ASSESSMENT OF GREEN SUPPLY CHAIN MANAGEMENT PRACTICE: THE CASE OF BGI ETHIOPIA AT ST. GEORGE FACTORY

BY

YOHANNES ABATE

A THESIS SUBMITTED TO ADDISABABA UNIVERSITY SCHOOL OF COMMERCE IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTERS' OF ARTS IN LOGISTICS AND SUPPLY CHAIN MANAGEMENT

ADVISOR: TARIKU JEBENA (PhD)

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DECLARATION

I, **Yohannes Abate Ayele**, declare that this thesis in title "**Assessment of Green Supply Chain Management Practice: The Case of BGI Ethiopia At St. George Factory**" was conducted by myself, that the work contained herein is my own except where explicitly stated otherwise in the text, and this work has not been submitted for any other degree or professional qualification except as specified for the partial fulfillment of the requirements for the Degree of Masters of Art in Logistics and Supply Chain Management at Addis Ababa University, School of commerce. I have duly acknowledged all the sources and references from which the ideas and extracts have been taken.

Yohannes Abate Ayele

Signature: _____

Date: _____

CERTIFICATION

This is to certify that the thesis in title "**Assessment of Green Supply Chain Management Practice: The Case of BGI Ethiopia At St. George Factory**" that is being submitted by **Yohannes Abate Ayele for** the partial fulfillment of the requirements for the award of the degree of Masters of Art in Logistics and Supply Chain Management at Addis Ababa University, School of commerce is a record of bona fide work carried out by him under my guidance and supervision. The results embodied in this thesis have not been submitted to any other University or Institute for the award of any degree or diploma.

Tariku Jebena (PhD)

Signature: _____

Date: _____

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ABBREVIATIONS/ACRONYMS

GSCM- Green Supply Chain Management

ISO- International Organization for Standardization

SCM- Supply chain management

SPSS- Statistical Packages for Social Science

UNDP- United Nations Development Program

ABSTRACT

The objective of this study is to assess the practices of green supply chain management at BGI Ethiopia. This study employed descriptive type which shows the extent in which BGI Ethiopia is implementing green supply chain management practice. Both quantitative and qualitative research has been employed. From the total population of 940 production manager and employees 189 samples were used by using purposive sampling techniques. The study incorporates six variables in which all of them were measured on a 5-point Likert-Scale,". Apparently, mean was used as a measure of central tendency. Furthermore, the data were encoded, processed and evaluated using Statistical Package for social science version 24. The analysis result show that the mean score values for green supply chain management practice was to the minimum the average mean value (only between 3.5 and 3.9) which actually indicates the green supply chain management practice at BGI Ethiopia in Addis Ababa is precisely strong. Regarding the correlation, it indicates green supply chain management practices correlated each other respectively. The result given on the conclusion entails that, the research questions were considerably assessed strong by which actually indicates the green supply chain management practice is at required level in BGI Ethiopia. By relying on the study findings, the researcher suggests the following points as credible recommendations to the problem such as adopting green manufacturing practices, maximize material and component recovery, reuse and recycling, focusing on environmental sustainability in its supply chain management.

Keywords: *Green Supply Chain management, GSCM, Supply chain management*

CHAPTER ONE

INTRODUCTION

This chapter explains the issue statement, research purpose, research question, and significance of the study in the study in addition to providing background information regarding the study. The limits of the study are among the other subjects mentioned in the chapter. The report explores the fundamental idea of green supply chain management in the background.

1.1. Background of the Study

Supply chain management (SCM), also known as active supply chain management, is used to optimize customer value and create a sustainable competitive advantage. It shows that supply chain management companies have made a concentrated effort to build and run supply chain as effectively and efficiently as they can. Product development, sourcing, production, and logistics are all included in supply chain operations, as are the information systems needed to manage these tasks Robert (2020).

According to the definition of GSCM, it is the practice of "integrating environmental thinking into supply chain management, including product design, material sourcing and selection, manufacturing processes, final product delivery to the consumer, and product end-of-life management after its useful life."

In addition, the GSCM's scope encompasses both proactive measures carried out through the various "R's" (reduce, rework, re-use, refurbish, reclaim, recycle, remanufacture, and reverse logistics) and reactive action carried out through conventional environmental management programs Hoek (2008).

Effective green supply chain management should focus on the common objective of the enterprise involved in the supply chain. On the other side, in order to remain viable in the global market, the supply chain needs to be socially conscious and dedicated to upholding a secure environment for people Neramballi (2017).

Both supply chain management and environmental management text are used to create green supply chains. Addressing the effects of the link between supply chain management and the environment is important in order to add the "green" component to supply chain management. Components of integrating environmental thinking into supply chain management include

product design, green purchasing, green manufacturing, material management, green distribution/marketing, delivery of the finished product to the consumer, and reverse logistics Neramballi (2017).

Incorporate environmental concerns or considerations into organizational purchasing choices and long-term supplier relationships through the use of conventional supply chain management produce is known as “green supply chain management.” The environmental principle must be incorporated into every stage of the product and service in a supply chain, according to green supply chain management Bhattacherjee(2015).

Reverse logistics is the other core idea in the green supply chain. Reverse logistics in the movement of good back up the supply chain for many reasons, including product returns, repairs, and upkeep. And end-of-life returns for recycling or disassembly. Both a service (repair, recall, etc.) and an environmental component are included in reverse logistics Hoek (2008).

BGI Ethiopia plc, one of the Breweries in Ethiopia with about 3.5M hectoliter attainable capacity producing three brands of products (Castel, St. George and Amber beer) both in draft and bottle. BGI Ethiopia is extending its capacity by owning two recently established breweries (Raya and Zebidar) to maintain its market share both in product mix as well as product volume. Currently the company is involving in greening the environment and social responsibility in different aspect. The company in all the three factories found in Addis Ababa, Hawassa and Kombolcha, constructed waste water treatment plants to avoid water pollution in the surrounding environment. The company also participated in the environment protection program held by the community. The company is committed to undertake social responsibility as part of the main production and distribution process of its products. However, it is not well-known challenges and impact of practice of green supply chain on organizational performance.

The practices of BGI Ethiopia plc's green supply chain management are discussed in this study, with a particular emphasis on those practices that are connected to it.

1.2. Statement of the Problem

Environmental concerns are very important to business decision-makers. Green supply chain management is one of many commercial and industrial environmental attitudes and practices that have received significant attention from scholars and practitioners. Environmental issues have long been a source of concern within business organizational systems. These factors have included proactive ones that address governmental and regulatory restrictions as well as more practical ones like enhancing organizational competitiveness and fostering a positive company image. As organizations are thinking about how to achieve a competitive advantage by managing their supplier and customer alliance and networks as the significance of inter- organizational relationships increases. E. Revilla, J. Cordeiro, and Joseph Sarkis (2011).

The natural environment currently presents a difficult dilemma for corporate companies because of both global and local environmental issues. Most of these problems are believed to be the result of business operations such as procurement, production, and logistics Beamon (1999).

As a result, numerous internal and external stakeholders, including governmental organizations, employees, residents, and not-for-profit organizations, are putting greater pressure on and scrutinizing business activities. This goes beyond the expanding desire for more environmentally friendly products among consumers and environmental organizations. These obstacles and demands force businesses to consider how their operations may have an influence on the organization Sarkis (2006).

"Green" has become a standard practice to promote the image of environmentally friendly products, processes, systems, and technology, as well as the way business is done Vachon and Klassen (2006a, b). The majority of green solutions, however, still take a command -and-control or “end-of-the-pipe” strategy, where a business works to lessen unfavorable environmental effects after they have already occurred rather than adopting proactive measures to cut back on waste or pollution sources. This is particularly true in developing nations Anbumozhi and Kanda (1998); Walton and colleagues (2005).

Traditional green projects are flawed and problematic in many ways. The end-of-pipe approach does not actually remove pollutants; it merely moves them from one medium to another Sarkis (2006). Furthermore, implementing green practices internally may expose the company to other companies in its supply chain with poor environmental standards. The performance and

reputation of purchasing organizations, for instance, may be significantly impacted by the subpar environmental performance of small suppliers Faruk et al. (2002), Cousins et al. (2004), Christmann and Taylor (2001), Darnall and Edwards (2006), and Hall (2001).

Most firms today are going green due to worries over the sustainability of the environment. They must present an image of products, processes, systems, and technology that are ecologically friendly Klassen and Vachon (2006). The life cycle of a product, from resource extraction to manufacture, use, reuse, recycling, and disposal, all have an impact on the environment Zhu and others (2007).

However, as industrialization and globalization advance in developing nations, manufacturing industries are given additional opportunities and environmental burdens rise at the same time Rao (2002). The recent changes in environmental rules that have impacted manufacturing activities are drawing increased attention to Environmental Management (EM) techniques for the supply chain. As a result, the idea of GSCM emerges as a novel systematic approach and develops into a significant problem for contemporary commercial activities. The "greening" of the supply chain is one of the forthcoming challenges for businesses Diane Lesley Holt (2005). Therefore, commercial organizations should assess the environmental impact of every supply chain decision. Regarding BGI Ethiopia Green supply chain practice, while the firm's primary goal is to offer high-quality beer products at competitive prices in both bottle and draft formats, the company must also raise awareness of environmental protection by applying green supply chain practice. According to pre-assessment conversations with the BGI supply chain department, the practice's benefits, impacts on the organization and the environment, and challenges have not yet been fully identified even though the company is working on projects like a waste water treatment plant and implementing an environmental management system. However, Mesfin Kora (2016) and Zellalem T. Beyene (2015) both did studies on the Ethiopian tanning business. Mesfin T. Beyene (2015) also conducted a study on ethio-telecom. The result also showed that a firm's commitment to the environment, eco-design, green purchasing, and environmental policies have statistically significant predictive potential for the success of the organization. However, there aren't enough studies looking into GSCM adoption and application in poor nations. However, the researcher is aware of just a few studies in Ethiopia about GSCM in industries other than brewing. This paper's main objective is to evaluate the use, benefits, and

challenges of green supply chain management in the context of brewery industry, specifically in the case of BGI Ethiopia plc.

