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ASSESSMENT OF GREEN SUPPLY CHAIN MANAGEMENT PRACTICES AND ORGANIZATIONAL PERFORMANCE: The Case of ethio telecom

By
Mesfin Kora

A Thesis Submitted to Addis Ababa University College of Commerce in Partial Fulfilments of the Requirements for the Degree of Master of Art in Logistics and Supply Chain Management

Addis Ababa University College of Commerce

June 2016

Addis Ababa, Ethiopia

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DECLARATION

I, the undersigned, declare that this thesis entitled "***Assessment of Green Supply Chain Management Practices and Organizational Performance*: The Case of Ethio Telecom***"* is my original work and has not been presented for degree requirement in any other university, and all the sources used to support this particular study have been appropriately acknowledged.

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ADDIS ABABA UNIVERSITY

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ABSTRACT

As ‚green" issues continue to become a global concern, assessing organizational performance from green paradigms perspectives is imperative. The purpose of this study was to assess the green supply chain practice and organizational performance in the case of ethio telecom. In order to attain the objectives of the study, mixed approach was entertained. As a means of data collection instrument; questionnaire and structured interview questions were applied. The population of the study were 41 employees of ethio telecom, mainly those at managerial position and responsible either directly or indirectly for the supply chain activities of the company. From a total of 41 questionnaires distributed, only 36 of them were correctly filled and applied in the study, and this revealed a response rate of 88%. The interviews were conducted with Compliance and Monitoring Control and Environmental Law and Standards Directorates of the Ministry of Environments and Forest officer and Communication and IT standardization and Regulation Directoratesofficer. In order to analyse, interpret and present the data captured via questionnaire,Statistical Package for the Social Sciences(SPSS) were used. Both inferential and descriptive analysis methods i.e., percentage, means, standard deviation, correlation, regression and narrative analysis were used. With regard to the survey output, with the exception of eco design and operational performance, though, conducted correlation analysis revealed the existence of statistically significant positive association between the dimensions of green supply chain management and organizational performance, the overall survey result indicate that except investment recovery, all the dimensions of green supply chain management; organizational commitment, eco-design, green purchasing, green marketing and environmental practice are poorly threated by ethio telecom. The regression result also suggested that organizational commitment, eco-design, green purchasing and environmental practice have statistically significant predicting power on organizational performance.

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Table of Contents

ABSTRACT i

Acknowledgements ii

Table of Contents iii

List of Table and Figure v

List of Acronyms vi

CHAPTER ONE 1

1.1 Introduction 1

1.2 Background of the Study 2

1.3 Statement of the Problem 4

1.4 Research Questions 6

1.5 Objective of the Study 6

1.6 Significance of the Study 7

1.7 Limitation of the Study 7

1.8 Scope of the Study 7

CHAPTER TWO 8

REVIEW OF RELATED LITERATURES 8

2.1 A Brief History of Supply Chain Management 8

2.2 Supply Chain Management and the Environment 9

2.3 Green Supply Chain Management Practice 11

2.4 Impact of GSCM on Organizational Performance 13

2.5 Importance of Supply Chain Performance Measurement 16

2.6 Evolution of Supply Chain Performance Measurement System 18

2.7 Evaluating the Environmental Impact 21

2.8 Empirical Review 23

2.9 Conceptual Framework 28

CHAPTER THREE 29

RESEARCH DESIGN AND METHODOLOGY 29

3.1 Research Methodology 29

3.2 Data Source 29

3.3 Sample Size and Sampling Technique 30

3.4 Measurement of Variable 31

3.5 Operational Definitions 32

3.6 Plan of Data Analysis 33

3.7 Validity and Reliability 33
CHAPTER FOUR 34
Introduction 34
4.1 Reliability Test 34
4.2 Demographic Information of Respondents 35
4.3 Descriptive Statistics 36
4.3.1 Respondents' Perception on Green Supply Chain Practice and organizational Performance 38
4.4 Correlation Analysis 38
4.4.1 Correlation between Green Supply Chain and Social Performance 39
4.4.2 Correlation between Green Supply Chain and Environmental performance 40
4.4.3 Correlation between Green Supply Chain and Economic performance 42
4.4.4 Correlation between Green Supply Chain and Operational performance 43
4.5 Regression Analysis 44
4.5.1 Multicollinearity Analysis 44
4.5.2 Multiple Regression Analysis Result 45
4.6 Challenges of Implementing Green Supply Chain Management 50
CHAPTER FIVE 52
CONCLUSION AND RECOMMENDATIONS 52
5.1 Conclusions 52
5.2 Recommendations 54
5.3 Limitation and Suggestions for Future Studies 55
Reference 56
APPENDIX A: 60
QUESTIONNAIRE 60
APPENDIX B: 63
INTERVIEW QUESTIONS 63
APPENDIX C: 64
CORRELATIONS 64

List of Table and Figure

Table 2.1. Categories of Green Supply Chain Management Practice……..…..…….……...14

Table 2.2. Evolution of Performance Measurement System in an organizational context…..…...…..20

Table 2.3. Issues Related to Organizational Commitment……...…….……..……24

Table 2.4. Issues Related to Eco-Design……..…….…....…….…….....25

Table 2.5. Issues Related to Green Purchasing…….……..……...……..…25

Table 2.6. Issues Related to Green Marketing……..……..…..……...26

Table 2.7. Issues Related to Investment Recovery……...…….....……...…26

Table 2.8. Issues Related to Environmental Practice……..……..……...……..…26

Table 2.9. Issues Related To Organizational Performance……...…..……....27

Table 2.10 Challenges of Implementing Green Supply Chain Management….……..……..….28

Table 3.1 Participants in the Designated Division, Department and Section…….……..……..….31

Table 3.2 Variables ……..…..……..…....…….....…...32

Table 4.1 Reliability of Questionnaire Dimensions……..……..,..……...…..……35

Table 4.2 Demographic Information of Respondents"……..……..……...……..……36

Table 4.3 Composite Mean and standard deviation Score…..…….……..…...…37

Table 4.4 Correlation between Green Supply Chain and Social Performance…..……..…….……40

Table 4.5 Correlation between Green Supply Chain and Environmental performance…...……41

Table 4.6 Correlation between Green Supply Chain and Economic performance…….....……42

Table 4.7 Correlation between Green Supply Chain and Operational performance…….……...……43

Table 4.8Multicollinearity Test Result…….……..……..……..45

Table 4.9 ANOVA……46

Table 4.10 Model Summery and Coefficients: Social Performance……47

Table 4.11 Model Summery and Coefficients: Environmental Performance…….……48

Table 4.12 Model Summery and Coefficients: Economic Performance……...……...……49

Table 4.13 Model Summery and Coefficients: Operational Performance……..…….……50

Table 4.14 Challenges of Implementing Green Supply Chain Management……..……51

Figure 1: Conceptual model …….……..…….28

List of Acronyms

SC - Supply Chain

SCM - Supply Chain Management

GSCM -Green Supply Chain Management

GSC- Green Supply Chain

PMS- Performance Measurement System

SMART- Specific, Measurable, Achievable, Realistic and Time Bound

KPI's- Key Performance Indicator

BSC- Balanced Score Cards

ICTs- Information Communication Technology

IT- Information Technology

CRS- Corporate Responsibility Social activities

EMAS-Eco – Management and Audit Scheme

SD – Standard Deviation

CHAPTER ONE

1.1 Introduction

Mentzer et al. (2001) define supply chain as: "a set of three or more entities (organizations or individuals) directly involved in the upstream and downstream flows of products, services, finances, and/or information from a source to a customer."

According to Cooper et al. 1997, Lambert et al. 1998:"Supply Chain Management (SCM) is the integration of key business processes from end user through original suppliers that provides products, services, and information that add value for customers and other stakeholders"

The above given definitions of supply chain tell us that it is the efficient and effective inbound and outbound transaction of goods, service, information and finance that necessitates supply chain management. Thus, the process of integrating organizational efforts and managing these two sides of a business activity is a very crucial task, and these days we use to refer this value addition effort as „supply chain management". In addition to this in order to deliver their products to their customers companies use to go through different means.

As we can further infer form the above definitions of supply chain, as an individual our day to day life is surrounded by enormous demand for goods and service. Therefore, supply chain is the process of putting forth efforts in a unified manner so as to satisfy our needs. In relation to this, as I have mentioned above while manufacturing and delivering these products and services companies go through different ways, which could be environmental friendly or the contrary.

Here, the most important question is that, how a given company healthy and efficient is? Must be gauged using different criteria so as to determine the level of fit to mission, goals and ecological factors. The answer seems very easy but it"s complicated because no one can answer this question without understanding the concept of supply chain especially performance measurement thoroughly.

This is to mean that this question worth measuring supply chain performance. And, measuring supply chain performance using environmentally friendly variables are unthinkable. This is because; most companies consider such contemplation as costly and unproductive. Besides, identifying and gauging key performance indicators is very challenging task to most managers.

Therefore, this study intended to address the gap related to measuring supply chain performance by adapting different antecedents manly those variables related to green supply chain paradigms, derived from previous studies in the area.

Hence, in the following section of this paper we will see different concept and intended ways of performance measurement associated to supply chain of ethiotelecom.

1.2 Background of the Study

Business is a course of routine activates that requests a due consideration of market in an endeavour to attain the hub purpose of its establishment. Since, our day to day life as individual or entity is surrounded by enormous demand for goods and service; the main intent of every business is satisfying this demand and attains the financial benefit out of it. This natural phenomenon is the source of interaction between people or firms in the demand side and producers or supplier in the other edge. This is all because of the self-insufficient nature of human being.

The need for supply chain management emanated from the reliantly nature of the existing business activity. In this regard Christopher, M. (2005), says that there is no longer any possibility of manufacturing and marketing acting independently of each other. Organization cannot longer act as an isolated and independent entity in competition with others similarly 'stand-alone' organizations.

In the other side, today‟s competitive business environment calls for companies to pay much more attention to how they manage their supply chains. Customers are insisting on greater value, faster order fulfilment, and more responsive service when they make purchases. Shorter product life cycles, global sourcing, and greater product variety have increased supply chain costs and complexity. The value chains of so many businesses are linked together that competitive advantage may be based on entire supply chains rather than individual firms. Supply chain management (SCM) today is not limited to order fulfilment but is tied to such strategic issues as the ability to create and deliver new products or to create and implement new business models (Laudon, 2011).

Besides the above stated integration requirements, in the course of delivering their goods and service to customers, firms go through different challenges. The most central and routine issues that firms need to deal with includes; act of rivalry firms, supply and demand side interruption, managing company‟s human and non-human assets, set out environmental

friendly means of production and distribution system etc. Here, most of the challenges come out of the inevitable nature of business doings except those related to environmental aspects, which is emanated from the cotemporary global concern on maintaining the balance of the nature.

In this regard, companies need to take in to account environmental issues. According to Michael M.et al (2014), as environmental issues are rapidly becoming one of the most important topics in supply chain management, managers consider improvements in environmental or „green" performance a basic competitive priority besides lower cost, short lead time, and high quality. The ever-growing green concerns in the market place and the ensuing green movements have forced decision makers to manage their organizational performance from the ecological or environmental perspective. Business activities can have an impact on the natural environment through one or more of the following ways:

- Emissions to air, e.g., greenhouse gases, dust and particles, metal emissions to air, ozone depleting substances
- Emissions to water, e.g., waste water, metal emissions to water
- Emission to land, e.g., pesticides and fertilizers, metal emissions to land, radioactive waste
- Resource use, e.g., water use and abstraction, minerals, forestry

Due to enormously growing global concern on environment or eco-system from varies entities and customers, countries in different corners of the world are issuing environmentally favoured legislations so as to secure a balanced eco-system. For the reason that, the existing production and distribution system is becoming increasingly significant cause of environmental pollution. As result of this the current situationcalls for environmentally worried supply chain activity (Michael M.et al. 2014).

In this regard the environmental policy of Ethiopia was approved on April 2, 1997 by the Council of Ministers. The Environmental Policy of Ethiopia has embraced the concept of sustainable development. As its goal, the Environment Policy of Ethiopia states "to improve and enhance the health and quality of life of all Ethiopians and to promote sustainable social and economic development through the sound management and use of natural, human-made and cultural resources and the environment as a whole so as to meet the needs of the present generation without compromising the ability of future generations to meet their own needs (National Report of Ethiopia, 2012).

Obtaining competitive advantage is by no means easy task. However, in order to hit their targets and responded to concerns like greening supply chain activity, companies need to measure their supply chain. Moreover, in order to plan and operate accordingly, companies need to gauge their performance using the cotemporary green paradigmof supply chain. This is to mean that without measuring their current performance a firm wouldn‟t set its future plan and hit its target.

1.3 Statement of the Problem

Different scholars have suggested performance measurement as the most crucial and inevitable task of firms. Performance measurement is „vital in strategy formulation and communication and in forming diagnostic control mechanisms by measuring actual results‟ (Wouters 2009).

Gunasekaran and Kobu (2007) mention the following as the hub purposes of a performance measurement system:

- *Identifying success.*
- *Identifying if customer needs are met.*
- *Better understanding of processes.*
- *Identifying bottlenecks, waste, problems and improvement opportunities.*
- *Providing factual decisions.*
- *Enabling progress.*
- *Tracking progress.*
- *Facilitating a more open and transparent communication and co-operation.*

Despite the factthat measuring supply chain performance comprises all the aforementioned substances, according to Khan R. W Azfara, et al (2011), measurement of Supply Chain performance with regards to key practices of Supply Chain paradigms is the area which is under research. Presently there are no guidance or set rules under which we can measure SC performance. The lack of clarity and comparability concerns in this area creates misunderstanding and makes it more difficult to formulate a clear strategy.

