



**ST. MARY UNIVERSITY
SCHOOL OF GRADUATE STUDIES**

DEPARTMENT OF MASTER OF BUSINESS ADMINISTRATION

**ANALYSIS OF REVERSE LOGISTICS PRACTICE OF WATER AND SOFT DRINK
PLASTIC BOTTLE COMPANIES IN ADDIS ABABA.**

The Case of: Top water, Aqua Addis water and Coca Cola soft drink companies.

**BY:
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**Aug 2020
ADDIS ABABA, ETHIOPIA**

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**A THESIS SUBMITTED TO SCHOOL OF GRADUATE STUDIES OF ST. MARY'S
UNIVERSITY IN PARTIAL FULFILLMENT OF THEREQUIRMENTS FOR THE
DEGREE OF MASTER OF BUSINESS ADMINISTRATION**

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Aug 2020

ADDIS ABABA, ETHIOPIA

ST. MARY UNIVERSITY
SCHOOL OF GRADUATE STUDIES
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This is to certify that the thesis entitles “Analysis of reverse logistic practice on water and soft drink plastic bottles in Addis Ababa”, submitted to St. Mary University for the award of the degree of master of business administration (MBA) and is a carried out by Bethelhem Fikru under my guidance and supervision.

Therefore, I am hereby declared that no part of this thesis has been submitted to any other university or institutions for the award of any degree or diploma.

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I hereby declare that this thesis entitled “Analysis of reverse logistic practice on water and soft drink plastic bottles in Addis Ababa” is my original work by the guidance and supervision of Asres Abitie (PHD).

The thesis is original and has not been submitted for the award of any degree or diploma to any university or institutions.

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Acknowledgement

First and for most, I would like to thank the almighty God who gave me the strength throughout the academic year and my life in general.

Next, I am grateful to my advisor, Dr. Asres Abitie, for his guidance and support and for his constructive suggestions and above all his patience and bringing this research into final.

I would also like to express my deepest love and gratitude to my family due to their, encouragement and help to my academic life. In particular, I want to give a special thanks to my sister Eyerusalem Fikru for her love and support in each and every stage of my life. Also, I am deeply grateful to Yohannes Kassu for the unconditional love, encouragement and support he has given me to every journey of my life.

Finally, my extended gratitude goes to the staff members and management body of TOP Water, Aqua Addis Water and Coca Cola Soft drink companies for giving me crucial data that is used in my thesis.

God bless you all!!

ABSTRACT

This study analyzed the reverse logistic practice of water and soft drink plastic bottles in Addis Ababa. It is very obvious to see plastic bottle wastes everywhere in the city of Addis Ababa, and manufacturing sectors exploit and brought biggest pollution to the natural environment. Thus, it seems very important to seek for more modern solutions which would solve certain problems. Therefore, one of the most beneficial opportunities includes reverse logistics practice, which is the relevant part of supply chain management. Reverse logistics is a profit-oriented strategy, its initial aim is to minimize the negative environmental emissions, and on the other hand, companies can be able to reduce their operating costs. This study was prepared to develop a stronger understanding on the basics of reverse logistics and it aims to investigate the critical factors for developing a successful reverse logistics practice, to indicate a strategic framework that could guide companies to implement or to improve their reverse logistics practice. Further, this thesis analyzed the role of the community, plastic bottle using companies, plastic bottle recycling companies, government and other concerned bodies to the contribution towards the process of reverse logistics which in turn to address the problem. To conduct this study, qualitative and quantitative data was collected from both primary and secondary sources of data. To collect data, Survey questionnaires were distributed for a total of 105 respondents and managers of each company were interviewed. Again, to meet the stated objectives, the collected qualitative data was analyzed by using phenomenological data analysis method and to analyze the quantitative data, SPSS and descriptive method was employed. Finally, the findings of the research showed that the community lacks knowledge on the practice of reverse logistics, companies strategic plan doesn't include the issue and still there is less commitment of top level managers to the practice of reverse logistic, lack of sufficient resource. To solve these problems the researcher recommended effective community and consumer awareness, plastic producing companies should be responsible to their post-sale plastic bottles, top level managers attention to reverse logistics, setting clear separate environmental policies and regulation related to reverse logistics practice, companies should collaborate with small scale enterprises, plastic recycling companies and government in order to minimize the damage to the environment and to create additional profit.

Keywords: reverse logistics, plastic bottles, water and soft drinks, Addis Ababa

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List of Acronyms and Abbreviations

CSR: Corporate Social Responsibility

RL: Reverse Logistics

SPSS: Statistical Package for the Social Sciences

CSCMP: Council of Supply Chain Management Professionals

CHAPTER ONE: INTRODUCTION

This chapter is conferred with the introduction which entails about the background of the study, statement of the problem, objectives of the study, significance of the study, scope, and limitation of the study.

1.1 BACKGROUND OF THE STUDY

Currently, the usage of plastics is increasing due to their convenience and reliability for packaging materials. Significant numbers of consumers of bottled water in Addis Ababa prefer to use bottled water for drinking at home, workplaces or hotels as compared to other forms of tap water (Matiwos Ensermu, 2014). In spite of its excessively high price, the change in Ethiopian people life style leads to high consumption of plastic bottled products. However, this incidence is a serious problem that causes the accumulation of the plastic wastes to the streets of Addis Ababa and makes the city very unclean. Cause pollution and degradation to the natural environment. The environment is becoming polluted because of high disposal of water and soft drink plastic bottles. These plastic bottle products are not friendly and biodegradable. As plastics take thousands of years to decompose; it has a wider impact to our environment and has already become the great concern for the environment.

According to (PENC, J: AW,Placet”, Warsaw 1997) More intensive environmental pollution negatively impacts human health and ability to work, shortens average life expectancy, morbidity and death rate as a result of ecologic stress connected with exposure to the devastated environment; there are also changes in interpersonal relations, social cost of development are rising while competitiveness on foreign markets is on the decrease.

Plastic bottle using companies has the responsibility to manage their after-sale products through the process of reverse logistics. Tibben-Lembke (2002) defined reverse logistics as the process of moving goods for capturing value. Responsibility for such a condition of the environment is obviously taken by companies, which are its main users. As Reverse logistics is a very mandatory process, more attention and resources should be paid in order to keep the environment clean as well as to extract value from the return of products, recycling and reusing back.

Reverse logistics is the process of retrieving the product materials or parts from the end user (consumer) to recapture value or dispose the materials in an environmentally friendly manner. Reverse Logistics include activities such as waste collection, parts collection, inspection,

selection, sorting, direct recovery, reprocessing, redistribution, and disposal. Recovering products, refurbishing goods, and salvaging parts such as precious metals that can be recycled or reused can bring a huge benefit to the environment and to the manufacturer. Reverse logistics enables the realization of the idea of a circular economy, which is a departure from the linear model of raw material flow, to a model of closed material-energy cycles, which significantly reduces the high entropy of the modern economy while enhancing the overall utility rate (Magdalene and Krzysztof, 2011).

Undoubtedly, organizations are degrading the environment because of poor management of waste disposal, collection, and reuse of the after-sale products. Again, Reverse logistics got lesser attention and poorly understood concept in most of Ethiopian companies because it's seen as expensive, complex and challenging process. However, reverse logistics is vital to the industries and Therefore, it is extremely essential to consider reverse logistics practice as part of relevant strategic plan of all industries.

Thus, the fact that this study based on is that, reverse logistics practice is impracticable in most of Ethiopian companies. Companies in Ethiopia are not working on their reverse logistics area, that they could not improve their supply chain performance, and this leads organizations to put pressure into the environment and to lose cost advantages.

The primary focus of this study is to analyze the reverse logistics practice on water and soft drink plastic bottles in Addis Ababa and it also focuses on identifying the problems facing the process of reverse logistics and to search for a possible solutions to promote efficient and effective practice of reverse logistics on water and soft drink bottles in Addis Ababa city in order to protect the environment from the harm by plastic bottles and to present economic and competitive opportunities to the companies.

As the practice of reverse logistic is fairly new concept in Ethiopia, plus as the magnitude of the problem is very vast in Addis Ababa, very few studies have been made to study reverse logistics practice on water and soft drink plastic bottles. It was therefore evident that there existed knowledge gap that needs to be filled through a research. This study aims to bridge this gap by providing knowledge on the area of reverse logistics practice through addressing the research questions.

1.2 STATEMENT OF THE PROBLEM

High population growth, industrialization and urbanization leads to high consumption of disposable and manufactured goods which commonly generate more waste to the environment.

People put burden to the environment by disposing wastes everywhere without realizing its impact. Among the major sources of wastes, used plastic bottles takes the greater volume which constitutes relatively wider portion of all wastes.

In Addis Ababa, a lot of disposable plastic bottle producing and using companies are engaging in mass production and increasing their number of products released into the market and distribute to their consumers. As plastic bottle producing and using companies are increasing and as the consumption of plastic bottled products are increased, it becomes very normal to see plastic bottle wastes in Addis Ababa in everyday of our life and the pollution of plastic bottles in the city becomes higher. Too many wastes and disposals of plastic bottles are becoming a social and environmental problem of city. This is because of poor management of plastic bottle wastes after use that in turn emits to the environment and cause harmful and negative impacts to the environments of Addis Ababa. The truth that makes things even worse is that, there is a lesser or no visibility of those companies' effort in terms of protecting the natural environment from deterioration.

According to the Ministry of Environment, Forest, and Climate Change (MEFCC, 2017), in Ethiopia, plastics constitute nine up to fourteen percent of cities waste. Irresponsible and reckless practices of waste disposal apart from polluting the air, water and soil and causing severe threat to public health, it also distorts the beautification of cities.

As the world is developing very fast and all the processes and phenomena change immediately one by one, in this way, it becomes more and more complicated to control them efficiently. Increase in waste is one of the successful confirmations of this. As society has grown wealthier, it has created more rubbish. A high level of life quality means that people are buying more products. Consumption also has changed drastically. Today, people have much more choice and products which have shorter life spans than earlier. There are also many more single-use and disposable products. These lifestyle changes may have improved the quality of human life, but they also mean we are generating more waste than ever before. (:<http://ec.europa.eu/environment/waste/index.htm># European Union 2010, p.10).

The life cycle of a product does not end when it is discarded. The lack of involvement and commitment of the entire supply chain caused by the mismatch of objectives, in addition to the lack of complete studies to ensure and prove the efficiency of reverse logistics processes along with the absence of clear legislation, induce the companies to not worry about the final destination of their products. Pires and Antas (2010).

As Rogers and Tibben-Lembke (1998) summarize reverse logistics as the process of moving goods from the destination to another point in the supply chain, to capture unavailable value.

Again according to Rogers and Tibben-Lembke (1999), the barriers to implement reverse logistics in companies are brought up by manufacturers that do not feel responsible by their products (after consumption) and also by the lack of studies by companies of the benefits of reverse logistics for the product life cycle in organizations.

Reverse logistics process is vital practice to the industries to protect the environment from the adverse effects of used plastic bottles, to make the waste as a means of generating revenue by reducing manufacturing costs and adding value for the production process of the companies.

It is not surprise that almost every company will look for ways and mechanisms that increase revenue and decrease expenses, but the truth is that, most of plastic bottle producing and using companies in Ethiopia neglect the practice of reverse logistics from their supply chain concept and they are becoming the root cause for the pollution of the city plus those industries are losing money that comes from the practice of reverse logistics. This is because reverse logistics is seen as expensive, complex, challenging process or companies do not have the expertise within their management related to this area, or they would rather put their expertise and resources mainly towards their forward manufacturing process. Because of this and other reasons, many companies avoid managing reverse logistics practice.

Reverse logistics (RL) is considered by firms as an undervalued part of supply chain in general due to the following reasons: minimal interest of top management, insufficient time commitment, change in functional priorities among and within firms, a lack of integrated corporate supply chain design target towards RL, a lack of awareness of the high potential value of integrating operations (PricewaterhouseCoopers', 2008; Jindal et al., 2011; Gunasekaran and Ngai, 2012).

(Azevedo, 2011) indicated that most manufacturing firms often focus on forward logistics and as a result, they tend to overlook the importance of reverse logistic activities and its potential of improving the firm's and supply chain's performance.

According to Wahab et al. (2010), some organizations do not reuse the materials and parts returned due to lack of knowledge on the reverse logistics processes. Moreover, it is necessary that the company is motivated either to reduce costs or to minimize the environmental impact, in order to implant the reverse logistics.

Several researches have been conducted on reverse logistic practice in Ethiopian and in the rest of the world. The researcher review a research conducted on reverse logistics in Ethiopian by Hagos Gebre Weldegebrail (2016) and by Dudubo Mobolaj (2017) in Nigeria, and those studies shows inconsistency and even difference results.

This study attempt to fill the gap by analyzing reverse logistic practice on water and soft drink plastic bottles in Addis Ababa, this research addressed subjects related to reverse logistics with emphasis on water and soft drink plastic bottle companies. In addition, it addressed the problems and mechanisms were employed to find out the contemporary reverse logistic practices undertaking by those companies. Further, this study seeks plastic bottle using companies to give attention to the management of plastic bottle disposal, collection and reuse through their reverse logistic practice, which in turn is a profit generating process for companies and as well brings a huge benefit to create a friendly environment.

1.3 RESEARCH QUESTIONS

By considering the above stated research problem, this study can be conducted to answer the following research questions.

- I. What does the understanding of the concept of reverse logistic practice looks like in companies and in the community of Addis Ababa?
- II. What is the current trend of reverse logistic practice on water and soft drink plastic bottles in Addis Ababa?
- III. What are the challenges to implement reverse logistics in plastic bottle companies?

1.4 Objective of the Study

1.4.1 General Objective

The general objective of this study is to analyze the reverse logistics practice of water and soft drink plastic bottles in Addis Ababa.

1.4.2 Specific objectives

Specifically, the study has the under listed specific objectives:

- To assess the level of understanding of reverse logistics concept in the community, in bottled water and soft drink producing companies in Addis Ababa.
- To analyze the contribution of the community, bottled water and soft drink producing companies and government in effective implementation of reverse logistic.
- To examine the current trend of reverse logistics practice of water and soft drink plastic bottles.
- To identify benefits and the barriers for the successful implementation of reverse logistics.
- To investigate mechanisms that helps to adopt reverse logistics practice.

1.5 SIGNIFICANCE OF THE STUDY

As business competition increased in global scale and as environmental protection is a big concern, companies' should seek for a mechanism that protect the environment, generate profit, and increase competitive advantage at the same time. This is when implementing reverse logistics practice will be very necessary.

(Morrel, 2001) Labeled reverse logistics as "the forgotten child of the supply chain".