1.3. Research Questions

The purpose of this paper is to investigate the following key research questions.

- To what extent the green manufacturing process at BGI Ethiopia plc. perform?
- How the practice of eco-design accomplishes at BGI Ethiopia plc.?
- What are the practices of green procurement in BGI Ethiopia?
- To what extent that the green distribution and transportation in BGI Ethiopia plc. achieve?
- What is the status of reverse logistics practice at BGI Ethiopia plc.?

1.4. Objectives of the Study

1.4.1. General objective of the study

The overarching goal of this paper is to evaluate BGI Ethiopia plc's green supply chain management practices.

1.4.2. Specific Objective of the Study

The primary research questions listed below serve as a framework for investigating green supply chain management practices.

- To investigate the green manufacturing process at BGI Ethiopia plc.
- To identify the eco-design practice at BGI Ethiopia plc.
- To examine the practices of green procurement in BGI Ethiopia.
- To evaluate the green distribution and transportation in BGI Ethiopia plc
- To assess the status of reverse logistics at BGI Ethiopia plc

1.5. Operational Definition of Terms and Concepts

- **Green Supply Chain**

The definition of the green supply chain (GSCM) is the incorporation of environmental initiative into supply chain management to enhance the environmental performance of suppliers and consumers Bowen (2009).

- **Supply Chain**

All stakeholders engaged in directly satisfying a client request are taken into account, including producers, suppliers, warehouses, merchants, and clients Meindl and chopra (2010).

- **Corporate social responsibility**

Corporate social responsibility (CSR) is the term for a company's duty to the community, its stakeholders, and the environment Blowfield (2005).

1.6. Significance of the Study

The findings of this research are useful for the improvement plan for organizations, managers, stakeholders, and policy makers.

In order for BGI Ethiopia plc and other stakeholder groups, such as supply chain partners, the government, academia, customers, and the general public, to monitor and assess their activities in this area, an analysis of the green supply chain management practice is crucial.

The study's second perceived benefit introduces numerous ideas on green supply chain management practices in manufacturing firms. Globalization's effects on manufacturing enterprises required them to cope with green supply chain in order to meet consumer demand for environmentally friendly products. The manufacturing industry's supply chains, such as distributors, retailers, and transporters, can examine how their own supply chain operations contribute to environmental sustainability and social responsibility using the findings. The results are useful for further research even though this study has several limitations.

1.7. Scope of the Study

The assessment of BGI Ethiopia plc's application of green supply chain management is the main goal of this study. The Addis Ababa St. George Factory, one of three factories run by BGI Ethiopia plc, was the focus of the investigation. The analysis concentrates on the company's upper stream.

1.8. Limitation of The Study

Although this study has been conducted with the application of various literature reviews and data analysis tools, it is important to mention that it still has some limitations. These limitations need to be acknowledged to pave the way for further studies in the field. One of the key

limitations of this study is the limited scope of the findings, as the research was only conducted on a single factory located in Addis Ababa. The generalization of the findings to other factories or regions may not be possible, which could impact the validity of the results. Another significant challenge during this study was the lack of adequate literature or secondary sources available regarding green supply chain management practices. This limited the scope of the study and may also have impacted the accuracy of the findings. A related issue was that most of the respondents were unwilling or difficult to reach, which hindered the collection of comprehensive and accurate data. These limitations highlight the need for further research in this area, particularly in terms of accessing broader sample sizes and more diverse sources of information.

1.9 Organization of the Paper

This paper was divided into five chapters. In chapter one it includes the study background, statement of the problem, research question, research objectives, definition of terms and concepts, significance of study and scope. In chapter two, the literature review on green supply chain management is explained. In order to create a conceptual framework that responds to the problem statements presented in chapter one, the researcher concentrates on related empirical and theoretical supply chain Literature in this chapter. Chapter three discusses the research approaches. The research design, sample and sampling methodology, data source, data collection procedures, data analysis strategies and methods for presenting finding are all covered chapter four reports on the finding and results. The conclusion was interpreted using a review of related literature. Chapter five contains the research summary, conclusion and recommendations.

CHAPTER TWO

RELATED LITERATURE REVIEW

INTRODUCTION

The academic and research literature on green supply chain management strategies is compiled in this chapter. It examines literature that is pertinent to the research's overall and particular objectives. It particularly discusses literature pertaining to the study's specific aims in the preceding studies/main review section.

2.1 Theoretical Literature Review

2.1.1 Stakeholder Theory

The stakeholder theory states that an organization can maintain support from a variety of constituent groups by taking into account and balancing their pertinent interests. It looks at the interactions between a company and its internal and external settings, as well as how these interactions impact the company's operational style.

Business need to be more ecologically aware and take the necessary safeguards as environmental issues become more widespread Clarkson (1998)

Many businesses in industrialized nations are now paying serious attention to environmental policies as a result of the development of environmentally friendly products Sezen and Cankaya (2018).

Although these policies are available, the environmental harm that many organizations' products create, especially in poor nations, has not decreased Ojo and colleagues (2014).

2.1.2 Supply Chain Management

The term "supply chain" refers to the entire process of getting a product from the point of manufacture to the customer, which includes sourcing components and raw materials, manufacturing and assembly, warehousing and inventory management, order entry and order

management, distribution through all channels, customer delivery, and the information systems needed to track all of these processes. Habib, n.d.

Controlling the movement of materials, finished goods, and related information between suppliers, businesses, resellers, and end users is what it entails Nabil Abuel Ata, Rudolf of Schmandt (2016).

With the main objective of maximizing supply chain surplus, or overall value generated, it is the management of all supply chain assets and flows (financial, informational, and product/materials). The difference between the product's worth to the consumer and all related costs is the overall value generated Chopra and Meindl (2010).

2.1.3 Green Supply Chain Management

Green supply chain management (GSCM) is a new discipline that differs from traditional supply chain thinking. As a result of the "quality revolution in the late 1980s and the supply chain revolution in the early 1990s," businesses have become more environmentally conscious Srivastava (2007), Wu&Dann (1995). Previously, supply chain management was thought to be a method for converting raw materials into finished goods Beamon (1999). Companies engage in this process to exploit natural resources in a variety of ways Srivastava (2007) increased its environmental relevance. The concept of a "green supply chain" can be used to prevent or lessen this exploitation and environmental damage. By combining the "green" and "supply chain" concepts, the GSCM, a new paradigm with a direct connection to the environment, is created. Most people believed that these two paradigms were in direct opposition to one another Srivastava (2007).

According to the research by Schaper (2002), "green" supply chain management has just recently progressed from its conception forty years prior. The first article on the green supply chain to be cited was by Kelle and Silver (1989). Due to the nature of later studies' supply chain studies, which can focus entirely or partially on a single functional area, the idea of GSCM has been updated.

Green supply chain management is the practice of incorporating environmental considerations or concerns into corporate purchasing decisions and long-term supplier partnerships (GSCM) Gilbert, G. (2000). A green supply chain attempts to keep wastes contained within the industrial system in order to save energy and prevent hazardous pollutants from entering the environment.

Nones, Morques, Torres, and Evgenio are the players (2004). It recognizes the disproportionate environmental impact of the organization's supply chain processes. It recognizes the disproportionate environmental impact of the organization's supply chain processes. The phrase" green supply chain management" (GSCM) refers to the fusion of environmentally friendly production, packaging, distribution, and marketing. Waste in the forms of energy, emissions, hazardous waste, and solid waste are all targets of GSCM Olugu,Wong and Shaharoun(2010).

Many corporate and industrial environmental philosophies and practices are closely related to and support green supply chain management, and they have also been the subject of extensive research, practice, and application. Green issues are a top priority for business leaders. In this context, green supply chain management (GSCM) is the incorporation of sufficient environmental activities at each stage of the supply chain. These programs cover purchasing, product design and development, manufacturing, transportation, packaging, and storage, as well as after-sales end-of-life management. Environmental issues have long been a source of concern within corporate organizational structures. These concerns have ranged from reactive ones resulting from governmental and regulatory demands to more proactive ones such as creating a competitive advantage for the organization and fostering a positive business image. Organizations are thinking about how to achieve a competitive advantage by managing their supplier and customer alliances and networks as the importance of inert-organizational interactions increases Revills, E,James Cordeiro and Joseph Sarkis(2011).

The two types of environmental practices in GSCM are intra- and inter-organizational; the former deal mostly with socially complex resources, whereas the latter occasionally deal with ambiguous resources. Energy use, material consumption, emissions, and waste in relation to internal operations are the primary subjects of intra-organizational environmental practices, such as total quality environmental management, waste management, and environmental management systems. Wu, T, Jim Wu.Y,C Chen, YJ and Goh, M (2013). For businesses, however, the key to reducing and preventing pollution is determining how to structure internal management systems that encourage extensive employee involvement and continuous learning.

