Business veterans are more likely to gain experience than new comers. The duration of time in business was found to be a key factor in business success. Duchesneau & Gartner (1990) found what lead entrepreneurs in successful firms tended to be raised by entrepreneurial parents.

The experience and ability of distributors in distribution management is one of the variables that manufacturers assess and employ when selecting appropriate distribution channels. One of the most critical aspects that challenge the performance and success of manufactured product distribution is the experience, talent, competence, and overall excellence of the chosen distribution channels (Kazi, Rezaul & Rehnuma, 2012). Distribution performance is harmed by deficiencies in distributor ability and competency. Distributors frequently offer the company more than it can achieve on its own because of their relationships, experiences, specialization, and scale of operation. Through evaluation of their performance, deficiencies in distributors' abilities and competences can be detected, and appropriate improvement measures can be adopted (Koshy, 2014).

When someone with experience and capability in distribution management and selling is in charge and offering efficient and effective leadership, distribution channels typically perform better. Many manufacturers believe it is worthwhile to assess the sales capabilities of distribution channel members more directly by evaluating their salespeople (Hamid, & Seydeh, 2014). At the wholesale level, this is especially true of members of the distribution channel. If data is available, the manufacturer should pay special attention to (1) the number of salespeople assigned to the manufacturer's product line by the channel member, (2) the technical knowledge and competence of the channel member's salespeople, and (3) salesperson interest in the manufacturer's products.

According to Recharad.R.et al, (2017), the channel member's industry experience is a critical factor in selection. Many sales managers look into the channel member's past experience in selling a particular product range. The company can look into factors like the type of products and the customers handled in the past. Channel members with good experience can be of great help for the new companies as they can help the company in designing the distribution strategies and sales promotion activities.

2.1.5.3 Stores Location

Location of the channel member can play a vital role in the easy availability of the products for the retailers. In many industries like pharmaceuticals, wholesaling channel members are concentrated in geographic pockets dedicated to pharmaceutical products. This makes it easy for the pharmacy retailers to come to that particular area to buy the products of different companies (Recharad.R.et al, 2017)

In an ideal supply chain, materials of all kinds are handled as few times as possible. Any warehouse needs to be designed so that after goods are received and checked in, they move directly to their designated storage locations. Efficient, orderly, clean, and well-marked warehouses enhance the flow of goods. Decisions must be made about the optimal size for a warehouse, how many warehouses to have, and where they should be located to minimize transportation costs. The last point is especially important if the warehouse serves as a distribution center in which functions such as breaking and accumulating bulk occur for ultimate reshipping to customers (Greg W &Mark W, 2010).

2.1.5.4 Financial capacity

The availability of the required inventory in the market and the number of outlets covered by the channel member are directly tied to the channel member's financial strength. Because retailers are notorious for delaying payments, channel members such as distributors and wholesalers must have sufficient financial resources to not only maintain an adequate amount of inventory but also make payments to the company on time. Channel members with strong financial standing will also contribute to the organization's expansion ambitions.

Without significant financial ability, no organization can execute tasks and receive comprehensive gestures. Finance is a driving force behind all actions, whether they are commercial or noncommercial. It is concerned with long-term investments as well as working capital. Working capital is a word that describes a company's short-term assets, such as inventory, and short-term liabilities, such as money owed to suppliers. Managing a company's working capital is a day-to-day task that ensures the company has enough funds to continue operating and avoid costly disruptions. This includes a variety of tasks linked to the firm's cash receipt and payout. The following are some questions about working capital that must be addressed: (1) Should we have a certain amount of cash and merchandise on hand? (2) Is it appropriate to sell on credit? If that's the case, what terms will we offer and to whom will they be extended? (3) Where will we get any necessary short-term funding?. (According to Stephen A., Randolph W., and Bradford D., 2001). Wholesalers finance their suppliers by placing early orders and paying their invoices on time, and they finance their customers by extending credit (Armstrong & Kotler, 2012).

Nevertheless, financial status or capacity and storage facility of the distributor (which normally considered carefully in the selection of distribution channels), as Salih & Emel, (2013) described, is among the basic factors that could affect the performance of distributors. In investigating the retailer performance in Taiwan, for instance, Wu et al. (2006), reveals that financial status of the distributors affect performance of the distribution system.

2.2 Empirical Review

2.2.1 Factors Determining Fuel Distribution Effectiveness in Ethiopia

Certain previous local researchers have devoted attention to factors affecting distribution effectiveness and certain aspects of distribution performance from different perspective/dimensions of overall distribution chain. Some of these researches findings are discussed as follow.

Integration

Melaku Mammo (2017) made his study on "Challenge of integration of fuel supply chain in Ethiopia" and proves that lack of information sharing among the supply chain members of the industry, the quality of the forecast provided by Oil Companies, and lack of a well-integrated ERP

system are the main factors that affected the importation of fuel into the country in line with the need of customers

Ksahun Mulat (2018) made his study on ‘‘Factors Affecting volume of Fuel Distribution Practices of Market Follower companies in Ethiopia’’ and proves that the variables lack of coordination among members, fixed profit margin, utilization of credit, number of dealers owned gas stations, access to market information, distance from the fuel source, market information and fuel measurement instruments problem have impact on the fuel volume distribution.

Samrawit Kassa (2020) made her study on ‘‘Determinant factors influencing fuel distribution performance in the case of Total Ethiopia share company’’ and she found out that the independent variables transport out sourcing, integration and safety policy are significantly affect fuel distribution performance.

Experience

Addis Seid (2018) in his study ‘‘Factors affecting distribution performance of fast moving goods. The case of east Africa bottling share company’’, he found out that distribution performance primarily affected by competence& experience and financial capacity

Store Location

Singhdong P. (2020) studied ‘‘Factors Affecting Storage and Distribution Development in OTOP Distribution Center Bangkok branch’’ the results showed that factors affecting development, storage and distribution are location of the warehouse, material safety management, inventory control, factors related to orders and factors related to moving and distributing goods to customers.

Financial Capacity

Tefera Workalemahu (2018) in his study ‘‘Factors Influencing the Distribution Performance The Case of Muger Cement Factory’’ he found out that, financial capacity, significantly affect distribution performance of the company.

Ermias Tilahun(2021) in his study ‘‘Factors affecting effectiveness of consumer products distribution in the case of Ethiopian trading business corporation’’ he found out that, financial

capacity, price of firms, stock of demanded goods significantly affect effectiveness of consumer products distribution.

The aim of this research is to investigate the relationship between the independent variables of integration, experience, depots location financial capacity with the dependent variable fuel distribution effectiveness in Ethiopia. The variables are taken from different papers discussed in the literatures taking into consideration the availability of data. Based on the assumed casual relationship given in the conceptual model the following hypotheses were developed for testing:

Hypothesis 1: Integration has a positive and significant impact on fuel distribution effectiveness.

Hypothesis 2: Experience has a positive and significant impact on fuel distribution effectiveness.

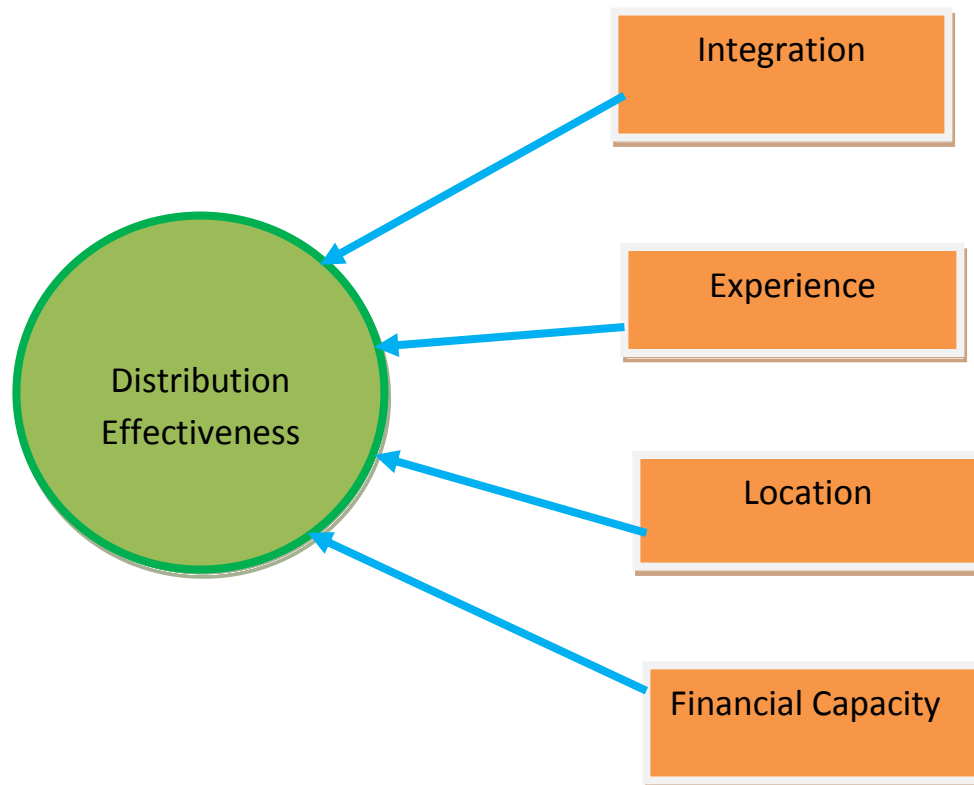
Hypothesis 3: Fuel stations location has a positive and significant impact on fuel distribution effectiveness.