And the very first reason for doing this area of study is that, In Ethiopia it is reality and it is very visible that companies lack to give enough attention to the practice of reverse logistics and its importance. Therefore, this study is directed at analyzing reverse logistic practice of water and soft drink plastic bottles in Addis Ababa, and it is believed to have number of significances.

(a).Principally, the findings of this study is expected to benefit bottled water and soft drink producing companies by allowing them to learn from the outcome of this study, they shall be able to understand the concept of reverse logistics practice, its importance and implement successful reverse logistics practice, And again, the result of this study also help companies that are already involved in the practice of reverse logistics, to strengthen and to standardize their current reverse logistic practice.

(b).This study is expected to increase the focus of supply chain managers by indicating that reverse logistics should be considered as a basic operational activity and companies have to consider it as part of their strategic plan.

(c).This study also offers a new insight to the community of Addis Ababa city who use bottled water and soft drink products, in a way of shedding some light on the concept of reverse logistics

practice, its advantages and to direct their contribution towards minimizing the negative environmental impacts caused by the disposal of used plastics bottles, which in turn helps to implement effective reverse logistics practice.

(d). The findings of this study may serve as an input to the administration of Addis Ababa city to formulate a regulatory system related to the process of reverse logistics management and to enforce bottled water and soft drink manufacturing companies to adopt reverse logistics practice and to offer a sound and favorable working environment for companies who are currently engaged in the process of reverse logistics.

(e). Moreover, this study could be added to the body of knowledge and serve as a source of secondary data and shall be referred by other researchers for further study on related area

1.6 SCOPE OF THE STUDY

The scope of the study was encircled with the analysis of reverse logistics practice only on water and soft drink plastic bottles in Addis Ababa city, particularly on selected plastic bottle using companies. Therefore, this study does not include all water and soft drink producing companies. This study does not include other different purpose plastic bottle products other than water and soft drink plastic bottles. As the factors may vary across the different industries, generalizing the results is not possible to all industries and to other industries. But it is possible that, future research can be carried out in different sectors.

The study methodologies are limited in scope due to time and resource limitation which the researcher believes that it can reflect the general practice of reverse logistics. Though, various methods can be used in analysis of reverse logistics, descriptive research design is chosen due to the fact that it is the model to describe certain problems and also stratified sampling method will be used in order to let the researcher to select the samples that best represent the population.

1.7 Limitation of the study

This research mainly focuses on reverse logistic practice and analyzing the reverse logistic practice of water and soft drink companies. In this regard there were flaws or shortcomings which could be the result of external (Uncontrollable) variables that hinders the study from getting a complete data. Among the limitations, the researcher face lack of adequate and relevant studies, up to date literatures and books on the concept of reverse logistics practices on Ethiopian companies, this may be due to reverse logistics is a contemporary concept to our country.

The other constraint faced by the researcher is the time pressure to undertake a wide survey in Ethiopia on the area of reverse logistics practice.

1.8 Organization of the paper

This paper consists of five chapters. The first chapter presents introduction, statement of the problem, objective of the study, the significance of the study, and limitations. Chapter Two reviews the most significant theoretical and empirical studies. Chapter Three presents methodology of the study. Chapter Four provides the analysis and findings of study and finally, chapter five give conclusions and recommendations and further research direction

CHAPTER TWO: LITERATURE REVIEW

This chapter of the paper tries to cover the theoretical review of related literature about reverse logistics practices. It begins by discussing the definition of reverse logistics, plastic bottle wastes, and importance of reverse logistics; driving forces of reverse logistics, reverse logistics activities, processes of reverse logistic, barriers in reverse logistics and at last the conceptual framework will be reviewed according to many literatures as follow.

2.1 Definitions of Reverse Logistics

There are many different definitions to the concept of reverse logistics. In recent years, reverse logistics has been an interest among academicians and practitioners in the field of supply chain and operations management (Rubio, Chamorro & Miranda, 2008).

Among the different definitions, this section will emphasize and gives some insight on the basic definitions of reverse logistics.

In the early nineties, emerges the first definition of reverse logistics, Stock (1992, p 73) emphasis on the recovery aspects of reverse logistics, defining as: "... the term often used to refer the role of logistics in recycling, waste disposal, and management of hazardous materials; a broader perspective that includes all logistics activities as recycling, substitution, reuse of materials and disposal of products".

Rogers and Tibben-Lembke (1999) defined reverse logistics as the process of planning, implementing and controlling the efficient, cost effective flow of raw materials, in-process inventory, finished goods, and related information from the point of consumption to the point of origin for the purpose of recapturing or creating value or proper disposal.

According to Arrieta (2015), reverse logistics is defined as the process of moving goods from the point of usage or consumption for the purpose of recapturing value, or proper disposal; including activities such as remanufacturing and refurbishing, processing of returned damaged products, seasonal inventory, recalls (return implemented because of safety or quality reasons), recycling programmers, hazardous material programmers, obsolete equipment disposition and asset recovery.

According to Steven (2004) reverse logistics comprises all activities involved in managing, processing, reducing, and disposing of hazardous or nonhazardous waste from the production, packaging and use of products, including the process of redistribution.

The Council of Supply Chain Management Professionals (CSCMP, 2010) defines reverse logistics as a specialized segment of logistics focusing on the movement and management of products and resources after the sale and after delivery to the customer. Reverse logistics is defined as the processes of receiving returned components or products for the purpose of recapturing value or proper disposal. Reverse logistics processes and plans rely heavily on reversing the supply chain so that companies can correctly identify and categorize returned products for disposition, an area that offers many opportunities for additional revenue. It is much more than simply counting defective items returned by customers. Also, it is much more complex than outbound shipping in that customers and/or consumers initiate a return, making it an inbound shipment process that is less predictable.

The science of reverse logistics includes return policy administration, product recall protocols, repairs processing, product repackaging, parts management, recycling, product disposition management, maximizing liquidation values and much more (Curtis Greve and Jerry Davis Feb 2013).

The European Working Group on Reverse Logistics (see De Brito and Dekker, 2004) puts forward the following definition: “The process of planning, implementing and controlling backward flows of raw materials, in-process inventory, packaging and finished goods, from a manufacturing, distribution or use point, to a point of recovery or point of proper disposal”

In his paper “Development and Implementation of Reverse Logistics Programs”, 1998, James R. Stock defines reverse logistics as, “The term most often used to refer to the role of logistics in product returns, source reduction, recycling, materials substitution, reuse of materials, waste disposal, and refurbishing, repair and remanufacturing.”

Ronald Kopicki in his book “Reuse and recycling: reverse logistics opportunities”, 1993, gives the definition of reverse logistics based upon the direction of flow as “Reverse Logistics is a broad term referring to the logistics management and disposing of hazardous or non-hazardous waste from packaging and products. It includes reverse distribution...which causes goods and information to flow in the opposite direction of normal logistics activities.”

“Reverse Logistics refers to the logistics management skills and activities involved in reducing, managing and disposing of hazardous or non-hazardous waste from packaging and products” (Kroon and Vrijens, 1995, p.56).

Again, Reverse logistics combines two concepts: logistics activity and reverse process. It manages the tangible and intangible flows from the market to the production site, and at the same time it is a distribution channel, where the cargo route goes in the opposite direction unlike the normal one. (Gandolfo & Sbrana, 2008, p. 32).

For Giuntini and Andel (1995, p. 73) Reverse Logistics is defined as “an organization’s management of material resources obtained from customers”.

In its turn, Business Dictionary gives the following definition of reverse logistics: “Flow of surplus or unwanted material, goods, or equipment back to the firm, through its logistics chain, for reuse, recycling, or disposal”. (Business Dictionary, 2016).

According to Martel, Vieira (2010), laws which aim at protecting the environment have become more stringent. The recognition of the need to meet the legislation being also sustainable, have made companies consider initiatives that deal with reverse logistics, i.e., what is the final destination of the products, and how they can be reintroduced in the chain.

In all cases the reuse opportunities give rise to a new material flow from the user back to the sphere of producers. The management of this material flow opposite to the conventional supply chain flow is the concern of the recently emerged field of 'reverse logistics' (Stock, 1992).

Reverse logistics, dealing with the physical flows of products, components and materials flowing from users/owners to re-users, is a growing field both in practice and in the academic world. To get insight in how reverse logistics are dealt with in practice, field studies and surveys are useful. Examples of the latter are presented in (Rogers and Tibben-Lembke, 1999; Guide, 2000).

Reverse logistics is used to manage the flow of products to effectively use resources. It has been the main target of the logistics system to move goods from one place to another (Dowlatshahi, 2000).

More recently, Pokharel and Muha (2009) stated that the focus of reverse logistics belongs to the waste management, recycling of materials, recovery of components or product recovery. According to the authors, the reverse logistics involves a paradigm shift in the product life-cycle management. Traditionally the life cycle of a product was between the period of its manufacture and its disposal ("cradle-to-grave"); currently the reverse logistics allows changing the product life cycle, between the periods from manufacture until its recovery ("cradle-to-cradle").

Furthermore, Rogers and Tibben-Lembke (1998) summarize reverse logistics as the process of moving goods from the destination to another point in the supply chain, in order to capture unavailable value.

From the above definition's reverse logistics in a simplest word is the management of the path of the products from its end users back to the manufacturers.



Figure 2.1 Schematic representation of reverse logistics. Source: Lacerda (2002)

There are two types of popular logistics models in practice: Forward logistic, defined "as the part of the supply chain process that plans, implements, and controls the efficient, effective flow and storage of goods, services, and related information from point-of-origin to the point-of-consumption in order to meet customers' requirements". Reverse Logistics which focuses on the movement of goods in the opposite direction, is defined "as the process of planning, implementing, and controlling the efficient, cost effective flow of raw materials, in-process inventory, finished goods and related information from the point of consumption to the point of origin for the purpose of recapturing value or proper disposal"(Ellinger et al., 2012)

While the forward supply chain concerns the flow from raw materials to end products and from manufacturer to consumer, reverse logistics (RL) concerns the reverse flow, from consumer to manufacturer.(Govindan et al. 2015)

While forward logistics handles and manages the flow of goods downstream in the supply chain from suppliers to customers, reverse logistics (RL) manages the flow of returned goods upstream. Reverse logistics in terms of forward logistics based on different parameters and theories summarized below in the table.

Table 2.1: Forward Logistics vs. Reverse Logistic

Forward Logistics	Reverse Logistics
➤ Product quality uniform	➤ Product quality not uniform
➤ Disposition not clear	➤ Disposition options clear
➤ Routing of product unambiguous	➤ Routing of product ambiguous
➤ Costs more easily understandable	➤ Reverse costs less understandable
➤ Pricing of product uniform	➤ Pricing of product not uniform
➤ Inventory management consistent	➤ Inventory management not consistent
➤ Product life cycle manageable	➤ Product lifecycle less manageable
➤ Financial management issues clearer	➤ Financial management issues unclear
➤ Negotiation between parties more straightforward	➤ Negotiation less straightforward
➤ Type of customer easy to identify and market	➤ Type of customer difficult to identify and market
➤ Visibility of process more transparent	➤ Visibility of process less transparent

Source: Tibben –Lembke and Rogers (2002).

2.2 Plastic bottle wastes

Consumption of plastic similar to production shows an exponential increase with more plastics being produced in the first decade of the present century than in the entire preceding century (Bowmer and Kershaw 2010; Thompson et al. 2009 a, b; 2011). The increase in numbers of plastic industries and subsequently discarding the wastes by consumers has only resulted in making the environment worse and encircled living organisms in danger. Plastics are extremely diverse in terms of chemical composition, properties, and possible applications, and are widely distributed in the society and the environment.

In 2009, UNEP reported that the world's annual consumption of plastic materials has increased from around 5 million tons in the 1950s to nearly 100 million tons; thus, 20 times more plastic is produced today than 50 years ago. This implies that on one hand, more resources are being used to meet the increased demand for plastic, and on the other hand, more plastic waste is being generated. Over the last few decades, there has been a steady increase in the use of plastic products resulting in a proportionate rise in plastic waste in the municipal solid waste streams in large cities in sub- Sahara Africa (World Bank, 1996; Yankson, 1998).

Clean and healthy living conditions in cities and towns cannot be achieved without reliable and regular waste collection and adequate disposal systems. The major solid waste management processes start at solid waste production, storage and followed by solid waste collection, transportation and transferring. Then after street cleaning, recovery of recyclable materials, solid waste treatment, and solid waste final disposal, and finally collects feedback to monitor and evaluate the solid waste management processes (Addis Ababa City Administration Urban planning, sanitation and beautification bureau solid waste manual plan, 2012).

Approximately 50% of manufactured plastic products are utilized for single disposable applications (Hopewell et al 2009). As such, there is a rapid increase in the amount of plastic solid wastes (PSWs) produced as most plastic products' life is short.

The Plastic Waste component of the Municipal Solid Waste has been described as quite problematic because it is non-biodegradable and can stay in the environment for a considerable length of time causing all sorts of environmental problems (Oteng-Ababio, 2011).

Plastic materials have captured the manufacturing industry because of their favorable properties. These properties have enabled the production of many products out of plastic materials.

However, the manufactured plastic products continue to increase the amount of waste generated and there is need for proper management and disposal of this waste type (Ferri et al., 2015).

In Ethiopia some studies showed that plastic bottles are causing severe environmental pollutions to human and animal health in urban and rural areas of the country (Bjerkli 2005; Ramaswamy and Sharma 2011; Tadesse et al. 2008).

2.2.1 Types of Plastics

1. **POLYETHYLENE TEREPHTHALATE (PET)**; Polyethylene Terephthalate sometimes absorbs odors and flavors from foods and drinks that are stored in them. Items made from this plastic are commonly recycled. PET (E) plastic is used to make many common household items like beverage bottles, medicine jars, rope, clothing, and carpet fiber.
2. **HIGH DENSITY POLYETHYLENE (HDPE)**; High-Density Polyethylene products are very safe and are not known to transmit any chemicals into foods or drinks. HDPE products are commonly recycled. Items made from this plastic include containers for milk, motor oil, shampoos and conditioners, soap bottles, detergents, and bleaches. It is NEVER safe to reuse an HDPE bottle as a food or drink container if it did not originally contain food or drink.
3. **POLYVINYL CHLORIDE (PVC OR V)**; Polyvinyl Chloride is sometimes recycled. PVC is used for all kinds of pipes and tiles but is most found in plumbing pipes. This kind of plastic should not meet food items as it can be harmful if ingested.
4. **LOW DENSITY POLYETHELENE (LDPE)**; Low-Density Polyethylene is sometimes recycled. It is a very healthy plastic that tends to be both durable and flexible. Items such as cling-film, sandwich bags, squeezable bottles, and plastic grocery bags are made from LDPE.
5. **POLYPROPYLENE (PP)**; Polypropylene is occasionally recycled. PP is strong and can usually withstand higher temperatures. It is used to make lunch boxes, margarine containers, yogurt pots, syrup bottles, prescription bottles. Plastic bottle caps are often made from PP.
6. **POLYSTYRENE (PS)**; Polystyrene is commonly recycled but is difficult to do. Items such as disposable coffee cups, plastic food boxes, plastic cutlery and packing foam are made from PS.