Beside the above mentioned problem in assessing supply chain, literature shows that most researches have been focused on measuring performance of companies based on financial paradigms or on a couple of paradigms in supply chain management. However measuring supply chain performance based on environmentally concerned paradigms such as green

supply chain management may help supply chains to become more efficient, streamlined, and sustainable by means of giving much more holistic outlook to decision makers.

Diane Lesley Holt (2005), the 'greening' of the supply chain is identified as one of the future challengesfacing organisations. They also put their concern as, 'in the future organisations will have to make all supply chain decisions within the context of environmental concerns. Therefore, assessing supply chain from environmental perspectives can be considered as the command of the time.

Moreover, over the past decade, Green Supply Chain Management (GSCM) has emerged as an important factor of the environmental and supply chain strategies for a number of companies around the globe. In recent years, some studies are conducted to explore the economic and environmental impact of green supply chain management.

Rao and Holt (2005) pointed out that organizations adopting GSCM in the South East Asian region ultimately enhanced both competitiveness and economic performance. A study by Klassen and Mclaughlin (1996) indicated that environmental performance positively affected financial performance of the firms through both increasing the market share and decreasing cost.Moreover, some anecdotal evidence showed that substantial environmental management performance leads to lower manufacturing costs by eliminating waste (Allen, 1992).

Therefore, as we can infer form the aforementioned studies, not only the need to comply to environmental legislations that stimulate firms to deploy green supply chain management but also, the positive impact of green supply chain on financial performance of firms that is inspiring green supply chain management. However, Walley (1994) stated that many managers consider environmental management as compliance with regulations while evaluating trade-offs between environmental and economic performance. Therefore, this situation revealed thatthere is confusionwith regard to the impact of green supply chain practice on organizational performance.

When we come to the case of ethio telecom, the firm objective of the companyis satisfyingthe telecom needs of the society by providing world class telecom service, and in line with this, makingthe possible optimum profit form the sector is unquestionable aspiration of the company. Both of the stated objectives demand high service quality and customer satisfaction in line with the environmental concern mentioned earlier. In this regard the company is not evaluated, yet.

Moreover, in the last few years in order to avoid the service inconsistency and the corresponding poor telecom service that resulted from frequent commercial power interruption the company has been undertaking different technical and strategicchanges including;installation of diesel generators in many of its infrastructuresas a backup, strengthening the capacity and expansion of the services, whichcould not be achieved without comparablyincreased utilization of diesel and emission of pollutants. However, while conducting these all reforms, at least to the knowledge of the researcher there is no effort made to respond to the aforementioned environmental issues.Therefore, the main theme of this research paper is filling this gap by evaluating the practice and performance of the company with regard togreen supply chain management dimensions.

1.4 Research Questions

Besides, the above mentioned gap, the following research questions are formulated to be answered in the course of the research:

- What is the status of Green Supply Chain practice and corresponding performance of ethio telecom?
- Which dimensions of Green Supply chain management describe performance of ethio telecom supply chain at the most?
- How the dimensions of Green Supply Chain related to Organizational Performance?
- What are the possible challenges of implementing Green Supply Chain?
- What are the benefits of measuring supply chain performance?

1.5 Objective of the Study

The general objective of this research is to assess the green supply chain practice and the corresponding organizational performance of ethiotelecom.

The research also intended to deal with the below embedded specific objectives, these are:

- To assess the relationship between the different dimensions of green supply chain management practice and organizational performance dimensions,
- To assess the extent of green supply chain management practice and the associated organizational performance in ethio telecom, and
- To identify the dimensions of green supply chain practice those have predicting power over the organizational performance of ethio telecom.

1.6 Significance of the Study

The significances of this study can be seen from different perspectives. Firstly, companies could gain cost advantage using their supply chain area of the business. Supply chain management is a possible source of cost improvements. Therefore, by assessing the level of supply chain performance and identifying bottlenecks the study has proposed way to implement effective and environmentally favoured supply chain activities.

Secondly, Otago (2009) argued in his findings on green supply management that GSCM helps to improve organizational performance. The findings of the study showed that green supply chain practices have positive contribution to economic performance. Therefore, this assessment will provide the ground basis information for strategic decision makers by giving valuable suggestion with regard to green supply chain management.

Moreover, this study will give an insight to future researches in the related area.

1.7 Limitation of the Study

This study is expected to have certain constraints. Primarily, it requires taking in to consideration that in line with the primary data collected via the instrumentalism of different data collection tools, the study also used secondary data collected from Enterprise Resource Planning (ERP) oracle system, which is subject to human error to some extent. As a result, this may leads to erroneous conclusion.

Furthermore, shortage of related literature, especially research works on this topic in Ethiopia context was another limitation to this study.

1.8 Scope of the Study

The focal point of this study is evaluating the supply chain performance of ethio telecom form green perspective. Even though, there are so many dimensions to measure the supply chain performance of a company such as;**lean, agile and resilience**paradigms**,** due to data and time limitation the study delimitated to focus on performance indicators based on green perspective only. Thus, the study merely tries to measure the supply chain performance on the basis of the aforementioned green supply chain. Besides, though, there are widely scattered divisions of the company thorough out Ethiopia the assessment area is delimitated to offices and divisions of the company relevant to carry out this study.

CHAPTER TWO
REVIEW OF RELATED LITERATURES

2.1 A Brief History of Supply Chain Management

The origins of supply chain management are not exactly known, but there is general reference to its introduction by consultants in the early 1980s. In the decades since, it has received considerable attention, initially starting within the business community. From the early 1990s, academic research started following supply chains and tried to establish some theoretical structure (Cooper, Lambert, and Pagh 1997; Lambert and Cooper 2000; Croom, Romano, and Giannakis 2000).

Part of the reason for the start of supply chain management is difficult to pin down is because of its many antecedents. These include channels research in the 1960s on managing inter organisational operations, systems integration research in the 1960s, and information sharing in the 1980s. Forrester is commonly cited for introducing key ideas on industrial dynamics, physical distribution, and transportation in the late 1950s and early 1960s (Mentzer et al. 2001; Croom, Romano, and Giannakis 2000; Cooper, Lambert, and Pagh 1997).

Though, Mentzer et al. (2001) start their paper with the following citation from 1958 that very much foreshadows supply chain management today: “Management is on the verge of a major breakthrough in understanding how industrial company success depends on the interactions between the flows of information, materials, money, manpower, and capital equipment. The way these five flow systems interlock to amplify one another and to cause change and fluctuation will form the basis for anticipating the effects of decisions, policies, organizational forms, and investment choices.” (Forrester, 1958).

A wide variety of terms relating to the supply chain concept have also arisen over the past few decades. These include network sourcing, supply pipeline management, demand chain management, value chain management, and value stream management. They can be found in discussions amongst academics, consultants, or business management. (Croom, Romano, and Giannakis, 2000). Of these, the purchasing/supply and logistics/transportation literature were the most prevalent with business, and out of the many terms, supply chain management rose in recognition.

In general, supply chain management is a discipline which deals with the integration and corporation of firms in a given value chain activities so as to optimize value to customers all

the way through an integrated effort. Besides, it is also possible to infer that unlike most science fields, the discipline is very young and under conception, yet. Moreover, with regard to supply chain performance measurement as we have mentioned earlier like most of its concepts it‟s under study.

2.2 Supply Chain Management and the Environment

Tan (2001), presents a review of the development of literature in the supply chain management field, discussing the emergence of supply chain management as a holistic and strategic approach, developed from the unification of work in the transportation/logistics field and purchasing field. He further states that supply chain management is a commonly accepted terminology that includes all the value creating activities along the supply chain.

According to Waller (1999), the supply chain is the integrated process operations network in place to provide tangible goods or services to a client. Environmental issues potentially impact every aspect of the supply chain from plant location, raw materials purchase, product design, technologies employed, manufacturing processes, packaging, transportation, energy consumption, worker safety, marketing, sales and final product disposal.

According to a deep literature review conducted by Diane Lesley Holt (2005), identifies two types of green supply. The first, defined as 'greening the supply process, represents process-based adaptations made to the firm's supplier management activities in order to incorporate environmental considerations (these include the process of collecting environmental information on suppliers and assessing and ranking suppliers' environmental performance). The second type of activity is what they term 'product-based green supply. This involves changes in the product supplied (including attempts to manage the by-products of supplied inputs such as packaging and co-operation with suppliers).

Green supply chain management practices could include demonstrating a strategic commitment to the environment, supplier initiatives for environmental improvement, designing products that can be disassembled, reused or recycled, adopting a life cycle approach to the design of products, critically reviewing and reassessing existing products, processes and services (Van Hoek 1999).

Although product-based greensupply is arguably traditionally associated with manufacturing organisations, Welford et al. (1998) notes the necessity to also examine environmental

behaviour in service industries. Such sectors, like the public or banking sectors, are under increasing pressure to improve their environmental performance, especially through their supply chains (New et al. 1998, 2002; Russel 1998). Such practices include supplier management, greener purchasing and managing waste products. Therefore, the distinction made between product-based and process-based green supply chain management is equally applicable to organisations in every sector (although specific products and specific processes will obviously differ depending on the type of goods and services provided by each individual organisation).

Therefore, whether firms are product-based or process-based they require implementing environmentally accepted green supply chain strategies. Since green supply chain is now becoming accepted, as a matter of policy management requires the consideration of the whole supply chain of materials and energy required to make a product or, more generally, to deliver a service or benefit to customers. Because, Environmental impacts should be considered cumulatively over the stages of the supply chain life cycle of a product or service to avoid shifting adverse environmental effects from one stage of the life cycle to another.

One of the key aspects of green supply chains is to improve both economic and environmental performances simultaneously throughout the chains by establishing long-term buyer–supplier relationships. Enterprises have developed a diverse set of initiatives for greening SCM, including screening suppliers for environmental performance, providing training to build supplier environmental management capacity, and developing reverse logistics systems to recover products and packaging for re-use and remanufacture.

Green SCM can not only generate environmental benefits, but also business benefits. Environmentally preferable characteristics include products and services that conserve energy and water, minimize generation of waste and releases of pollutants; products made from recycled materials and that can be reused or recycled; energy from renewable resources such as bio based fuels, solar and wind power; alternate fuel vehicles; and products using alternatives to hazardous or toxic chemicals, radioactive materials and bio hazardous agents.

2.3 Green Supply Chain Management Practice

Over the past decade, SCM has played an important role for organizations‟ success and subsequently the green supply chain (GSC) has emerged as an important component of the environmental and supply chain strategies of a large number of companies. Although the term "environment" or "greening" has an ambiguous meaning in various fields, the term indicates not only harmonizing corporate environmental performance with stockholders‟ expectations but also developing a critical new source of competitive advantage in terms of management perspective (Gupta, 1995).

According to Gupta (1995), environmental management relieves environmental destruction and improves environmental performance by institutionalizing various greening practices and initiating new measures and developing technologies, processes and products.

In recent years, various studies have attempted to find and explore GSCM. Green supply refers to the way in which innovations in supply chain management and industrial purchasing may be considered in the context of the environment. The GSC covers wide areas of GSCM practices and SCM‟s participants and practices from green purchasing to integrated supply chains flowing from suppliers, to manufacturers, to customers, and to the reverse supply chain (Holt, 2005).

Brown et al. (2001) suggests two main types of green supply management process: greening the supply process and product-based green supply. Greening the supply process stands for accommodations made to the firm‟s supplier management activities for considering environmental perspectives. In addition, product-based green supply focuses on changes to the product supplied and attempts to manage the by-products of supplied inputs. According to Pagell et al. (2004), leaders of the logistics and supply chain department should balance low cost and innovation process while maintaining good environmental performance. Through supply chain analysis, organizations are able to check whether environmental issues can be incorporated into industrial transformation processes (Green et al., 1996).

To implement GSCM, organizations should follow GSCM practices which consist of environmental supply chain management guidelines. Numerous studies have tried to identify GSCM practices in organization which are referred to such internal systems as environmental and quality management systems. Internal environmental management is critical to improving the organization‟s environmental performance (Zhu et al., 2008).

Zhu and Sarkis (2004) indicate that quality management lubricates implementation of GSCM. They suggest that under rigorous quality control, organizations can improve their environmental practice by learning from experiences of their quality management programs. By receiving the certificate for the ISO 14001 environmental management system (EMS) standard, organizations are able to create structured mechanisms for continuous improvement in environmental performance (Kitazawa and Srakis, 2000).

Beamon (1999) suggested that GSCM and logistics efforts have encouraged firms to adapt the closed-loop supply chain. Closed-loop supply chain management stands for "the design, control and operation of a system to maximize value creation over the entire life-cycle of a product with the dynamic recovery of value from different types and volumes of returns over time".

Some studies focused on external environmental factors such as customers and suppliers. To improve their own environmental supply chain performance, organizations need the interactions with the government, suppliers, customers, and even competitors (Carter and Ellram, 1998). Cooperation with suppliers and customers has become extremely critical for the organizations" to close the supply chain loop (Zhu et al., 2008).

Importance of the design process in environmental management is well demonstrated by the existing literature. Reuse stands for both the use of a product without re-manufacturing and is a form of source reduction. Recycling is the process which makes disposal material reusable by collecting, processing, and remanufacturing into new products (Kopicki et al., 1993). As an environmental practice, resource reduction enables firms to minimize waste which results in more efficient forward and reverse distribution processes (Carter and Ellram, 1998). Eco-design, design for environmental management, enables organizations to improve their environmental performance and close the supply chain loop by handling product functionality while minimizing life-cycle environmental impacts (Zhu et al., 2008).