Hypothesis 4: Channel members' financial capacity has a positive and significant impact on the fuel distribution effectiveness.

2.3 Conceptual Framework

From reviewed literatures, the researcher adopts the following conceptual framework to suit for the nature of the study, that is, effectiveness of fuel distribution in Ethiopia. On the below diagram, effectiveness of fuel distribution represents the dependent variable whereas integration, experience, depots location & and financial capacity are termed as independent variables.

Figure 2.1: Conceptual framework



Source: Concepts adopted from different books and studies; Rechar.R. et al, (2017), Ellinger et al (2000), Paiva et al (2010), Amarpreet, S., & John, B. (2010), John, C. John, Rober, & Brain (2013), Coia.A, (1999), Kazi, Rezaul & Rehnuma, (2012), Koshy, (2014), Hamid, & Seydeh, (2014), Greg W & Mark W, (2010), Stephen A., Randolph W., and Bradford D., (2001), Armstrong & Kotler, (2012), Salih & Emel, (2013), Wu et al. (2006), Addis Seid (2018), Samrawit Kassa (2020) and Ermias Tilahun (2021)

CHAPTER THREE

RESEARCH METHDODOLOGY

Introduction

This chapter discusses how the research has been carried out. It contains the research approach, the research design, data types and sources, population of the study, sampling procedure, data analysis techniques, validity and reliability, and ethical considerations of the research.

3.1 Research Approach

Research methods can be classified into three categories based on the type of data they use: qualitative, quantitative, and mixed methodologies (Abate, 2018). It is assumed that combining qualitative and quantitative approaches will result in a more comprehensive grasp of the study challenge than either approach alone (Creswell. John W., 2005).

As a result, the researcher was used a mixed research approach to assess the effectiveness of gasoline delivery networks

3.2 Research Design

According to Burns and Bush (2003), there are three types of research designs; exploratory, descriptive and explanatory.

The choice of the most appropriate design depends on the objective of the research. Thus, the researcher was adopt both descriptive design in order to describe and summaries the characteristics of respondents and explanatory design to establish the magnitude, direction and significance of variables affecting fuel distribution effectiveness in Ethiopia.

Data Type and Data Source

3.3.1 Data Type

Primary data and secondary data are the two forms of data. The researcher collects primary data with the sole goal of addressing the issue at hand. Secondary data is gathered for a reason other than the current problem (Malhotra, 2005).

In order to answer the research questions, the researcher was employed both primary and secondary data.

3.3.2 Data Source

The researcher was collected primary data by using structured questionnaires, which are the most significant tool for gathering primary data. Secondary data were gathered from Ethiopian Petroleum Supply Enterprise records (plans, reports, and manuals), periodicals, newspapers, and websites for this research.

3.3.3 Population of the study

The entire aggregation of respondents that met the designated set of criteria is called population (Kothari, 2004). The population of this study was divided in two strata. The first stratum contained the 38 fuel distributor oil companies which perform the whole sale distribution in Ethiopia and the second stratum contained 1237 retail fuel stations found in Ethiopia.

Table 3.1 Population Characteristics

S. No	Company Name	Business Starting Date	Starting Capital Amount in ETB	No. of Fuel Stations	Market Share in %
1	Libiya Oil Ethiopia Ltd	15/01/2004	183,486,009.00.	174	16.59
2	Total Ethiopia S.C	03/05/1950	200,000,000.00	142	18.97
3	National Oil Ethiopia (NOC)	01/04/2004	100,000,000.00	224	36.28
4	Yetbabeut Bherawi Petroleum S.C (YBP)	14/02/2005	21,000,000.00	133	5.91
5	Rubis Energy Ethiopia Limited PLC (KOBIL)	11/12/2011	74,735,000.00	38	1.17
6	Nile Petroleum Co.ltd	11/05/2007	1,600,000.00usd	21	0.56
7	Wadi Elsundus Petroleum CO.LTD	26/12/2007	40,000,000.00	14	0.22
8	Taf Oil PLC	10/08/2011	57,7500,000.00	74	6.02
9	Dallol Oil S.C	14/12/2011	64,147,000.00	33	0.92
10	Olway Petroleum Distribution PLC	25/03/2016	30,000,000.00	4	0.33
11	Gomeju Oil Ethiopia PLC	22/04/2016	10,700,000.00	48	2.94
12	Yeshi PLC	19/04/2016	15,000,000.00	5	0.26
13	Zagol Oil Ethiopia PLC	23/05/2017	20,000,000.00	21	0.98
14	Tebark Oil PLC	01/08/2017	5,000,000.00	10	1.45

15	Halefay Petroleum Trading PLC	05/07/2018	50,000,000.00	9	0.04
16	Kernel Trading PLC	02/09/2019	1,000,000.00	7	0.05
17	Habesha Petroleum and Petroleum Products distribute PLC	01/12/2017	16,000,000.00	21	0.21
18	JR Petroleum PLC	25/12/2017	21,000,000.00	35	0.74
19	Petro Ethiopia PLC	30/08/2019	34,200,000.00	9	0.09
20	Delta Petroleum PLC	13/06/2018	1,000,000.00	34	0.80
21	Baro oil Ethiopia	1/07/2018	50,000,000.00	14	0.40
22	Green Petroleum Distribution PLC	10/12/2018	15,000,000.00	22	1.05
23	Zemen Oil PLC	27/03/2019	5,000,000.00	11	0.20
24	Worku Petroleum PLC	30/07/2019	21,000,000.00	6	0.02
25	Odaa Integrated Transport S.C	26/08/2019	274,944,000.00	15	0.28
26	Full A.M Oil Ethiopia PLC	23/10/2019	20,000,000.00	3	0.13
27	SKY Petroleum PLC	07/07/2020	25,000,000.00	24	0.57
28	Kumbi oil Trading PLC	17/08/2020	20,000,000.00	5	0.04
29	J.F.M Petroleum PLC	21/09/2020	6,000,000.00	3	0.15
30	African Oil PLC	22/09/2020	50,000,000.00	22	1.35
31	AlemTefera (DPC)	17/09/2020	135,571,900.00	8	0.29
32	ABAC Trading PLC (Alfa Petroleum)	03/05/2021	3,600,000.00	10	0.14
33	Zoble oil Ethiopia	25/06/2021	10,000,000.00	8	0.20
34	ELLA Trading PLC	09/07/2021	26,000,000.00	11	0.24
35	Ellele Petroleum Supplier PLC	17/08/2021	15,000,000.00	9	0.08
36	Tsehay Petroleum S.C	16/08/2021	200,000,000.00	3	0.15
37	Felge-Gihon Petroleum PLC	10/12/2021	50,000,000.00	4	0.12
38	Global Oil Trading PLC	16/12/2021	1,000,000.00	3	0.03
	Total			1237	100

Source: EPSE Customers Profile (Dec., 2021)

3.4 Sampling Procedure

3.4.1 Sample Size

To gather data that is representative of oil companies, out of the 38 oil Companies, 10 oil companies that have a market share of 1% and above and contribute more than 90% of the total market share in the country's fuel distribution were selected in the survey. The researcher believed that the rest 28 fuel distributor oil companies have little information about the country's fuel distribution system because they are new entrants to the system and have less market coverage in the country.

Table 3.2 List of sample fuel distributor oil companies selected from the first stratum

S.No	Company Name	Market Share in %
1	Libiya Oil Ethiopia Ltd	16.59
2	Total Ethiopia S.C	18.97
3	National Oil Ethiopia (NOC)	36.28
4	Yetbabeut Bherawi Petroleum S.C (YBP)	5.91
5	Rubis Energy Ethiopia Limited PLC (KOBIL)	1.17
6	Taf Oil PLC	6.02
7	Gomeju Oil Ethiopia PLC	2.94
8	Tebark Oil PLC	1.45
9	African Oil PLC	1.35
10	Green Petroleum Distribution PLC	1.05
	Total market share	91.73

Although the stations are dispersed across the country, more 146 retail fuel stations operate in Addis Ababa. Accordingly, for retailers the sample of this research consists of all active stations operating in Addis Ababa. To get unbiased representative of this population, proportional stratified sampling was used depending on the number of stations each oil company has in Addis Ababa.