7. MIXED (OTHER); is used to designate miscellaneous types of plastic not defined by the other six codes. Polycarbonate and Poly lactide are included in this category. These types of plastics are difficult to recycle. Polycarbonate (PC) is used in baby bottles, compact discs, and medical storage containers.

2.3 Reverse Logistics on Used Plastic Bottles

The number of polyethylene bottles (bottles for beverages made from plastic) produced is on the rise in all countries. Even with recycling, there are still several environmental impacts that are generated from the production of bottles, the transportation of beverages, refrigeration and sales, recycling, and the lifecycle of the product from production to disposal. In many countries that have water service infrastructure in place and can provide safe and high-quality tap water, there are measures and campaigns being implemented to reduce the use of PET bottles, and review and promote the use of tap water (Friends of Earth Japan Annual report, 2013).

Polyethylene Terephthalate (PET) bottles have experienced rapid growth since the 1970s when the technique of blow molding was introduced (Glenz, 2007).

Mechanical recycling can only be performed on single-polymer plastic thus the more complex and contaminated the waste, the more difficult it is to recycle it mechanically (Al-Salem, Lettieri & Baeyens, 2009).

According to Cheng Wong Plastics can be recycled at the end of use, typically for a maximum of six times. Most plastic waste can be re-processed to form plastic products.

2.3.1 Reduce, Reuse and Recycling of Plastic Wastes (The 3 R's)

2.3.1.1 Reduction

Reduction or minimization involves all actions aimed at decreasing the amount of waste production. Waste reduction, after prevention, is one of the most important strategies to achieve sustainable development. In practice, waste reduction can be carried out by conducting life-cycle analyses or very thorough mass or material balances.

Source reduction is the process of reducing the amount of waste that is generated. The plastics industry has successfully been able to reduce the amount of material needed to make packaging for consumer products. Plastic packaging is generally more lightweight than its alternatives, such as glass, paper, or metal. Lighter weight materials require less fuel to transport and result in less material in the waste stream (<http://www.epa.gov/osw/conservation/materials/plastics.htm#content> American chemistry council last updated on 6/17/2015).

2.3.1.2 Reusing plastic bottles

WWF Report (2001) suggested that water bottles be washed and reused to lessen their negative impact on the environment. Unfortunately, reusing plastic bags and bottles further compromises the quality of the water due to leaching of more and more hazardous chemicals into water; such as bisphenol A (BPA), phthalates, antimony and other organic contaminants as the bottle gets older (Andra et al. 2011; Earth Talk 2012; Schmid et al. 2008, Widen et al. 2005; 2012).

2.3.1.3 Recycling of plastic wastes

Plastic waste recycling is recommended to sustainable waste management. The primary aim is to lessen environmental damage and achieve environmental sustainability. Recycling can save energy, conserve resources, reduce emissions from incinerators and prolong life spans of the landfills (Tsai, 2008).

Recycling is a critical step towards environmental protection. Processing used materials into new products reduces resources, saves primary energy, prevents pollution and lowers greenhouse emissions (EFBW, 2010).

In the area of waste recycling, PET recycling has continued to receive considerable attention due to the main environmental benefits which are acknowledged throughout the world and make it one of the most successful and cleanest waste-recovery processes (Badia, Strömberg, Karlssonb & Ribes-Greus, 2012).

Recycling PET has become a well-established system with its own logistic chain including bottles collection, flake production and pellet production (Shen, Worrell and Patel, 2010).

Technically four categories of recycling processes exist, primary (mechanical reprocessing into a product with equivalent properties), secondary (mechanical reprocessing into products requiring lower properties), tertiary (recovery of chemical constituents) and quaternary (recovery of energy), (Hopewell, Dvorak & Kosior, 2009).

2.4 Importance of Reverse Logistics

Reverse logistics (RL) is becoming an important aspect of supply chain management. Many companies that previously did not devote much time or energy to the management and understanding of reverse logistics have begun to pay attention. Firms have begun to benchmark return operations with best in-class operators. Third parties specializing in returns have seen demand for their services greatly increased. (Arun and Kwan, 2003).

Reverse logistics has become significant because organizations are under increasing pressure from many stakeholder groups, including shareholders, customers, employees, suppliers, reverse supply chain partners, government agencies, nonprofit organizations and the (public) environment (Vachon & Klassen 2006) owing to environmental issues, legislation and consumer expectations.

As with any organization, processes that take away from potential profit or put a drain on limited resources will gain the watchful eye of management to rein in costs and streamline the process. It is this reason that field of reverse logistics has increased in importance within the business community and academia (Carter and Ellram 1998; Blumberg 1999; Dowlatshahi 2000; Rogers and Tibben-Lembke 2001; Mason 2002).

Reverse logistics has numerous importance's among this, economic, environmental, marketing image, market share and asset protection can be raised. The main motive behind reverse logistics is economic (minimizing cost and increasing profits), environmental protection and gaining competitive advantage into the industry.

This section focuses on the importance of reverse logistics and how reverse logistics can play an important role in the growth of organizations through the environmental and societal, financial, and competitive advantages.

2.4.1 Environmental and Societal Importance of Reverse Logistics

The growing concern in relation to the environment in addition to the variety of products available in the market made companies and consumers seek mechanisms for the treatment of wastes. Reverse logistics can help the organizations to be more cost effective and ecologically friendly by extending a product's normal life cycle beyond traditional usage (Melbin in Dowlatshahi, 2000:144).

Reverse logistics includes processes such as remanufacturing, refurbishment, recycling, and recovery of asset. Engaging in reverse logistics activities organizations can therefore reach a certain level of green. In other words, organizations can be more environmentally responsible (Patridge, 2011).

The green image has stimulated several organizations to explore options for take-back and recovery of their products. In addition, reverse logistics is growing in importance because governmental regulations and legislation are compelling organizations to take back their products (Sarkis et al., 2010).

The adoption of reverse logistics is an element of the of product differentiation strategy because activities such as disposing environmentally friendly, provide an organizational image ecologically correct (BRAGA; ZILBER, 2011).

Corporate Social Responsibility is expected by customers (Chan et al., 2012). Corporate citizenships represent this set of values that will push companies to be involved in reverse logistics (De Brito and Dekker, 2004).

According to Ravi &Shanker, (2005), study which established that societal interests and well-being could influence the company to engage in environmentally friendly practices such as reverse logistics. The design and implementation of reverse logistics should therefore consider well- being of the society.

2.4.2 Financial Importance of Reverse Logistics

Organizations have discovered that the effective management of reverse logistics can result in reductions of inventory carrying costs, transportation costs and waste disposal costs (Lu et al., 2007, Gupta &Tiwari, 2009).

Reverse logistics can reduce costs by reusing products, components, and materials instead of simply disposing of them in landfills which has a negative impact on the environment (Yimsiri, 2009:1).

Firms realize that the reverse channel is a target for gains in efficiency and reduction of costs. Businesses have started to focus on the reverse channel and started operating it as a value-added center and using their reverse process as a differentiator (Stock 2001).

This differentiation should allow them to gain/maintain market share, add revenue, and possibly reduce transportation and inventory costs through the continual monitoring and gained efficiencies of their reverse logistics process (Daugherty, Myers et al. 2002).

If the reverse logistics process is managed correctly, it can minimize logistics costs and improve revenue (Bernon, Rossi & Cullen, 2011).

If adequate resources (tangible/intangible or property-based/ knowledge-based) are targeted to reverse logistics programs, this can have tremendous positive financial impact (Genchev, Landry, Daugherty &Roath, 2010).

From a logistics perspective, returned products that are handled efficiently can be reinserted into the forward supply chain, which can generate additional revenue, reduce operating cost and

minimize the opportunity costs of writing off defective or obsolete products (Mollenkopf&Closs, 2005).

2.4.3 Customer satisfaction and competitive advantage of reverse logistics

In today's globalized and fast paced economy, competition is driving companies to address the importance and impact of the reverse logistics processes on firm performance. Customers expect more from manufacturers, retailers, and service providers regarding return policies, and companies are seeking to attain as much value out of any returned product (Daugherty, Autry et al. 2001).

Reverse logistics can contribute to the competitiveness of a firm in at least three different ways. First, efficient reverse logistics processes can result in lowering of total supply chain costs for the firm, thereby giving the firm a potential cost advantage (Fisher, 1997; Stock et al, 2002), which can support a strategy of cost leadership (Porter, 1980). Second, these processes can be a significant factor for improving customer service by securing fast repair and return of products to the customer (Larsen and Jacobsen, 2016). This gives the firm a differentiation advantage (Porter, 1980) through the ability to deliver superior service. Third, reverse logistics can contribute to value creation by enabling the firm to reuse or salvage components, sub-assemblies, and products (Mollenkopf & Closs, 2005).

Reverse logistics practice allows organizations to differentiate themselves in the eyes of the customers. High-quality reverse logistics can promote long-term relationships where customers are more likely to repurchase if the organization does a good job handling returns (Daugherty, Myers & Richey, 2002; Genchev et al., 2010).

The increased focus on the reverse logistics process has started moving organizations beyond just customer service with the timely delivery of a product, but to total customer satisfaction; moving beyond the initial transaction to ensuring the customer's needs are cared for if the product needs returned or exchanged (Mason 2002).

In order to enable organizations to compete in the market, they should know and analyze the environment where they operate, and also establish and adopt strategies that create competitive advantages and improve business performance (TEMPLE; SWANN, 1995).

Reverse logistics is a vital tool for supporting marketing and brand initiatives in an age where good corporate citizenship has become more important to consumers (Butler, 2004:1).

With reverse logistics processes, organizations can enhance customers' perceptions of product quality, help minimize the purchase risk and boost goodwill (Mollenkopf & Closs, 2005). Ultimately, an effective reverse logistics process can give an organization the necessary competitive advantage to move above peers and competitors, and possibly capture larger market share in the industry (Huscroft, 201v0).

2.5 Driving Forces of Reverse Logistics

In this section, the focus will be on the driving forces of reverse logistics. Generally, the companies carry on reverse logistics because of the profit, obligatory forces, or social pressure.

According to this classification, the drivers is named as; economic, legislation and corporate citizenship. (De Brito and Dekker, 2004).

2.5.1. Economic

Economic drivers mean that with reverse logistics, it is possible to recover economic value from products that are being taken back. Recovery can be cheaper than manufacturing or buying new products or raw material. (Partridge, 2011) points out that applying sustainable methodologies in the management of activities enables the reduction of inefficiencies and costs.

In all recovery actions, economic benefits are related with direct and indirect gains. Decreasing the use of raw materials and waste materials, obtaining valuable spare parts and other financial opportunities like secondhand market are among direct gains (De Brito and Dekker 2004).

2.5.2 Corporate Social Responsibility (CSR)

Corporate citizenship refers to the set of values or principles that an organization holds to be responsible with RL activities. The motivations behind the implication of RL activities lay on both being legally obliged and trying to establish an image the consumer's desires as an environmentally responsible organization. Better customer services such as increasing the level of customer awareness for returning and refunding options, guaranteeing better services would affect company's image positively and provide potential benefit. (Diaz; Alvarez; Gonzalez 2004).

According to, Ravi &Shanker, (2005), societal interests and well-being could influence the company to engage in environmentally friendly practices such as reverse logistics. The design and implementation of reverse logistics should therefore consider well- being of the society.

2.5.3 Legislation

The legislation driver refers to any jurisdiction indicating that a company should recover its products or take them back (Peters 2009). Since the strict legislations about the environmental issues express the extended producer responsibility, companies are entitled to recover their products or accept them back. Companies are holding accountable for the whole product life cycle anymore.

According to Thierry (1995), underline the responsibility of governmental action in supporting organizations towards reuse activities. It is stated that governments could take legislative actions such as banning the disposal of certain products, and obliging companies to take back their products at the end of their use.

2.6 Reverse Logistics Activities

In reverse logistics concept there are several activities the companies carry on with returned products or materials and they need to identify the possible destination of returned product (i.e. the production line, the distribution, reassembly line) Due to the diversity of products in the reverse flow, there are various alternatives of reverse logistics activities namely as; reutilization, repair, renovation, reprocessing, cannibalization or recycling (Thierry et al., 1995).

- **Direct reuse:** some of the returned products may be reused without involving in production process instead with slight cleaning and limited repair. Examples of such products are the means of transportation; pallets, containers, bottles, or boxes (Diáz; Álvarez; Gonzalez 2004).
- **Repair:** the products are returned by the consumer/user to have it back in working order. The producer fixes or replaces the broken parts if necessary. It requires limited effort. Generally, quality of repaired products perceived less quality those new products (Thierry et al., 1995; Diáz; Álvarez; Gonzalez 2004).
- **Refurbishing:** Returned products are brought up to specified quality level. The product is disassembled into modules and after those modules are inspected, they are fixed or replaced. Also upgrading the technology of the product can be associated with refurbishing. After the process, the quality of the product is improved substantially (Thierry et al., 1995; Diáz; Álvarez; Gonzalez 2004).
- **Remanufacturing:** Returned products are carefully inspected, disassembled, and broken or outdated parts are replaced with new ones. At the end of the process, the purpose is to

increase quality standards. Additionally, repairable parts and modules also can be used after being fixed.

- **Cannibalization:** the purpose is to recover limited parts of used products that are reused in other reverse logistics activities (i.e. repair, refurbish, remanufacture). There is no strict quality standard for cannibalization. It depends on the process where parts will be reused.
- **Recycling:** is the “process of collecting used products, components, and/or materials from the field, disassemble them, separating them into categories of like materials, and processing into recycled products, components, and/or materials” (Beamon, 1999). Another description of recycling is “the process by which materials that would otherwise become waste are collected, separated or processed are returned to the economic mainstream to be reused in the form of raw materials or finished goods” (Global Recycling Network, 2008). Incineration and land filling; the last alternative is to incinerate or landfill the returned products because of the limited capacity of waste yards. In case of providing no gain to the company even being involved in recovery process, it is an option.

2.7 Processes of Reverse Logistic

Reverse logistic processes, Roberta P. and Pier Paolo Carrus (2012) stated in *Reverse Logistics and the Role of Fourth Party Logistics*, the main reverse logistic processes are the following:

- Collection.
- Examination and processing (inspection/selection and sorting):
- Re-processing or direct recovery and
- Redistribution
 - ✓ **Collection:** is the first process that is, all those activities that are necessary for reclaiming returned products, surplus or by-products and transporting them to a point of recovery where they will be subjected to further examination and processing i.e. their quality is assessed and a decision is made on the type of recovery (Roberta P. & Pier Paolo Carrus, 2012).
 - ✓ **Examination and processing (inspection/selection and sorting):** where a decision must be reached as to whether a product (or parts of it) will be re-used, remanufactured recycled or disposed. Physical inspection is necessary for

determining further processing for most commercial products (Roberta P. & Pier Paolo Carrus, 2012).