To summarise, as shown in Table 2.1, GSCM practices are divided into four major dimensions: internal environmental management, external environmental management, investment recovery, and eco design (Zhu and Sarkis, 2004).

Tabel 2.1 Categories Of Green Supply Chain Management Practice

Internal environmental management	Commitment of GSCM by senior managers Support for GSCM by mid-level managers Cross-functional cooperation for environmental improvements Total quality environmental management Environmental compliance and auditing programs ISO 14001 certification Environmental management systems
External GSCM practices	Providing design specification to suppliers that include environmental requirements for purchased item Cooperation with suppliers for environmental objectives Environmental audit for suppliers" internal management Suppliers" ISO14000 certification Second-tier supplier environmentally friendly practice evaluation Cooperation with customer for eco-design Cooperation with customers for cleaner production Cooperation with customers for green packaging
Investment recovery	Investment recovery (sale) of excess inventories/materials Sale of scrap and used materials Sale of excess capital equipment
Eco-design	Design of products for reduced consumption of material/energy Design of products for reuse, recycle, recovery of material, component parts Design of products to avoid or reduce use of hazardous products and/or their manufacturing process

Table 2.1 Categories of green supply chain management from literature (Zhu and Sarkis, 2004)

As we are going to see in the subsequent section of this paper, most of the variables used to measure green supply chain management of ethio telecom are adapted from the above embedded table and from research conducted to investigate the green supply chain practises in tannery industry in Ethiopia by Zellalem T. Beyenein2015.

2.4 Impact of GSCM on Organizational Performance

Wu et al (2013) confirmed that GSCM practices are the focal constructs in the theorized model with internal environmental management and green information systems as antecedents and environmental, economic, operational, and organizational performance as consequences. In addition, green information systems provide the information necessary to

make decisions about green purchasing, the level of cooperation with customers, design of the product, and investment recovery. Changes made as a result of internal environmental management or green information systems impact the ability to implement green supply chain practices which will impact environmental performance, economic performance, operational performance, and organizational performance.

Previous studies show that external GSCM practices such as supplier and customer collaboration will facilitate the adoption of internal GSCM practices, with the explicit purpose of improving environmental performance in supply chain-wide context (Vachon and Klassen, 2006). Also, developing collaborative relationships with suppliers is favourable for the adoption and development of internal innovative environmental technologies (Geffen and Rothenberg, 2000).

Similarly, externally focused GSCM practices (e.g., green design of process with suppliers for minimizing wastes and customer cooperation for eco-design of product) need internal coordination mechanisms (e.g., specialized staff training on environmental management issues and cross-functional cooperation) to cascade the task requirements through the organizational hierarchy for these external practices to be effectively carried out.

Whether GSCM and corporate socially responsible practices can improve economic performance is still an open question (Seuring and Muller, 2008). Some have shown that environmental management and GSCM have appositive relationship with an organization‟s economic performance (Rao and Holt, 2005).

In general, inter-firm relations provide formal and informal mechanisms that promote trust, reduce risk and in turn increase cooperation, commitment and hence profitability. Others have suggested that economic performance is not being reaped in short-term profitability and sales performance when GSCM practices are implemented (Bowen et al. 2001).

The literature over the past 15 years seems to have divided views on whether there are joint gains, “win-win‟s”, or trade-offs that must be managed for environmental and economic performance in sustainable supply chains (Seuring and Muller, 2008). Among barriers to implement environmental management practices, the most critical aspect appears to be economic reasons and issues related to costs (Ambec and Lanoie 2008).

Restrictions to firms‟ behaviour may arise from the enactment of internal procedures as well as from conformity with extant environmental regulations. Eco-control such as compliance with internal and external procedures posits considerable restrictions to opportunistic behaviour of firms as well as increased operational costs, and this may not benefit the economic performance of the participating firms (Henri and Journeault, 2010). These mixed results in the relationships between economic and environmental performance leads to some possibilities of more complex mediations occurring between internal and external practices.

For example, the lack of external GSCM programs may actually weaken the long term viability of operational advantages for internal profitability (Plambeck, 2007). It is possible for well-executed external GSCM relationships failing to bring economic performance. The reason behind can be a lack of internal managerial support and resources to take financial advantage of these relationships. It remains unclear on whether either or both external or internal GSCM practices are mediators of this relationship.

Research indicates a positive relationship between external GSCM practices and operational performance. Through interaction with suppliers and customers, manufacturers can improve their operational performance (Ellram, et al, 2008).

Research has also shown that internal GSCM practices such as integrated environmental management systems and staff involvement can improve operational performance (Hanna M, WR, Newman, P. Johnson, 2000). It has been argued that producing an environmentally friendly product may create a final product that is safer and less costly, and which has higher, more consistent quality and greater scrap value (Porter and Van der Linde 1995, Sarkis, 2001). The „lean and green‟ literature has also argued that the level of customers‟ involvement in improvements to the lean performance of a supplier firm is positively related to the environmental management practices (Simpson et al. 2007). Yet, coordination between internal and external practices has seen no conclusive findings. Using the argument that both internal and external GSCM practices have influenced operational performance.

According to Srivastava (2007) green supply chain management can reduce the ecological impact of industrial activity without sacrificing quality, cost, reliability, performance or energy utilization efficiency; meeting environmental regulations to not only minimizing ecological damage, but also leading to overall economic profit.

2.5 Importance of Supply Chain Performance Measurement

From the business operational perspective, the core purpose of performance measurement system is "a process of quantifying the efficiency and/or effectiveness of action" (Neely et al., 1995).

Moullin (2002) also defines it as "the process of evaluating how the organizations are managed well and how the values are delivered for customers and other stakeholders." From the modern business management perspective, the performance measurement provides the necessary information of management feedback for process managers as well as decision makers, and it takes a significant role in monitoring performance, enhancing motivation, improving communication, and diagnosing potential problems. Furthermore, performance measurement can support the deployment of management strategies and facilitating the feedback for the futuristic situation.

In addition, performance measurement supports in directing management attention, revising and updating company goals, and re-engineering business processes accordingly. Therefore, the accurate supply chain performance measurement is essential in the continuous improvement of supply chain management (Chan 2003).

The major purposes of a performance measurement system are presented by Gunasekaran & Kobu (2007) as follows;

- identify customer demands and requirements as well as capability, no values in process, problems and improvement opportunities
- provide better understanding of processes
- enable monitoring and controlling the achievements
- facilitate the more communication and collaboration
- support feedback for decision-making

It is very hard to elaborate common measures and metrics for measuring total supply chain performance effectively and precisely, and, therefore, the metrics are usually to be established independently for each business unit organization.

The features of multi-dimensional parameters and diversity of business objectives emphasize the importance of performance measurement approaches such as financial, non-financial, qualitative and quantitative. Also, the performance measures and metrics including plan,

resource, time, cost, quality, flexibility, reliability, agility with the operational processes and activities are relevant to the approach of performance measurement.

Supply chain performance measurement system is a performance measurement model which is based on mutually agreed goals, measures, measurement methodology that specify procedures, responsibilities and accountability of supply chains, and the criteria of the measurement system together with supply chains. (Holmberg 2000)

A performance measurement is defined as the feedback on operations which are dedicated to customer satisfaction, company strategy and business objectives.

Also, it asserts that performance measurement motivates the need for improvement in operational processes that are referred to as the critical paths in performance measurement. (Bhagwat and Sharma, 2007)

The importance of performance measurement systems is summarized by Gunasekaran et al. (2004) as follows;

- Driving organizational activities to achieve higher performance with the monitored outcomes by identifying the improvement area.
- Providing a basis of evaluation and criteria of decision-making for actions at all the levels of strategic, tactical and operational function.
- Facilitating feedbacks on process tracking, diagnosis of problems and identification of potential opportunities for improvement through the internal and/or external communications.

The futuristic research topics on supply chain performance measurement are the actual implementation in business performance management, proactive performance measurement of supply chain, measurement approach in intangible and tangible metrics, dynamic measurement systems, and flexibility of measurement systems across the industries (Neely, 2005).

As we have seen in the preceding paragraphs, according to research conducted by different scholars supply chain performance measurement is fundamental task for the reason that it has the potential to avails the means to achieve higher performance with the examined results by identifying the improvement area, provide decision making baselines, a way to identify potential threats and opportunities of the organization in advance to its appearance or

banishment, and so on. Hence, it is clear to deduce from the above sections that performance measurement is not only crucial but also inevitable task that determine the success or failure of a firm strategy.

2.6 Evolution of Supply Chain Performance Measurement System

The basic objective of supply chain management is to "optimize performance ofthe chain to add as much value as possible for the least cost possible". In other words, it aims to link all the supply chain agents to jointly cooperate within the firm as a way to maximize productivity in the supply chain and deliver the most benefits to all relatedparties (Finch 2006).

Furthermore, (Mentzer 2001) the significant importance of SCM is the systematic, strategic coordination of the traditional business functions within aparticularcompany and across businesses within the supply chain, for the purposes ofimproving the long term performance of the individual companies and the supply chain asa whole". Performance measurement has its roots in early accounting systems.

According to Gomes et al. (2004), performance measurement evolved through two phases. The first phase was started in the early1880s, while the second phase in the late 1980s.The first phase was characterized by its cost accounting orientation. This orientation aimed at aiding managers in evaluating the relevant costs of operating their firms. It incorporated financial measures such as profit and return on investment. A study has indicated that by 1941 about half of US companies were using budgetary control in one form or other and by 1958, over 95 % of the companies; budgets were used for overall control of company performance (Bourne et al., 2003). These accounting based performance measures were financially based, internally focused, backward looking and more concerned with local departmental performance than with the overall health or performance of the business (Bourne et al., 2003).

These traditional financially-based performance measurement systems failed to measure and integrate all the relevant factors critical to business success. By the 1980s, traditional accounting measures were being criticised as inappropriate for managing businesses of the day. The mid-1980 was a turning point in the performance measurement literature, as it marked the beginning of the second phase. This phase was associated with the growth of global business activities and the changes brought about by such growth. In the late 1980s,

some frameworks, which attempted to present a broader view of performance measurement started to appear (Gomes et al., 2004).

They underscored the need for the alignment of financial and non-financial measures in order to be in accordance with business strategy. The emphasis was on the development of better integrated performance measurement systems. The structure of the business organization also evolved during this period. The early 19th century saw the birth of systematic large organizations. During the 1980ʺs the business organizations became global and 1990ʺs were significant with automation of business processes. The 2000ʺs saw the emergence of e-commerce and boarder less business activities. PMS also changed with this evolution of business organization from cost accounting system (before 1980s), mixed financial and non-financial systems (1990ʺs) to balance integrated approach (2000ʺs). **Table 1** summarises the evolution of SCPM in an organizational context.

Table 2.2Evolution of Performance Measurement System in an organizational context

Period	Characteristics of business organisation	Characteristics of PMS
Before 1980	Systematic large organizations	(i). Cost Accounting orientation. (ii).Retroactive approach and results used to promote organizational efficiency, facilitate budgeting and attract capital from external entities (iii).Performance measurement dominated by transaction costs and profit determination
1980 - 1990	Business organizations became global	(i). Cost Accounting orientation (ii).Retroactive approach and results used to promote organizational efficiency. (iii).Enhanced to include operations and value adding perspectives.
1990 – 2000	Automation of business processes	(i).A mixed financial and non financial orientation. (ii).A mixed retroactive and proactive approach. (iii).Results are used to manage the entire organization. (iv).PMS enhanced to include process, quality & customer focus
2000 - 2010	e-Commerce and borderless business activities	(i).A balanced and integrated orientation. (ii).A more proactive approach. (iii).Results are used to enhance organizational responsiveness. (iv).Performance measurement enhanced to give a balanced view of the organization and included the SC & inter-process activities.

Gomes et al., 2004 and Morgan, 2007

From the above embedded table we could understand that there is a paradigm shift in supply chain performance measure through time form financial oriented to mixed financial and non-financial balanced approach systems. This is due to the reasons that financial measure is not enough to gauge the performance of a certain supply chain since there are a lot of non-financial factors which may indicate the success or failure of a business. Besides, the need to

build proactive and responsive supply chain is among the reasons that inspired the paradigm shift happened from 2000 to 2010.

Literature survey indicates development of a number of Performance Measurement Models since 1980s. Most of the models have gone through some empirical testing and some have only theoretical developments. The most widely cited performance measurement systems are the SMART (1988), the performance measurement matrix (1989), the Balanced Scorecard (1992), and the integrated dynamic PMS (1997).

The performance measurement system in the SC is important in the joint efforts of the *stakeholders* in the logistics system under the premise that generates added value to customers in the short, medium and long term, better-looking global local optima and not SC. According to Ramdaset al.(2003), improving the performance of the SC is a continuous process that requires an analytical system for measuring performance and a mechanism for the implementation of KPI's. At this point connects planning and execution, and then the construction of performance goals in the daily routines of the current work of the chain linking the impact on revenue and costs throughout the system.

The need to develop performance measurement systems at different levels of organizational decision making led to Robert S. Kaplan & David P. Norton (1992) to develop and propose the *Balanced Scorecard, BSC* as a means to evaluate corporate performance from four perspectives: financial, internal processes, customer and learning and growth. However under the new market trends in environmental terms *(Green Supply Chain),* Information and Communication Technologies (ICTs), leanness*(LeanSupplyChain)* Collaborative models *(CSC Collaborative Supply Chain)* and SC agile *(Agile Supply Chain*), among others, bring contemporary perspectives oriented and future of SC, under the overall dynamism and the era of information technology (IT).