Table 3.3 List of sample fuel stations selected from the second stratum

S.No	Company Name	Total number of fuel stations in Addis Ababa	Currently operational fuel stations in Addis Ababa	Sample size
1	Libiya Oil Ethiopia Ltd	35	30	28
2	Total Ethiopia S.C	40	31	29
3	National Oil Ethiopia (NOC)	24	23	22
4	Yetbabeut Bherawi Petroleum S.C (YBP)	9	8	8
5	Rubis Energy Ethiopia Limited PLC (KOBIL)	6	4	4
6	Nile Petroleum Co.ltd	2	2	2
7	Taf Oil PLC	9	8	4
8	Dallol Oil S.C	1	1	1
9	Gomeju Oil Ethiopia PLC	2	1	1
10	Yeshi PLC	1	0	0
11	Tebark Oil PLC	1	0	0
12	Habesha Petroleum and Petroleum Products distribute PLC	2	1	1

13	JR Petroleum PLC	1	1	1
14	Petro Ethiopia PLC	2	1	1
15	Delta Petroleum PLC	4	3	3
16	Baro oil Ethiopia	2	2	2
17	Zemen Oil PLC	1	1	1
28	African Oil PLC	3	0	0
19	ABAC Trading PLC (Alfa Petroleum)	1	1	1
20	SKY Petroleum PLC	1	1	1
	Total	146	119	110

The sample size of retail fuel stations was determined by using Yamane (1967:886) simplified formula for finite population which is posted on:

<https://www.tarleton.edu/academicassessment/documents/samplesize.pdf>

Assuming that

- 95% confidence level and
- P=0.5 (is the estimated proportion of an attribute that is present in the population)

$$n_0 = \frac{N}{1 + N(e)^2}$$

Where

- n_0 is the sample size,
- N is the population size, and
- e is the level of precision.

Out of the 38 oil Companies 20 of them cumulatively own 146 retail fuel stations in Addis Ababa. Out of 146 stations only 119 were operational during the data collection period. To increase precision and minimize sampling bias, 110 stations were selected in proportion to the number of operational stations each oil company has in Addis Ababa.

3.4.2. Sampling Unit

According to (Kothari, 2004) the researcher has to decide one or more of sampling units that he has to select for his study. The sampling units of this study were fuel distributor oil companies' marketing managers and fuels station owners or employees who act as a marketing manager of the fuel station.

3.4.3 Sampling Technique

When applying purposive or judgment sampling, the researcher uses his discretion in selecting sample observations from the total population. In this study the researcher was used purposive sampling technique to select sample fuel distributor companies from the first stratum based on their contribution to the wholesale distribution market.

Convenience sampling is used to describe a sample in which elements have been selected from the target population on the basis of their accessibility or convenience to the researcher. The researcher was used a convenience sampling method in this study to select sample fuel stations of the second stratum and the number of sample fuel stations was calculated proportionally based on the number of stations each oil company has in Addis Ababa.

3.5 Data Gathering Instruments

A structured closed ended questionnaire was used as a primary source of data by the researcher, and it is one of the most essential research instruments for gathering primary data. The questionnaires were written in English and consisted of six parts: the first part was included demographic information about respondents, the second part was about integration, the second part was about experience, the fourth part was included a questionnaire about locations, the fifth part was about financial capacity, and the last part was contained questions about fuel distribution effectiveness constructed in to five point Likert Scale ranging from 1 for “Strongly Disagreed” to 5 for “Strongly Agreed.”

3.6 Data Analysis Technique

There will be several steps that are required to prepare the data ready for analysis and these steps includes data editing, data coding and data cleaning (Shukla, 2008). In order to test and analyze the role of independent variables (integration, experience, depots location financial capacity) on dependent variable (fuel distribution effectiveness), the researcher was used Multiple Linear Regression Model. A multiple linear regression model is used for analyzing relationships between a dependent variable and two or more independent variables (Malhotra, Nunan& Birks, 2017). The Equation for Multiple Linear Regression Model is:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 \dots \beta_k X_k + u$$

Where

Y - Represents the dependent variable i.e. Fuel distribution effectiveness

β_0 -Represents the intercept/constant term

$\beta_1, \beta_2, \beta_3, \beta_4, \dots, \beta_k$ -Represents coefficients /slopes/

$x_1, x_2, x_3, x_4, \dots, x_k$ - Represents independent variables i.e. integration, experience, depots location and financial capacity.

3.7 Reliability and validity

The degree to which a measure is accurate and consistent is called reliability (Okwandu, 2004).

The researcher was employed a well utilized measure to assess consistency: cronbach alpha, which is a score between 0 and 1.

The extent to which observed scale source discrepancies represent the genuine difference between objects on the qualities being assessed is known as validity (Shukla, 2008).The extent to which a measuring instrument adequately covers the topic under investigation is known as content validity (Kothari, 2004).The researcher was developed the questionnaire and conducted a pilot test for 10 selected samples to ensure the validity of the instruments employed. Finally, the researcher was compiled constructive feedback from the pilot test and make necessary changes to the questionnaire.

3.8 Ethical Consideration

In research, there are two types of ethical concerns. The first is the researcher's personal principles of honesty, forthrightness, and personal integrity. The researcher's handling of other participants in the study, which includes informed permission, confidentiality, anonymity, and courtesy, is the second factor to consider. As a result, the researcher was conducted the research in such a way that the ideas, thoughts, and works of others are appropriately acknowledged, and the source of data is properly cited. Furthermore, the researcher was handled participants ethically and follows necessary procedures to obtain complete consent from respondents and to inform them of the target so that they can confidently reply to the questionnaire. Finally, data collection, analysis, and presentation was done in an ethical manner.

CHAPTER FOUR

RRESULT AND DISCUSSION

In this chapter, the data collected from respondents was analyzed and interpreted using quantitative analysis, which entails the examination of respondents' demographic data as well as the use of descriptive and inferential statistics to test the hypothesis and investigate the impact of the independent variables on the dependent variable. Statistical procedures were used to examine the acquired data in accordance with the overall goal of the study project using SPSS version 20.

4.1 Data Cleaning and Coding

To achieve the research objective, data was obtained from fuel distributor oil companies and retail fuel stations. To make the obtained data appropriate for analysis, the data was cleaned and coded, and all questions were reviewed for completion. As a result, all returned incomplete questionnaires were considered as mistakes and were eliminated from the survey results. 10 of the 120 questionnaires distributed were incomplete and 14 were not returned. As a result, the study used a total of 96 completed questionnaires, with a response rate of 80%. Data coding is required for data transfer and modification in SPSS. The questions and possible answers were coded for further analysis using SPSS and arranged in the order of the actual questionnaire.

4.2. Demographic Analysis of Respondents

To ensure that the data collected is reliable, it is vital to examine the demographic profile of the respondents. As a result, respondents were asked to provide their gender, age, position, education status and year of experience. The following is a summary of the data processed by SPSS. As a result, the respondent profiles from the 96 questionnaire are shown in this section.

Table 4.2 Demographic Analysis of Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Sex	Male	71	74.0	74.0	74.0
	Female	25	26.0	26.0	100.0
	Total	96	100.0	100.0	
Age	26-35	35	36.5	36.5	36.5
	36-45	47	49.0	49.0	85.4
	46-55	12	12.5	12.5	97.9
	Above 55	2	2.1	2.1	100.0
	Total	96	100.0	100.0	
Respondents Position	Department Head	32	33.3	33.3	33.3
	Team Leader	26	27.1	27.1	60.4
	Senior Officer	27	28.1	28.1	88.5
	Officer	11	11.5	11.5	100.0
	Total	96	100.0	100.0	
Educational Status	Certificate	4	4.2	4.2	4.2
	Diploma	11	11.5	11.5	15.6
	Advanced Diploma	3	3.1	3.1	18.8
	First Degree	70	72.9	72.9	91.7
	Second Degree	8	8.3	8.3	100.0
	Total	96	100.0	100.0	
Relevant Work Experience	Below 5 Years	5	5.2	5.2	5.2
	5-10	42	43.8	43.8	49.0
	11-15	34	35.4	35.4	84.4
	16-20	15	15.6	15.6	100.0
	Total	96	100.0	100.0	

Source: Survey Result, (2022)

Table 4.1 divides the information of 96 valid respondents of this study by five. As shown on the first part of the table, male respondents constituted 74% (71) of the total respondents,

while female respondents constituted the remaining 26% (25). This shows that the number of male employees participated in responding to the questionnaire is higher than the female employees. This indicates that most of the employees worked on the core functions of the country's fuel distribution are male employees.

The age of the respondents is shown in the second part of table 4.1: 36.50% were between the ages of 26 and 35, 49% were between the ages of 36 and 45, 12.50% were between the ages of 46 and 55, and 2.10% were above the age of 55. This indicates that most of the respondents were between the ages of 36 and 45. This is a good opportunity to have matured and balanced data about the issues under study.