- ✓ **Re-processing or direct recovery:** Once a product has been returned to a company, the firm has many disposal options from which to choose. If the quality is “as-good-as-new,” products can be fed into the market almost immediately through direct recovery. Direct recovery involves three options: re-use; re-sale and re-distribution. Re-use refers to cases where returned products have such a good quality that they can be re-used almost immediately in the same or an alternative market. This happens for re-usable packages, containers and most leased or rented equipment. The second option is the re-processing that includes the following recovery options repair (at product level), refurbishing (at module level), remanufacturing (at component level), retrieval (at part level), recycling, and incineration. (Roberta P. & Pier Paolo Carrus, 2012).
- ✓ **Re-distribution:** refers to logistics activities required to introduce a product into a market and transfer it to customers (Roberta P. & Pier Paolo Carrus, 2012).

2.8 Barriers in Reverse Logistics

Companies today acknowledge the importance of the reverse flow, even though there is still a lack of interest and difficulties to implement them (Guarnieri et al., 2006; Quinn, 2001; Rogers and Tibben-Lembke, 1999).

Apart from indisputable advantages of reverse logistics, there is also a range of barriers to implement the process of reverse logistics. This section indicates the barriers occurring in reverse logistics in terms of financial barriers, operational barriers, internal barriers, management barriers, policy barriers and infrastructural barriers.

2.8.1 Financial barriers

Lack of initial capital and funds for returns monitoring systems, storage and in-house handling of returns are a major barrier to RL practices (Abdulrahman et al. 2014:461; Sharma et al. 2011:102). Conducting RL practices are a precarious endeavor for top management, as they involve financial aspects that may impact the organizations’ long-term performance (Ganjali, Shirouyehzad & Shahin 2014:52).

Shibao et al. (2010) state that, even with the recent concerns in reducing pollution and wastes, the difficulty of implementing reverse logistics is a result of the absence of indicators that

measure the cost-benefit of implementing and operating it. The lack of these indexes is related to the nonexistence of knowledge of the costs of the operation.

Research in the field of reverse logistics should focus enterprises on segregation of costs, i.e., what are the real costs of reverse logistics and what are the factors that stimulate certain businesses to choose it and others not to. These unanswered questions may cause a delay in its implementation (Dowlatshahi, 2010).

An effective RL operation requires personnel to be trained; however, this training requires financial support that the organization may not possess or want to dedicate to RL, thus creating great difficulty in managing the RL practices (Sarkis, Zhu & Lai 2011:8; Sharma et al. 2011:102).

2.8.2 Operational Barriers

Reversing the flow of products is a challenge to most organizations in terms of the physical activities (Aitken & Harrison 2013). Operational barriers include problems related to the effective management of reverse logistics processes. The operational barriers identified in this section include inconsistent product quality and limitations to forecasting and visibility.

(a) Inconsistent product quality

In reverse logistics, the quality of products is not uniform as in the case of forward logistics (Sharma et al. 2011). Reverse logistics also includes the quality of end-of-use or end-of-life returns (Kaynak et al. 2014). As the quality of returned products is uncertain, organizations find it hard to estimate product value, which leads to the problem of control and managing the financial aspects of reverse logistics (Lee & Lam 2012).

(b) Limitations to forecasting and visibility

Accurate return forecasts are hardly available, which is a direct barrier to both strategic and operational planning (Janse, Schuur & De Brito 2010; Sharma et al. 2011). Limited visibility of returns also acts as a barrier in many organizations (Srivastava 2013). Reverse logistics is a reactive process because of less visibility, which makes planning and decision-making complex (Rajagopala et al. 2015). Therefore, there is a lack of knowledge about return volume as well as an unpredictable demand on recovered materials (Starostka-Patryk et al. 2013).

2.8.3 Internal Barriers

An internal barrier relates to a hindrance within the organization that affects the performance of RL practices (Abdurrahman et al. 2014:461).

Lack of functional integration: RL practices often suffer from a lack of functional communication and cooperation (Abdurrahman et al. 2014:463; Sharma et al. 2011:102).

Internal integration builds on the premise that various functions in the organization should work collaboratively as a single entity, ensuring that mutually acceptable outcomes are achieved and contribute to the continued success of the RL practices (Bernon et al. 2013:601; Hazen et al. 2012:247).

Differing views on the importance of RL are, however, shared; resulting in poor functional integration, as well as higher product return rates (Abdurrahman et al. 2014:466; Bernon et al. 2011:485; Ye et al. 2013:140).

If the functions that are involved in RL practices do not understand the end goal of RL, competing goals and objectives will be set across departments (Badenhorst 2013a:54).

2.8.4 Management barriers

The lack of clear management of the organizations in relation to the reverse logistics processes poses several problems. One is the absence of skilled professionals in the area, in addition to the lack of internal policies and knowledge of employees about the organization's process of reverse logistics (AITA; RUPPENTHAL, 2008).

Management may also not be committed to RL because they are not aware of the resulting benefits that could accrue (Hazen et al. 2012:248; Ho et al. 2012:33). Top managements posture and role in the decisions ensure congruent views on RL, allowing for the appropriate resources to be dedicated to the effective performance of RL practices (Creutz& Larsson 2012:27; Ye et al. 2013:134).

Aita; Ruppenthal (2008) inform that reverse logistics is still seen by some companies as an area of little relevance, in view of the few companies that have specific managers dedicated to the subject.

2.8.5 Policy Barriers

A lack of tax policies and financial support from government to subsidize reverse logistics has acted as a disincentive for organizations to invest and or collaborate in reverse logistics practices, as the products brought back into the reverse chain create high degrees of tax complexity and exposure (Abdurrahman et al. 2014).

It is therefore government policy that has the greatest external influence on an organization's reverse logistics practices (Lai & Wong 2012).

Government policy and financial support can play a major role in an organization's reverse logistics practices, as the lack of enforceable environmental laws established by the government reduces the incentive and motivation for organizations to perform reverse logistics practices (Ganjali et al. 2014; Ho et al. 2012).

2.8.6 Infrastructural Barriers

Many organizations do not have the expertise, manpower or Infrastructure for processing returns and expanding to start up a new operating system of returns (Shukla 2015)

Infrastructure plays a vital role in RL implementation. Researchers and practitioners felt that affordable recycling technologies with the support and coordination of all the members would enhance the success of RL implementation (Rogers et al., 2002; Dibenedetto, 2007; Jack et al., 2010). The existence of good RL infrastructure provides a company with the capability to handle returns quickly and efficiently and /or recalls (Dibenedetto, 2007; Jack et al., 2010).

The presence of good returns-handling system can be a source of significant cost savings and even function as a profit center (Stock et al., 2002). Conversely, a lack of RL infrastructure will impede a company's ability to quickly and efficiently deal with returns and/or recalls and any effort at handling returns will be a financial burden with the costs exceeding the benefits (Jack et al., 2010).

Insufficient investment in information technology and a lack of information systems are major barriers to the successful management and implementation of reverse logistics (Ravi & Shankar, 2004).

Most organizations have mature information and technology systems to support forward logistics, but reverse logistics still needs further improvement (Lee & Lam 2012).

2.9 Empirical Review

Internationally, a number of studies have been done especially in manufacturing industries.

Few RL studies focused on developing countries is hardly surprising because whereas RL is a mandatory part of supply chain in developed countries, it is still in its infancy state in developing countries (Zhang, 2011; Sarkis, 2011).

There was a research conducted by Lin (2009) on electric power customer satisfaction

Price water house Coopers', 2008 highlighted that best reverse logistics operations would lead to higher sales revenue and reduced operational costs.

Mollenkopf, Frankel and Russo (2011) identified the drivers to create value by the means of return management. From this perspective, economic reasons, marketing objectives, corporate objectives are among the value drivers. Verstrepen et al. (2007) stated that majority of the reasons of return management was to accomplish marketing and economic objectives.

Lau and Wang (2009) investigated the drivers of reverse logistics in consumer electronics industry in China and mainly legislation, corporate image, economic and marketing objectives were found to be important. Hernandez, Marins and Rocha (2009) identified the indicators of corporate performance in automobile industry taking into consideration reverse logistics activities. The results shows that the important factor is economic, followed by corporate citizenship and marketing objectives.

Other studies that support this findings. Ying (2009) suggested that many Chinese manufacturers have not engaged in RL because China has not yet realized its importance and benefits Based on the findings of the empirical study, it can be seen that full and matured RL implementation in the Chinese manufacturing sector still has a long way to go. The general results show that the key management barriers to RL implementation in Chinese manufacturing sector are the low commitment to RL practices and the lack of RL experts at the management level in the manufacturing firms investigated.

Regarding legislation, governments could take legislative actions such as banning the disposal of certain products, and obliging companies to take back their products at the end of their use (Thierry et al. 1995). However, a study done by Sirak Wondimu (2016), research made in measuring performance of reverse logistics system in PET(Polyethylene terephthalate) bottles recovery in East African Bottling Company in Ethiopia, the survey findings indicate that, no government enforcing rules and policies for companies operating in any industry to recovery post-consumer packages such as PET bottles.

A study done by Ilias P. Vlachos (2014) Reverse Food Logistics during the Product Life Cycle indicates that remanufactured products incur 40-60% less costs than new products and save 85% of the energy needed to start from scratch since remanufacturing expands the life cycle of the product (Kumar and Putnam, 2008).

(Azevendo, 2011) indicated that most manufacturing firms often focus on forward logistics and as a result, they tend to overlook the importance of reverse logistic activities and its potential of improving the firm's and supply chain's performance.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Description of the Study Area

This study was conducted on aqua Addis water, Top water, and Coca Cola soft drink companies. The factory of aqua Addis water is located at Oromia region Finfine special zone at Burayu city. Whereas, the head quarter is in Addis Ababa city. Aqua Addis is the most popular bottled water brand in Ethiopia. It is also the exclusive franchise bottler for all royal crowns (RC) brands manufactures and Ethiopicana Juice as well.

Top water is factory is located at Oromia region around Tatek Geferes. Whereas, the head quarter is specifically located in Addis Ababa city.

East Africa bottling share company (Coca-Cola) is the most recognized brand in the country. Coca-Cola is bottled in Ethiopia's capital Addis, which later expanded the second branch in Dire Dawa.

3.2 Research Design

This study mainly focuses on analysis of reverse logistic practice on water and soft drink plastic bottles in Addis Ababa. Taking the research objective and nature of the study into consideration and in order to attain those objectives of the study and to answer the research questions, descriptive method was employed. The study applied descriptive research design because it helps to assess, analyze and describe the existing situation, the current condition and phenomena.

3.3 Research Approach

There are two main research approaches: quantitative and qualitative. The third methodology is a combination of the two, is gaining acceptance to improve and substantiate research findings. The quantitative method, which has its origin based in the scientific method, relies on statistical procedures for data analysis. In contrast, qualitative methods rely on the descriptive narrative for data analysis (Berrios& Lucca, 2006).

Therefore, to capture the best of both qualitative and quantitative approaches, to provide with in-depth analysis of the subject matter and to meet the objective of the research, the researcher found Mixed-Research approach more suitable to adopt.

The mixed methods research design creates a wider picture by enhancing the depth and insight given by numbers through inclusion of dialogue and narratives (O'Leary, 2010).

3.4 Data Type, Source and Method Collection

While conducting a research the researcher was use primary and secondary data. The primary data are those data which are collected for the first time and the secondary data is targeted companies different report. As this study main concern is to analysis reverse logistic practice on water and soft drink plastic bottles in Addis Ababa, it demands primary data type. Because of this, the researcher was enforced to use both questionnaire and interview for the study and, also include TOP water, Aqua Addis water and Coca Cola soft drink companies headquarter employees in the study. In this study, the researcher used Likert scale questioner data collection method and interview because it is inexpensive, comparable, standardized, and easy to analysis and easily understandable by respondents.

3.5 Population and Sample Size

3.5.1 Population

Due to cost, time, geographical restrictions, and access to data, studying all the employees who are working in those companies were difficult. Therefore, the target population for this study was confined with supervisors, senior staff members, middle and top level managers who involve directly or indirectly in reverse logistics, logistics and supply chain, production, operation, marketing, and in general management working in those selected companies.

Therefore, based on the companies of human recourse management active list report as of January 31st 2020. The total of 142 permanent supervisors, senior staff members, middle and top-level managers are existed in those companies.

Table 3.1 Target Population

Companies	Total Number of targets
TOP Water	42
Aqua Addis Water	40
Coca Cola	60
Total	142

3.5.2 Sample Size

A stratified sample is a sampling technique in which the researcher divided the population into separate groups called strata, and then, a probability sampling (simple random sampling) has been drawn from each group (Strata's).

Therefore, 142 supervisors, senior staff members, middle and top-level managers are targeted under those three (TOP, Aqua Addis and Coca Cola) companies.

The appropriate sample size was generated by applying the statistical formula for sample size proposed by Yamane's, 1967. and finally, 105 employees were sampled.

$$n = \frac{N}{(1 + Ne^2)}$$

Whereby

n=Sample Size

N=Target Population

e²=error

$$\begin{aligned} n &= \frac{N}{(1 + Ne^2)} \\ &= 142 / (1 + 142 \times 0.05^2) \\ &= 142 / (1 + 142 \times 0.0025) \end{aligned}$$

$$n = 104.797$$

Table 3.2 Questionnaire distribution and response rate

Strata/Company	Distributed	Collected
TOP Water	35	34
Aqua Addis Water	35	32
Coca Cola	35	32
Total	105	98

3.6 Methods of Data Analysis

To obtain meaningful and useful information, the data collected through the above data collection tools has passed through the process of editing, coding, classification, tabulating and further organized; interpreted, structured, comparison was done as per their characteristics, and presented. In order to analyze the data, both quantitative and qualitative data analysis method were implemented.

Data Analysis for Quantitative Study (Analysis of Survey questionnaires): In order to reach on meaningful facts and conclusions, the data collected via questionnaires is analyzed by using version 20 Statistical Package for Social Sciences (SPSS) software. To generate the actual results, preliminary frequency tables were produced to determine the number of respondents who expressed their opinion on a particular item. Based on the frequency tables generated from SPSS, descriptive statistic data analysis method is used to analyze and describe the findings.

Data Analysis for Qualitative Study (Semi structured interview): Qualitative data gathered through semi structured interview and discussion were analyzed by using phenomenological data analysis method. Based on the reflection of the discussion the researcher has used phenomenological data analysis method in order to obtain the direct sense perception of the researched phenomenon.