The KPI's as input for decision making at every step of the SC should be available at the right time and readily available means and consultation in this way, each stakeholder in the chain can manage your system a comprehensive picture logistics. The web is a good choice for designing query tools.

2.7 Evaluating the Environmental Impact

With the emergence of environmental problems, people have been keeping trying to find appropriate measurements for environment. However, up to date, environmental performance measurement is still a difficult task. It cannot be solved using simple mathematical model or calculation because sometimes environmental impact is not estimable (Yan Zhang, 2001). In other words even though firms emit CO_2 to the environment the emission of CO_2 is a main cause for global warming (a serious environmental problem). However, the value of the damage from the CO_2 emission is hard to estimate. In general, the impact to environment always came from the following:

- Waste (all forms, for example solid waste, all kinds of emissions, wastewater etc.),
- Resource consumption,
- Energy consumption.

So, the direct way to evaluate environmental impact should be to measure these wastes and emissions for different process which is defined by different purpose. Different process can be evaluated by this summation. Such kind of performance measurement include total material consumed, material recovery rate (Guide, 1997).However, such kind of measurements can only be used to evaluate some aspects of the product's or processes environmental performance.

On the other side, there is a tremendous need to look at the product from a system perspective. Life-cycle assessment is such an approach, which is a systematic procedure for identifying, evaluating and selecting among these opportunities for improving the energy, resource consumption, and environmental release profile of a product or process. It can be defined as: both a concept and methodology for auditing and evaluating the environmental performance of a product, process, or activity throughout its entire existence from raw materials acquisition to ultimate disposition through recycling, incineration, landfilling, or composting (Harry, 1994). The following are some quantitative measurements, which can be used in environmental performance evaluation.

Life-cycle assessment - is a tool to evaluate the environmental consequences of a product or activity holistically, across its entire life. It is a widely used approach to assess a process's or a product's environmental impact throughout its entire existence from raw materials acquisition to ultimate disposition though recycling, incineration, landfilling, or composing. It

examines the whole life cycle of the product from "cradle to grave." The concept of life-cycle assessment is to evaluate the environmental effects associated with any given activity from the initial gathering of raw material from the earth until the point at which all residuals are returned to the earth. A complete life-cycle assessment consists of three complementary components: inventory, impact, and improvement analysis. They are referred as the following (Vigon, 1996):

- The identification and quantification of energy and resource use and environmental releases to air, water, and land (inventory analysis);
- The technical qualitative and quantitative characterization and assessment of the consequences on the environment (impact analysis);
- The evaluation and implementation of opportunities to reduce environmental burdens (improvement analysis).

Basically, the inventory analysis is the one that mostly will be used because it is measurable. It will analyse the input (i.e., raw materials, energy) and output (i.e., water born waste, solid wastes, coproduces, atmospheric emissions, etc.) of every stage during the product's life cycle. Most life-cycle assessment always stops here without doing the impact and improvement analysis due to the complexity and uncertainty of the following analysis.

Eco-indicator - is a direct measure of the negative environmental impact based on life-cycle assessment. They are numbers that express the total environmental load of a product or process. A Dutch group called Pre Consuhants created it. The latest version of Eco-indicator is Eco indicator 99. It categorizes the environmental damage to three aspects: human health, resources, and ecosystem quality. In order to calculate the Eco indicatorscore, three steps are needed (Yan Zhang, 2001):

1. Inventory of all relevant emissions, resource extractions and land-use in all processes that form the life cycle of a product. This is a standard procedure in Life-cycle Assessment (LCA).
2. Calculation of the damages these flows cause to Human Health, Ecosystem Quality and Resources.
3. Weighting of these three damage categories.

2.8 Empirical Review

Zellalem T. Beyene (2015), from a research conducted in order to assess the green supply chain management practices in Ethiopian tannery industry, six independent variables and five dependent variables as well as scales to measure the challenge in greening are identified. And, these variables were in charge to measure the green supply chain management practice in the above-mentioned industry. Those variables are

Independent:

1. *Organizational Commitment*
2. *Eco-Design*
3. *Green Purchasing*
4. *Green Marketing*
5. *Investment Recovery*
6. *Organizational Practice*

- *Challenges of Implementing Green Supply Chain Management*

Dependent:

a. *Social Performance*
b. *Environmental Performance*
c. *Economic Performance*
d. *Operational Performance*
e. *Financial Performance*

In the following part we will further demonstrate the variables listed above and the viable factors influencing the characteristics, performance and nature of those variables. Therefore, the subsequent section of the study will illustrate the independent and dependent variables identified in the prior studies as well as their viability to the context under research.

As I have mentioned above the first variable is factors related to organizational commitment, which is to be manifested by five antecedents, i.e.

Table 2.3 Issues Related to Organizational Commitment

No.	Items
1	Top Management Commitment
2	Middle Management Commitment
3	Cross Functional Cooperation for Environmental Improvement
4	Employee Involvement
5	Total Quality Environmental Management

Zellalem T. Beyene (2015*), "Green Supply Chain Management Practices*

Item one of table above shows that top management commitment towards greening the whole supply chain. The second item shows middle management commitment about greening supply chain. The third item is with regard to cross functional cooperation for environmental improvement, employee involvement in the supply chain and total quality environmental management are also among the factors associated with organizational commitment (Zellalem T. Beyene, 2015). Therefore, the variable as well as the factors embedded in the variable is practicable to the context of ethio telecom.

The second possible variable according to Zellalem T. Beyene (2015) is Eco-Design which is related to; design of the product with regard to materials and energy utilization, recycle, recovery of components and reduced use of hazardous products. The following table elaborate issues correlated to Eco-Design. This is the core issue of this study, and will be applied as it is.

Table 2.4 Issues Related to Eco-Design

No.	Items
1	Design of Products for Reduced Materials and Energy Consumption
2	Design of Products for Reuse, Recycle, Recovery of Material, Component Parts
3	Design of Products to Avoid or Reduce Use of Hazardous of Products

Zellalem T. Beyene (2015*), "Green Supply Chain Management Practices*

Thirdly displayed variable is issues related to green purchasing which is further to be expressed by five antecedents listed in the below embedded table. As far as Zellalem T. Beyene (2015) is concerned green purchasing is the sum of supplier cooperation, environmentally design for supplier specification, environmental audit for supplier, ISO 14000 certification and second-tier supplier environmentally friendly practice evaluation.

Since, the company under research exhibits comparable features with tanneries, in this regard this study will deploy the variable and antecedents mentioned below without revision.

Table 2.5 Issues Related to Green Purchasing

No.	Items
1	Cooperation with suppliers for environmental objectives
2	Providing design specification to suppliers with environmental requirements
3	Environmental audit for suppliers" internal management
4	Suppliers" ISO 14000 certification
5	Second-tier supplier environmentally friendly practice evaluation

Zellalem T. Beyene (2015*), "Green Supply Chain Management Practices*

The table below reveals the fifth variable which is about sub-constructs related to green marketing. Cooperation with customer for eco-design and the other three factors mentioned in the table is among the items supposed to play in green marketing activities. Therefore, issues related to green marketing, that is to be manifested by the variable and antecedents mentioned below are adopted without change.

Table 2.6 Issues Related to Green Marketing

No.	Items
1	Cooperation with customer for eco-design
2	Cooperation with customers for cleaner production
3	Cooperation with customers for green packaging
4	Cooperation with customer for least energy consumption for logistics

Zellalem T. Beyene (2015*), "Green Supply Chain Management Practices*

The table embedded below indicates the variables on investment recovery. Investment recovery is among the factors that determine green supply chain in a way that, efficient and effective inventory management, disposal of used or scrap materials and excess capital equipment control. This issue is also adopted as it is.

Table 2.7 Issues Related to Investment Recovery

No.	Items
1	Investment recovery (sale) of excess inventories/materials
2	Sale of scrap and used materials
3	Sale of excess capital equipment

Zellalem T. Beyene (2015*), "Green Supply Chain Management Practices*

The table below sought to provide a description of the variables used in describing the determinants of environmental practices. Therefore, this research grabbed all the antecedents of environmental practice to assess the green supply chain of ethio telecom as it is.

Table 2.8 Issues Related to Environmental Practice

No.	Items
1	Environmental compliance and audit procedure
2	ISO 14000 certification
3	Environmental management system
4	Eco-labelling of products

Zellalem T. Beyene (2015*), "Green Supply Chain Management Practices*

Issues related to organizational performance is manifested by five mediating variables, they are; social, environmental, economic, operational and financial performances. And, each of these indicators further elaborated by other possible factors. Hence, the five mediating variables along with their determinant elements listed out in the following table are applied with some amendment to assess the similar instance in the case of ethio telecom.

Table 2.9 Issues Related To Organizational Performance

I	**Social Performance**
No.	**Items**
1	Business Ethics
2	CRS activities
3	Employment generation
4	Positive Image
II	**Environmental Performance**
No.	**Items**
5	Reduction of air emission
6	Reduction of waste water
7	Reduction of solid wastes
8	Reduction of accidents
9	Recycle of materials
10	State of art design of reverse logistics
III	**Economic Performance**
No.	**Items**
11	Energy consumption
12	Cost of materials purchasing
13	Water Usage
14	Reduction of disposal cost
15	Reduction of Waste
IV	**Operational Performance**
No.	**Items**
16	Optimum design
17	Minimum inventory
18	Capacity utilization
19	Improved quality
20	Effective reverse logistics
21	Reduction of time for recycling
V	**Financial Performance**
No.	**Items**
22	Average returns investments over the past three years
23	Profit growth over the past three years
24	Average return on sales over the past three years
25	Average market share growth rate over the past three years
26	Average sales growth over the past three years

Zellalem T. Beyene (2015*), "Green Supply Chain Management Practices*

The tableembedded below reveals challenges of implementing green supply chain management. Hence, the challenges tend to happen in the course of deploying green supply chain management; unawareness of customers, supplier reluctance to change towards green supply chain management, cost implication, lack of support from top management and government, weak market competition, inadequacy of skilled human resource and resistance to technology advancement adoption are adopted without making significant change to the case of ethio telecom

Table 2.10 Challenges of Implementing Green Supply Chain Management

No.	Items
1	Unawareness of customers
2	Supplier reluctance to change towards green supply chain management
3	Cost implications
4	Lack of top management commitment
5	Lack of government support policies
6	Weak market competition
7	Lack of quality of human resources
8	Resistance to technology advancement adoption

Zellalem T. Beyene (2015*), "Green Supply Chain Management Practices*

Moreover, as per the above study conducted on Ethiopia tanner industry by Zellalem T. Beyene (2015*)*, organizational commitment, green purchasing, green marketing, investment recovery, eco-design, environmental practice have a positive effect on environmental, economic and operational performance of firms.

To summarise, all the above mentioned factors has been assessed through the instrumentalism of different research tools such as; questionnaire and interview. Furthermore, in order to gauge the green supply chain performance of ethio telecom other factors has been incorporated and these factors will be presented in the data presentation and discussion part of the research. Besides, some of the aforementioned variables and their elements areamended or eliminated to so as to make to order to the specific scenarios.

2.9 Conceptual Framework

From previous studies conducted in related topics the perceived relationship between the dimensions of green supply chain management and organizational performance is suggested out the following conceptual framework. Therefore, the proposed framework for this research is illustrated in Figure 1. The framework shows the impact of Green supply chain management practices on the Organizational Performance. Hence, the study would follow the below embedded conceptual framework in the course of the subsequent parts.

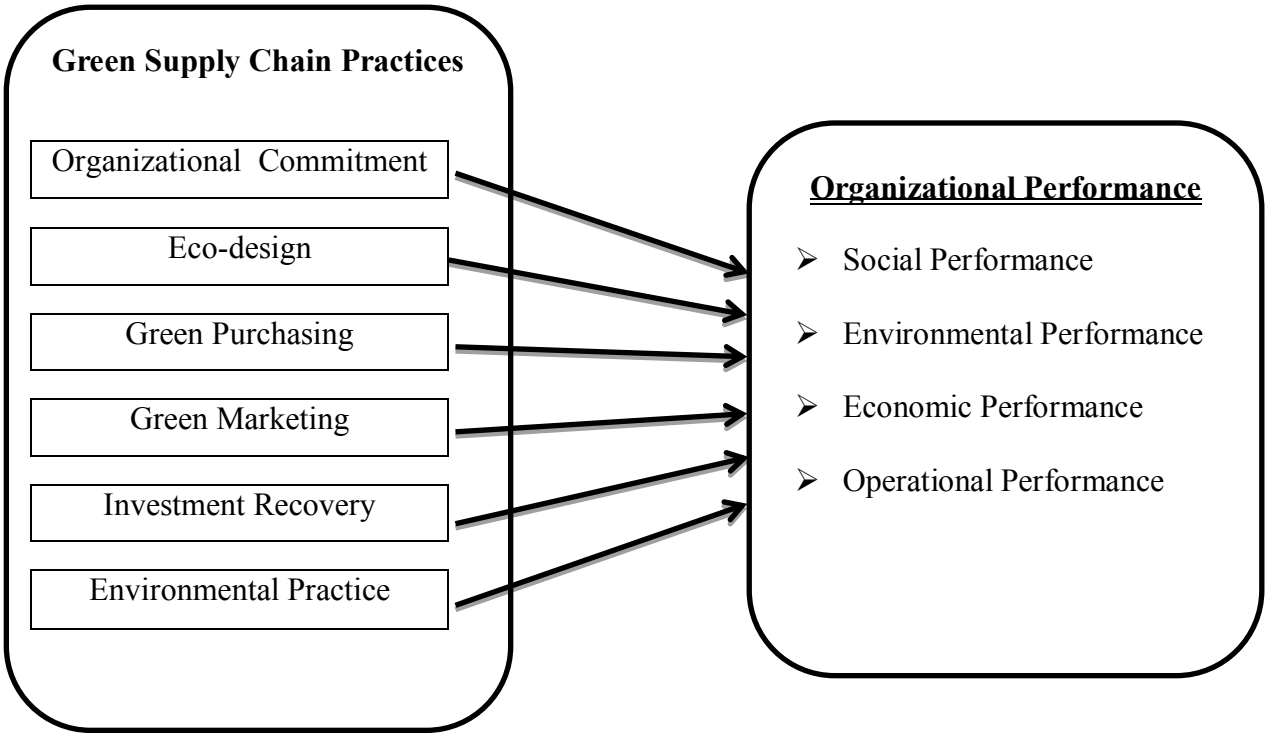

Figure 1: Conceptual model (adopted from Salah M. Diab et al. (2014) with modification)

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 Research Methodology

The purpose of the design of a research methodology is to support the purpose and the research questions of a study (Yin, 1994). In relation to this, with the help of literatures and approaches applied to conducted researches in related area, the viable research design that best suit the situation under study is determined. Therefore, the deployed research methodology to carry out this study so as to answer the research questions developed in chapter one is both qualitative and quantitative research approach i.e. mixed approach.