Inter organizational environmental practices are more typically used to refer to product stewardship programs, which place an emphasis on collaborations between suppliers and customers to cooperatively manage cross-firm environmental challenges Wong et al (2012) and

Vachon and Klassen (2006). These approaches include things like reverse logistics, green distribution, life cycle analysis, and design for the environment. These procedures create social networks built on loyalty and trust that encourage information sharing and reciprocity among supply chain actors, creating an engaging environment for all involved Hart (1995). Inter – organizational environmental measures are consequently socially complex and depend on strong cooperation between companies and supply chain partners Lujun Chen, Han Jinping Tian and Shi (2012).

The significance of taking the essential actions to properly integrate suppliers and clients is also emphasized by tense methods. Supply chain integration is the collaboration of supply chain participants in organizational activities both internally and externally B.B Flynn, S. Sakakibara R.G.Schroeder, K. Bates(1990). According to the authors' justifications, integrating a green supply chain entails a company coordinating intra- and inter-organizational environmental practices with its supply chain partners. Green Supply Chain assists various members in measuring, analyzing, and improving action in order to determine whether or not businesses are operating in an environmentally sustainable manner.

2.1.3.1 Green Procurement

The United Nations Development Program (UNDP) (2008) defines environmental or green procurement as “the purchase of products and services that have less impact on the environment and human health when compared to competing products or services that serve the same purpose.” Others counter that green procurement can involve both the acquisition of a green product and a green procurement procedure. This could be done during the supplier evaluation process, where a supplier is chosen because of its environmental accreditation (for example, implementing the ISO (International Organization for Standardization) 14001 standard), or because of its environmental policy. A supplier is encouraged to continue implementing “greenness” into their operation and even their products as their business grows as a consequence of this “green” criterion, and competitors are also encouraged to adopt to green business practices New and colleagues (2000).

According to Javier González-Benito et al. (2016) “green purchasing" entails the use of "an environmentally conscious purchasing practice that reduces waste sources and promotes recycling and reclamation of purchased materials without adversely affecting such materials'

performance requirements." We can deduce three important terms and phrases from this definition: recycling, performance requirements of such materials, and environmentally conscious Tice. Environmental purchasing practices that involve reducing, reusing, and recycling of resources during the purchasing process are referred to as "green procurement." It is a workaround for environmentally conscious and financially prudent businesses, and it is a suggestion for choosing goods and services with the least amount of negative environmental impact Salam (2008).

One of the practices and ideas used to prevent pollution is green procurement. It is often referred to as "green" or "environmental purchasing" and focuses on selecting suppliers and contractors that adhere to environmental standards as well as making purchases of environmentally friendly goods and services. It integrates the environmental impact of the product, service, or contract with price, technology, and quality Kipkorir & Wanyoike, (2015). Green procurement, commonly referred to as sustainable procurement (SP), is a recent concern in the field of purchasing. It requires looking beyond conventional economic constraints and making decisions based on the total life cost, associated risk, success measures, and societal and environmental implications. It also necessitates considering public and environmental factors alongside financial factors when making procurement decisions Nderitu and Ngugi (2014). Green procurement plans entail the purchase of environmentally friendly goods and services, such as those derived from renewable energy sources or recycled materials, as well as more complex actions such as establishing environmental standards for vendors and contractors. Green products and services are more durable, require less resource, and are less harmful to the environment. Green products and services may also fulfill higher safety requirements and have less of an effect on human health. Despite the fact that some green products and services may cost more up front, they are less expensive in the long run Wanyoike and Kipkorir (2015).

2.1.3.2 Green Manufacturing

To reduce waste and boost productivity, green manufacturing, uses quick, dependable, and energy-efficient production machinery. It involves production methods that are extremely effective; depend on inputs with little to no negative environmental effect, and product little to no waste or pollutions Nimawat and Namdev (2012). In order to achieve low input, high output, and low pollution, Al-Odeh and Smallwood (2012) connected green manufacturing to clean

production practices, efficient technology, and reduced raw materials and resources. In contrast, Amemba et al. (2013) pushed for the use of environmentally friendly energy sources like solar energy, raw material recycling, and biodegradable energy sources and materials in manufacturing operations.

Managers and researchers argue on the benefits of making investments in green technologies. Green manufacturing initiatives should transition from being an environmental management technique to an environmental strategy Hoffman (2000).

The term "green manufacturing" has only recently come into usage, and it now refers to all stages of a product's life cycle, including design, manufacturing, and distribution, as well as end-user use and eventual disposal Kalhari et al (2018). When executing any component of an activity, such as recycling, conservation, waste management, environmental protection, regulatory compliance, pollution control, and other difficulties, it refers to practices that do not hurt the environment Mukonzo (2017). It assists all businesses in reducing waste and pollution, slowing the depletion of natural resources, and reducing the massive amounts of waste dumped in landfills.

Furthermore, it focuses on minimizing parts, rationalizing materials, and reusing components to build goods more efficiently Hami et al. (2016). Green manufacturing, in general, refers to any activities related to environmental issues that continuously include environmentally friendly production methods for commodities. It entails converting raw materials into finished products with great efficiency and fewer environmental hazards Soubihia et al (2015). According to the realities of the manufacturing system, green production strategies that employ production technology programs and processes that use fewer resources and less energy result in less environmental pollution. Zero safety issues, zero health risks to product users and operators, zero environmental pollution, trash recycling, and waste disposal as much as possible during the production process are the 13 principles for green manufacturing Alshura, & Awawdeh, (2016).

It should intentionally lower a portion of all expenses, such as those related to sourcing raw materials, production, and supply chain costs, as well as maintenance, replacement, and any other expenses related to green products Ngniatedema & Li (2000). According to Mukonzo (2017), a green manufacturing strategy is a way to foster good relations between industry and its surroundings. By using green manufacturing methods, it focuses on creating value by producing

more with fewer resources. The results of these strategies should be zero pollution, errors, downtime, and inventory. Manufacturers should therefore create green manufacturing methods as a means of addressing these issues through environmental technology innovation; green technology innovation; learning and environmental technology innovation; and continual improvement to environmental health hazards. Therefore, considering stakeholder opinions would also be a crucial concern. To improve the environmental performance of supply chain management as well as its financial and operational performance, proactive strategy adoption is essential. To establish green systems and adhere to environmental standards when manufacturing components and parts, manufacturers must work in collaboration with both first- and second-tier suppliers Onyinkwa & Ochiri, (2016).

2.1.3.3 Eco- Design

The concept of "eco-design" (environmental-conscious design), also referred to as "design for the environment" or "green design," describes action taken during the product development process to lessen a product's environmental impact throughout its entire life cycle, from material acquisition to manufacturing, use, and ultimately disposal. This is accomplished without jeopardizing other critical product criteria such as performance and cost Johansson (2002). One of the green supply chain initiatives is eco-design, which incorporates environmental factors into the product design process and considers the entire flow of the product through its supply chain. This factor is critical to consider because design decisions directly affect the majority of environmental impacts associated with the product's manufacture, use, and disposal Handfield and colleagues (2001). Raw material, supplier, and process chemicals are selected during the design stage, while the purpose of the product, process, or service is established. These, in turn, determine the amount of energy required to produce them as well as the amount of waste generated. Eco-design practices vary between businesses and goods. However, the following are the fundamental eco-design procedures:

1. Lead, mercury, chromium, and cadmium are examples of environmentally hazardous materials that should be reduced or eliminated Siferd and Zsidisin (2001).
2. Design for reuse is the process of creating a product or a portion of a product with the intention of reusing it, with or without minimal treatment of the used product Sarkis (1998).

3. A recyclable design makes it easier to disassemble the waste product, separate the parts by material, and then reprocess the materials Lin and colleagues (2001)
4. The term "design for remanufacturing" refers to a design that makes rework, repair, and refurbishing procedures easier to perform to restore a product to like-new or better-than-new condition Beamon (1999)
5. Designing for resource efficiency entails reducing the number of materials and energy used to create a product and encouraging the use of renewable energy sources APO (2004).

2.1.3.4 Green Distribution and Transportation

According to Syed Abdul Rehman Khan (2018), green distribution and transportation can reduce waste and energy use, and the value-added green warehousing products can improve overall organizational performance and brand recognition. Green distribution additionally enables a business to enhance both its financial and environmental performance. Business reputation can be enhanced while also saving money with green mobility options. By promoting the efficiency and expansion of clients' transportation networks, logistics expenses can be decreased. Additionally, associations can be created to boost output. Green packaging is a component of green distribution. Packaging factors such as size and material selection have an impact on distribution because they affect the product's transportation capabilities. Medical products are frequently thought to be too delicate for use. Green packaging refers to the practice of packaging goods in a way that complies with environmental regulations Wills (2012).

According to the categories listed by Mustaffa (2009), distribution packaging is the primary packaging that makes it possible to carry and store the product up until the point of use. Reusable packaging ought to be used for products in this category. Packaging for transportation uses secondary packing for storage and transportation. It was suggested against using an excessive amount of paper bags because they can occasionally become too hot and melt, damaging the packaging.

Different studies use different dimensions to measure green logistics practices (GLP). Sari & Yanginlar (2015) measured GLP through reverse logistics green purchasing, distribution, and marketing strategies, and manufacturing practices. According to Mogeni (2016) GLP measured through the dimension of Green Purchasing (Waste Control and Compliance to 11 Regulations),

Reverse Logistics (Backward distribution and Lead Time), and Responsive Packaging are all examples of eco-design (Size of packaging and Use of agile materials). GLP was measured in this study through green purchasing practices, green manufacturing practices, reverse logistics practices, and environmental practices and regulations based on Sari and Yanginlar (2015) and Mogeni (2016).