In terms of respondents position, the third part of table 4.1 indicates that 33.30% (33) of the 96 respondents were department heads, 27.10% (26) of the respondents were team leaders, 28.10 (27) of the respondents were senior officers and 11.50 %t (11) of the respondents were officers. This means that the majority of the respondents were department heads. This indicates that there is a maximum opportunity of getting a valid data about the current operation of fuel distribution in the country.

In terms of educational status, the fourth part of table 4.1 indicates that 4.20% (4) of the 96 respondents had a certificate, 11.50% (11) of the respondents had a diploma, 3.10% (3) of the respondents had advanced diploma, 72.90%t (70) of the respondents had first degree and 8.30% (8) of the respondents had second degree. This means that the vast majority of respondents were first-degree holders. In terms of educational status, this is a good proportion of respondents, which is advantageous for acquiring essential research data

Finally In terms of work experience, 5.20% (5) of respondents had below 5 years work experience, 43.80% (42) had 5-10 years work experience, 34.40% (34) had 11-15 years experience and, 15.60 (15) had 16-20years work experience. This indicates that the majority of the respondents had 5-10 years work experience. This is a good percentage, indicating that these respondents are knowledgeable about the fuel distribution operations.

4.3 Test of Reliability and Validity

The reliability test is an important tool for determining the degree of consistency of the attribute being measured. According to (Anol, B., 2012), the stronger the instrument's reliability, the less variance it causes in repeated measurements of a property. A measuring tool's reliability might be defined as its stability, consistency, or dependability. Cronbach's alpha is one of the most often used reliability measurements. It assesses the internal consistency of a scale's items. It describes how closely the items in a questionnaire are related to one another. It also shows if the scale is one-dimensional or multi dimensional. Cronbach's coefficient alpha values typically range from 0 to 1, with higher values indicating greater internal consistency. Different authors accept different values of this test in order to achieve internal reliability, but the most commonly accepted value is 0.70 as it should be equal to or higher than to reach internal reliability (Hair et al., 1998).

The value of alpha for each dimension is shown in the table below. This demonstrates the measure's internal consistency.

Table 4.3 Reliability Analysis of Variables

Measurement	Number of items	Cronbach's alpha
Integration	7	.822
Experience	7	.806
Fuel Stations Location	7	.830
Financial Capacity	7	.767
Distribution Effectiveness	7	.739
Reliability of all items	26	.852

Source: Survey Result, SPSS (2022)

As indicated in table 4.1.2, all of the constructions met the desired alpha cut-off threshold, which was Cronbach's Alpha.822for integration,.806 for experience, .830 for fuel stations location, .767 for financial capacity and .739 for distribution effectiveness. 852 is the overall Cronbach Alpha Coefficient for all products.

To summarize, all of the constructions have been confirmed as reliable variables, indicating that the scale is suitable for further investigation.

4.4 Descriptive Statistics of Variables

In this section, descriptive statistics in the form of mean and standard deviation were used to show the respondents' level of agreement. The study's major objective is to identify determinant factors that influence fuel distribution effectiveness in Ethiopia. To do so, fuel distributor oil companies and retail fuel stations were asked to rate their level of agreement to each question under the five attributes of integration, experience, fuel stations location, financial capacity, and distribution effectiveness on a five-point Likert scale, with 1 indicating strongly disagree, 2 indicating disagree, 3 indicating neutral, 4 indicating agree, and 5 indicating strongly agree.

A total of 35 questions were organized into five categories to analyze determinant factors of fuel distribution effectiveness in Ethiopia: integration, experience, fuel stations location, financial capacity and distribution effectiveness which is the dependent variable

Table 4.4 Mean and standard deviation for determinants of distribution effectiveness.

	Mean	Std. Deviation	N
Distribution Effectiveness	2.1801	.50401	96
Integration	2.1116	.53940	96
Experience	2.1220	.51067	96
Fuel Stations Location	2.2738	.55140	96
Financial Capacity	2.0893	.53018	96

Source: Survey Result, SPSS (2022)

Table 4.1.3 shows that the mean score values vary from 2.0893(mean score value of Financial capacity) to 2.2738(mean score value of fuel stations location).This indicates that most respondents were on the position of disagreement to the statements of all variables in the study

The mean displays how much the sample group agrees or disagrees with the various statements on average. The higher the mean, the more people agree with the statement, and the lower the mean, the more people disagree. Furthermore, standard deviation depicts the variability of a given response.

4.5 Inferential Statistics

4.5.1 Correlation Analysis

A correlation is a measurement of how closely two variables are linked. Because they are simple to use and contain a lot of information in a single value, correlation coefficients are commonly employed to describe data (Akroush, N. (2003).

The most commonly used method of evaluating the degree of link between two variables is Karl Pearson's coefficient of correlation, sometimes known as simple correlation (Kothari, 2004). The correlation coefficient is calculated in a range of -1 to 1, with -1 denoting a perfect negative association (the relationship is perfectly linear) and 1 denoting a perfect positive relationship.

Table 4.5.1 Correlations Analysis Result

		Correlations				
		Integration	Experience	Fuel Stations Location	Financial Capacity	Distribution Effectiveness
Integration	Pearson Correlation	1				
	Sig. (2-tailed)					
	N	96				
Experience	Pearson Correlation	.415 ^{**}	1			
	Sig. (2-tailed)	.000				
	N	96	96			
Fuel Stations Location	Pearson Correlation	.417 ^{**}	.715 ^{**}	1		
	Sig. (2-tailed)	.000	.000			
	N	96	96	96		
Financial Capacity	Pearson Correlation	.430 ^{**}	.518 ^{**}	.391 ^{**}	1	
	Sig. (2-tailed)	.000	.000	.000		
	N	96	96	96	96	
Distribution Effectiveness	Pearson Correlation	.583 ^{**}	.647 ^{**}	.589 ^{**}	.676 ^{**}	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	96	96	96	96	96

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

Source: Survey Result, SPSS (2022)

The Pearson correlation result is shown in the table, along with its significance level. When we look at the link between integration and Distribution effectiveness, we find a significant positive Pearson correlation of .583 at the 0.01 confidence level. It exhibits a significant positive Pearson correlation of .647 at the 0.01 level of confidence interval for experience. At the 0.01 level of confidence interval, the third variable, fuel stations location, exhibits a significant Pearson correlation of .589 and the fourth variable, financial capacity has significant positive Pearson correlation of 0.676 at the 0.01.

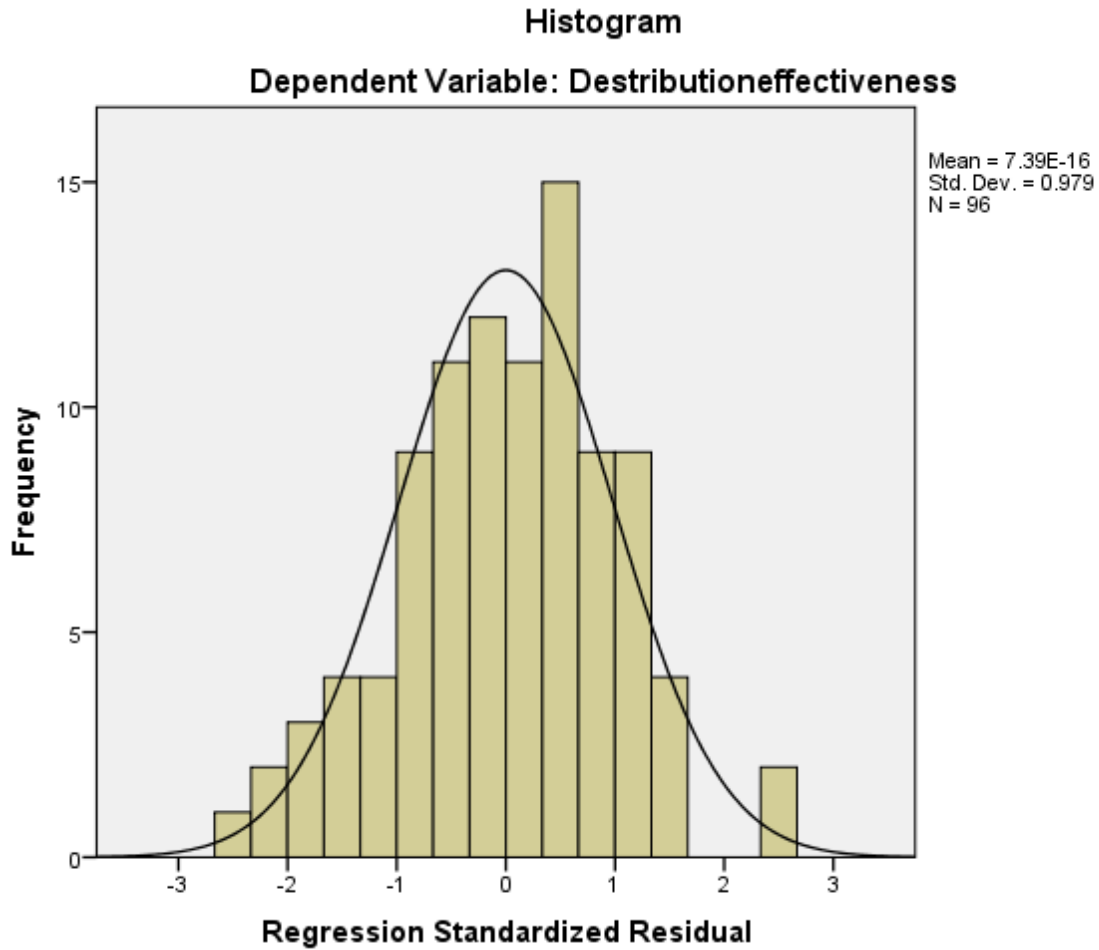
This means that integration, experience, fuel stations location and financial capacity are factors that have a direct and positive impact on distribution effectiveness, and the magnitude of the impact is also significant, as indicated by significant person correlation coefficients of .583, .647, 0.589 and 0.676 for, integration, experience, fuel stations location and financial capacity respectively, implying that the factors under consideration are important in affecting the country's fuel distribution effectiveness.