Thus, descriptive and explanatory research approaches have been deployed. Besides, the research used some descriptive statistics (i.e., measure of central tendency such as: mean; and measures of spread: standard deviation), along with different inferential tools were used so as to elaborate the relationship and interactions between variables.

3.2 Data Source

In order to address the objectives and questions established ahead, the study employed both primary and secondary data collected through the instrumentalism of different methodologies and sources, i.e., questionnaire and interview.

In relation to this, the researcher deployed primary data gathered using questionnaire and interview. As per the study plot the targeted population was ethiotelecom staffs; specifically designated employees in managerial position (managers) and above, i.e., Sourcing and Facility Officers, Business Partner Managers, Procurement Managers, Supplier Relation Manager, Logistics Manager and Operation and Maintenance Managers, Logistics and supply chain officer, etc. This is because, as far as the knowledge of the researcher is concerned the above mentioned section, department and division heads are those responsible for discharging and monitoring much of the supply chain activities of the company.

Furthermore, interviews were conducted with external population such as; Communication and IT standardization and Regulation Directorates,and Compliance and Monitoring Control and Environmental Law and Standards Directorates of the Ministry of Environments and Forest.

Furthermore, with regard to secondary data, itwasfundamentally collected from the company **Oracle Enterprise Resource Planning System**. Furthermore, other secondary data sources such as; reports, conference papers and previous studies conducted in related topics have also been used.

3.3 Sample Size and Sampling Technique

The sampling tool deployed in this research is purposive sampling method form non-probability sampling technique. Methods involving judgement are sometimes referred to as purposive selection, judgement selection, or non-probability selection (Doherty, M. 1994). In this type of sampling, items for the sample are selected deliberately by the researcher instead of using the techniques of random sampling. It is also known as purposive or judgment sampling (Muzammil H. et al, 2010).This ensured professional judgment to select cases that would best enable to answer the research question and meet the research objective.

Thus, in this regard the researcher distributed the questionnaire to all designated officers and managers in the Divisions, Departments and Sections of ethio telecom listed in the below table, understanding that managers and officers in the following Davison, Departments and Sections are directly or indirectly responsible for the supply chain activity of the company.

In addition to this, the other reason for implementing this sampling technique is that, the total population in the chosen Division, Departments and Sections is 41, which was convenient to distribute questionnaire to all managers and officers in the aforementioned offices of the company. Moreover, in order to deliver the questioners to participants located in the regional offices ethio telecom outlook e-mail portal was used.

On the other side, in order to see the situation form the external partaker‟s point of view interviews were conducted with Compliance and Monitoring Control and Environmental Law and Standards Directorates of the Ministry of Environments and Forest, and Communication and IT Standardization and Regulation Directoratesofficer. Therefore, two interviewees form the above mentioned offices were approached.

Table 3.1 Participants in the Designated Division, Department and Section of ethio telecom

Division	Department	Section	No of Participant	
			Officer	Manager
Sourcing and Facility	Sourcing	Supplier Relation	5	1
		Contract Management		1
		Customer equipment		1
		IS sourcing		1
		Network sourcing		1
		Facility and fleet		1
	Facility and Fleet	Fleet Management		1
		Fleet Maintenance		1
	Logistics and Supply Chain	Logistics Management		1
		Inventory Management		1
		Warehouse Management		1
	Business Partner	Regional and Zonal BP	1	18
Marketing	Residential Marketing	-----	3	
	Enterprise Marketing			
Network	Fixed Line	Fixed Line	3	
	Operation and Maintenance	Operation and Maintenance		
Sub Total			12	29
Total			**41**	

***Source**: Survey Finding, 2016*

3.4 Measurement of Variable

The identified variables to this particular study have followed the conventional variable fashion (i.e., dependent and independent variable). Therefore, the dependent variable or variable to be measured using different antecedents or dimensions is Organizational Performance. Whereas the independent variable or the measuring variable is Green Supply Chain Management and, each of these variables further to be operationalized by other dimensions mentioned in the following table. Most of the variables were adapted from the research conducted by Zellalem T. Beyene (2015*) and* Zhu and Sarkis, (2004). The following table revealed those variables to be assessed under this research;

Table 3.2 Variables

	Variable	
	Dependent *(Organizational Performance)*	**Independent** *(Green Supply Chain Management)*
Dimensions	Social Performance	Organizational Commitment
	Environmental Performance	Eco-Design
	Economic Performance	Green Purchasing
	Operational Performance	Green Marketing
		Investment Recovery
		Environmental Practice

Zellalem T. Beyene (2015*), "Green Supply Chain Management Practices*

3.5 Operational Definitions

The following definition is chosen as means of common understanding for this specific research with regard to the following terms.

Supply chain management:Supply Chain Management (SCM) is the integration of key business processes from end user through original suppliers that provides products, services, and information that add value for customers and other stakeholders" Cooper et al. 1997, Lambert et al. 1998):"

Performance measurement:also defined as "the process of evaluating how the organizations are managed well and how the values are delivered for customers and other stakeholders."(Moullin, 2002).

Green:organizational philosophy to achieve corporate profit and market share objectives by reducing environmental risks and impacts while improving ecological efficiency of these organizations and their partners (Zhu et al., 2008; Rao, 2005).

Green supply chain management practices: according to van Hoek (1999) and as citied in the work ofHolt (2005);include demonstrating a strategic commitment to the environment, supplier initiatives for environmental improvement, designing products that can be disassembled, reused or recycled, adopting a life cycle approach to the design of products, critically reviewing and reassessing existing products, processes and services.

3.6 Plan of Data Analysis

As it was mentioned earlierboth inferential and descriptive statistics such as; Statistical Package for Social Science (SPSS) was applied. Withinthe inferential method,in order to put numerically found result of the study in understandable way the study further used descriptive statistic method of data and result summarization or presentation. Descriptive statistics; measure of central tendency, measures of spread, Pearson correlation and, regression analysis were applied.

Besides, in order to put the qualitative data in understandable way, the overall qualitative data of the study was presented in a narrative analysis approach. This approach helped in presenting fragmented data of the research in brief and summarized manner. By applying these statistical tools, the study has pointedup the current performance level of ethio telecom from greening the supply chain perspectives, also identified bottlenecks and potential areas of improvement.

3.7 Validity and Reliability

The internal consistency of the instrument was tested via reliability analysis. Cronbanch‟s coefficient alpha is an internal consistency estimator where the values exceed 0.60 (Hair, 1995).Therefore, this rule was the guiding line to measure the internal consistency of data collection instrument deployed in this study i.e., questionnaire.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND INTERPRETATION

Introduction

It is recalled that the general objective of this research is measuring the supply chain performance of ethio telecom with respect to the dimensions of green supply chain management. Therefore, the overall effort was to attain this objective,and answer questions formulated in chapter one, along the lines of scientifically valid research procedure.

Hence, as we can infer from the title, this chapter is all about presentation, analysis and interpretation of the study findings. Thus, in the following sections of the chapter both inferentially and descriptively found results of the study will be presented, examined and interpreted using different statistical and judgmental procedures. With respect to this, quantitative results are presented and discussed with the help of measurement tools such as; percentage, means, standard deviations, correlation and regression so that, conclusion about the situation is drawn. Whereas, the descriptive statistical tools such as; narrative analysis and tables have also been employed in order to summarize or brief and understand the qualitatively found data.

In order to address the above mentioned objective of the study, data collection instrument such as, questionnaire and interview were deployed. Therefore in the following sections of the study the accuracy of the overall research procedure as well as the findings of the study have been examined and presented.

4.1 Reliability Test

The study was conducted through the instrumentalism of different data gathering tools (i.e., questionnaire and interview). Questionnaires were distributed to participants via email and in person. From the total of 41 questionnaires distributed to the designated respondents only 36 were collected. Fromthe remaining 5 questionnaires; 3 were not returned at all, and 2 were not correctly filled. Therefore, the overall response rate was 88%.

Moreover, in order to evaluate the internal consistency of the item used in the data collection tool, Cronbanch‟s Alpha is used. According to George and Mallery (2003), Chronbanch‟s Alpha is an indicator of degree of internal consistency of scales. The higher the coefficient the higher degree of consistency denotes; >0.9-Excellent, >0.8-Good, >0.7-Acceptable, >0.6-Quesstionable, >0.5-Poor, <0.5-Unacceptable. Therefore, as shown in the table below, the

result of the reliability test revealed that the items in the questionnaire exhibited Chronbanch Alpha rate more than enough to be called consistent or acceptable.

Table 4.1 Reliability of Questionnaire Dimensions

Dimension	Cronbach's Alpha	No. of Items
Organizational Commitment	0.752	4
Eco-Design	0.844	3
Green Purchasing	0.838	5
Green Marketing	0.777	4
Investment Recovery	0.74	3
Environmental practices	0.808	4
Social Performance	0.77	4
Environmental Performance	0.872	5
Economic Performance	0.791	5
Operational Performance	0.728	6

***Source**: Survey Finding, 2016*

As clearly shown in the above table, all the scales used to measure the dimensions of this particular study scored calculated alpha values that range from the lowest value of 0.728 to the highest value of 0.844.

4.2 Demographic Information ofRespondents

A total of 41 questionnaires were distributed and 36 appropriately filled questionnaires were collected. Therefore, the overall response rate is 88%. The collected data were analysed with the statistical package for social science (SPSS version 20). The following table present frequency statistics of demographic variables.

As we can infer from the below embedded table 16.7% of respondents were female while the remaining 83.3% of the study participants were male. With regard to educational qualification 69.4% of the participants were BA or BSc degree holders and 30.6% were MA or MSc degree holders.

In relation to service year in the company, 5.6% of respondents served the company from 6 to 10 years, 30.5% 11 to 15 years, 52.8% 16 to 20 years, and 11.1% of the participant served for 21 and above years. Concerning the job status of the respondents, as we can simply infer from the table below; majority of the respondents were managers of different sections that is demonstrated by 83.3%. Supervisors took 5.6%, officers 8.3% and chief officer 2.8%.

Table 4.2 Demographic Information of Respondents'

Variable	Frequency	Valid Percent
Gender		
Female	6	16.7
Male	30	83.3
Total	***36***	***100***
Educational Qualification		
College Diploma	0	0
First Degree (BSc, BA)	25	69.4
Second Degree (MSc, MA)	11	30.6
Total	***36***	***100***
Service Year		
1 to5 Years	0	0
6 to10 Years	2	5.6
11 to 15 Years	11	30.5
16 to 20 Years	19	52.8
21 and above Years	4	11.1
Total	***36***	***100***
Job Status		
Super visor	2	5.6
Manager	30	83.3
Officer	3	8.3
Chief Officer	1	2.8
Total	***36***	***100***

Source*: Survey Finding, 2016*

4.3 Descriptive Statistics

Using questionnaire, feedbacks on 10 dimensions were captured. These 10 dimensions were further to be operationalized by 44 items. With the intention of measuring the study constructs numerically these 51 items were set up with their correspondent items in five point Likert Scale, ranging from 1 to 5. Based on the responses obtained from the participants, the dependent and independent variables composite mean scores and standard deviations have been computed.

It is know that composite mean value is indicators of the average of all respondents" views on a specific dimension. Whereas, standard deviation shows how diverse responses are the

participants give out on a particular dimension or on its constructs. In other words, the higher the standard deviation discloses the higher the disparity of the respondents‟ perception about a given dimension. For that reason, the data will be wide spread, which means that respondents give variety of observation, and low standard deviation implies that respondents express close observation on a common matter.

Table 4.3 below reveals descriptive data (mean and standard deviations) for the four Organizational Commitment sub constructs, three Eco-Design sub constructs, five Green Purchasing sub constructs, four Green Marketing sub constructs, three Investment Recovery sub constructs, four Environmental practices sub constructs, four Social Performance sub constructs, five Environmental Performance sub constructs, five Economic Performance sub constructs and six Operational Performance sub constructs, incorporated in the questionnaire.