2.1.3.5 Reverse Logistics

Reverse logistics, often known as "products take back," is a key idea in green logistics management and is thought to be a potential answer. B. Gutta (2016). When a manufacturer uses reverse logistics, previously transported goods are accepted at the point of consumption for potential recycling and recovery Forkes (2009). Reverse logistics is a natural part of the green logistics concept, as evidenced by the fact that it encourages consideration in many environments for its inclusion in the concept Wu and Pagek (2009).

The CSCMP defines logistics as “the process of planning, implementing and controlling product for the efficient and effective transportation and storage of goods, including related service and information, from the point of origin to the point of consumption in order to conform to customer requirements.” The subfield of logistics known as reverse logistics, on the other hand, is concerned with the environment, resource management, and the return of goods for repair after they have been delivered to the client. In addition, reverse logistics is a method that enables companies to reduce their consumption of resources, recycle them, and reuse them in new ways CSCM (2014: 151)

Reverse logistics refers to the role of logistics in product returns, source reduction, recycling, material substitution, material reuse, waste disposal, repair and remanufacturing. It is a system for recovering discarded goods and materials, storing them, and delivering them to specialized processing facilities Nimawat and Namdev (2012).

Recycling and waste logistics, which can be developed based on actual demand for collection, classification, processing, packaging, handling, storage and delivery to specialized treatment facilities for processing, are two ways that organizations might apply reverse logistics Zhu and Zhang (2010).

Reverse logistics involves taking steps to stop returns, lessen the number of materials in the forward system to lessen the flow of materials back, and make sure that resources are recycled and utilized. Olaf Schatteman (2013). Reverse logistics is the process of planning, executing and monitoring the efficient and effective flow of materials, work – in – process inventory, finished goods and related information from the point of consumption to the point of source with the aim of recouping value or properly discarding them Vlachos (2016).

Due to damage, routine inventory, restock, salvage, recalls and additional inventory, any things may be returned from the point of consumption to the origin. Less environmental harm is caused through recycling, recovering objects and disposing of waste Turrisi and co. (2013).

Manufacturing returns, commercial returns, recalled goods, warranty returns, service returns, end-of-use returns, and end-of-life returns are all examples of how goods are returned in the real world. Some products are returned for reasons such as inadequate packaging and quality issues. Unsatisfactory quality, installation or usage issues, warranty claims, incorrect order processing, retail overstock, replacement of a product nearing the end of its life cycle, and manufacturer recalls Afum & Zhuo (2019). Programs for reverse logistics are expanding due to legal, financial, and corporate social responsibility responsibilities, as well as because of their ability to respond quickly to customer needs, accommodate a variety of delivery requirements, and lower costs Ramirez & Morales (2011).

For large manufacturing companies to deal with the rising levels of unpredictability in their operations, reverse logistics is becoming more and more essential. Because it helps to lessen this uncertainty, it raises the need for flexible information distribution in this situation. Additionally, it enhances the options available to the manufacturing sectors, lowering uncertainty and enhancing decision-making. Information systems employed in reverse logistics programs reduce response times and increase the adaptability of information delivery, facilitating or aiding you in making better judgments Adebambo & Adebayo (2014). In general, reverse logistics adoption and implementation are essential for achieving sustainable development goals, which center on both environmental and financial objectives; as a result, reverse logistics practices can help manufacturing companies reduce waste and boost profits through an efficient re-use and recovery option Abdullah & Yaakub (2014). Furthermore, businesses are under increased

pressure to develop a more effective reverse logistics strategy because to the growing awareness of environmental issues and the advantages of re-use and recovery possibilities Salim (2016).

2.1.3 Difference between Supply Chain Management and Supply Chain Management

SCM and GSCM differ in several ways. While SCM typically focuses solely on the economy, GSCM considers environmental factors as well. Unlike traditional SCM, which does not consider the toxicological effects on humans, GSCM are environmentally friendly, integrated, and ecologically optimized Gilbert (2000); Ho Johnny, Shalishali, Maurice, Tseng, and Ang (2009). Despite any potential harm to the environment during production and delivery, SCM is more focused on keeping control over the end product. Environmental standards are crucial requitements for goods and production, but the business must also guarantee its economic survival by continuing to be profitable and competitive Johnny Ho, Shalishali, Maurice, Tseng, and Ang (2009). The distinctions between GSCM and SCM are outlined in the following table.

Table 2. 1: Difference between GSCM and SCM

No	Characteristics	GSCM	SCM
1	Objective's	Ecological and economic	Economic
2	Ecological optimization	High ecological impact	Integrated approach low economic impact
3	Supplier selection criteria	Ecological aspect long term relationship	Price switching supplier quickly short-term relationship
4	Cost pressure	High	Low
5	Flexibility	Low	High
6	Speed	Low	High

Green supply chain management and supply chain management differ from one another Beamon (1999), Gilbert (2000), and Ho Johnny etal(2009).

2.1.4 Challenges of Green Supply Chain Management

The difficulties are separated into internal and external categories to give a more complete picture. Inter- organizational supply chain operations are not particularly highlighted, despite the fact that internal barriers are crucial for the adoption of green concepts. Internal challenges are crucial for the success of such projects, even if they are not directly related to the implementation green supply chain management. To mention efficient inter-organizational cooperation, it is crucial to identify any potential problems that must be fixed. According to a review of external barriers, the main problem is that multinational corporations must cope with diverse environmental laws and regulations in numerous countries. This could make streamlining a global supply chain more difficult Abid Haleem, Luthra S, Vinod Kumar, Sanjay Kumar (2010). According to the argument, obstacles to GSCM implementation include: reluctance to adopt new technology, a lack of organizational incentive, low human resource quality, market competitiveness, and unpredictability.; Lack of government backing, failure to implement green practices, a lack of commitment from senior management, the cost of change, supplier resistance to GSCM, and disregard for customers.

2.2 Empirical Review

In addition to Climate change, ozone layer loss, biodiversity loss, pollution, degradation, and depletion of air, water, minerals, and land are all examples of environmental degradation. The rising global economy has also provided affluence. Environment United Nations Program (2012; World Bank (2012). One of the top 29 difficulties that corporations face today is one related to the environment. Initiatives to solve problems included implementing environmental ideas utilizing supply chain thinking. It's interesting that the same supply chain management practice tree with iridescent methods is the new solution for risky company operations. Businesses, according to researchers, should only employ strategies that will benefit them financially in the long run. Furthermore, GSCM methods improve the operational, competitive, social, and economic performance of an organization. Researchers are getting more and more interested in how Green Supply Chain Management (GSCM) practices affect organizational performance as a result of demand and challenges. According to several writers, employing GSCM approaches has an impact on performance. According to Sini Laari's makes an effort to address the economic and environmental aspects of sustainability, notably in the context of green supply chain

management (GSCM), using data from Finland. The research's overarching objective is to add to the topic of GSCM in terms of its drivers and performance effects.

To address the research purpose, three research questions are developed. What are the links between GSCM practices and firm performance in manufacturing? What roles do competitive strategy and customer requirements play in GSCM adoption? Because the main goals of this thesis are to evaluate causal links between GSCM practices and company performance using well-defined concepts and models, the approach chosen is primarily explanatory survey research. The empirical data used came from two sources: (1) data from the Finland State of Logistics surveys in 2012 and 2014, and (2) financial reporting information culled from external databases. The article's conclusion emphasizes that the type of GSCM exercise used has a significant impact on the performance outcomes that can be expected. Small environmental changes appear to be viewed as a point of differentiation rather than a strategy to increase productivity and cut costs to compete on price. Businesses must be able to modify their GSCM procedures to meet stakeholder needs and pool internal GSCM resources with those of suppliers and customers. Additionally, Drs. Shivani Sharma and V.K. Jain (2017) discuss how firms should implement specific environmental 30 efforts to lessen the environmental effect of their operations in the current competitive business environment. According to their analysis, there are three GSCM practices: green manufacturing, green reverse logistics, and green design. Like this, three performance indicators—environmental performance, economic performance, and operational performance—found to be prevalent in most research and collectively referred to as organizational performance. The study has identified several GSCM procedures and performance measurement standards for more empirical research. The authors of Green Supply Chain Management and Corporate Performance: Creating a Roadmap for Future Research, Hassan Younis, Balan Sundarakani, and Barry O'Mahony, the association between green supply chain management (GSCM) practices and corporate performance (CP) is examined by IIMB Management Review (2019) utilizing a sequential mixed methods study approach. Additionally, they want to enable researchers to create a number of managerial suggestions for businesses looking to enhance performance while using green supply chain methods. The effects of integrating supply chains and green supply chain management on organizational performance written by Ayham A.M. Jaaron, Ahmed A. Zaid and Abdul Talib Bon asserts that supply chain integration (SCI) possesses the critical relational capacity to facilitate the strategic use of green

supply chain management (GSCM) methods. This study makes the assumption that SCI moderates the relationship between GSCM practices and organizational performance. It is suggested that environmental cooperation could boost GSCM practices and enhance GCSM implementation. The implementation of green practices is supported by internal integration within an organization as well as an external integration involving consumers and suppliers since both consumers and suppliers are the foundation of any supply chain. As a result, an organization may obtain the limited and precious resources that are beyond its control by relying on its supply chain members. Borchardt, Wendt, Pereira, and Sellitto (2011) conducted a study on the environmental impact and cost-reduction successes of redesigning a component using eco-design principles, and the findings supported the ideas put forth in the theoretical framework that the introduction of new technologies based on eco-design can help firms create competitive advantage, enhance their public image, and comply with legal requirements. The case's primary contribution has been the confirmation of the Eco-design construct, which might be investigated further in the 31 industries. The Eco-design team will receive managerial support as a result of further examination of technological capability and market potential to accept a modified product. According to European journal of business and management, (2013) Green procurement is the process of choosing and acquiring goods and services that minimize their adverse effects on the environment. It includes ecologically friendly manufacturing, delivery, usage, and disposal processes. When making purchase selections, green procurement takes into account environmental factors in addition to performance objectives. According to a study by Walton et al (2006) sited in Jikson (2010) Two growing patterns result from the inclusion of suppliers in the environmental management process. First and foremost, they contend that due to tougher regulations and the need for environmental accountability, environmental issues are increasingly being included in strategic planning within enterprises. According to the study conducted by Dheeraj andvishal (2012), overall socioeconomic growth, green manufacturing improves efficiency and environmental performance, which leads to a sustainable improvement in the organization's product quality. Additionally, green et al (2012) states Efforts to improve the organization's production include using green packaging and ecologically friendly delivery methods. The study conducted by Ninlawan and Seksan (2010) indicate that, Manufacturing industries must implement green supply chain management strategies in order to improve

sustainability performance. These activities include green manufacturing, distribution, and logistics.