4.6 Tests for Linear Regression Model Assumptions

4.6.1 Normality Assumption

A histogram with a normal curve can be used to test the normality of a distribution. The residuals were regularly distributed around their mean of zero, as shown in Figures 2, indicating that the data were normally distributed and compatible with the normal distribution assumption. Because the numbers supported the data's normality assumption, conclusions regarding population parameters drawn from sample statistics are likely to be accurate.

Figure 4.1 Normality test result



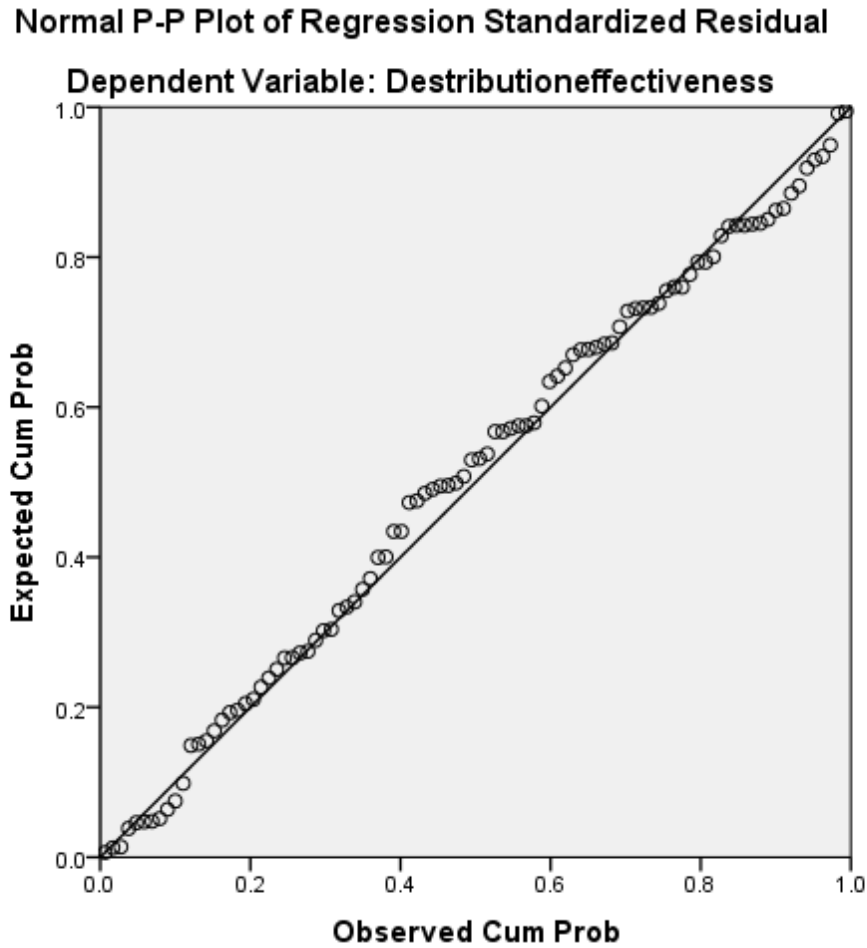
Source: Survey Result, SPSS (2022)

4.6.2 Checking for Linearity

The degree to which the change in the dependent variable is related with the independent variable is measured by the linearity of the relationship between the dependent and independent variables (Hair et al., 1998). In a nutshell, linear models predict values falling in a straight line by assuming the dependent variable has a constant unit change (slope) for a constant unit change of the independent variable (Hair et al., 1998). A linear expression of the regression model is possible.

Plotting the independent variables against the dependent variable can be used to check for linearity between the y and x variables Akroush, N. (2003).

Figure 4.2 Linearity test result

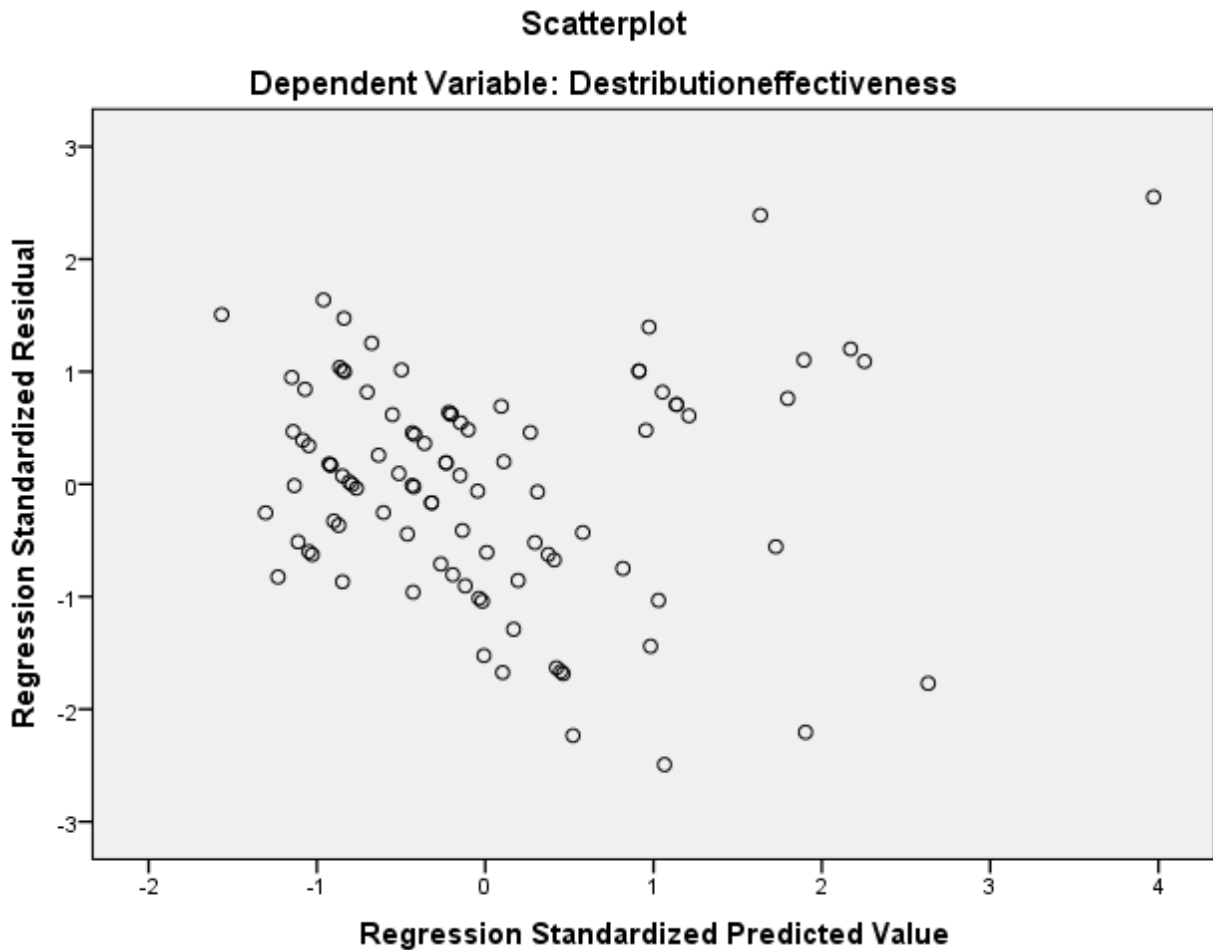


Source: Survey Result, SPSS (2022)

4.6.3 Assumption of Homoscedasticity

At all values of the dependent variable, the variability in scores for independent variables should be similar. The scatter plot should have a rectangle form running the length of it. Before doing multiple regression analysis, there should be homoscedasticity. This indicates that the residuals (the discrepancies between the observed and predicted values of the dependent variable) are normally distributed with constant variance. This suggests that the homoscedasticity assumption was met

Figure 4.3 Homoscedasticity test result



Source: Survey Result, SPSS (2022)

4.6.4 Testing Multicollinearity

The term "multicollinearity" refers to when the independent variables are significantly linked. There is overlap or sharing of predictive power when the independent variables are multicollinearity. The unique contribution of each predictor variable is difficult to measure when the predictor factors are interrelated. If there are high correlations between some of the independent variables, the problem of multicollinearity may be present.