Kidane (2012), The rule of thumb pertaining to the intervals for breaking the range in measuring variables that are captured with five point scale (that ranges from strongly disagree to strongly agree) is 0.8, which is actually found by dividing the difference between the maximum and minimum scores to the maximum score. Hence, a calculated composite mean value that ranges from 1 to 1.80 implies strong disagreement, whereas the remaining ranges of 1.81 to 2.6, 2.61 to 3.4, 3.41 to 4.2 and 4.21 to 5.00 representing respondents‟ perceptions of disagreement, neutrality, agreement and strong agreement respectively (as cited by Sileshi Solomon, 2016).

Table 4.3 Composite Mean and standard deviation Score

Dimension	N	Mean	Std. Deviation
Organizational Commitment	36	2.7569	0.80287
Eco-Design	36	2.9444	0.80672
Green Purchasing	36	2.9521	0.73851
Green Marketing	36	2.7431	0.81391
Investment Recovery	36	3.3519	0.70348
Environmental practices	36	2.9321	0.77485
Social Performance	36	2.6597	0.80212
Environmental Performance	36	2.9500	0.74431
Economic Performance	36	2.7111	0.75811
Operational Performance	36	2.7685	0.64768

***Source**: Survey Finding, 2016*

4.3.1 Respondents' Perception on Green Supply Chain Practice and organizational Performance

As presented on table 4.3, in all cases, the distribution of scores for all dimensions revealed reasonable mean and standard deviation values that show the average rate of responses on each of the 10 dimensions of the analyses.

As clearly depicted in the above table 4.3, the overall composite mean score of the dimensions range from the minimum of 2.66 mean value scored by Environmental Performance to the maximum of 3.35 mean score showed by Investment Recovery. In other words, form the ranges of independent variables (Green Supply Chain Management Practise) and its dimensions listed above ethio telecom score relatively best performance on Investment Recovery, followed by Green Purchasing, eco-Design, Environmental Practices, Organizational Commitment and Green Marketing in a descending order.

Similarly, from the list of Organizational Performance dimensions, Environmental Performance exhibited the highest score by a mean value of 2.95, followed by Operational Performance, Economic Performance and Social Performance in a diminishing order.

Similarly, the standard deviations that range between 0.65 and 0.81 were registered. From the Green Supply chain dimensions the highest standard deviation score was registered on Green Marketing by standard deviation score of 0.81, and the lowest was in the case of Investment Recovery by a mean score of 0.70. Correspondingly, from performance dimensions the highest standard deviation score was observed on Social Performance dimensions by standard deviation score of 0.80 and the lowest was on Operational Performance dimension by a mean score of 0.65.

To summarize, following the overall low composite mean sore on the aforementioned dimensions, the perception of respondents towards the current status of ethio telecom performance from green supply chain management perspectives revealed that the company is performing below average.

4.4 Correlation Analysis

By using the Pearson correlation coefficient the survey identified the existence of relationship between the green supply chain dimensions and organizational performance dimensions, the causality of these independent and dependent variable was established at 95% confidence level. Therefore, this correlation analysis helped to determine whether a

statisticallysignificant relationship exist between the dimensions of green supply chain (i.e. Organizational Commitment, Eco-Design, Green Purchasing, Green Marketing, Investment Recovery and Environmental practices) and Organizational performance dimensions (i.e.Social Performance, Environmental Performance, Economic Performance and Operational Performance), and the direction of relationship (i.e. positive or negative relation).

Dancy and Reidy, (2004), the coefficient of correlation could take values ranging from -1 to +1, where the signs signifying the direction of relationship. A correlation value of 0 implies the absence of relationship among variables, a result between 0.1 and 0.3 indicates weak relationship, whereas a result between 0.4 and 0.6, and 0.7 and 0.9 imply respectively moderate and strong relationships among variables, while a correlation coefficient of 1 suggests a perfect relationship (as cited by; Sileshi Solomon, 2016).

Therefore, based on the above mentioned parameters the tables embedded below revealed that there is a positive relationship between the dimensions of green supply chain and organization performance with the exception of the case of eco-design and operational performance. In this regard, the strongest correlation was exhibited between green purchasing and environmental performance (r=0.99, p=0.01) correlation coefficient, whereas the weakest correlation was identified between green purchasing and operational performance (r=0.28, p=0.05)correlation coefficient and level of significance. All the relationships are statistically significant at 95% confidence level. The overall correlation between green supply chain and organizational performance denotes the existence of relatively strong positive correlation.

Besides the correlation analysisintroduced above, correlation analyses between the six dimensions of green supply chain and the four dimension of organizational performance has been organized and presented separately. This is to examine in depth the correlation between the dimensions of the independent and dependent variables. Therefore, the following sections of the study confer the degree and direction of correlation between the dimensions of green supply chain and the four organizational performance dimensions.

4.4.1 Correlation between Green Supply Chain and Social Performance

As we can simply infer from table 4.4, the correlation between green supply chain dimensions (i.e. Organizational Commitment, Eco-Design, Green Purchasing, Green Marketing, Investment Recovery and Environmental practices) and social performance is strong in most of the relationships, ranging from the strongest correlation between

organizational commitment and social performance, with a correlation coefficient (r=0.91, p=0.01) followed by (r=0.88, p=0.01), (r=0.79, p=0.01), (r=0.59, p=0.01), (r=0.43, p=0.01) and (r=0.39, p=0.05) between green marketing and social performance, eco-design and social performance, investment recover and social performance, environmental practice and social performance, and green purchasing and social performance, respectively. Except in the case of green purchasing (95% confidence level), all the relationships are statistically significant at 99% confidence level.

Table 4.4 Correlation between Green Supply Chain and Social Performance

		Social Performance
Organizational Commitment	Pearson Correlation	0.913**
	Sig. (2-tailed)	.000
	N	36
Eco-Design	Pearson Correlation	0.798**
	Sig. (2-tailed)	.000
	N	36
Green Purchasing	Pearson Correlation	0.392*
	Sig. (2-tailed)	.018
	N	36
Green Marketing	Pearson Correlation	0.885**
	Sig. (2-tailed)	.000
	N	36
Investment Recovery	Pearson Correlation	0.590**
	Sig. (2-tailed)	.000
	N	36
Environmental practices	Pearson Correlation	0.437**
	Sig. (2-tailed)	.008
	N	36
**. Correlation is significant at the 0.01 level (2-tailed).		
*. Correlation is significant at the 0.05 level (2-tailed).		

***Source**: Survey Finding, 2016*

In this regard, Jayaraman and Luo (2007) have also confirmed that green image earned by acting in socially responsible way will help to boost customer loyalty. Finally, cost saving could also be achieved by the reduced cost of goods sold and operational expenses assuming that some product materials and components could be reclaimed.

4.4.2 Correlationbetween Green Supply Chain and Environmental performance

As clearly depicted on table 4.5, the correlation between the green supply chain dimensions against environmental performance revealed the existence of positive correlation. Strong correlations were found between green purchasing and environmental performance (r=0.99,

p=0.01), and environmental practice and environmental performance (r=97, p=0.01), whereas moderate relationship were between investment recovery and environmental performance (r=0.5, p=0.01) and eco-design and environmental performance (r=0.48, p=0.01), and weak relationship appeared between organizational commitment and environmental performance (r=0.35, p=0.05), and green marketing and environmental performance (r=0.29, p=0.05). Besides, all the relationships found to be statistically insignificantat 99% and 95% level of confidences.

Table 4.5 Correlation between Green Supply Chain and Environmental performance

		Environmental Performance
Organizational Commitment	Pearson Correlation	0.350*
	Sig. (2-tailed)	.037
	N	36
Eco-Design	Pearson Correlation	0.487**
	Sig. (2-tailed)	.003
	N	36
Green Purchasing	Pearson Correlation	0.991**
	Sig. (2-tailed)	.000
	N	36
Green Marketing	Pearson Correlation	0.292*
	Sig. (2-tailed)	.034
	N	36
Investment Recovery	Pearson Correlation	0.500**
	Sig. (2-tailed)	.002
	N	36
Environmental practices	Pearson Correlation	0.973**
	Sig. (2-tailed)	.000
	N	36
**. Correlation is significant at the 0.01 level (2-tailed).		
*. Correlation is significant at the 0.05 level (2-tailed).		

***Source**: Survey Finding, 2016*

In relation to this, there are a number of previous studies supporting the positive association found between green supply chain and environmental performance. For instance, according to a study conducted on greening and business performance in China, Choi and Zhang (2011) found out that organizations have found a match between environmental considerations and profitability. Similarly, Otago (2009), argued in his findings on green supply management that GSCM helps reduce the ecological impacts of industrial activities thereby enhancing environmental performance.

4.4.3 Correlation between Green Supply Chain and Economic performance

As shown in the following table, like that of social and environmental performance, the correlation between green supply chain dimensions and economic performance depicts a positive direction. From the below survey result, strong correlation were exhibited between green marketing and economic performance (r=0.88, p=0.01), organizational commitment and economic performance (r=0.87, p=0.01) and eco-design and economic performance (r=70, p=0.05), and moderate correlation were found between investment recovery and economic performance (r=0.45, p=0.01), and weak relationship were between environmental practice and economic performance (r=0.38, p=0.05) and green purchasing and economic performance (r=0.46, p=0.05). The relationship also found to be statistically significant at 99% and 95% level of confidences.

Table 4.6 Correlation between Green Supply Chain and Economic performance

		Economic Performance
Organizational Commitment	Pearson Correlation	.877**
	Sig. (2-tailed)	.000
	N	36
Eco-Design	Pearson Correlation	.705**
	Sig. (2-tailed)	.000
	N	36
Green Purchasing	Pearson Correlation	.322*
	Sig. (2-tailed)	.046
	N	36
Green Marketing	Pearson Correlation	.883**
	Sig. (2-tailed)	.000
	N	36
Investment Recovery	Pearson Correlation	.453**
	Sig. (2-tailed)	.006
	N	36
Environmental practices	Pearson Correlation	.388*
	Sig. (2-tailed)	.019
	N	36
**. Correlation is significant at the 0.01 level (2-tailed).		
*. Correlation is significant at the 0.05 level (2-tailed).		

***Source**: Survey Finding, 2016*

Previous studies also tell us that environmental management and GSCM have appositive relationship with an organization‟s economic performance (Rao and Holt, 2005). With respect to this, Muma B. Onyango et al (2014) confirmed that there is a statistically significant positive relationship between green procurement and economic performance. This implies that organizations that adopt green procurement activities are likely to enjoy

improved economic performance. There is also, a statistically significant positive relationship between green design and economic performance.In general, there is statistically significant relationship between green supply chain management practices and economic performance.

4.4.4 Correlation between Green Supply Chain and Operational performance

The following correlation table between green supply chain and operational performance revealed that there is both positive and negative relationship between the dimensions of greening and operational performance. Despite, the relationship between eco-design and operational performance is negative (r=-0.45, p=0.01), as we can simply deduce from the table below, there is strong positive correlation between organizational commitment and operational performance (r=0.88, p=0.01), followed by green marketing and operational performance (r=83, p=0.01), a moderate positive correlation exhibited between investment recovery and operational performance (r=0.56, p=0.01), and weak relationshipswere also found between environmental practice and operational performance (r=0.35, p=0.05), and green purchasing and operational performance (r=0.28, p=0.05).Moreover, all the correlations were statistically significant at 99% and 95%confidence level.

Table 4.7 Correlation between Green Supply Chain and Operational performance

		Operational Performance
Organizational Commitment	Pearson Correlation	.882**
	Sig. (2-tailed)	.000
	N	36
Eco-Design	Pearson Correlation	-.455**
	Sig. (2-tailed)	.005
	N	36
Green Purchasing	Pearson Correlation	.285*
	Sig. (2-tailed)	.042
	N	36
Green Marketing	Pearson Correlation	.837**
	Sig. (2-tailed)	.000
	N	36
Investment Recovery	Pearson Correlation	.564**
	Sig. (2-tailed)	.000
	N	36
Environmental practices	Pearson Correlation	.356*
	Sig. (2-tailed)	.033
	N	36
**. Correlation is significant at the 0.01 level (2-tailed).		
*. Correlation is significant at the 0.05 level (2-tailed).		

***Source**: Survey Finding, 2016*

With regard to this, there are previous studies supporting the above revealed outcome of this survey result. For instance, Tooru (2001), demonstrated that an environmental management system can improve operational performance of a firm (as sited by; MarufHasan (2013)). MarufHasan (2013) himself also confirmed that green supply chain practices have considerable effect on the environmental and operation performance of organisations. Amemba et al. (2013) found out that implementation of Green Supply Chain Management leads to enhanced sustainability in the supply chain processes. They found out that it reduces wastes and costs associated with procurement process thereby leading to enhance operational performance.On the contrary, according to a study conducted byGallop and Roberts (1983) the effect ofenvironmental regulations on the cost of operations in the electricity utilities industry, they found out that - environmental regulations were associated with a decline in industry productivity. This result could be comparable with the negative relationship found between eco-design and operational performance.

4.5 Regression Analysis

In order to determine how the dimensions of the independent variable predict the dependent variable, multiple linear regression analysis was conducted. Regression analysis is a statistical method to deal with the formulation of mathematical model depicting relationship amongst variables which can be used for the purpose of prediction of the value of dependent variable, given the value of the independent (Kothari,2004). Therefore via the instrumentalism of multiple linear regressions analysis effort was made to determine the predictive power of the independent variables (i.e. Organizational commitment, Eco-design, Green Purchasing, Green Marketing, Investment Recovery and Environmental Practice) about the dependent Variable (Social Performance, Environmental Performance, Economic Performance and Operational Performance).

Furthermore, it isknown that multicollinearity test is a prerequisite to proceed to other regression analysis.Therefore, in advance of the regression analysis a multicollinearity test was conducted.