The following topics are offered as part of the empirical literature review.

2.2.1 Green supply chain practices

Two studies by Zellalem T. Beyene (2015) and Mesfin Kora (2015) are included in this review. Six independent factors and five dependent variables were found in the study to evaluate the green supply chain management techniques in the Ethiopian tannery industry and organizational performance in Ethio telecom. Scales were also developed to measure the difficulties of going green. The effectiveness of green supply chain management in the aforementioned industries was then evaluated using these variables. Organizational commitment, eco-design, green buying, green marketing, investment recovery, organizational practice, and the difficulties of adopting green supply chain management are a few of these elements.

The variables mentioned above, as well as the factors that can affect their nature, performance, and features, are illustrated further in the following section. As a result, the following section of the study demonstrates the independent and dependent variables discovered in previous research, as well as their applicability to the current environment.

Item is one of the factors related to organizational commitment Zellalem T. (2015), Mesfin Kora (2016). The first variable is organizational commitment-related factors, which will be manifested by five precursors: employee involvement, cross-functional cooperation for environmental improvement, top management commitment, and total quality environmental management.

According to Zellalem T. Beyene (2015) and Mesfin Kora (2016), the second variable is eco-design, which is concerned with how a product is made in terms of materials and energy use, recycling, recovering parts, and using less dangerous items.

Issues with green purchasing, which are further outlined by five antecedents, are the third important variable to assess the practice of green supply chain practice. According to Zellalem T. Beyene (2015) and Mesfin Kora (2016) Environmentally friendly purchasing is the result of supplier collaboration, ecologically designed supplier specifications, environmental supplier audits, ISO 14000 certification, and evaluation of second-tier supplier environmentally friendly practices, according to the analysis. The variables and antecedents mentioned above will be used

in the study because the company under study shares characteristics with tanneries and Ethiopian telecom.

The investment recovery is the second most crucial factor to take into account when analyzing a company's green supply chain practices. Investment recovery, efficient and effective inventory management, the removal of used or scarp materials, and the management of excess capital equipment are some of the aspects that constitute a green supply chain. Zellalem T. Beyene (2015, and Mesfin Kora (2016)

The second significant factor that researchers consider when evaluating the green supply chain of BGI Ethiopia as it is are the precursors of environmental practice. These include environmental management systems, ISO 14000 certification, environmental compliance and audit procedures, and product eco-labeling Zellalem T. Beyene (2015), and Mesfin Kora (2016). The Kenyan healthcare sector only recently began using green supply chain management techniques. Yvonne (2013) conducted a study on the green supply chain management methods and performance of pharmaceutical businesses in Nairobi, Kenya. This is only one example of a recent study in the field of GSCM. The study found that obstacles to green practices are primarily caused by stakeholders' ignorance. The study was limited in that it only examined one component, the pharmaceutical division. This is a perfect representation of the entire healthcare sector. Chege (2012) conducted research on the efficiency of private hospitals in Nairobi, Kenya, and the use of green supply chain management techniques. The researcher discovered that in order to establish a green supply chain starting as soon as the items reach the healthcare supply chain, procurement managers should deliver eco-friendly and standards to their suppliers.

2.2.3 Benefits of green supply chain management

According to Mesfin Kora's (2016) study on the performance of a company's environmental, financial, and social systems is improved by organizational commitment, green purchasing, investment recovery, eco-design and green marketing. According to Mesfin Kora's (2016) study on Ethiopian telecom, organizational dedication, eco-design, green purchasing, and environmental practice have statistically significant predicting power on organizational performance.

In general, all of the aforementioned criteria were assessed using a variety of research tools, such as questionnaires and interviews. In addition, additional factors have been considered in order to

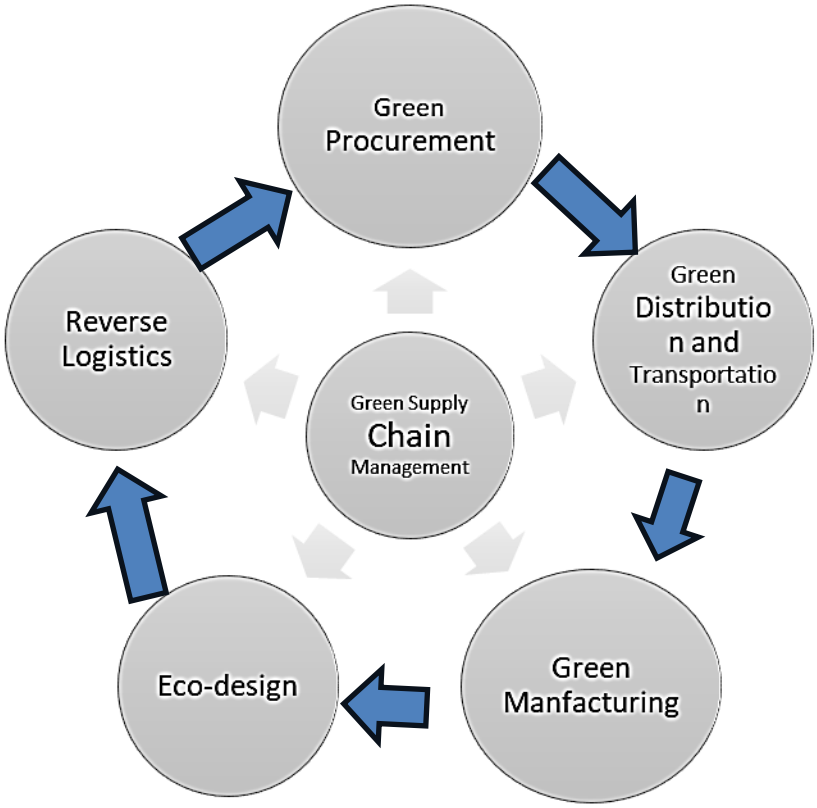
assess BGI Ethiopia's green supply chain performance; these additional factors will be discussed and presented in the research's data presentation and discussion section. In order to organize the various scenarios, some of the aforementioned variables and their components are changed or removed. Lower material costs, lower energy costs, lower trash disposal fees, higher earnings per share, higher returns on investments, and higher sales and profits are all critical for green supply chain management. Environmental benefits include the improvement of an enterprise's environmental position, the reduction of waste, the reduction of air emissions, the reduction of consumption of harmful, toxic, and hazardous materials, and the reduction of the frequency of environmental mishaps. Customer satisfaction improvements, investments in social projects (education, culture, sports) relationships with community stakeholders such as non-governmental organizations (NGOs) and community activists, and protection of local residents' rights and claims are all examples of social benefits. Personnel education and training have also improved 2019 (January).

The following criticism was put out to describe the empirical studies and empirical gaps: the studies only looked at one main GSCM practice, but this research looked at four important GSCM practices. While the current study included both the financial and non-financial consequences of implementing GSCM procedures, earlier studies were restricted to measuring the economic (financial effect of doing so. In contrast to earlier studies 32 that solely employed surveys and secondary sources, the current study used both primary and secondary sources of data. Furthermore, none of the studies look at how the installation of GSCM affects the organizational performance of the beer businesses. The impact of implementing the four main GSCM practices (eco-design, green purchasing, environmental cooperation, and reverse logistics) on overall organizational performance was also not accurately and extensively investigated in research.

2.3 Conceptual Framework of the Study

Green supply chain management is still a popular research topic among academics. However, there are currently insufficient studies looking into GSCM adoption and use in developing countries. However, there have been few studies on the topic of GSCM in various sectors in Ethiopia; thus, the purpose of this research is to identify and evaluate the application of green supply chain management in the BGI brewing business.