The Variance Inflation Factor (VIF), which assesses the impact of correlations among independent variables on the precision of regression results, is used to verify this. The VIF factor should be less than ten. Tolerance is a measure of how much of the variability of a

given independent variable is not explained by the other independent variables in the model, and it is determined for each variable using the formula $1-R^2$. If this value is very low (less than 0.10), it means that the multiple correlation with other variables is high, implying that multicollinearity is possible.

Table 4.6.4 Multicollinearity Test Result

Coefficients^a

Model	Collinearity Statistics	
	Tolerance	VIF
1		
Integration	.738	1.355
Experience	.419	2.388
Fuel stations location	.470	2.125
Financial capacity	.676	1.480

Source: Survey Result, SPSS (2022)

As shown in table 4.6.4, the tolerance level of all independent variables in this study is larger than 0.1, and the VIF value of all independent variables is likewise less than 10. This demonstrates that multicollinearity does not exist.

4.7 Regression Analysis

4.7.1 Multiple Regressions

Regression analysis allows market researchers to examine relationships between one or more independent and one dependent variable in its most basic form. The dependent variable in marketing applications is usually the outcome we care about, while the independent variables are the tools we use to accomplish those outcomes.

Distribution effectiveness was dependent variable, while the independent factors were integration, experience, fuel stations location and financial capacity.

Table 4.7.1 Model Summary

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.800 ^a	.640	.624	.30889

Source: Survey Result, SPSS (2022)

The R-Square score of .640 in the model summary table suggests that the variation of the four variables namely (integration, experience, fuel stations location and financial capacity explained 64.00 percent of distribution effectiveness. In other words, these four variables cannot explain 36.00 percent of the dependent variable, distribution effectiveness, implying that there are additional variables that have an influence on the outcome.

Table 4.7.2 ANOVA Analysis

ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	15.747	4	3.937	42.724	.000 ^b
Residual	8.385	91	.092		
Total	24.132	95			

a. Dependent Variable: Distribution effectiveness

b. Predictors: (Constant), Financial capacity, Fuel stations location, Integration, Experience

Source: Survey Result, SPSS (2022)

The overall significance of the model can be seen in the ANOVA table. Divide the sums of squares by the related degrees of freedom to find the mean squares. The F-ratio is a test of the null hypothesis that all of the regression coefficients are zero. The F-value (42.724) is significant at the 0.01 level of significance, as seen in the table (P value that corresponds to F statistics is significant). The study's findings revealed that the regression model accurately predicts Ethiopia's fuel distribution effectiveness.

Table 4.7.3 Coefficient Matrix

Coefficients^a					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	.093	.164		.565	.574
Integration	.237	.067	.253	3.522	.001
Experience	.211	.094	.214	2.243	.027
Fuel Stations Location	.164	.082	.179	1.992	.049
Financial Capacity	.367	.071	.386	5.130	.000

a. Dependent Variable: Distribution Effectiveness

Source: Survey Result, SPSS (2022)

Each variable's constant, beta, and significance level are listed in the table above. It shows that all the four variables, integration, Experience, fuel stations location and financial capacity have a significant impact on Distribution Performance, with sig. levels of 0.001, 0.027, 0.049 and 0.000, respectively, at a 95% confidence interval.

The regression model of this study can now be properly written in an equation as follows:

$$Y_1 = 0.093 + 0.237X_1 + 0.211X_2 + 0.164X_3 + 0.367X_4 + 0.05$$

$$\text{Distribution effectiveness} = 0.093 + 0.237(\text{integration}) + 0.211(\text{Experience}) + 0.164(\text{Fuel stations location}) + 0.367(\text{financial capacity}) + 0.05$$

The intercept (β_0) is the point on the vertical axis where the regression line crosses the Y axis and it gives the expected value of distribution effectiveness (Y) as **0.093** where all the 4 predictor variables of distribution effectiveness are null or not exists. The other distribution effectiveness determinant betas were obtained and interpreted from the above beta coefficient table as follows.

Keeping other variables constant

- ✓ A one unit increase in integration will result in a 23.70% increase in distribution effectiveness.

- ✓ A one unit increase in experience will result in a 21.10% increase in distribution effectiveness
- ✓ A one unit increase in fuel stations location will result in a 16.40% increase in distribution effectiveness.
- ✓ A one unit increase in financial capacity will result in a 36.70% increase in distribution effectiveness

4.8 Hypothesis Testing and Interpretation of Results

Hypotheses (H1)

Integration has a favorable and considerable impact on Ethiopia's fuel distribution effectiveness. According to the regression table result beta is 0.237 and is significant (0.001) at 95%. The significance level is below the cut-off value we have set (0.05), we accept the alternative hypothesis and reject the null hypothesis. An increase in integration by 1 unit will result in 23.70% increase on fuel distribution effectiveness, holding other variables constant.

Hypotheses (H2)

Experience has a positive and significant impact on fuel distribution effectiveness. Based on the regression table result beta value is 0.211, and p is .0027 at 95%. The significance level is below the cut-off value we have set (0.05), we accept the alternative hypothesis and reject the null hypothesis. An increase in experience by 1 unit will result in 21.10% increase on fuel distribution effectiveness, holding other variables constant.

Hypotheses (H3) Fuel stations location has a positive and significant impact on fuel distribution effectiveness. Based on the regression table result beta is 0.164 and is significant (0.049) at 95%. The significance level is below the cut-off value we have set (0.05), we accept the alternative hypothesis and reject the null hypothesis. An increase in fuel stations location by 1 unit will result in 16.40% increase on fuel distribution effectiveness, holding other variables constant.

Hypotheses (H4)

Channel members' financial capacity has a positive and significant impact on the fuel distribution effectiveness. Based on the regression table result beta is 0.367 and is significant (0.000) at 95%. The significance level is below the cut-off value we have set (0.05), we accept the alternative hypothesis and reject the null hypothesis. An increase in financial capacity by 1 unit will result in 36.75% increase on fuel distribution effectiveness, holding other variables constant.

Hypothesis	Result	Reason
Hypothesis 1: Integration has a positive and significant impact on fuel distribution effectiveness	Accept	$\beta=0.237$, $p<0.05$
Hypothesis 2: Experience has a positive and significant impact on fuel distribution effectiveness	Accept	$\beta=0.211$, $p<0.05$
Hypothesis 3: Fuel stations location has a positive and significant impact on fuel distribution effectiveness	Accept	$\beta=0.164$, $p<0.05$
Hypothesis 4: Channel members' financial capacity has a positive and significant impact on the fuel distribution effectiveness.	Accept	$\beta=0.367$, $p<0.05$

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter builds on the fourth chapter's analysis and interpretation. Following the data presentation, the summary, conclusions, recommendations, and future study areas are highlighted.

5.2 Summary of Finding

The following summary of findings was created based on the data analysis and interpretation in chapter four of this study:

- The descriptive analysis result shows that a mean value of 2.1116 for distribution integration, 2.1220 for experience, 2.2738 for fuel stations location, 2.0893 for financial capacity and 2.1801 for distribution effectiveness.
- The correlation results show a positively and significant association between integration and distribution effectiveness ($r = .583, P < 0.01$), experience and distribution effectiveness ($r = .647, P < 0.01$), fuel stations location and distribution effectiveness ($r = 0.589, P < 0.01$), and financial capacity and distribution effectiveness ($r = 0.676, P < 0.01$).
- Each independent variable has a 0.237, 0.211, 0.164 and 0.367 effect on distribution effectiveness respectively. In general, higher levels of financial capacity, integration, Experience are highly predicted fuel distribution effectiveness in and fuel stations location is predicted to lesser extent.
- Independent variables (financial capacity, integration, experience and fuel stations location) have a positive and significant effect on the distribution effectiveness of the country. As a result, the idea that financial capacity, integration, experience and fuel stations location had a significant impact on distribution effectiveness has been accepted.

- Finally, we can observe from the regression model that the independent factors explain 64.00 percent of the variance in distribution performance, whereas extraneous variables explain the remaining 36.0 percent.