3.7 Ethical Consideration

The researcher was consent of the organization for the study. Employees who were completed the questionnaire would be informed about the purpose of data collection, analysis, and the covenant to maintain privacy of their responses.

Regarding published and unpublished materials used in the literature review and throughout the study, all citations from copy right holder would be made properly.

- Participants were informed about the purpose of the study.
- Participant's privacy and dignity would maintain.
- Confidential information of the enterprise is not disclosed.
- Convenient place and time were designed for participants.
- Collected data was not used for other purposes other than the study.

Chapter Four: Data Analysis and Presentation

Introduction

This chapter describes the analysis and presentation of the data collected from Top water, Aqua Addis water, and Coca Cola soft drink manufacturing companies. The questionnaires were distributed to selected staffs in those companies. As stated in the previous chapter, the questionnaires were distributed to a total of 105 employees of those targeted companies' employees. However, only 98 questionnaires were appropriately filled and returned. Out of the total sample 7 questionnaires were uncollected and this gives a 93 % return rate. The data is analyzed and presented by frequency, percentage and mean using tables with the help of statistical software program SPSS-20.

4.1 Demographic Profile of Respondents

This part of the study consists of gender, age, work experience, educational level, and employee categories. Based on their response, the demographic characteristics of the respondents presented in the below table.

Table 4.1 background of the respondents

Variables	Category	Frequency			Total	Percentage
		TOP Water	Aqua Addis	Coca Cola		
Gender	Male	23	27	22	72	73.5
	Female	11	5	10	26	26.5
	Total	34	32	32	98	
Age	18-25	11	9	5	25	25.5
	25-30	7	12	9	28	28.6
	30-40	13	6	15	34	34.7
	>40	3	5	3	11	11.2
Education Level	Certificate	2	7	3	12	12.2
	Diploma	8	13	7	28	28.6
	BA/BSC	14	8	15	37	37.8

	MA/MSc	10	4	7	21	21.4
Service Year	<4	10	12	5	27	27.6
	5-8	24	9	17	50	51.0
	9-12		10	5	15	15.3
	>12		1	5	6	6.1
Position	General Manager	3	2	1	6	6.1
	Production Head	4	6	2	12	12.2
	Marketing Head	1	1	1	3	3.1
	Supervisor	26	23	28	77	78.6

Sources: primary data generated by SPSS V.20, June. – 2020

As it can be seen from the above table, 73.5% of the respondents are male while the remaining 26.5% were female. This implies that the proportion of male is more than that of female in those corporations.

Regarding respondents' age category, 25.5% of respondents is at the age of 18-25 whereas 28.6% and 34.7% of the participants were between 25-30 and 30-40 years respectively while the rests 11.2% of the respondents are greater than the age of 40.

Concerning with educational level, 12.2% of the participants was educational level of Certificate, 28.6% of the participants were diploma holders, and the majority 37.8% of the participants were BA/BSC holders. The rest 21.4% of the participants were at the level of masters and above. This implied that the organization has educated employees range from certificate to masters.

With regard to service year 27.6% of the participants had a work experience of bellow 4 years, 51% of the participants had 5-8 years' work experience, 15.3% had 9-12 years' work experiences while the remaining 6.1% of the participants had greater than 12 years' work experience.

According to collected data from those organizations, 21.4 % of the participants are in the position of management while the rest and most of the participants 78.6% are constitute from supervisors /non-management /.

4.2 Data Analysis

A 5-point Likert scale which ranges from “Strongly Disagree” to “Strongly Agree” and “Indifferent” in the middle. The scale was applied across most questions of the survey to capture the feelings of respondents to different questions for easy analysis of data. In addition, this analysis section also employs frequencies table to interpret the data generated from SPSS. The “indifferent” option of the table was interpreted as neither agrees nor disagrees and natural it was interpreted as such in the data analysis. The other four choices, namely strongly agree and agree are interpreted as agreed while disagree and strongly disagree are interpreted as disagreed for the purpose of analyzing the outcome of the survey.

Table 4.2 Reverse logistics practice

Reverse logistics practice	Response	Frequency			Percentage		
		TOP	AQUA	COCA	TOP	AQUA	COCA
Our organization’s management and employees understand the concept of reverse logistic practices and its importance.	Strongly Disagree	3	2	6	8.8	6.3	18.8
	Disagree	4	6	7	11.8	18.8	21.9
	Neutral		2	5		6.3	15.6
	Agree	25	20	10	76.5	62.5	31.3
	Strongly Agree	2	2	4	2.9	6.3	12.5
Our organization gives attention and put effort towards the implementation of reverse logistics practice.	Strongly Disagree	1	2	2	2.9	6.3	6.3
	Disagree	10	8	9	29.4	25.0	28.1
	Neutral		2	2		6.3	6.3
	Agree	16	15	15	47.1	46.9	46.9
	Strongly Agree	7	5	4	20.6	15.6	12.5
Our organization allocates enough resources to the practice of reverse logistics.	Strongly Disagree		2	1		6.3	3.1
	Disagree	5	6	5	14.7	18.8	15.6

	Neutral	4	4	9	11.8	12.5	28.1
	Agree	21	17	12	61.8	53.1	37.5
	Strongly Agree	4	3	5		9.4	15.6
Our organization regularly follows the process of reverse logistics practice.	Strongly Disagree	4	3	2	11.8	9.4	6.3
	Disagree	5	5	9	11.8	15.6	28.1
	Neutral		3	5		9.4	15.6
	Agree	21	18	13	14.7	56.3	40.6
	Strongly Agree	4	3	3	61.8	9.4	9.4
Our organization's environmental policies and actions are aligned with minimizing the impact of after use plastic bottle wastes to the environment.	Strongly Disagree	3	2	5	8.8	6.3	15.6
	Disagree	7	7	5	20.6	21.9	15.6
	Neutral	2	2	4	5.9	6.3	12.5
	Agree	20	20	16	58.8	62.5	50.0
	Strongly Agree	2	1	2	5.9	3.1	6.3

Sources: primary data generated by SPSS V.20, June. – 2020

Concerning management and employees understanding on the concept of reverse logistic practices and its importance, 89%, 69% and 44% of the respondents from TOP, Aqua Addis and Coca cola companies respondents respectively responds that, the management and employees of those companies understand about the concept of reverse logistic practices and its importance. On the other hand, 21 %, 25%, and 41 % respondents from those companies respectively disagree on the issue. The rest of respondents are at the middle of the road; they neither agree nor disagree.

Respondents were also asked whether their organization gives attention and put effort towards the implementation of reverse logistics practice. Subsequently, 68 %, 63% and 60 % of respondents from TOP, Aqua Addis and Coca cola respectively argued that their organization gives attention and put effort towards the implementation of reverse logistics practice. On the contrary, 32%, 31% and 34 % of respondents advocated that their organization does not give attention and put effort towards the implementation of reverse logistics practice. Furthermore,

rest of respondents neither agree nor disagree on the matter. From this fact we can conclude that there are still things that need to be done on the attention of the organization to improve reverse logistics practice.

The researcher has raised a question to assess whether their organization allocates enough resources to the practice of reverse logistics or not and 62%, 63% and 53 % of respondents from TOP, Aqua Addis and Coca Cola companies respectively replied that their organization allocates enough resources to the practice of reverse logistics. On the contrary, 15 %, 25% and 16% of respondents respectively argued that their organization does not allocate enough resources to the practice of reverse logistics. Apart from these perspectives, around 23 % of respondents have preferred to be neutral. This all figures indicate that those companies' management allocates enough resources to the practice of reverse logistics, but it also indicates that organizations need to allocate sufficient amount resources to support the reverse logistics activity.

Respondents were also asked whether the their organization regularly follows the process of reverse logistics practice or not, and Subsequently 76%,65% and 49% of respondents from those companies respectively argued that their organization management and staffs regularly follows the process of reverse logistics practice. On the contrary, 24%, 25% and 34% of respondent respectively argued that their organization does not follow the process of reverse logistics practice. Furthermore, rest of the respondent is not sure if their organization management and staffs regularly follows the process of reverse logistics practice or not.

Concerning their organization's environmental policies and actions are aligned with minimizing the impact of used plastic bottle wastes to the environment or not, 65%, 66% and 56 % of respondents from those companies respectively believed that their organization's follows environmental policies and take actions to minimize the impact used plastic bottle wastes to the environment. On the other perspective 30%, 28% and 31% of respondents disagree in the matter and the remaining respondents neither agree nor disagree on this idea. From this fact, we can infer that majority of the employees agreed that, and their organization's follow environmental policies and take mandatory actions to minimize the impact of used plastic bottle to the environment and to the community.

In addition to the response of the sample respondents, the interviewed Aqua Addis water manufacturing company production and plant manager told that, as the company is a large

quantity of water Producer in Ethiopia, aqua Addis water manufacturing company is interestingly involved in activities that support sustainable environment and waste management. Also, The Company considers the natural resources and environmental problems it prevails in the process of manufacturing. Though, The Company involves in the activity that takes environmental protection and waste management into consideration. The company takes care of the waste it generates into the environment. This includes air pollution and wastes that came out of the factory. The company strictly believes in protecting the natural environment from deterioration.

Despite its not stated as a principle in organization policy lists, the management believes the company is committed to produce a product that is friendly to environment; a product that has lesser hazardous chemical content in bottle production.

The interviewed Coca Cola soft drink manager told that, reverse logistics practice is a system that creates sustainable environment from the process of the backward flow of used materials to production unit, which aims to keep the natural resources from degradation. Again, according to the activity, they engaged in, besides the sustaining the environment from hazard, reverse logistics is a source of revenue as it reduces production costs and cover material costs from the production activity.

Their company considers reverse logistics system as an important opportunity for companies that produce plastic bottle, to the community and also, for business owners. Because it is a profit-oriented activity, their company has given RL a bigger concern. And it is also good to make a profit from reverse logistics activity. So, the company is giving more attention and its finding a better and standardizes ways for the management of reverse logistic activity.

Table 4.3 Reverse logistics process

Reverse logistics process	Response	Frequency			Percentage		
		TOP	AQUA	COCA	TOP	AQUE	COCA
Collection/organization (selecting and transporting products for	Strongly Disagree	2	2	2	5.9	6.3	6.3
	Disagree	3	4	3	8.8	12.5	9.4

further examination)	Neutral	4	5	5	11.8	15.6	15.6
	Agree	22	20	19	64.7	62.5	59.4
	Strongly Agree	3	1	3	8.8	3.1	9.4
Inspection/selection and sorting (a decision that the collected product pass to further processing)	Strongly Disagree	12	8	1		25.0	3.1
	Disagree	3	7	11	35.3	21.9	34.4
	Neutral	16		2	8.8		6.3
	Agree	3	14	15	47.1	43.8	46.9
	Strongly Agree	12	3	3	8.8	9.4	9.4
Remanufacture/recovering (whether to remanufacture the product or to recover and distribute)	Strongly Disagree		4	3		12.5	9.4
	Disagree	8	4	5	23.5	12.5	15.6
	Neutral	3	3	3	8.8	9.4	9.4
	Agree	19	18	19	55.9	56.3	59.4
	Strongly Agree	4	3	3	11.8	9.4	6.3
Utilization/redistribution (introduce the product into a market/ customer)	Strongly Disagree	2	3	3	5.9	9.4	9.4
	Disagree	4	3	8	11.8	9.4	25.0
	Neutral		5	3		15.6	9.4
	Agree	27	16	12	79.4	50.0	37.5
	Strongly Agree	1	5	6	2.9	15.6	18.8

Sources: primary data generated by SPSS V.20, June. – 2020

Regarding to collection, selecting and transporting products for further examination, 74%, 66% and 68% of respondents from TOP, Aqua Addis and Coca Cola companies respectively agreed that their organization collect, select and transport products. Whereas, 15%, 19% and 16% of respondents from those company respectively argued that their organization does not select and transport products for further examination. The remaining of respondents are neither of the two sides. From this fact it can be conclude that even if majority of the respondents believed that

their organization collect, select and transport products. The organizations further needs to work in improving the number.

Concerning a decision if the collected product pass to further processing or not and 56%,53% and 57 % of respondents from those companies respectively agreed the collected product pass to further processing in their organization. On the other perspective 35%, 47% and 37% of respondents disagree in the matter and the remaining respondents neither agree nor disagree on this idea. From this fact, we can infer that majority of the employees agreed that, it is a good decision nut companies should overlook this step process as many employees disagree on the implementation of this process.

The researcher has raised a question to assess whether to remanufacture the product or to recover and distribute or not and 68%, 65% and 65% of respondents from those organizations respectively replied as their organization prefer to remanufacture the product or to recover and distribute. On the contrary, 24%, 25% and 23% of respondents respectively argued their organization did not prefer to remanufacture the product or to recover and distribute. Apart from these perspectives, around 5 % respondents have preferred to be neutral. From this fact, we can deduce that majority of the respondents believe that their organization prefer to remanufacture the product or to recover and distribute and it make their organization beneficial.

To have an overall view about the marketing system of TOP water, Aqua Addis water and Coca Cola the researcher also questioned the respondents if their organization introduce the product into a market/ customer or not, and 81 %, 66% and 56 % of respondents from TOP, Aqua Addis and Coca Cola companies believed that their organization introduce the product into a market/ customer. While 18%, 20% and 34 % of respondents from those companies respectively replied that their organization does not introduce the product into a market/ customer, the remaining around 10 % of respondent have taken neither of the two sides.

Table 4.4 Collection

Collection	Response	Frequency			Percentage		
		TOP	AQU A	COCA	TOP	AQU A	COCA

Our organization contributes to a proper disposal and collection of used plastic bottles to protect the environment and to make plastic bottles as a source of income.	Strongly Disagree	1	2	4	2.9	6.3	12.5
	Disagree	10	7	5	29.4	21.9	15.6
	Neutral		6	7		18.8	21.9
	Agree	16	13	10	47.1	40.6	31.3
	Strongly Agree	7	4	6	20.6	12.5	18.8
Our organization creates awareness to the society about proper disposal and management of after consumption plastic bottles.	Strongly Disagree		5	4		15.6	12.5
	Disagree	3	2	5	8.8	6.3	15.6
	Neutral	4	4	5	11.8	12.5	15.6
	Agree	23	18	15	67.6	56.3	46.9
	Strongly Agree	4	3	3	11.8	9.4	9.4
Our organization has a relation with the city administration, with plastic bottle recycling companies and with plastic bottle collectors to improve/expand the reverse logistics activity.	Strongly Disagree	2	2	3	5.9	6.3	9.4
	Disagree		4	2		12.5	6.3
	Neutral		6	4		18.8	12.5
	Agree	31	19	22	91.2	59.4	68.8
	Strongly Agree	1	1	1	2.9	3.1	3.1

Sources: primary data generated by SPSS V.20, June. – 2020

The researcher asked respondents of TOP, Aqua Addis and Coca Cola companies contribution to a proper disposal and collection of used plastic bottles to protect the environment and to make plastic bottles as a source of income, and the researcher asked the respondents of those companies and 68%, 44% and 40 % of the respondents believed that their organization contribute to a proper disposal and collection of used plastic bottles to protect the environment and to make plastic bottles as a source of income. On the other hand, 32 %, 28% and 29 % of respondent of those companies respectively argued that their organization does not contributes anything to a proper disposal and collection of used plastic bottles to protect the environment and to make plastic bottles as a source of income. From this fact, we can understand that most of

companies participate in environmental protection in a way of proper disposal and collection of used plastics.