4.5.1 Multicollinearity Analysis

In order to identify whether some of the independent variables have very highcorrelations with other independent variables, using collinearity diagnostics,multicollinearity estimate was performed.Robert (2006), if collinearity is discovered then one can either remove one of the variables or create a new variable that combine the previous two that were highly inter-

correlated because when the predictor variables are highly correlated, they share essentially the same information and together, they may explain a great deal of the dependent variable, but may not individually contribute significantly to the model. Thus, the impact ofmulticollinearity is to reduce any individual independent variable‟s predictive power by theextent to which it is associated with the other independent variables (as sited by; Sileshi Solomon, 2016).

Tolerance value is an indication of the percentage of variance in the predictor that cannot beaccounted for by the other predictors implying the fact that very small values indicate overlap or sharing ofpredictive power. Besides,if the VIF values of independent variables are beyond 10, then it is suggested that further investigation is required (Robert, 2006).

Table 4.8 Multicollinearity Test Result

Model		Collinearity Statistics	
		Tolerance	VIF
1	Organizational Commitment	.134	7.452
	Eco-Design	.383	2.610
	Green Purchasing	.450	2.221
	Green Marketing	.226	4.425
	Investment Recovery	.506	1.978
	Environmental practices	.460	2.173

***Source**: Survey Finding, 2016*

Therefore, the multicollinearity test result of this particular study as it was presented on table 4.8 revealed that the Tolerance values for all the independent variables are within the acceptable level of greater than 0.1, while the VIF values are also less than the threshold of value of 10. In this regard, it is possible to agree that multicollinearity is not a serious problem as long as this particular test result is concerned.

4.5.2 Multiple Regression Analysis Result

In a multiple linear regression analysis of such sort, ANOVA test shows the acceptability of the model from statistical perspective. Accordingly, the regression row indicates the extent of variation explained by the model, whereas the residual row indicates information about the variation that is not accounted for the model, i.e. variation on the dependent variable explained by factors not included in the model (Sileshi Solomon, 2016).

Table 4.9 ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	20.685	6	3.448	54.518	.000[b]
	Residual	1.834	29	.063		
	Total	22.519	35			
a. Dependent Variable: Social Performance						
b. Predictors: (Constant), Organizational Commitment, Eco-Design, Green Purchasing, Green Marketing, Investment Recovery and Environmental practices						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	19.127	6	3.188	51.415	.000[b]
	Residual	.263	29	.062		
	Total	19.390	35			
a. Dependent Variable: Environmental Performance						
b. Predictors: (Constant), Organizational Commitment, Eco-Design, Green Purchasing, Green Marketing, Investment Recovery and Environmental practices						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	17.124	6	2.854	27.663	.000[b]
	Residual	2.992	29	.103		
	Total	20.116	35			
a. Dependent Variable: Economic Performance						
b. Predictors: (Constant), Organizational Commitment, Eco-Design, Green Purchasing, Green Marketing, Investment Recovery and Environmental practices						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	12.260	6	2.043	24.470	.000[b]
	Residual	2.422	29	.084		
	Total	14.682	35			
a. Dependent Variable: Operational Performance						
b. Predictors: (Constant), Organizational Commitment, Eco-Design, Green Purchasing, Green Marketing, Investment Recovery and Environmental practices						

***Source**: Survey Finding, 2016*

As shown in the above table the ANOVA test results demonstrated that the models are acceptable from statistical perspective. In other words, 0.000 levels of significances are obtained in all cases (i.e. Social Performance, Environmental Performance, Economic Performance and Operational Performance); this statistical condition further revealed that the regression models are statistically appropriate (fit) to the data.

Table 4.10 Model Summery and Coefficients: Social Performance

Model Summary		R		R Square	Adjusted R Square	Std. Error of the Estimate
		.958[a]		.919	.902	.25147
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
Coefficients	(Constant)	.236	.240		.984	.333
	Organizational Commitment	.542	.145	.543	3.753	.001
	Eco-Design	.364	.085	.366	4.278	.000
	Green Purchasing	.304	.271	.280	1.119	.272
	Green Marketing	.127	.149	.129	.853	.401
	Investment Recovery	.015	.085	.013	.173	.864
	Environmental practices	.280	.256	.270	1.093	.283
a. Dependent Variable: Social Performance						
b. Predictors: (Constant), Organizational Commitment, Eco-Design, Green Purchasing, Green Marketing, Investment Recovery and Environmental practices						

***Source**: Survey Finding, 2016*

As shown in the above model summary table, the adjusted R Square is 0.902, this suggest that 90% of the variation in the model is explained by the variables already incorporated in to the model. Therefore, in this particular case 0.902 R Square value revealed that 90% of the variation in the social performance explained by the variables existed in the model. This further shows that only 10% of the variation in the dependent variable is to be determined by the variables outside of this model.

Although the model fitness is confirmed as presented in the ANOVA table, as far as the coefficient table is concerned only organizational commitment and eco-design are statistically significant (at $p<0.05$ and $p<0.01$ respectively). From their beta values these two independent variables are relatively important in measuring the dependent variable (social performance). The remaining statistically insignificant variables (i.e. green purchasing, green marketing, investment recovery and environmental practice) are statistically failed to explain the dependent variable namely social performance since they scored p value out of the acceptable range ($p<0.05$). In relation to the measuring power of the two statistically significant variables the coefficient table revealed that organization commitment has a predicting standardized coefficient of 0.546 and eco-design scored standardized coefficient of 0.366.

Table 4.11 Model Summery and Coefficients: Environmental Performance

Model Summary		R		R Square	Adjusted R Square	Std. Error of the Estimate
		.993[a]		.986	.984	.09524
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
Coefficients	(Constant)	.021	.091		.227	.822
	Organizational Commitment	.024	.055	.026	0.447	.658
	Eco-Design	.036	.032	.039	1.124	.270
	Green Purchasing	.790	.103	.784	7.683	.000
	Green Marketing	.002	.056	.002	.028	.978
	Investment Recovery	.003	.032	.003	.107	.915
	Environmental practices	.216	.097	.225	2.227	.034
a. Dependent Variable: Environmental Performance						
b. Predictors: (Constant), Organizational Commitment, Eco-Design, Green Purchasing, Green Marketing, Investment Recovery and Environmental practices						

***Source**: Survey Finding, 2016*

The above embedded model summary and coefficient table with regard to environmental performance revealed an adjusted R Square value of 0.984, suggesting that 98% of the variation in the dependent variable that is environmental performance explained by the variables incorporated in this particular model. Moreover, from the result found in the model summary table it is also possible to infer that only 0.016% of variables those determine the change in environmental performance are external of this model. Alike that of social performance, even if the ANOVA result confirmed that the model is statistically significant to the data, the coefficient table revealed that only green purchasing and environmental practice exhibited statistically significant outcome (atp<0.01 and p<0.05 respectively) with standardized coefficient of beta values 0.784 and 0.225 respectively. This is to mean that the corresponding coefficients of these to independent variables are statistically significant since they fall in the range of acceptable p values (i.e. $0.01 \geq p \leq 0.05$). However, there remaining independent variables (i.e. Organizational Commitment, Eco-Design, Green Marketing and Investment Recovery) are found to be statistically insignificant in predicting organizational performance from environmental perspectives.

As presented on table 4.13, the model summery as well as coefficient analysis conducted with regard to economic performance demonstrated that the adjusted R Square of the regression conducted to economic performance is 0.820; shows that the model represents the variation in

the dependent variable that is economic performance by 82%, and 18% of dependent variables are external of this model. Furthermore, from the six dependent variables only two namely; organizational commitment and eco-design are statistically significant. As per the below portrayed coefficient table, organizational commitment and eco-design scored positive standardized coefficient of beta values 0.542 and 0.278 respectively (at $p<0.05$) level of confidence. Statistically insignificant independent variables (i.e. Eco-Design, Green Marketing, Investment Recovery, investment recovery and environmental practice) has been identified as they have no role in predicting the dependent variable (organizational performance) from economic performance perspective.

Table 4.12 Model Summery and Coefficients: Economic Performance

Model Summary		R		R Square	Adjusted R Square	Std. Error of the Estimate
		.923[a]		.851	.820	.32120
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
Coefficients	(Constant)	.463	.306		1.511	.142
	Organizational Commitment	.511	.185	.542	2.770	.010
	Eco-Design	.261	.109	.278	2.402	.023
	Green Purchasing	.475	.347	.463	1.370	.181
	Green Marketing	.219	.191	.235	1.150	.259
	Investment Recovery	.160	.109	.148	1.470	.152
	Environmental practices	.476	.327	.487	1.457	.156
a. Dependent Variable: Economic Performance						
b. Predictors: (Constant), Organizational Commitment, Eco-Design, Green Purchasing, Green Marketing, Investment Recovery and Environmental practices						

***Source**: Survey Finding, 2016*

The model summery and coefficient table affixed below asserted that adjusted R Square of the model formulated regarding operational performance is 0.801 that embraced the ability of the model in predicting the change in dependent variable by 80%. Moreover, the 0.801 adjusted R Square depicts that the model doesn"t comprised 19.01% of the variables which can predict the dependent variable (operational performance). Besides, the coefficient table fixed below also revealed that only two variables namely organizational commitment and eco- design are statistically significant (at $p<0.05$). The standardized coefficient beta value of organizational commitment and eco- design are 0.640 and -0.302 respectively. Similar to the

result found in the course of the correlation analysis, the direction of the relationship between eco-design and operational performance is negative i.e., eco-design negatively affect operational performance, whereas, the relationship between organizational commitment and operational performance is positive.

Table 4.13 Model Summery and Coefficients: Operational Performance

Model Summary		R		R Square	Adjusted R Square	Std. Error of the Estimate
		.914[a]		.835	.801	.28897
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
Coefficients	(Constant)	.679	.275		2.466	.020
	Organizational Commitment	.516	.166	.640	3.108	.004
	Eco-Design	-.243	.098	-.302	-2.483	.019
	Green Purchasing	.008	.312	.009	.026	.979
	Green Marketing	.294	.171	.369	1.713	.097
	Investment Recovery	.131	.098	.142	1.344	.190
	Environmental practices	.038	.294	.046	.130	.898
a. Dependent Variable: Operational Performance						
b. Predictors: (Constant), Organizational Commitment, Eco-Design, Green Purchasing, Green Marketing, Investment Recovery and Environmental practices						

***Source**: Survey Finding, 2016*

As far as the strength of the predicting power of the two statistically significant dimensions is concerned, it is revealed that organizational performance has the strong positive explaining power on the change in the dependent variable with a standardized coefficient of 0.64 whereas, eco-design exhibited a negative relationship denoted by a standardized coefficient of -0.302.

4.6 Challenges of Implementing Green Supply Chain Management

Based on the feedback received from participants of the survey descriptive statistics analysis was conducted so as to identify which challenges most prevalent in implementing green supply chain management. Therefore, as clearly depicted on table 4.14, the major challenges identified and agreed among most of the participants were supplier reluctance to change towards green supply chain management (mean=4.39, SD=1.076) followed by unawareness of customers and lack of quality of human resources with a mean and SD value of (mean= 3.97, SD=1.134) and (mean=3.17, SD=0.941) respectively.

Table 4.14 Challenges of Implementing Green Supply Chain Management

Challenges	Mean	Std. Deviation
Unawareness of customers	3.97	1.134
Supplier reluctance to change towards green supply chain management	4.39	1.076
Cost implications	2.56	.998
Lack of top management commitment	2.25	1.251
Lack of government support policies	1.83	.775
Weak market competition	1.56	.695
Lack of quality of human resources	3.17	.941
Resistance to technology advancement adoption	2.06	.715

Moreover, as shown in the above table cost implications, lack of top management commitment, resistance to technology advancement adoption, lack of government support policies and weak market competition are also identified by the participants as challenges of implementing greens supply chain with their respective mean and SD values. Unlike the degree of the challenges identified in the previous studies cost implication doesn‟t receive the usual result in the case of ethio telecom.

Moreover, from the interview conducted with Communication and IT Standardization and Regulation Directoratesand Compliance and Monitoring Control and Environmental Law and Standards Directorates of the Ministry of Environments and Forest it is identified that cost is not that much significant challenge of implementing environmentally favored system of production and distribution rather it is lack of top management commitment, cost implications and resistance to technology advancement adoption are thethreatening challenges of implementing green paradigms. Besides, from the interview questions raised with regard to the current status of ethio telecom from environmental criteria perspectives, the interview result revealed that the participants have no clear and accurate knowledge of the wastes that ethiotelecom emit in to the environment and that have significant environmental impact.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 Conclusions

Significant concern is prevailing at present about reduction of the negative impact of firms‟ activity on the eco-system so as to preserve the natural environment for future generation. This research is conducted to examine the relationship between green supply chain management practices and organizational performance in the case of ethio telecom, along with to identify the challenges of green supply chain implementation. In particular, the study examined whether adoption of green supply chain management scheme resulted in a positive impact on the overall organizational performance of the company (i.e. ethio telecom) or not. Therefore, based on the findings of the study, the following conclusions were made:

From the descriptive statistics analysis result of the dimensions of greens supply chain management practices (i.e. organizational commitment, eco-design, green purchasing, green marketing, investment recovery and environmental practices) ethio telecom achieved a composite mean score above the average only in one of the dimension, namely on investment recovery. This reveals that as far as the perception of the respondents are concerned ethio telecom is currently exerting relatively moderate level of effort to sale; scrap and used materials, excess capital equipment and excess inventories or martials. Therefore, from investment recovery perspectives the status of ethio telecom can be considered as moderately exercising green supply chain. On the contrary, the composite mean scores perceived in the remaining dimensions namely; organizational commitment, eco-design, green purchasing, green marketing and environmental practices were below average, suggesting that with regard to the stated five dimensions of greens supply chain practice ethio telecom is either at stage of planning to considering it or not considering it at all. Hence, the overall status of ethio telecom with regard to these dimensions is poor.