5.3 Conclusion

The study generally concludes that lack of information sharing and coordination among channel members, strong and unified coordination office, strong controlling system, non-automated process and activities throughout the distribution chain makes the fuel distribution process disintegrated and ineffective in the country

Further, due to key actors in the distribution chain's lack of experience in fuel distribution, particularly the later entrants, the fuel couldn't be distributed effectively in the country.

Problem of land accessibility particularly in urban areas to fuel stations construction as well as insufficient infrastructure and transportation system to distribute the fuel to all regions also make the country's fuel distribution system ineffective.

Finally, the lack of a minimum financial capital requirement for new entrants, key actors' weak financial position (due to a minimum and fixed profit margin) to invest in the construction of additional distribution outlets, and the lack of credit facility all contribute to the country's ineffective fuel distribution.

5.4 Recommendation

The researcher makes the following recommendations based on the findings of the analysis and the conclusions reached.

The government should established a strong centralize body and controlling systems which enables to coordinated all channel members and control the whole distribution chain of fuel in the country in order to ensure the fuel distribution effectiveness. In addition, Process and activity that integrate the distribution chain should be short and automated.

In relation to experience, ministry of mines, petroleum and natural gas should include experience to its current requirement of license giving to new entrants of the industry and should give adequate training to the currently operating channel members.

From the standpoint of fuel stations location, every fuel distributor oil Company or fuel station owner should do exhaustive study before constructing a fuel station and the respective government body should supply the required amount of land to the sector. Further the country should assessed and implemented alternative fuel transportation systems in order to ensure the availability of fuel in all stations that found throughout the country.

From the point of channel member's financial capacity, currently the government totally eliminated on credit purchasing and selling system of fuel from the inland distribution system without facilitating other alternatives. As the value of fuel is higher than other commodities, most channel member have no enough financial capacity to accommodate the current fuel demand of the country and the amount of fuel distributed daily depends on the amount of cash a fuel distributor oil company or a retail fuel station has. In addition, the profit margin set by the government for each channel member is very low and it is very difficult to use a bank loan with the market interest rate for them. So, ministry of trade and regional integration should set a minimum financial capital requirement which relates to the current fuel value as a licensing requirement to new entrants of the distribution chain. Finally, ministry of finance should facilitate a special finance source to the distribution chain members in order to maintain an effective fuel distribution in the country.

5.5 Area for Further Study

This research could easily be expanded to include additional energy firms. Furthermore, there is a need to investigate additional aspects that influence distribution effectiveness in an organization's context that are not examined in this study. Again, it would be quite interesting to expand this study by including sample respondents not included in this study and applying the appropriate analysis technique for the subject, whether for the same or different area of study.

REFERENCE

- .Kazi N.H., Rezaul K. &Rehnuma S.K. (2012).“An Empirical Study on Competitive Distribution Management of Tea Brands in Bangladesh”, *International Journal of Marketing Studies*. Vol. 4, No. 5.pp.99-107
- Akroush, N. (2003) An integrated approach to marketing strategy formulation and implementation. University of Huddersfield.
- Alderson, W., & Shapiro, S. J. (1957). Marketing behavior and executive action: A functionalist approach to marketing theory. RD Irwin.
- Amarpreet, S. & John, B., 2010, Assessing Effectiveness of Supply Chain Collaboration: An Empirical Study, Anjali.
- Anol, B., 2012. Social Science Research: Principles, Methods, and Practices. 2nd ed. Florida: University of South Florida Tampa
- Bartmann, D., & Beckmann, M. J. (1992).Inventory control (models and methods). Lecture notes in economics and mathematical systems.
- Berg &Zijm(1999), Models for warehouse management: classification and examples, *International Journal of Production Economics* 59 (1–3) pp. 519-528
- Burns A and Bush R. (2003). —Marketing Research: Online Research Applications. Fourth Edition, Prentice Hall: New Jersey, p120.capabilities perspective. *Int. J. Production, Economics* 126. 379–386.
- Christopher M. &Towill D (2002), Developing Market Specific Supply Chain Strategies: *International Journal of Logistics Management*, Vol. 13, No. 1, pp. 1-14
- Coia, A., 1999, Integrating goil’s supply chain. *Traffic World*, 259, 2.
- Creswell, John W. (2005) *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*, 2nd Ed. New Jersey: John Wiley and Sons
- Dent, J. (2011).*Distribution channel: Understanding and managing channels to market*, 2nd ed, by Kogan Page, Dineshkumar, U., &Vikkraman, P. (2012). “Customers’ Satisfaction towards Organized Retail Outlets in Erode City”. *IOSR Journal of Business and*

Management (IOSRJBM) ISSN: 2278-487X Volume 3, Issue 4 (Sep,-Oct. 2012), PP 34-40

Deribsa Abate (PhD), (2018), “ Research Methodology”, Mega Publishing& Distribution P.L.C

Ellinger A E, Daugherty P J & Keller S B (2000),. The relationship between marketing/logistics

Ethiopian petroleum supply enterprise (EPSE) (2017). Petroleum Products Sales manual.

Ethiopian petroleum supply enterprise (EPSE) (2017-2021). Annual report

George, K. &Iravo, M. (2014), Factors Affecting the Performance of Distribution Logistics among. Production Firms in Kenya: A Case Study of Bata Shoe Company (K) Limited: International Journal of Research in Business and Social Science. Vol.4, No.10

Greg W. Marshall& Mark W. Johnston (2010), *MARKETINGMANAGEMENT*, .McGraw-Hill/Irwin, 1221 Avenue of the Americas, New York, NY, 10020

Guan, W. (2010). Developments in Distribution Channels: A Case Study of a Timber Product Distribution Channel, Department of Management and Engineering Linköping University, SE-581 83 Linköping studies in science and technology, PhD Thesis No. 1458

Hair, J.F. Jr., Anderson, R.E. and Tatham, R.L. (1998). *Multivariate data analysis*, 5th ed. Upper Saddle River, NJ: Prentice-Hall

Hamid, R. I., Kamran, S. &Gholamreza, J. (2011). “Develop a Framework for Selection of Intermediary in Marketing Channel”, *Iranian Journal of Management Studies (IJMS)*, Vol.4, No.1, March 2011, pp: 25-42

Hamid, S. &Seydeh M. M. Z., (2014). “Management of distribution channels”, *Indian Journal of Science Research*. No. 5(3).PP 452-456

Hanaa, E.S (2013). “Supply Chain Key Performance Indicators Analysis”.*International Journal of Application or Innovation in Engineering & Management (IJAIEM)*. Volume 2, Issue 1.

Handfield, R., Ph.D, 2016, Driving supply-chain engagement in oil and gas now is the time <https://scm.ncsu.edu/blog/2016/01/13/driving-supply-chain-engagement-in-oil-and-gas-now-isthe-time/> Holldorsson, A., Kotzab, H., Mikkola, H.F. &Skjott-Larson, T., 2007.

- Complementary theories to supply chain management. *Supply Chain Management: An International Journal*, 12(4), pp.284-96.
- Iyer, G., & Villas-Boas, J. M. (2003). A bargaining theory of distribution channels. *Journal of marketing research*, 40(1), 80-100.
- John O'Shaughnessy, John, (1992), *Competitive Marketing: A strategic Marketing Approach*, Capman and Hall INC, New York
- Kiumars, S. Nazanin, Z., & Roshanak, R. (2013). "Identifying and Prioritizing Factors Effecting on Efficiency of Goods Distribution Network." *International Journal of Management & Business Studies*, Vol. 3, Issue 2..
- Koshy, C.J. (2014). "A Study on the Effectiveness of FMCG Distributors in Kerala", *International Journal of Commerce, Business and Management*. Vol. 3, No. 5, pp.668-671
- Kotari, C. R. (2004), "Research Methodology: Methods and Techniques", 2nd ed. New Age International Publisher, India.
- Kotler, P. and Armstrong, G. (2001), *Principles of Marketing*, 9th Ed, New Jersey: Prentice –Hall Inc.
- Malhotra, N. K., Nunanl, D., & Birks, D. F. (2017). *Marketing Research an Applied Approach - Fifth Edition*. New Jersey: Printice Hall Inc
- Malhotra Y. (2005) "Integrating knowledge management technologies in organizational business processes: getting real time enterprises to deliver real business performance", *Journal of Knowledge Management*, 9 (1): 7-28, doi: 10.1108/13673270510582938.
- Michael, M. O., (2012). "Innovative Distribution Strategies and Performance of Multinational Corporations (MNCs) and Domestic Manufacturing Sectors in Nigeria: A Case Study of Lagos State Industrial Areas". Ph. D thesis in business administration (Entrepreneurship) of department of business studies, school of business, college of Development studies, Covenant University, Ota, Ogun state, Nigeria.
- Paiva Ely Laureano. (2010), *Manufacturing and marketing integration from accumulative*