Figure 2. 1: - Conceptual framework of the study



Source: - Own Computation 2023

CHAPTER THREE

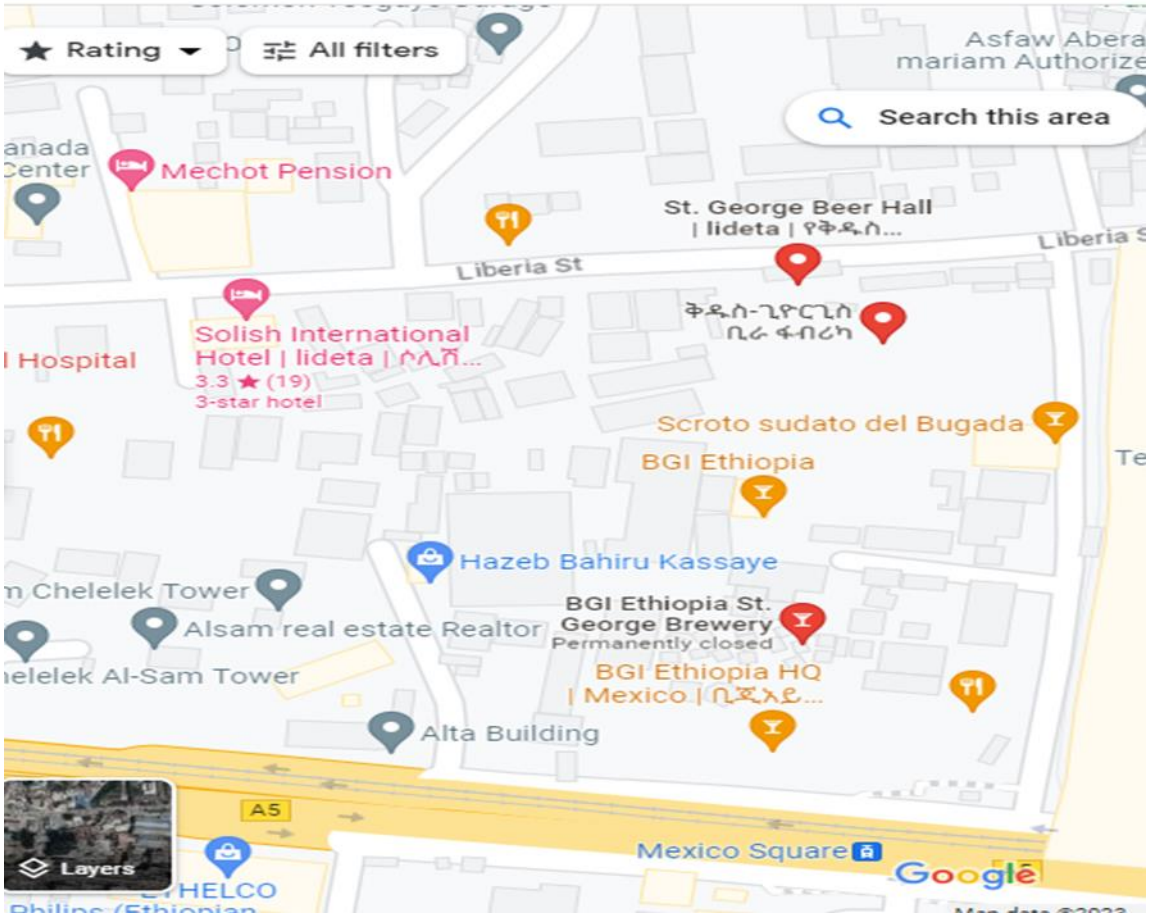
3. RESEARCH METHODOLOGY

3.1 INTRODUCTION

3.2 Description of the Study Area/Setting

The research's primary focus is on the Addis Ababa city Lideta sub-city-based brewery that makes St. George beer.

Figure 3. 1: Location of BGI Ethiopia St. George factory



Source: Google map

3.3 Research Design

This study employed a descriptive and explanatory research methodology to show the breadth of GSCM processes at BGI Ethiopia plc. It is implementing green supply chain management strategies. For our research, we'll employ a hybrid methodology (qualitative and quantitative). For this subject, descriptive research is more appropriate. As per Koheri (2004), based on observable facts, descriptive research was used to evaluate the GSCM processes of BGI Ethiopia plc.

3.4 Sources of Data

Both sources were used in the study. The primary data was collected directly from respondents via questionnaire. Secondary data was gathered from published books, libraries, the internet, journal articles, and published research. Secondary data will be gathered to provide the necessary information to guide the study's conduct and to supplement the primary data.

3.5 Population of the Study

In Ethiopia there are around fourteen breweries. Since BGI Ethiopia is the first brewery in the country, the researcher chose the target group by using the purposive sample technique based on their social responsibility. The business is a good fit for the study since it complies with legislation and so has a social obligation. Based on social responsibility requirements, management staff and regular employees who are directly involved in the supply chain process are the target population. Employees from departments such as production, supply chain, human resources, sales and marketing, and maintenance. 281 respondents were chosen from each department by the target audience. Production managers and staff members that were directly involved in the supply chain process were included. Based on the target population's selection criteria, individuals from their department who work for BGI Ethiopia were included. There are about 940 employees in BGI Ethiopia. 10% of production managers and employees make up the target population. There are 281 respondents chosen from the target population in each department. The supply chain management procedures were directly participated in by the production manager and staff.

3.6 Sampling Design

Purposive sampling was used by the researcher to choose the respondents for the purpose of data gathering. Instead of employing random sample procedures, non-probabilistic sampling methods use respondents that the researcher has specifically chosen. So, the target population estimated as follows:

n= N/(1+N(e) 2

Sources: (Yemane, 1967)

Where is sample size

n= sample size

N = population of the study

e = signifies the margin error

So, in this case we set equal to e = 0.05

n = 0.05 x 0.05 = 0.0025

0.0025 x 940 = 2.35

1 + 2.35 = 3.35

940/ 3.35 = 280.59

N = 281

As a result, based on the formula this study needs a sample of 281 respondents gathered from each department of BGI Ethiopia plc at 95% confidence interval.

3.7 Data Collection Method

Both primary and secondary data were used in this investigation. Primary data were gathered from 281 randomly chosen respondents from each department using self-administered structured questioners.

3.8 Data Analysis

The data in this study were analyzed using both descriptive and inferential statistics. The terms percentage, frequency, mean and standard deviation were used in descriptive statics. Correlation analysis is used in inferential statics. The statistical software SPSS version 24 was used to calculate the mean and standard deviation of the quantitative data from the surveys.

3.9 Validity of the Data Collection Instrument

Validity is concerned with whether the conclusions actually relate to the topics they claim to Anol (2012). When a test or instrument is legitimate, it simply means that it is measuring what it is intended to Stephanie G. (2016). According to Anol (2012), validity is the degree to which a data collection method or approach accurately measures what it was designed to measure. Validity is a term used in both qualitative and quantitative research, derived from the Latin term 'validitas' which means "strength". It implies that a finding can only be argued but cannot be proven to be true. In quantitative research, validity is achieved through several methods, and it is employed in a different sense than it is in qualitative research. In this context, validity means how accurately an instrument assesses the variables that the researcher intends to assess. The researcher employed closed-ended multiple choice questions on a five-point Likert scale to ensure the validity of the questionnaire. Some SPSS instructors and staff members examined the instrument to verify its validity, and they were successful in doing so.

3.10 Reliability of the Data Collection Instrument

The degree to which data collection methods or analysis processes yield reliable results is referred to as reliability. In this study, there was no subject error or bias because respondents were given enough time to complete the questionnaire and agreed to keep the information confidential.

According to Bryman and Bell (2007), the internal consistency of the research tool is a topic of reliability analysis. The internal validity of supply chain management methods, SCM practice, SCM challenges, and SCM benefit were studied in the framework of Cronbach’s Alpha as numerous items in all constructs were used.

Table 3. 1: Reliability Statistics

Items	Cronbach's Alpha
Green Manufacturing	.727
Eco-design	.748
Green Procurement	.729
Green Distribution & Transportation	.809
Reverse Logistics	.766

According to Table 3.1 above explains about in terms of performance, ecologically sustainable distribution and transportation over 0.70, and competitive advantage in .809, the analysis of Cronbrcah's Alpha (a metric of internal consistency) was calculated to be good. This explains why there is a high level of internal consistency in the data that was collected.

3.11 Ethical Consideration

Before having verbal advice to help them understand and participate in the survey, respondents were first informed of its goal and purpose. Additionally, participants were made aware of their freedom to withdraw from the study at any moment. Additionally, participants were made aware of the benefits of the study, thus there is no danger involved. Participants may, at any point during the study process, request clarification on a question or decline to provide information.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1 INTRODUCTION

Based on the conceptual framework described in the preceding section, this thesis provides an assessment and evaluation of the supply chain management practice at BGI Ethiopia.

The first section of this chapter deals with the demographics of the respondents, while the second section is made up of information gathered from the respondents via questionnaires. In order to answer the research questions, 281 questionnaires were created and given to BGI Ethiopia's production management and staff. Of these, 189 were completed and returned, 50 were excluded from analysis because of missing data and 47 were invalid.

4.2 Demography of Respondents

Out of the 281 questionnaires distributed, 189 responses were received; however, 47 of those responses were invalid and disregarded for analysis, while the remaining 50 questionnaires were left unreturned and destroyed owing to missing data. A respectable response rate of 74.07% is the outcome. After being edited and checked for accuracy, all of the surveys were used in the data analysis.