TOP water, Aqua Addis water and Coca Cola soft drink manufacturing company employees who participate in this study was requested to indicate their opinion if their organization creates awareness to the society about proper disposal and management of after consumption plastic bottles or not, and 79%, 65% and 56% of respondent believed that there organization creates awareness to the society about proper disposal and management of after consumption plastic bottles. On the contrary, 9%, 22% and 30% of respondents respectively argued that their organization does not create awareness to the society about proper disposal and management. While the rest of respondents have stated that they are neither of the two sides. Form this fact, we can infer that majority of the respondents believed their organization creates awareness to the society about proper disposal and management of after consumption plastic bottles.

In addition to that the researcher has raised a question to assess whether the their organization has a relation with the city administration, with plastic bottle recycling companies and with plastic bottle collectors to improve/expand the reverse logistics activity or not, and 94 %,62% and 72% of the respondents are approved that their organization has a relation with the city administration, with plastic bottle recycling companies and with plastic bottle collectors to improve/expand the reverse logistics activity. On the contrary, 6%, 19% and 15% of respondent argued that their organization did not have a relation with the city administration, with plastic bottle recycling companies and with plastic bottle collectors to improve/expand the reverse logistics activity. The rest of respondents preferred to be neutral. From above interpretation, the researcher can conclude that those organizations have a good relationship with city administration.

The interviewed Coca Cola soft drink manufacturing company general and deputy manager witnessed that their company has a collection center and collects used plastic bottles from small scale and micro enterprises, Qorale's, individuals, institutions, plastic packed water and soft drink manufacturers etc. from all parts of the city. Also, the company collects PET bottles from water and soft drink bottle producing companies.

Table 4.5 Reuse

Reuse	Response	Frequency			Percentage		
		TOP	AQUA	COCA	TOP	AQUA	COCA
Our organization has its own design and standard on its materials for the purpose of reuse.	Strongly Disagree	1	1	1	2.9	3.1	3.1
	Disagree	16	8	15	47.1	25.0	46.9
	Neutral		2	1		6.3	3.1
	Agree	13	18	10	38.2	56.3	31.3
	Strongly Agree	4	3	5	11.8	9.4	15.6
Our organization's effort towards the implementation of reuse of the plastic bottles.	Strongly Disagree		1	2		3.1	6.3
	Disagree	3	5	6	8.8	15.6	18.8
	Neutral	4	2	3	11.8	6.3	9.4
	Agree	23	21	18	67.6	65.6	56.3
	Strongly Agree	4	3	3	11.8	9.4	9.4
Our organization has the capacity and the resources to reuse back and to generate profit from the renewable materials.	Strongly Disagree	3	2	5	8.8	6.3	15.6
	Disagree	10	11	2	29.4	34.4	6.3
	Neutral		5	6		15.6	18.8
	Agree	18	11	14	52.9	34.4	43.8
	Strongly Agree	3	3	5	8.8	9.4	15.6

Sources: primary data generated by SPSS V.20, June. – 2020

Based on the above table, 50%, 65%, and 47 % of respondents from TOP water, Aqua Addis water and Coca Cola soft drink manufacturing companies respectively believes that their organization has its own design and standard on its materials for the purpose of reuse. On the other hand, 50 %, 28 % and 50 % of respondents of those companies argued that their organizations have not own their design and standard on its materials for the purpose of reuse. Rest of respondents did not take either of the two. Based on the presented fact, approximately equal proportion of the employees believes that their organizations have its own design and standard on its materials for the purpose of reuse.

As shown in the above table, 80%, 76% and 65 % of the respondents of TOP, Aqua Addis and Coca Cola companies respectively believed that their organizations are committed to implement reuse of the plastic bottles. On the other hand, 9%, 19% and 25% of respondent of those companies respectively argued that their organizations do not commit to implement the reuse of the plastic bottles. The rest of respondents were neutral. From this fact, we can understand that the above mentioned organizations have willingness and commitment to implement reuse of plastic bottles, but still, there is a gap they cannot fully implement reuse.

To have an overall view about the reuse of resource the researcher also questioned the respondents if their organization has the capacity and the resources to reuse back and to generate profit from the renewable materials or not, 62 %, 43% and 60 % of respondents of those companies respectively believed that their organization has the capacity and the resources to reuse back and to generate profit from the renewable materials. While, 38 %, 40% and 23 % of respondents replied that their organization did not have capacity and the resources to reuse back and to generate profit from the renewable materials. Having all these facts in mind, we can infer that majority of the respondents of those companies has the capacity and the resources to reuse back and to generate profit from the renewable materials and that can make them competent in the market.

Table 4.6 Recycling

Recycling	Response	Frequency			Percentage		
		TOP	AQU A	COCA	TOP	AQU A	COCA
There is a system used on the packaging materials for the purpose of recycling.	Strongly Disagree	2	4	1	5.9	12.5	3.1
	Disagree	6	4	8	17.6	12.5	25.0
	Neutral		2	5		6.3	15.6
	Agree	25	21	11	73.5	65.6	34.4
	Strongly Agree	1	1	7	2.9	3.1	21.9

Our organization has the technology and the resource to engage in the process of recycling plastic bottle products.	Strongly Disagree		4	4		12.5	12.5
	Disagree	13	10	8	38.2	31.3	25.0
	Neutral		3	5		9.4	15.6
	Agree	15	13	12	44.1	40.6	37.5
	Strongly Agree	6	2	3	17.6	6.3	9.4

Sources: primary data generated by SPSS V.20, June. – 2020

TOP water, Aqua Addis water and Coca Cola soft drink manufacturing company employees participate in this study are requested to indicate their opinion if there is a system used on the packaging materials for the purpose of recycling or not, and 77%, 69% and 56 % of respondent of those companies respectively believed, that there is a system used on the packaging materials for the purpose of recycling in their organization. On the contrary, 23 %, 26% and 28 % of respondents of those organizations respectively argued that there is no system used on the packaging materials for the purpose of recycling. While, rest of respondents have stated that they are neither of the two sides. Form this fact, we can infer that majority of the employees of those companies agreed that there is a system used on the packaging materials for the purpose of recycling. This indicates that most of the products has a system for the purpose of recycling and those companies can easily get into the process of recycling , can be financially beneficial and foremost it’s good for environment protection.

In addition to that the researcher has raised a question to assess whether the organization has the technology and the resource to engage in the process of recycling plastic bottle products., and 42 %, 47% and 47 % of TOP, Aqua Addis and Coca Cola companies employees respectively approved that their organization has the technology and the resource to engage in the process of recycling plastic bottle products.. On the contrary, 38 %, 44% and 38 % of respondent argued that their organization does not have the technology and the resource to engage in the process of recycling plastic bottle products. The rest of respondents preferred to be neutral. From above interpretation, the researcher can conclude that those organizations should improve their technology and the resource to engage in the process of recycling plastic bottle products.

In addition to the response of the sample respondents, the interviewed Aqua Addis water manufacturing company production manager witnessed that their company currently follows a

trend of producing a plastic bottle product that can easily be compressed and crushed. The plastic bottles the company produces are lightweight relative to other water bottles. And, Jars (20 liter) water plastics is being recycled to our company. This is because, jar plastics are limited in number and easy to find than that of other plastic bottles.

The interviewed Coca Cola soft drink general deputy manager told that, their organization buy recycling used plastic bottles mainly from small scale and micro enterprises, Qorale's, individuals, plastic packed water and soft drink manufacturers etc. from all parts of the city. They believe in if plastic waste is disposed of in normal trash bins, it will not be recycled, so, to make the collection process it is extremely important to separate other waste and plastic waste.

Also the interviewed TOP water general manager has answered the understanding of their company on the area of reverse logistics practice and the current activity they are performing.

Top water manufacturing company is a company that takes waste management and environmental aspects into account. The company supports and involves in creating a sustainable environment. Top water manufacturing company is the 68th bottled water brand in Ethiopia established in April 2018 to the industry of water manufacturing sector, despite its early establishment, the company is moving forward to protect the environment from the adverse effect that it release in to the environment.

Even though it's not written as a principle of the company, the company strongly believes the wastes that arise from using our product should not degrade the environment. Thus, the company is in the process of collecting plastic bottle products from the environment and to further examination.

And the organization is making a way for young peoples to be organized in a group to collect plastic bottle wastes, which is one way of creating employment opportunity and protecting the environment as well.

Beside this TOP water is soon to be awarded the ISO 14000 standard certificate which will be given to companies that protect the environment from the adverse effect because of the material wastes and hazardous chemicals released from the process of manufacturing.

The company believes practices of RL are very important and should be thought as the focus of companies' strategic level and as part of companies supply chain. Despite it is a challenging process and requires large amount of investment, the organization gives environmental

protection prior advantage of reverse logistics and making plans and taking action of reverse logistics practice and already made supply chain department's focus.

supply chain department has its own operating director that control only the practice of reverse logistics process which is initially collecting waste plastic bottles from the environment , a machine that compress it and transport it into the factory. Finally the plastic bottles will be crushed and sold in to a foreign market, which in turn help the company to earn foreign currency.

Table 4.7 Driving forces to implement reverse logistics practice.

Driving forces to implement reverse logistics practice.	Response	Frequency			Percentage		
		TOP	AQU A	COCA	TOP	AQU A	COCA
Social and environmental responsibility	Strongly Disagree		5	2		15.6	6.3
	Disagree	7	7	8	20.6	21.9	25.0
	Neutral	4	3	3	11.8	9.4	9.4
	Agree	20	14	16	58.8	43.8	50.0
	Strongly Agree	3	3	3	8.8	9.4	9.4
To generate profit and to decrease raw materials cost.	Strongly Disagree	1		1	5		2
	Disagree	1	1			8	
	Neutral						
	Agree	18	19	20	55	59	53
	Strongly Agree	16	14	13	40	33	45
To increase customer satisfaction.	Strongly Disagree	3	5	5	8.8	15.6	15.6
	Disagree	3	5	4	8.8	15.6	12.5
	Neutral	2	2	5	5.9	6.3	15.6

	Agree	23	18	16	67.6	56.3	50.0
	Strongly Agree	3	2	2	8.8	6.3	6.3
To remain competitive in the industry.	Strongly Disagree				5.9	15.6	6.3
	Disagree				14.7	21.9	15.6
	Neutral	2	1		8.8	3.1	18.8
	Agree	30	30	30	61.8	53.1	50.0
	Strongly Agree	2	1	2	8.8	6.3	9.4
Governments and company's rule and regulations.	Strongly Disagree		2	5		6.3	15.6
	Disagree	12	9	5	35.3	28.1	15.6
	Neutral	3	2	4	8.8	6.3	12.5
	Agree	16	16	17	47.1	50.0	53.1
	S. Agree	3	3	1	8.8	9.4	3.1

Sources: primary data generated by SPSS V.20, June. – 2020

Respondents also requested the back force to which their organization is engaged in the practice of reverse logistics and subsequently 68%, 53% and 59% of TOP water, Aqua Addis water and Coca Cola soft drink manufacturing company employees who participate on this study respectively responded that their organization is derived by social and environmental responsibility to be engaged in reverse logistics practice. On the contrary, 21%, 39 %, 31 % of the respondents from those organizations respectively advocated their organizations do not believe that social and environmental responsibility is a driving force to implement reverse logistics. Furthermore, around 10% of respondents neither agreed nor disagreed on the matter. From this fact we can determine the majority of respondent believe that their organization is derived by the force of social and environmental responsibility.

Based on the above table, 95%, 92% and 98 % of respondents from TOP water, Aqua Addis water and Coca cola soft drink Company respectively argued generating profit and decreasing raw materials cost is a back force to implement reverse logistics practice. On the other hand, 5 %, 8% and 2 % of respondent from those companies respectively disagreed on the stated driving

force. Rest of respondents did not take either of the two. Based on the presented fact, larger proportion of the employees believed that generating profit and decreasing raw materials cost is a driving force.

As shown in the above table, 74%, 64% and 56% of the respondents from those companies respectively believed that their organization can be driven to implement reverse logistics practice to increase customer satisfaction. On the other hand, 18%, 32% and 29% of respondent argued that their organization does not consider increasing customer satisfaction as a driving force. The rest of respondents were neutral.

To have an overall view about the driving force of being a market competitive in the industry, the researcher also questioned the respondents if competitive advantage is a driving force to implement reverse logistics practice or not, 96%, 98% and 100 % of respondents believed that their organization consider being competitive in the industry as a driving force. While 4 %, and 2% of employees from TOP and Aqua Addis companies participate in the study respectively replied that their organization did not consider gaining competitive advantage as a driving force to reverse logistics practice. From this we can conclude majority of respondents consider competition advantage as a driving force to reverse logistics practice.

Respondents were also asked whether the government and company's rule and regulations is a back force to implement reverse logistics practice or not and subsequently 56 %, 59% and 56% of respondents from those TOP, Aqua Addis and Coca Cola companies respectively argued that the government and company's rule and regulations is a back force to the implementation of reverse logistics practice. On the contrary, 35%, 34% and 31 % of respondents from those companies' replied that government and company's rule and regulations are not a driving force to implement reverse logistics practice. Furthermore, rest of respondents neither agree nor disagree on the matter.