Except in the case of eco-design and operational performance, the relationship between the dimensions of green supply chain management that is, organizational commitment, eco-design, green purchasing, green marketing, investment recovery and environmental practices, and the dimensions of organizational performance, namely, social performance, environmental performance, economic performance and operational performance have a statistically significant positive relationship. The strength of the relationship in most of the cases wasmoderate. However, unlike most of the relationships between the dimensions of

green supply chain and organizational performance, eco-design and operational performance have shown statistically significant negative relationship. This isan indication of the fact that environmental regulations increase the cost of operation there by decreased productivity. Moreover the existence of moderate level of positive association between green supply chain and organizational performance reveals the current status of ethio telecom in discharging environmental responsibilities.

With regard to the predictive power of the dimensions of greens supply chain management, from the regression analysis result conducted to identify the effect of the dimensions of the independent variables (i.e. organizational commitment, eco-design, green purchasing, green marketing, investment recovery and environmental practices) on one of the dimensions of the dependent variable, namely, social performance; only organizational commitment and eco-design have statistically significant beta values indicating that only these two dimensions have an effect on the organizational performance of ethio telecom. A similar regression analysis conducted between the dimensions of the independent variable and environmental performance, only green purchasing and environmental practice, and economic performance and operational performance only organizational commitment and eco-design have disclosed statistically significant beta values indicating that only these dimensions have effect on the organizational performance of ethio telecom.

Besides, an assessment on the challenges of implementing green supply chain management revealed that as far as ethio telecom and the perceived responses of the participants are concerned, supplier reluctance to change towards green supply chain management, unawareness of customers and lack of quality of human resources are among the major challenges of green supply chain implementation.

Generally, the overall survey findings of this particular study revealed that the organizational performance of ethio telecom in relation to green supply chain management practice is poor as the perceived appraisal of the participants indicated. Moreover, from the ranges of green supply chain management dimensions only; organizational performance, eco-design; green purchasing and environmental practice have a statistically significant predicting power in the four different scenarios that is social performance, environmental performance, economic performance and operational performance.

5.2 Recommendations

Based on the finding obtained and conclusions drawn the following recommendations are proposed;

- The study revealed that the current status of green supply chain management practice in ethio telecom is not strong. This implies that the commitment of different partakers" is not at required level (poor). In this regard, different studies indicate that management and employees commitment and vigorous support is a critical factor in implementation of environmentally favoured supply chain practice. Therefore, in order to safeguard the environment from pollutants, comply with the law of the land and exploit the advantages that emanate from the very nature of green supply chain practice, the study recommended ethio telecom to go further so as to adopt the concept of environmentally responsible supply chain management fully.

- In order to be able to expand the green supply chain practices, and boldly built environmentally favoured green supply chain, the company need to establish a separate unit so as to review and convey experiences and techniques installed in companies ascribed from environmental stances.

- Instead of a mere observation and levelling of companies as non-pollutant, an audit framework and manual must be set up at industry level by Compliance and Monitoring Control and Environmental Law and Standards Directorates of the Ministry of Environments and Forest, in order to seriously look at to the activities of firms from environmental perspectives. This will help to effectively monitor the activity and compliance at industry level in agreement with the country green development strategy.
- The study identified that supplier reluctance to change towards green supply chain management, unawareness of customers and lack of quality of human resources are the major challenges of green supply chain management. Therefore, Compliance and Monitoring Control and Environmental Law and Standards Directorates of the Ministry of Environments and Forest, Communication and IT Standardization and Regulation Directorates need to arrange a platform and work together so as to build capacity create awareness and resolve the problems.

5.3 Limitation and Suggestions for Future Studies

There are limitations to this study that should be considered when interpreting the study results. These limitations are left for future research. First, this study did not include all green supply chain management practices. The study included only six dimensions of green supply chain practices: Organizational Commitment, Eco-Design, Green Purchasing, Green Marketing, Investment Recovery and Environmental practices, studies suggest several other types of green supply chain management practices such as closed-loop system. Second, the performances from financial perspectives are not measured. Thirdly, because of the difficulties involved in collecting data and other limitations this research used data mainly collected from manager and officers of ethio telecom. It is advisable that future research should collect data from a more diverse sample.

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APPENDIX A:

QUESTIONNAIRE
ADDIS ABABA UNIVERSITY
COLLEGE OF COMMERCE SCHOOL OF GRADUATE STUDIES
DEPARTMENT OF LOGISTICS AND SUPPLY CHAIN MANAGEMENT

Dear respondents:

The intent of this questionnaire is gathering information to a thesis to be conducted with regard to the **Supply Chain Performance of ethio telecom, from Green Supply Chain perspectives**, in partial fulfilment of the requirements for the Master of Logistics and Supply Chain Management Degree and; to be submitted to Addis Ababa University School of Graduate Studies Faculty of Business and Economics to Logistics and Supply chain Department. Therefore, I humbly request you to consider your participation in responding the questionnaire is in high importance so as to give the researcher a great deal of clarity about the issue.

Also, I can assure you that the information to be collected from you are solely for academic purpose and will be treated with strict confidentiality. Once again, I demand your valuable support in filling the questionnaire as patiently and frankly as possible.

Thank you for your time and consideration!

- *contact address +251912335363*

Instruction: Please, put a tick (✓) mark in which you want to select.

Part I: Questions related with Background Information

1. Gender?

Male ☐ Female☐

2. Highest formal education attended?

Secondary education ☐ College Diploma ☐ Undergraduate Degree ☐

Master Degree ☐ Doctoral Degree ☐

3. What is your job title?

BP Manager ☐ Facility/Fleet Manager ☐ Logistics/Warehouse Manager ☐

Sourcing Manager ☐ Officer and above ☐

4. How long have you been working in ethio telecom (in years)

0-5 ☐ 6-10 ☐ 11-15 ☐ 16-20 ☐ 21 and above ☐

Part II Question Directly Related to the Study

Section A: Questions related with GSCM practice. To be answered using a tick (✓) mark. The five Likert Scale points denote: 1=not considering it, 2=Planning to consider it, 3=considering it currently 4=carrying out to some degree and 5= Carrying it out fully). The questions grouped as five topics are:

No.	Parameter	1	2	3	4	5
Organizational commitment						
1	Top management commitment					
2	Middle management commitment					
3	Cross functional cooperation					
4	Employee involvement					
Eco-design						
5	Design of products for reduced materials and energy consumption					
6	Design of products for reuse, recycle, recovery of material, component parts					
7	Design of products to avoid or reduce use of hazardous of products and /or their manufacturing process					
Green Purchasing						
8	Cooperation with suppliers for environmental objectives					
9	Providing design specification to suppliers with environmental requirements					
10	Environmental audit for suppliers' internal management					
11	Suppliers ISO14000 certification					
12	Second-tier supplier environmentally friendly practice evaluation					
Green Marketing						
13	Cooperation with customer for eco-design					
14	Cooperation with customer for cleaner production					
15	Cooperation with customers for green packaging					
16	Cooperation with customer for least energy consumption for logistics					
Investment Recovery						
17	Investment recovery (sale) of excess inventories/martials					
18	Sale of scrap and used materials					
19	Sale of excess capital equipment					
Environmental practices						
20	Environmental compliance and audit procedure					
21	ISO 14000 certification					
22	Environmental Management system					
23	Eco-labelling of products					

Section B: includes questions related with performance. To be answered using a tick (✓) mark. The five Likert Scale points denote: 1= not at all, 2= a little bit, 3=to some degree, 4= relatively significant and 5= significant)

No.	Parameter	1	2	3	4	5
Social Performance						
24	Business ethics					
25	CRS activities					
26	Employment generation					
27	Positive image					
Environmental Performance						
28	Reduction of air emission					
29	Reduction of solid wastes					
30	Reduction of accidents					
31	Recycle of materials					
32	State of art design of reverse logistics					
Economic Performance						
33	Energy consumption					
34	Cost of materials purchasing					
35	Water usage					
36	Reduction of disposal cost					
37	Reduction of Waste					
Operational Performance						
38	Optimum design					
39	Minimum inventory					
40	Capacity utilization					
41	Improved quality					
42	Effective reverse logistics					
43	Reduction of time for recycling					

Section C: incorporates issues related with challenges of Implementing Green Supply Chain Management. The five Likert Scale points denote: 1= not at all, 2= a little bit, 3=to some degree, 4= relatively significant and 5= significant)

No.	**Parameter**	1	2	3	4	5
44	Unawareness of customers					
45	Supplier reluctance to change towards green supply chain management					
46	Cost implications					
47	Lack of top management commitment					
48	Lack of government support policies					
49	Weak market competition					
50	Lack of quality of human resources					
51	Resistance to technology advancement adoption					

APPENDIX B:

INTERVIEW QUESTIONS
ADDIS ABABA UNIVERSITY
COLLEGE OF COMMERCE SCHOOL OF GRADUATE STUDIES
DEPARTMENT OF LOGISTICS AND SUPPLY CHAIN MANAGEMENT

For:

- **Communication and IT Standardization and Regulation Directorates**
- **Environment Law and Standards Directorate of the Ministry of Environments and Forest**

1. What does the green industry transformation strategy of Ethiopia telecom industry looks like?
2. What is the implication of Ethiopia‟s climate resilient green economy strategy towards sustainability of the telecom industry?
3. What are the wastes that ethiotelecom emit in to the environment and that have significant environmental impact?
4. How do you describe the role of ethiotelecom in bringing sustainable economic development?
5. Is there any serious problem that ethio telecom creates on the people living nearby ethio telecom infrastructure?
6. How do you descript the effort of ethio telecom in converting or mitigating the impact of pollutants in to valuable products?
7. How the environmental regulation for industry does changed the environmental performance of ethio telecom?
8. How compliance with the environmental regulations can be improved? Enforcement of standards and quality, enshrined in national legislation?
9. What are the difficulties and problems facing ethio telecom in adoption of environmental initiatives?
10. What need to be done to improve ethio telecom‟ compliance with environmental regulations?
    a. Reduction of waste along the supply chain
    b. Control of solid waste, discharges and air emissions in the supply chain
    c. Control and abatement of pollution
    d. Propose initiatives for technology and knowledgetransfer

APPENDIX C:
CORRELATIONS

		OrgComm	EcoDesi	GreenPurc	GreenMkt	InvReco	EnvPrac	SociPerf	EnvPerf	EconPerf	OperPerf
OrgComm	Pearson Correlation	1	.648**	.336*	.605**	.590**	.380*	.913**	.350*	.877**	.882**
	Sig. (2-tailed)		.000	.045	.000	.000	.022	.000	.037	.000	.000
	N	36	36	36	36	36	36	36	36	36	36
EcoDesi	Pearson Correlation	.648**	1	.509**	.652**	.528**	.486**	.798**	.487**	.705**	-.455**
	Sig. (2-tailed)	.000		.002	.000	.001	.003	.000	.003	.000	.005
	N	36	36		36	36	36	36	36	36	36
GreenPurc	Pearson Correlation	.336*	.509**	1	.273	.493**	.466**	.392*	.991**	.322	.285
	Sig. (2-tailed)	.045	.002		.108	.002	.000	.018	.000	.056	.092
	N	36	36	36	36	36	36	36	36	36	36
GreenMkt	Pearson Correlation	.705**	.652**	.273	1	.474**	.356*	.885**	.292	.883**	.837**
	Sig. (2-tailed)	.000	.000	.108		.003	.033	.000	.084	.000	.000
	N	36	36	36	36	36	36	36	36	36	36
InvReco	Pearson Correlation	.590**	.528**	.493**	.474**	1	.517**	.590**	.500**	.453**	.564**
	Sig. (2-tailed)	.000	.001	.002	.003		.001	.000	.002	.006	.000
	N	36	36	36	36	36	36	36	36	36	36
EnvPrac	Pearson Correlation	.380*	.486**	.666**	.356*	.517**	1	.437**	.973**	.388*	.356*
	Sig. (2-tailed)	.022	.003	.000	.033	.001		.008	.000	.019	.033
	N	36	36	36	36	36	36	36	36	36	36
SociPerf	Pearson Correlation	.913**	.798**	.392*	.885**	.590**	.437**	1	.416*	.856**	.781**
	Sig. (2-tailed)	.000	.000	.018	.000	.000	.008		.012	.000	.000
	N	36	36	36	36	36	36	36	36	36	36
EnvPerf	Pearson Correlation	.350*	.487**	.991**	.292	.500**	.973**	.416*	1	.344*	.291
	Sig. (2-tailed)	.037	.003	.000	.084	.002	.000	.012		.040	.085
	N	36	36	36	36	36	36	36	36	36	36
EconPerf	Pearson Correlation	.877**	.705**	.322	.883**	.453**	.388*	.856**	.344*	1	.690**
	Sig. (2-tailed)	.000	.000	.056	.000	.006	.019	.000	.040		.000
	N	36	36	36	36	36	36	36	36	36	36
OperPerf	Pearson Correlation	.882**	-.455**	.285	.837**	.564**	.356*	.781**	.291	.690**	1
	Sig. (2-tailed)	.000	.005	.092	.000	.000	.033	.000	.085	.000	
	N	36	36	36	36	36	36	36	36	36	36

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

*. Correlation is significant at the 0.05 level (2-tailed).