Table 4. 1: Demographic characteristics of respondents

Demographic Questions		Responses of Customers	
		Frequency	Percentage
Gender	Male	104	55.0
	Female	85	45.0
	Total	**189**	**100**
Gender			
Level of Education	Diploma	4	2.1
	BA/BSC	132	69.8
	MA/MSC	20	10.6
	PHD	33	17.5
	Total	189	100
Work unit and Position	Production Manager mMMMMMMMMMMMMMMMMMmANManager	4	2.1
	Human Resource	24	12.7
	Maintenance	39	20.6
	Sales and Marketing	75	39.7
	Supply Chain Department demAMMMMMMMMMM	47	24.9

	MMMDepartment		
	Total	**189**	**100**
Experience	Less than 5 Years	12	6.3
	5-10 Years	46	24.3
	10-15 Years	54	28.6
	Over 15 Years	77	40.7
	Total	189	100

The table above provides an overview of the overall results on the demographic status of the data. According to gender issues raised by the respondents, 55.0% of participants are men, while the remaining 45.0% are women. According to the findings, the majority of BGI Ethiopia's employees are men. The results of the educational level of the BGI Ethiopia personnel show that 10.6% had master's degrees, 69.8% had first degrees, and 2.1% had diplomas. The findings show that the majority of respondents were educated individuals who could easily understand and reply to a study questionnaire.

By taking into account their qualifications, their position inside the organization varies. The department of supply chain management, which makes up 24.9% of BGI Ethiopia, includes the majority of the workforce. Production manager accounts for 2.1%, human resource manager for 12.7%, maintenance is responsible for 20.6%, and sales and marketing accounts for 39.7%. The majority of respondents came from the BGI Ethiopia supply chain department, where they were involved in supply chain processes. Regarding the respondents' work experience, 6.3% had less than five years, 24.3% had between five and ten years, 28.6% had between ten and fifteen years, and 40.7% had more than fifteen years. The findings show that nearly all of the respondents had solid training and experience.

4.3 Describing the Green Supply Chain Management Practices of BGI as Perceived by the Study Respondents

When creating equal intervals for a range of five Likert scale points (ranging from strongly disagree to strongly agree in the survey questionnaire), Mesfin (2016) employed a kind of rule of thumb. Severe disagreement is indicated by a calculated mean value that falls between 1 and 1, severe disagreement between 1 and 2, neutral agreement between 2 and 4, slight agreement between 3 and 5, and strong agreement between 4 and 5. Each component of the measurement in the questionnaire had a limit of 0.8.

When compared to the mean, a large standard deviation indicates that the data points are much outside of the mean, whereas a small standard deviation shows that the data are relatively close to the mean. The data are not sufficiently represented by the mean. The standard deviation indicates how accurately the mean captures the data Field (2009). Each variable was measured using a five-point Likert scale, with 1 denoting "Strongly Disagree" and 5 denoting "Strongly Agree." In fact, the mean of each variable falls between the two ranges, so the interpretation would be that if the mean approached 1, the respondents did not agree with the raised issue or variable, and the opposite would be true if it approached 5.

4.3.1 Green Production Practices of BGI Ethiopia

Based on the analysis's findings, it can be inferred that green manufacturing practices are important in the SCM of your business. The use of energy-efficient and dependable manufacturing machinery helps to reduce waste and increase productivity. Lessening environmental effects can also be achieved by implementing industrial methods that utilize inputs with low environmental impact. Green manufacturing can be advanced by utilizing ecologically friendly energy sources including solar energy, raw material recycling, and biodegradable energy and materials.

Table 4. 2: Green Production N=189

Items	Mean	Standard Deviation
The company use fast, reliable and energy efficient production equipment to eliminates waste and improving productivity.	3.69	.90
The company adopts production processes that use inputs with	3.61	.88

minimal or reduced environmental impacts.		
The company use efficient technology to reduced raw materials and resources to reach low input, high output low pollution.	3.42	1.0
The company use environmentally friendly energy sources like solar energy, recycling of raw materials and use biodegradable energy service and materials	2.98	.63
Grand Mean	3.4	.71

Source: Own survey result 2023

In terms of SCM, your business relies on energy-efficient, quick, and dependable manufacturing machinery to reduce waste and increase productivity. The average response from the participants was 3.69, with a 0.90 standard deviation. As a result, it can be deduced from the analysis's results that businesses were using production equipment that was rapid, dependable, and energy-efficient in order to cut waste and increase output. The second item, with a mean score of 3.61 and a standard deviation of 0.88, is now up for discussion. "The companies use production methods that use inputs with little to no environmental impact."

The result shows how an organization can reduce a variety of environmental effects by using minimal inputs and functioning at an agreed-upon level. The business uses effective technology to reduce the number of resources and raw materials needed to achieve low input, high output, and little pollution. The majority of respondents said that the average score was 3.42 with a standard deviation of 1.0. The outcome demonstrates that the company uses effective technology necessary for minimal pollution and can achieve high productivity at a level that is agreed upon. The overall goal of green manufacturing is to increase output by reducing waste and increasing productivity in the production process. When asked whether their company uses ecologically friendly energy sources including solar energy, raw material recycling, and the usage of biodegradable energy sources and materials, respondents gave a mean score of 2.98 and a standard deviation of 0.93. The majority respondents at the neutral level of the company developed the practice of green manufacturing by using environmentally friendly energy sources, such as solar energy for raw materials, as well as biodegradable energy sources and materials.

The results of the grand mean 3.4 and standard deviation 0.71 indicate that the majority of respondents agreed that green manufacturing was mostly used in BGI Ethiopia and that it was crucial for reducing waste and boosting productivity.

4.3.2 Eco-Design Practices of BGI Ethiopia

The study found that most respondents strongly agree that the company should develop goods that use less energy and material. The average score and standard deviation for the second group of questions indicate that the majority of respondents support the organization's product designs for reuse, recycling, and recovery of materials and component parts. Generally, the study demonstrates that eco-design practices are essential in BGI Ethiopia using alternative raw materials and maximizing material and component recovery while also working towards avoiding or reducing the use of hazardous products.

Table 4. 3: Eco-design N=189

Items	Mean	Standard Deviation
The company design products for reduced materials and energy consumption	4.6	8.05
The company design products for reuse, recycle, recovery of material and component parts.	3.43	1.05
The company design products to avoid or reduce use of hazardous products and/or their manufacturing process.	3.03	.944
Grand Mean	3.71	2.76

Source: Own survey result 2023

According to Table 4.3, the study gave respondents who responded a mean score of 4.6 and a standard deviation of 8.05. The outcome demonstrates that the company and its customers have a similar sense of humor. This indicates that most respondents strongly agree that the company should develop its goods to use less energy and material.

The average score and standard deviation for the second group of questions are 3.43 and 1.05. The outcome demonstrates that the majority of respondents supported the organization's product designs for reuse, recycling, and recovery of materials and component parts. This demonstrates

that the responder supported the business approach of designing goods to maximize material and component recovery, reuse, and recycling.

Regarding the BGI Ethiopia develops its goods to prevent or limit usage of hazardous products and/or their production method, the mean score is 3.03 and standard deviation is 0.944. This demonstrates that the respondent's position was indifferent on the organization's avoidance or reduction of the usage of unimportant items in subsequent manufacturing processes.

To conclude, the grand mean 3.71 and standard deviation 2.76 respectively, eco-design practices an essential element in BGI Ethiopia by making another raw materials and reuse, recycle, recovery of material and component parts and avoiding or reducing use of hazardous for their further production process.

4.3.3 Green Procurement Practices of BGI Ethiopia

On this section it discusses the implementation and analysis of green procurement practice at the BGI Ethiopia. The mean scores and standard deviations for each of the five major components are shown. The study shows that the organization engages in cooperating with suppliers for environmental objectives for providing design specification to suppliers with environmental requirements. Furthermore, the company has an interest in conducting environmental audit for suppliers' internal management.

Table 4. 4: Green Procurement N=189

Items	Mean	Standard Deviation
The company cooperates with suppliers for environmental objectives.	3.2	1.0
The company provides design specification to suppliers with environmental requirements.	3.2	1.0

The company conducts environmental audit for suppliers' internal management.	3.25	1.0
The company demands its supplier to adopt environment system such as ISO 14001.	3.4	.80
The company has second-tier supplier environmentally friendly practice evaluation criteria in its procurement.	3.2	.94
Grand Mean	3.27	.55

Source: Own survey result 2023

Theoretical evidence supports the notion that supply chain management relies on information to deliver needed resources at the appropriate time and location Russell (2006). To do this, there must be smooth and immediate flow information along the value chain. Regarding the aforementioned theoretical explanation, this study attempted to look into the information-sharing behaviors among BGI Ethiopia's supply chain employees.

The mean score was 3.2, and the standard deviation was 1.0, as indicated in Table 4.4 the findings indicate that the majority of respondents have a neutral opinion of how well the company collaborates with suppliers to achieve environmental goals by sharing the confidential information of its business divisions.

The mean score is 3.2 and the standard deviation is 1.0 for the second category of questions, according to the research. The response, who is on the organization's neutral level, gives suppliers design specifications that include environmental standards. This demonstrates how businesses' design criteria and environmental needs work together. The organizations' internal management of suppliers' environmental audits had a mean score of 3.2 and a standard deviation of 1.0 in response to BGI Ethiopia's query.

This demonstrates that the respondent's position on the organization's system for environmental auditing suppliers for internal management is neutral. According to the analysis of the respondents, the mean score is 3.4 and the standard deviation is 0.88. The respondent, who represents the organization on a neutral level, requests that its suppliers implement environmental systems such as ISO 14001 certification.

This shows that most respondents reported that their company had used new environmental measurement methods for its suppliers. The final question yielded a mean score of 3.2 and a standard deviation of 0.94. It demonstrates that the respondent, who is positioned at a neutral level within the company, is aware of the organization's second-tier supplier environmental practice evaluation criteria. This shows that the majority of respondents thought the company should evaluate environmental friendliness as part of its buying procedures.