Table 4.8 Problems/challenges in reverse logistics

Problems/challenges in reverse logistics	Response	Frequency			Percentage		
		TOP	AQUA	COC A	TOP	AQU A	COCA

High cost related to reverse logistics and organization's financial barrier.	S. Disagree		2	3		6.3	9.4
	Disagree	2	4	4	5.9	12.5	12.5
	Neutral		2	4		6.3	12.5
	Agree	31	22	18	91.2	68.8	56.3
	S. Agree	1	2	3	2.9	6.3	9.4
Lack of awareness, commitment, and attention of top managements to the practice of reverse logistics.	S. Disagree	1	5	1	2.9	15.6	3.1
	Disagree	10	4	8	29.4	12.5	25.0
	Neutral		2	4		6.3	12.5
	Agree	16	17	14	47.1	53.1	43.8
	S. Agree	7	4	5	20.6	12.5	15.6
Insufficient information and inability on creating awareness about the practice of reverse logistics.	S. Disagree		3	5		9.4	15.6
	Disagree	4	5	5	11.8	15.6	15.6
	Neutral	4	4	4	11.8	12.5	12.5
	Agree	22	17	15	64.7	53.1	46.9
	S. Agree	4	3	3	11.8	9.4	9.4
Unavailability of clear policy and regulation on reverse logistics practice and lack of support from government.	S. Disagree	4	3	3	11.8	9.4	9.4
	Disagree	5	5	2	14.7	15.6	6.3
	Neutral		5	6		15.6	18.8
	Agree	21	17	19	61.8	53.1	59.4
	S. Agree	4	2	2	11.8	6.3	6.3
Lack of available expertise in reverse logistics process.	S. Disagree		3	2		9.4	6.3
	Disagree	2	6	8	5.9	18.8	25.0
	Neutral		3	3		9.4	9.4
	Agree	31	17	17	91.2	53.1	53.1
	S. Agree	1	3	2	2.9	9.4	6.3
Poor value and culture of the population in proper management of after use plastic products.	S. Disagree	1	2	3	2.9	6.3	9.4
	Disagree	10	8	7	29.4	25.0	21.9
	Neutral		4	3		12.5	9.4
	Agree	16	15	15	47.1	46.9	46.9

	S. Agree	7	3	4	20.6	9.4	12.5
Poor cooperation and integration of different organizations in the area of reverse logistics	S. Disagree		3	1		9.4	3.1
	Disagree	3	5	3	8.8	15.6	9.4
	Neutral	4	1	2	11.8	3.1	6.3
	Agree	23	21	21	67.6	65.6	65.6
	S. Agree	4	2	5	11.8	6.3	15.6

Sources: primary data generated by SPSS V.20, June. – 2020

Concerning the question whether high cost to reverse logistics and organization’s financial barrier is a challenge to implement reverse logistics practice or not. From respondents forward their view point 94%, 75% and 65% of the respondent from TOP water, Aqua Addis and Coca Cola companies respectively responds that high cost for the reverse logistics practice and organization’s financial barrier is the problem in order to implement reverse logistics in the organization. Furthermore 6%, 19% and 22% of the respondents argued that high cost and organization’s financial barrier is not a problem to the practice of reverse logistics. Furthermore, 8% of the respondent is not sure if high cost and organization’s financial barrier is a barrier or not. From this fact we can conclude that the cost of reverse logistics and organizations financial barrier is a problem in order to engage the practice of reverse logistics.

Regarding the awareness, commitment, and attention of top managements of TOP water, Aqua Addis and Coca Cola as a barrier to reverse logistics, 67%, 65% and 58 % of respondent respectively believed that lack of awareness, commitment, and attention of top managements is a problem to the implementation of reverse logistics practice. Then again, 32%, 28% and 28% of the respondents respectively argued that, lack of awareness, commitment, and attention of top managements is not a barrier to the implementation of reverse logistics practice. And rest of respondent remained neutral. This implies that majority of respondents agreed that the lack of top management awareness, commitment hinders reverse logistics practice from implementation. As shown in the above table, 77%, 62% and 58% of the respondents from TOP, Aqua Addis and Coca respectively believed that the insufficient information and inability on creating awareness about the practice of reverse logistics is a barrier to implementation of reverse logistic practice. On the other hand, 12%, 25% and 31% of respondent from those companies are respectively

argued that enough information and inability on creating awareness about the practice of reverse logistics will not be a problem to reverse logistics implementation. The rest of respondents were neutral. From this fact it can be conclude that majority of the respondents believed the existences of insufficient information and inability on creating awareness about the practice of reverse logistics is a problem that hinders reverse logistics activity from being implemented.

Regarding to unavailability of clear policy and regulation on reverse logistics practice and lack of support from government as a challenge of reverse logistics, 73%, 59% and 65% of respondent from those companies respectively agreed the unavailability of clear policy and regulation on reverse logistics practice and lack of support from government is considered as a problem to reverse logistics activity. Then again, 27%, 25% and 15% of respondents believes the availability of clear policy and regulation on reverse logistics practice and lack of support from government cannot be a problem to reverse logistics. The rest around 15% of respondent preferred to stay neutral on the matter. Considering these all facts, it is possible to say that largest proportion of those companies' employees who participate in this study believed the Unavailability of clear policy and regulation on reverse logistics practice and lack of support from government can directly and indirectly be a problem to reverse logistics practice.

The results in above table indicate that, 94 %, 62% and 59% of the respondents from above mentioned companies respectively replied no existence of enough expertise in reverse logistics area is a barrier to implement reverse logistics process. Whereas, 6%, 28% and 31 % of respondents believed that no existence of expertise in reverse logistics process is not a problem to reverse logistics process. From the finding, most respondents from those companies implicit the unavailability of expertise in the area of reverse logistics processes is a challenge to implement reverse logistics practice. Thus training expertise on this area is crucial for companies.

The researcher has raised a question whether the poor value and culture of the population in proper management of used plastic products as a challenge for reverse logistics or not. 67%, 56% and 59% of respondents from those companies respectively believed the existence of poor value and culture of the population in proper management of used plastic products is the major problem to reverse logistics practice. On the other hand, 32%, 31% and 31% of respondent respectively disagreed that the poor value and culture of the population in proper management of used plastic products as a challenge for reverse logistic practice. Furthermore, the rest of

respondent preferred to stay neutral on the matter. Considering these all facts, it is possible to say that largest proportion of the employees of those companies believe the existence of poor value and culture of the population in proper management of used plastic products is a barrier to the effective implementation of reverse logistics practice.

The researcher has raised a question to participants of this study if poor cooperation and integration of different organizations in reverse logistics is a problem to reverse logistics practice or not. As indicated in the above table, 79%, 72% and 82% of respondents from TOP water, Aqua Addis and Coca cola companies respectively believed that the existence of poor cooperation and integration of different organizations is a barrier to the implementation of reverse logistic practice. On the other hand, 9 %, 25% and 12 % of the respondents respectively disagree on the matter. The rest around 12 % of the respondents remain neutral. Thus, it is noted that organizations still needs to work on a system of cooperation and integration with different organizations in the area of reversed logistics.

In addition to the response of the sample respondents, the interviewed Aqua Addis water manufacturing company production manager told that their company considers too many challenges to not to fully involve in the process of reverse logistics practices, among the barriers, here are some lists of barriers that are identified by the organization are:

First, there is lack of strategic planning related to reverse logistics practice. Top level management in the company lacks attention toward the implementation of reverse logistics practice. This is because of that the forward logistic which is the production of water products is very successful, and this made the company to give more weight time, attention, and resource only for the production process.

Second, as reverse logistics require allocation of large amount of investment, large amount of capital is needed implement RL. The company believes that the return money that comes from the practice reverse logistic cannot be compared to the amount of money to be invested on reverse logistics. Because, the process of reverse logistic need large amount of investment.

Third, where waste disposal and after use waste management practice is poor like our country, collecting the plastic materials from customer and going to a further process becomes more complex and unachievable.

The interviewed Coca Cola soft drink general and deputy manager told that the main opportunity that they got from involving in to reverse logistics process is that can contribute toward creating clean and net environment to the city. Even the process is very difficult they are putting little effort on the contribution of creating a clean Addis Ababa.

Also, the company is creating an employment opportunity to young people in the process of collection and transporting process and they are working to decrease the unemployment rate of our country.

Among some challenges that become a constraint from implementing a successful operation of reverse logistics practice to coca cola soft drink manufacturing company due to:

- Lack of awareness and cooperativeness of the community.
- High amount of reverse logistics cost.
- Lesser support from city administration and government.
- Supply shortage from collection.
- Bad quality of collected products.

The interviewed general manager of TOP water manufacturing company identified challenges/barriers to the process of reverse logistics practice.

The company considers too many challenges from implementing a reverse logistics practice; not only as a single company but also as industry there are many barriers in the reverse logistics process. Among the many barriers, the biggest barriers identified by our organization are:

First, reverse logistics require allocation of more funds like financial, information technological and other resources. All the various processes RL require high amount of financial support, thus shortage of sufficient amount of investment for the RL is a constraint to the company.

Second, as reverse flow starts with the final customers and ends with the producers, the challenge arise here in collecting the plastic materials from customer and transport to the factory. This includes high costs in transportation and storage costs.

Third, the community of Addis Ababa is not well trained in a proper disposal and removal of wastes. Consumers throw plastic bottle everywhere after use rather than putting into a single waste bin. This makes a mixing of plastic bottles with other wastes which creates contamination. Also, this process is very time consuming for the collectors, and there is lack of quality of the

returned product like High uncertainty in the quality of collected plastic bottles and inconstant timing of the returned products. This makes the collection of plastic bottles very difficult.

Table 4.9 Mechanisms to implement/improve reverse logistics practice

Mechanisms to implement/improve reverse logistics practice	Response	Frequency			Percentage		
		TOP	AQUA	COCA	TOP	AQUA	COCA
Creating awareness to the society about reverse logistics practice and its importance.	S. Disagree	4	5	4	11.8	15.6	12.5
	Disagree	5	6	6	14.7	18.8	18.8
	Neutral		2	4		6.3	12.5
	Agree	21	16	15	61.8	50.0	46.9
	S. Agree	4	3	3	11.8	9.4	9.4
Top level management's and employee's commitment to the practice of reverse logistics	S. Disagree	3	3	5	8.8	9.4	15.6
	Disagree	2	11	3	5.9	34.4	9.4
	Neutral		2	3		6.3	9.4
	Agree	26	13	19	76.5	40.6	59.4
	S. Agree	3	3	2	8.8	9.4	6.3
Government policy and regulation that enforce companies to implement reverse logistics and a system that punish and reward	S. Disagree	2	5	1	5.9	15.6	3.1
	Disagree	3	4	9	8.8	12.5	28.1
	Neutral	4	3	4	11.8	9.4	12.5
	Agree	22	18	15	64.7	56.3	46.9
	S. Agree	3	2	3	8.8	6.3	9.4
Efficient investment of resources like financial, labor, and technological resources.	S. Disagree		3	3		9.4	9.4
	Disagree	12	10	7	35.3	31.3	21.9
	Neutral	3	2	1	8.8	6.3	3.1
	Agree	16	14	19	47.1	43.8	59.4
	S. Agree	3	3	2	8.8	9.4	6.3
Cooperating and working with supply chain partners in the area of	S. Disagree		4	2		12.5	6.3
	Disagree	1	1	2	2.9	3.1	6.3

reverse logistics.	Neutral	4	5	8	11.8	15.6	25.0
	Agree	25	20	16	73.5	62.5	50.0
	S. Agree	4	2	4	11.8	6.3	12.5

Sources: primary data generated by SPSS V.20, June. – 2020

The researcher asked the respondents whether creating awareness to the society about reverse logistics practice and its importance is a mechanism used to implement/ improve reverse logistics practice or not, and 74%, 59% and 55% of respondents from TOP water, Aqua Addis water and Coca Cola soft drink manufacturing company employees respectively replied creating awareness to the society about reverse logistics practice and its importance helps to implement/improve reverse logistics practice. On the contrary, 26 %, 35% and 31% of respondent respectively believes that creating awareness to the society about reverse logistics practice and its importance does not help to implement or to improve the practice of reverse logistics. Apart from these perspectives, rest of the respondent preferred to be neutral. As a result, it is possible to say most of respondents of this study agreed on creating awareness to the society about reverse logistics practice and its importance is necessary for the companies to involve or to improve reverse logistics activity.

One of the issues rose in this part is whether top level management’s and employee’s commitment to implement or to improve the practice reverse logistics or not. And 85%, 50% and 65% of respondents from those companies respectively agreed that the top level management’s and employees commitment is a mechanism to improve and implement reverse logistics practice, in other hand 15%, 45% and 25% of respondent argued that the top level management’s and employees commitment is not considered as a mechanism to improve or to implement reverse logistics practice. The rest of respondents did not take either of the two sides. Therefore, we can reach on consensus that the top-level management’s and employees commitment is one of the mechanisms that help companies to implement and improve the practice of reverse logistics.

Respondents were also asked whether government policy and regulation enforce companies to implement reverse logistics and a system that punish and reward is a mechanism to improve and implement reverse logistics or not. Subsequently, 74%, 62% and 56% respondents from TOP water, Aqua Addis water and Coca Cola soft drink manufacturing company employees respectively argued that the government policy and regulation that enforce companies to

implement reverse logistics help companies to implement or to improve their reverse logistics practice. On the contrary, 15%, 28% and 31% of respondents advocated that government policy and regulation that enforce companies to implement reverse logistics cannot be considered as a mechanism to implement reverse logistics practice. From this fact we can conclude that government policy and regulation that enforce companies to implement reverse logistics can be one of the mechanisms used to implement reverse logistics practice of companies.

The researcher has raised a question to assess whether efficient investment of resources like financial, labor, and technological is a mechanism to implement or to improve reverse logistics practice or not and 56%, 52 % and 65% of respondents from those companies replied the existence of efficient investment of resources like financial, labor, and technological resources as a mechanism used to improve and implement reverse logistics practice. On the contrary, 35%, 40% and 31% of respondents advocated efficient investment of resources like financial, labor, and technological resources are not considered as a mechanism in their organization. Apart from these perspectives, rest of respondents has preferred to be neutral. This all figures indicate that efficient resources like financial, labor and technological resources should be rise for a proper implementation of reverse logistics practice.

Finally the researcher arises a questions to respondents if cooperation with supply chain partners in the area of reverse logistics is a mechanism used to implement or to improve reverse logistics practice or not and 85%, 69% and 62 % of respondents from TOP water, Aqua Addis and Coca Cola companies respectively replayed the existence of cooperation with supply chain with partners in the area of reverse help companies to implement or to improve the reverse logistics practice. The other 3%, 16% and 12% of respondents replied cooperation with supply chain partners in the area of reverse logistics does not help companies to implement or to improve reverse logistics practice .The remaining around 15% of respondents did not give any comment. From this fact, we can deduce that majority of the respondents believe that cooperation with supply chain partners in the area of reverse logistics is one of the crucial thing for companies to implement and to improve reverse logistics.

In addition to the response of the sample respondents, the interviewed managers told that their organization understands the numerous benefits of reverse logistics, like its economic, environmental, marketing image, asset protection advantages.

Again, In addition to the respondent's response the interviewed Coca Cola soft drink company general and deputy manager told the researcher that the company is making progress on the environmental protection through collection waste bottles and by producing quality products.

To the future the company has a plan to maximize its supply quantity to provide a better outcome, to standardize the operation for effective results, to involve in other activity of manufacturing and reverse logistics practice.