- Philip Kotler and Kevin Lane Keller (2012). "Marketing Management". 14th Ed. New York, Prentice Hall. PWC, 2016. Prospects in the retail and consumer goods sector in ten sub-Saharan,
- Pravin, K. B., (2010). Constructing a scale to measure the effectiveness of FMCG distribution channels in rural markets in Maharashtra; Ph. D. Thesis, symbiosis center for management studies (UG), Noida.
- Raed, AL-H., Tiravat, A. & Basheer, K., 2006, Supply Chain Management in the Petroleum Industry: Challenges and Opportunities. International Journal of Global Logistics & Supply Chain Management. Vol. 1, No. 2, 1 November 2006, 90 – 97
- Rallabandi, S. (2014). Fast moving consumer goods retail Market, growth prospect, market overview and food inflation in Indian market – an overview; International Journal of Innovative Research in Science, Engineering and Technology, Vol. 3, Issue 1
- Rechar, R. Still, Edward W. Condiff, Norman A.P. Goven and Sandeep Nari (2017), "Sales and Distribution Management" Sixth Edition, Pearson India Education Service Pvt.Ltd.
- Remy Darras, (2021), Ethiopia's oil Supply constrained by Djibouti logistics battle, The African Report.
- Röthlisberger, S. (2005). Excellent Supply Chains in The Oil Industry: Royal Dutch/Shell. Zaragoza: Zaragoza Logistics Center.
- Salih, Y. & Emel Y. (2013). The measurement of distributor performance with a multi criteria decision making method, Innovative Marketing, Volume 9, Issue 3.
- Schewe, D. C. and Smith, R. M. (1980), Marketing Concepts and Application, New York: McGraw – Hill, Bk Company.
- Shukla, P. (2008). Essentials of Marketing Research. Paurav Shukla and Ventus Publishing APS.
- Singh, A.K & Imran, M. D. (2014). A Study on the Problems faced by the FMCG Distribution Channels in Rural Area of Bhopal & Hoshangabad Districts of M.P. International Journal of Business quantitative Economics Applied Management Research, ISSN: 2349-5677 Volume 1, Issue 2.

- Singhdong P. (2020) "Factors Affecting Storage and Distribution Development in OTOP Distribution Center Bangkok branch" WJSS walalax Journal of social science, Vol. 13 No. 2.
- Soumyajit. D. (2019), What are different types of ports for ships?, Marine Insight
- Wihdat D, Yousef A, & Sang-Heon L. (2013). "A Review on Long Distribution Channel's Problems", International Journal of Materials, Mechanics and Manufacturing. Vol. 1, No. 1. Pp.60-64
- World Bank. (2021). "Steering Towards Cleaner Air" Report Reference #AUS0002513. Washington, DC 20433, USA: The World Bank Group.
- Yang X. (2013). "A Review of Distribution Related Problems in Logistics and Supply Chain Research". International Journal of Supply Chain Management. Vol. 2, No. 4, pp.1-8

APPENDICES

Appendix-1

ST. MARY'S UNIVERSITY
SCHOOL OF GRADUATE STUDIES
MMA PROGRAM

Dear respondent,

My name is Serkalem Damtew and I am carrying out an academic research on the Determinant of fuel distribution effectiveness in Ethiopia.

Hence, you are kindly requested to give necessary information for the research questions. Please be assured that the information acquired shall be used purely for academic purpose only and will be kept strictly confidential. Please indicate your level of agreement or disagreement by using (√) mark on the appropriate box given after your Choice for Each Question corresponding to each statement.

Your co-operation and assistance will be highly appreciated. If you need any clarification or information: **Mob.0931-79-69-46 E-mail. arstotlemu@gmail.com**

I highly appreciate your time and contribution to this research. Thank you very much and Best wishes!

Section I: General Information

Please read each question carefully and make a tick mark (√) under each value.

1. Sex:

Male Female

2. Age:

Under 25 26-35 36-45 45-55

Above 55

3. Respondent's position:

Department Head Team Leader Senior Officer

Officer

4. Educational Status:

Certificate Diploma Advanced Diploma

First Degree 2nd Degree and above

5. Relevant work experience:

Below 5 years 5-10 years 11-15 years

16-20 years Greater than 20 years

Section II: Statement of Survey

Direction: Please indicate your degree of agreement/disagreement with the following statements by selecting the appropriate number. (1-Strongly disagree; 2-Disagree; 3-Neutral; 4-Agree and 5-Strongly agree) by using (√) mark on the appropriate box corresponding to each statement.

S. No	Questions	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
❖	Integration Related Questions	1	2	3	4	5
1	Integration between fuel distribution Channel members has minimum role on fuel distribution effectiveness in the country					
2	There is strong integration between channel members of fuel distribution in Ethiopia.					
3	There is a strong designated government body that can coordinate the participants of fuel distribution in the country.					
4	Participants of fuel distribution in Ethiopia are willing to collaborate to enhance the distribution Effectiveness.					
5	All fuel distribution participants are responsive about maintaining a cooperative relationship among themselves.					
6	Information on fuel shortage and shipment delay shared to every member promptly.					
7	Processes that integrate fuel distribution participants in the country making fuel order not time taking.					
❖	Experience Related Questions					
1	Fuel distributor oil companies and retailers industry experience has minimum role on fuel distribution effectiveness.					
2	Industry experience is one requirement to get license for fuel distribution.					
3	All channel members of fuel distribution in Ethiopia have adequate industry experience..					

	Questions	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
		1	2	3	4	5
4	There is experienced and capable leadership at all levels of fuel distribution in the country.					
5	There are employees that have enough industry knowledge and experience at each level of fuel distribution in the country.					
6	All fuel station's employees' customer service experience facilitating the on time delivery of fuel in the country.					
7	There is an evaluation practice of fuel distribution channels performance in relation to their skill and competency.					
	❖ Fuel stations location Related Questions					
1	Retail fuel stations and reserve depots location has role on fuel distribution performance.					
2	All fuel distributor oil companies have fuel stations in all regions of the country.					
3	All the retail fuel stations in the country are close to end customers.					
4	Retail fuel stations establishment depends on the society demand rather than land accessibility..					
5	The location of fuel stations is convenient to distribute the required fuel from the country's fuel reserve depots on time.					
6	Retail fuel stations are located proportionally in urban and rural areas of the country.					
7	There is adequate infrastructure throughout the country to distribute the fuel effectively.					

	Questions	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	❖ Financial Capacity Related Questions	1	2	3	4	5
1	There is a minimum capital requirement that relates to the current fuel value to enter in to fuel distribution business in the country.					
2	All Participants/channels of fuel distribution practice have adequate financial resource to perform the current fuel distribution in the country					
3	The amount of fuel distributed by a fuel distributor oil companies or fuel stations depends on its credit settlement or cash payment capacity					
4	There is a bank or other financial institution to give special credit facility for fuel distribution business in the country.					
5	Channel members of fuel distribution in the country have strong creditors to supply finance to their business					
6	There is a credit fuel purchase/sale service from local suppliers					
7	Fuel distributor oil companies and retail fuel stations have financial capacity to invest on facilities to accommodate the growing demand of fuel in the country					
	❖ Distribution Effectiveness Related Questions					
1	The distribution system of fuel is flexible enough to alter delivery schedules depending on the society demand.					
2	Fuel distribution channels deliver the required amount of fuel timely to their respective customer.					

	Questions	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
		1	2	3	4	5
3	The distribution system of fuel in the country is enables to ensure product availability at all fuel stations throughout the country.					
4	There is working collaboration between channel members to protect illegal price increment of fuel in the country.					
5	There is a strong controlling system at each level of distribution to maintain the fuel quantity and quality.					
6	The transportation system of fuel enables to distribute the fuel easily throughout the country.					
7	There is a strong evaluation system at each level to ensure fuel distribution effectiveness in the country.					

Appendix.2

Product Imported in to the country in Metric Ton and the USD dollar amount paid within the last five years

Year	Gasoline (MGR)	Gasoil (ADO)	JET/ Kerosene	Light Fuel Oil (LFO)	Light Fuel Oil (HFO)	Total Product Amount for each year	USD Paid for each year
2017	363,844	2,199,355	800,782	39,629	35,655	3,439,265	1,663,434,515.33
2018	442,602	2,507,602	737,614	35,785	47,483	3,771,086	2,225,222,456.13
2019	502,973	2,587,256	809,657	33,430	38,135	3,971,451	2,493,360,763.96
2020	533,830	2,528,399	630,770	34,000	44,827	3,771,826	2,003,663,514.68
2021	652,573	2,535,455	444,022	30,160	57,413	3,719,623	1,839,518,621.59

Appendix -3

ETB Amount Paid for Fuel Price Stabilization within the last five years

Year	Amount Paid for Fuel Price Stabilization in Birr
2017	2,437,584,311.01
2018	4,549,430,970.86
2019	2,477,274,043.24
2020	4,128,078,364.91
2021	27,504,936,243.91
Total	41,097,303,933.93