- TOP water general manager told about the company's future plan in relation with reverse logistics and the Organization has considered the importance of Reverse Logistics as it protects the environment from negative impact and it gives competitive advantages to companies. Besides that by Reverse Logistics companies obtain significant cost advantage. But it is a complex and dynamic process and it is not merely a reversal of the direction of the supply chain. It involves high level of investment, commitment not only from the community within the organization but also from government, from whole society, logistics providing companies and other concerned bodies. Without the integration of all this parties, the implementation of effective reverse logistics practice will not become true. Thus to the future, TOP water manufacturing company will work on the environmental protection and at the same time gaining economic benefit through reverse logistic practice not only from the plastic bottle products, but also on packaging materials. The company is getting step towards using the right packaging material which avoid packaging plastic wastes and replace it with cartoons, because cartoons take minimum time to decompose. As the organization concentrate in the core business that is producing water products, it also have a plan in the future to be involved in reverse logistics activities, like recycling and reusing plastic bottle products back. In the future managers of the company will surly focus on the development of awareness on the concept and advantage of RL to the society and to be example for other companies in the industry
- The interviewed Aqua Addis water company production manager told that even if they company understands the importance of reverse logistics in terms of protecting the environment from negative impact and as it gives competitive advantages to the company, the company has no plan to engage in the process of reverse logistics process in the near future.

The reason they consider is that the system of reverse logistics has to be changed, and the contribution should also come from the community and government. The company will work towards to change this entire system and of course will be part of change. By awakening the community on the idea of reverse logistics, by coordinating the society towards the effective implementation of reverse logistics and by involving in the process of creating sound environment for the implementation of reverse logistics practice. After creating the right situation and system for the implementation process, the company will surely involve in the practice of reverse logistics and make change.

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

In the previous chapter, the collected data was analyzed and reveal to the findings of the study. Basically, this chapter consists of four sections; first section is summary of findings, second section is conclusions of study drown from pervious chapter analysis and findings, in third section based on the findings of the study; reasonable recommendation was forwarded and finally end up by forwarding possible further research direction in the problem area.

5.2 Summary of the findings

- ✓ The objective of this thesis is to analysis the reverse logistic practice on water and soft drink plastic bottles in Addis Ababa. As clearly explained in chapter one of this thesis. A data collection instrument which was questionnaires were distributed to sampled populations of TOP water, Aqua Addis and Coca Cola soft drink companies located at Addis Ababa specifically at their head quarter, and the response rate was 93%.
- ✓ As the study was to analyze the reverse logistic practice on water and soft drink plastic bottles in Addis Ababa, the returned responses were 98 employee survey questionnaires and management interview. Based on this, the researcher analyzed the reverse logistics practice, reverse logistics process, driving forces to implement reverse logistics practice, problems/challenges in reverse logistics, mechanisms to implement/improve reverse logistics practice and, also collecting, reusing, recycling used plastic bottles.
- The study sought to find out the respondents' opinion about reverse logistics practice in their organization and the results indicated that 73% of the respondents from those organization are agreed that their organization's management and employees understand the concept of reverse logistic practices and its importance, gives attention and put effort towards the implementation of reverse logistics practice, allocates enough resources to the practice of reverse logistics, regularly follows the process of reverse logistics practice and follow environmental policies and actions to minimize the impact used plastic bottle in the environment.
- The study also determined respondents opinion about reverse logistics process and high number of respondents (70%) agreed that their organization select and transport products for further examination and processing, the study again established that the majority of

the respondents around 74 % agreed that their organization contributes large amount of resources to a proper disposal and collection of used plastic, to creates awareness to the society and working great things with city administration to protect environment from clean and the community from harm.

- The study sought to find out the respondents' opinion about reusing and recycling used plastic bottles in their organization. The results indicated that, only 60% of the respondents from those organizations believed that their organization is committed to reuse and recycling plastic bottles.
- The study also determined respondents opinion about the driving forces that push their organization to implement reverse logistics practice, and 81% agreed that their organization is pushed by social and environmental responsibility, governments rules and regulations, to maximize profit, to increase customer satisfaction and finally to remain competent in the market.
- The study sought to find out the respondents' opinion about the challenges in reverse logistics in their organizations and around 83 % of respondents replied the problem with reverse logistics are high cost of reverse logistics, lack of awareness, commitment in top managements, company policy problem, unavailable of expertise in the area and poor cooperation of different organizations.
- Larger proportion of the respondents replied, government and organizations are striving to solve the problems through providing policies, standards, and procedures on reverse logistics practice to the trend of after use plastic bottles by creating awareness to the community.
- Finally, 75 % of respondents from those above-mentioned companies believed that the best mechanisms to improve reverse logistics practice are creating awareness to the society, improving top level management's and employees commitment, following government policy and regulation, using existing resources effectively and efficiently and working with all concerning bodies.

5.3 Conclusions

- Most people in the city lacks a practice of proper disposal of plastic bottle wastes after use and plus there is a gap in separation of plastic bottle waste from other kind of wastes.

Still reverse logistic practice is not well understood concept in the community of the city yet.

- The lack of quality of the returned product and the difficulty of predicting time of return products and most of the collected plastic bottles may be damaged.
- There is lack of strategic planning regarding reverse logistics and lack of commitment of top level managements and supply and logistics managers.
- There is lesser intervention of government to company's reverse logistics practice. Government has minimal involvement in the practice of reverse logistics and lack of support in fulfilling major infrastructure, this also include setting a separate policy and standard to waste management of companies.
- Lack of sufficient fund for reverse logistics area, because these companies are primarily engaged in the production of beverage products which take a larger amount of investment.
- From this study, the researcher understands that reverse logistics is not effectively implemented in those companies because reverse logistics is relatively a new concept to our country but as it is new concept companies are looking forward for effective implementation of reverse logistics.

5.4 Recommendations

The purpose of the thesis is to analyze the reverse logistics practice on water and soft drink plastic bottles specifically on TOP water, Aqua Addis water and Coca Cola soft drink manufacturing companies and by identifying problems related to reverse logistics practice to forward suggestions and recommendations which can help to solve the problems and ensure effective management of used plastic bottles and then protect the environment from hazard and the community from the negative impact caused by the untreated after use plastic bottle wastes. So, the researcher identified the problems and forwarded possible solutions to the problems as follows.

- The first and the best thing is, to create an effective and ongoing consumer and community awareness about the proper disposal of plastic wastes, the impact of plastic bottle wastes to the environment and it is benefit if it is managed properly.

- Companies must strive to improve community and employee's awareness on the practice of reverse logistics activity and process, build a better knowledge in this field and involve the society to effectively participate in the reverse logistics practices; this can be done through training and awareness creation program by using different covenant methods.
- Those companies should set a clear environmental manual, standard, policies and regulation in order to minimize the impact of used plastic bottle waste to the environment and also to reduce the cost related to production of new plastic bottles and also to save foreign currencies incurred to buy raw material.
- Top level Managers need to consider reverse logistics practice as part of their supply chain management, company's management should give enough attention, follow up the process and allocate sufficient amount of fund to the reverse logistics practice.
- Training and education should be given for reverse logistics expertise, for informal sector plastic bottle collector, and mechanisms are also needed to standardize the collection process.
- Government need to take part in companies reverse logistics practice, starting from establishing a restrictive policy and regulation, up to follow up and evaluate the implementation process, and create a mechanism that reward and take a constrictive action.
- Companies that produce or use plastic bottle products need to collaborate for a mutual benefit with plastic recycling companies, with suppliers, with government and with community on how to improve the reverse logistics practice to the city of Addis Ababa.

5.5 Limitation and Direction for Further Research

- Some questionnaires were not returned because some of the employees were out of their principal workplace because of different reasons.
- Some of the employees were not volunteers to fill the questionnaire because they are busy of their daily routine work. Moreover, some of them seem bored of feeling lots of questionnaire from different researchers every year.

- Other limitation is the static nature of the study, that is, the study is based on the existing scenario of plastics bottles; but in the future the current issues are maybe changed. Therefore, the research conducted in the future should be focus on whether reverse logistics system is improved in the country with changing time and technology.
- As expressed earlier, the research done in the field of reverse logistics is very minimal. Therefore, it would be very beneficial to conduct further research in the subject using a larger sample size and from different system perspective.

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Annex A: Questionnaires

St. Mary's University
School of Graduate Studies
MBA Program

Dear respondent,

This research is conducted as a partial fulfillment of Master of Business Administration in General Management at St. Mary University. The research is entitled with "Analysis of reverse logistic practice on water and soft drink plastic bottles in Addis Ababa". Aiming at, explaining the overall reverse logistics practice on selected water and soft drink plastic bottle using companies and plastic bottle recycling company.

In this questionnaire, I ask you about the general reverse logistics practice that your organization is engaged in and questions for organizations that do not still engaged in the practice of reverse logistics.

I would be very grateful if you would take a few minutes to fill this short questionnaire genuinely and your participation in this survey shall be highly appreciated.

Be assured that all answers you provide will be kept in the strict confidentiality and shall be used for academic purposes only.

Thank you!

Instructions

- Don't write your name
- Answer all questions

SECTION A: GENERAL INFORMATION

1. Sex: Male Female

2. Age : 18 -25 25-30 30-40 40 or above

3. Educational level: Certificate Diploma BA/BSC

MSC

PhD

if any, please specify

4. Year of experience: 0-4 years 5- 8 years 9-12 years above 12 years

5. In which position are you currently enrolled?

General Manager Production Head

Marketing head Other, please specify _____

SECTION B: REVERSE LOGISTICS PRACTICES

1. This part of questionnaire covers about your organization and employee’s understanding and effort to the practice of reverse logistics. There are five options to answer here.1 stands for “Strongly disagree”, 2 for “Disagree”, 3 for “Neutral”, 4 for “Agree” and 5 for “Strongly agree”. Please indicate how much you agree or disagree with each of the following statements by Putting check mark “√” on the box provided that best represents your opinion.

Reverse logistics practice		1	2	3	4	5
1	Our organization’s management and employees understand the concept of reverse logistic practices and its importance.					
2	Our organization gives attention and put effort towards the implementation of reverse logistics practice.					
3	Our organization allocates enough resources to the practice of reverse logistics.					
4	Our organization regularly follows the process of reverse logistics practice.					
5	Our organization’s environmental policies and actions are aligned with minimizing the impact of after use plastic bottle wastes to the environment.					

2. Indicate how much your organization is engaged to the following reverse logistics Processes. There are five options to answer here.1 stands for “Strongly disagree”, 2 for “Disagree”, 3 for “Neutral”, 4 for “Agree” and 5 for “Strongly agree”. Please indicate

how much you agree or disagree with each of the following statements by putting check mark “√” on the box provided that best represents your opinion.

Reverse logistics process		1	2	3		4	5
1	Collection/organization (selecting and transporting products for further examination)						
2	Inspection/selection and sorting (a decision that the collected product pass to further processing)						
3	Remanufacture/recovering (whether to remanufacture the product or to recover and distribute)						
4	Utilization/redistribution (introduce the product into a market/customer)						

Collection		1	2	3	4	5
1	Our organization contributes to a proper disposal and collection of used plastic bottles in order to protect the environment and to make plastic bottles as a source of income.					

2	Our organization creates awareness to the society about proper disposal and management of after consumption plastic bottles.					
3	Our organization has a relation with the city administration, with plastic bottle recycling companies and with plastic bottle collectors in order to improve/expand the reverse logistics activity.					
Reuse		1	2	3	4	5
1	Our organization has its own design and standard on its materials for the purpose of reuse.					
2	Our organization's effort towards the implementation of reuse of the plastic bottles.					
3	Our organization has the capacity and the resources to reuse back and to generate profit from the renewable materials.					
Recycling		1	2	3	4	5
1	There is a system used on the packaging materials for the purpose of recycling.					
2	Our organization has the technology and the resource to engage in the process of recycling plastic bottle products.					

3. Indicate the force that drives organizations to implement reverse logistics practice and indicate the back force to which your organization implements reverse logistics practice. There are five options to answer here. 1 stands for “Strongly disagree”, 2 for “Disagree”, 3 for “Neutral”, 4 for “Agree” and 5 for “Strongly agree”. Please indicate how much you agree or disagree with each of the following statements by putting check mark “√” on the box provided that best represents your opinion.

Driving forces to implement reverse logistics practice.		1	2	3	4	5
1	Social and environmental responsibility.					
2	To generate profit and to decrease raw materials cost.					
3	To increase customer satisfaction.					
4	To remain competitive in the industry.					
5	Governments and company’s rule and regulations.					

4. This part of the questionnaire covers about the challenges/problems which discourage organizations from implementing reverse logistics practice. Please indicate how much the following challenges/problems affect your organization from implementing reverse logistics practice. There are five options to answer here. 1 stands for “Strongly disagree”, 2 for “Disagree”, 3 for “Neutral”, 4 for “Agree” and 5 for “Strongly agree”. Please indicate how much you agree or disagree with each of the following statements by putting check mark “√” on the box provided that best represents your opinion.

Problems/challenges in reverse logistics		1	2	3	4	5
1	High cost related to reverse logistics and organization's financial barrier.					
2	Lack of awareness, commitment, and attention of top managements to the practice of reverse logistics.					
3	Insufficient information and inability on creating awareness about the practice of reverse logistics.					
4	Unavailability of clear policy and regulation on reverse logistics practice and lack of support from government.					
5	Lack of available expertise in reverse logistics process.					
6	Poor value and culture of the population in proper management of after use plastic products.					
7	Poor cooperation and integration of different organizations in reverse logistics					

5. This part of questionnaire covers mechanisms to implement or to improve reverse logistics practice. There are five options to answer here. 1 stands for “Strongly disagree”, 2 for “Disagree”, 3 for “Neutral”, 4 for “Agree” and 5 for “Strongly agree”. Please indicate how much you agree or disagree with each of the following statements by putting check mark “√” on the box provided that best represents your opinion.

Mechanisms to implement/improve reverse logistics practice		1	2	3	4	5
1	Creating awareness to the society about reverse logistics practice and its importance.					
2	Top level management's and employee's commitment to the practice of reverse logistics					
3	Government policy and regulation that enforce companies to implement reverse logistics and a system that punish and reward					
4	Efficient investment of resources like financial, labor, and technological resources.					
5	Cooperating and working with supply chain partners in reverse logistics.					

Annex B: Interview

St. Mary's University

School of Graduate Studies

MBA Program

Interview Questions for Management of Aqua Addis water, Top water, Coca Cola Soft Drink Company

1. What is your organization's principle to waste management and environmental protection to social responsibility?
2. What kind of system, policy or trend does your company follow regarding to after sale or usable plastic bottles of your own products?
3. How your organization understands reverse logistics practice and its importance?
4. Why reverse logistics practice is not part of supply chain focus of your company?
5. What challenges you consider implementing reverse logistic practice in your organization?
6. What is your plan in relation to reverse logistics practice?