The fact that the grand mean and standard deviation are 3.27 and 0.55, respectively, shows that developing product specifications that adhere to environmental requirements, preparing an environment audit for suppliers to measure internal management, and announcing a different measurement of a certificate of quality measurement for an evaluation criterion in its procurement are all essential components of creating an environmental objective.

4.3.4 Green Distribution and Transportation Practices of BGI Ethiopia

This section shows that the business can increase value for warehousing its items by minimizing energy consumption. Additionally, it entails efforts to achieve superior financial and environmental performance.

Table 4. 5: Green Distribution and Transportation N=189

Items	Mean	Standard Deviation
The company reduces its energy to add value for warehousing its products	3.3	0.95
The company involves the activities of obtaining superior	2.8	1.0

financial and environmental performance.		
The company designs an opportunity for improving its image and to reduce its costs.	3.2	1.0
The company also provides transportation system's efficiency and enhancement of customer association can be obtained to create more profitability.	2.4	1.0
Grand Mean	2.96	.56

Source: Own survey result 2023

The analysis of the mean score is 3.3, and the standard deviation is 0.95, as shown in Table 4.5. According to the results, most respondents to the first question were unsure about the company's plans to use less energy while still providing value for storing a variety of items that needed to be stored.

The mean score and standard deviation for the second question were 2.8 and 1.0, respectively. This shows that opinions on the organization's involvement in programs to enhance financial and environmental performance were divided among the majority of respondents.

The findings indicate that 3.2 are the mean score and that the standard deviation is 1.0. The respondents' opinions on how to create a chance to boost brand recognition is good while cutting costs are evenly split. The mean score is 2.4 and the standard deviation is 1.0 for the question of how to improve consumer associations and provide a transpiration system's effectiveness to generate more money.

According to the findings, the respondent's level of unbiased knowledge on information sharing between your company and its trading partners is sufficient. This demonstrates that a larger percentage of respondents concurred that the transportation system might increase profitability and promote more fulfilling and enjoyable customer connections.

In BGI Ethiopia, the grand mean and standard deviation values are 2.96 and 0.96, respectively. This suggests that by using less energy, the business can increase both its financial and environmental performance. Additionally, create a chance to raise its profile, cut costs, and provide a transportation system to strengthen relationships with customers.

4.3.5 Reverse Logistics Practices of BGI Ethiopia

The Table below discusses the implementation and analysis of reverse logistics practice at the BGI Ethiopia. The mean scores and standard deviations for each of the four crucial components that were assessed are displayed. The study demonstrates that the organization actively participates in the logistics of material collection, categorization, processing, handling, storage, and delivery. Additionally, the business wants to fix products and minimize returns while reducing source and material substitution.

Table 4. 6: Reverse Logistics N=189

Items	Mean	Standard Deviation
The company returns its product; reduce its source, materials, substitution, reuse of materials, waste disposal repair and remanufacturing.	2.2	.87
Recycling and waste logistics need for collection, classification, processing, handling, storage and distribution.	3.3	.97
The company involves the activities to avoid returns, to reduce materials in the forward system.	2.9	.91
The company flow back and ensure reuse and recycling of materials for reducing materials.	2.5	1.2
Grand Mean	2.7	.47

Source: Own survey result 2023

Reverse logistics is the last GSCM technique, according to the literature review. The BGI Ethiopia's reverse logistics practice is intended to be analyzed using the four elements listed in Table 4.6 above. A mean score of 2.2 and a standard deviation of 0.87 were recorded for the first question. This demonstrates that most respondents, who gave their interest in the company's product a neutral rating, were interested in lowering source and material substitution and repair.

The mean value is 3.3 and the standard deviation is 0.97 when it comes to the issue of recycling and waste logistics requirements for collection, classification, processing, handling, storage, and distribution. This indicates that the business recycles and requires logistics for material collection and processing, as the majority of respondents indicated on a neutral scale.

The third question's analysis revealed that the mean value is 2.9 and the standard deviation is 0.91. This suggests that the majority of respondents who have a neutral opinion of the organization are engaged in initiatives to reduce the number of materials in the forward system and prevent returns.

The organization flow back and ensure reuse and recycling of materials for recycling materials analysis. The standard deviation is 1.2 while the mean value is 2.5. The majority of survey participants were undecided about the best way to ensure material flow back, reuse, and recycling.

In BGI Ethiopia, the overall mean value and standard deviation value are 2.7 and 0.47, respectively. This suggests that the business can accept returns for its goods in order to reduce the number of raw materials utilized, reuse materials, recycle waste, and repair goods. Recycling also necessitates the collection and handling of materials.

Table 4. 7: Green Supply Chain Practices

Items	Mean	Standard Deviation
Green Manufacturing	3.4	0.71
Eco-Design	3.7	2.7
Green Procurement	3.2	0.55
Green Distribution and Transportation	2.9	0.56
Reverse Logistics	2.7	0.47

Source: Own survey result 2023

Green supply chain management strategies have grown more crucial in recent years for businesses looking to lessen their environmental impact. Utilizing quick, dependable, and energy-efficient production machinery to reduce waste and enhance production processes is a key component of green supply chain management strategies. The focus of green manufacturing, according to Al-Odeh and Smallwood, is on resource-saving technology, low resource use, and minimal pollution. The production procedures utilized by BGI Ethiopia, which has implemented green manufacturing techniques to reduce the environmental impact of its operations, are based on these concepts. The use of efficient technology, solar energy, the recycling of raw materials, and the use of biodegradable energy and materials are a few examples of how to do this.

Green manufacturing is a crucial and important part of green supply chain management methods. In order to reduce waste and boost productivity, green manufacturing, according to Nimawat and Namdev (2012), uses quick, dependable, and energy-efficient production machinery. In order to achieve low input, high output, and low pollution, Al-Odeh and Smallwood (2012) associated green manufacturing with clean production methods, efficient technology, and decreased raw materials and resources.

Additionally, it was used in BGI Ethiopia to embrace production methods that made use of inputs with little to no negative environmental effects. By utilizing effective technology, it is also employed to eliminate a necessary raw material and achieve high output.

Additionally, it is employed to create environmentally beneficial practices for the utilization of solar energy, raw material recycling, and biodegradable materials and energy sources.

4.5. Correlation analysis

The intensity and direction of the relationship between two variables are displayed through correlation. The correlation coefficient (r), also known as Pearson product moment correlation, can be used to determine the linear relationship between two variables. The "r" of a person primarily measures data at the interval or ratio level. In addition to the descriptive analysis, the correlation analysis is employed to determine whether there is any correlation between the various variables. The study reveals that the error is positively and significantly correlated with

the bulk of the variables, including poor communication, a lack of resources, fatigue, stress, a lack of teamwork, social norms, and distraction. Table 4.5.1 displays the descriptive adjectives and measures of connection between variables.

Table 4. 8: Measures of Association and Descriptive Adjectives

Measure of Association	Descriptive Adjectives
>0.00 to 0.20; <0.00 to -0.20	Very weak or very low
>0.20 to 0.40; <0.20 to -0.40	Weak or low
>0.40 to 0.60; <0.40 to -0.60	Moderate
>0.60 to 0.80; <0.60 to -0.80	Strong or high
>0.80 to 1.0; <0.80 to -1.0	Very high or very strong

Source MacEachern,(1982)

Table 4. 9: Correlations

GSCM Practices		Green Manufacturing	Eco-Design	Green Procurement	Green Distribution and Transportation	Reverse Logistics
Green manufacturing	Pearson Correlation	1	.247**	.484**	.194**	.040
	Sig.(2-tailed)		.001	.000	.007	.587
Eco-Design	Pearson Correlation	.247**	1	.319**	-.109	.049
	Sig.(2-tailed)	.001		.000	.136	.508
Green Procurement	Pearson Correlation	.484**	.319**	1	.041	.220**
	Sig.(2-tailed)	.000	.000		.576	.002
Green Distribution and Transportation	Pearson Correlation	.194**	-.109	.041**	1	-.037
	Sig.(2-tailed)	.007	.136	.576		.611
Reverse Logistics	Pearson Correlation	.040	.049	.220**	-.037**	1
	Sig.(2-tailed)	.587	.508	.002	.611	
**. Correlation is significant at the 0.01 level (2-tailed)						

Source SPSS output survey of 2023

The survey's finding that green manufacturing has a positive and weak or low link with eco-design (r=.247 according to MacEachron's magnitude of correlation) is supported by evidence. Green manufacturing and green procurement have a moderately good association, as indicated

by the correlation coefficient of r=.484. The association between green production, distribution, and transportation is positive and extremely weak or very low, as indicated by the value of r=.194. Reverse logistics and green manufacturing have a weak or positive association, as indicated by the correlation coefficient of r =.040.

According to the correlation result for the second eco-design practice, r =.247, there is a positive but slender or modest association between eco-design and green manufacturing. According to r =.319, there is a weak or positive association between eco-design and green procurement. Ecological design and environmentally friendly distribution and transportation have a negative and very weak or very low association, as indicated by the statistic r = -.109. Reverse logistics and eco-design have a moderately good association, as indicated by r =.049.

The third green procurement technique has a correlation result of r =.484, which indicates a good and moderate association between green procurement and green manufacturing. According to r =.319, there is a weak or positive association between eco-design and green procurement. Green procurement, distribution, and transportation have a moderately favorable association (r =.041) with each other. According to r =.220, there is a weak or positive association between reverse logistics and green procurement.

The correlation result for the fourth practice, green manufacturing, indicates a positive but very weak or extremely low association between green manufacturing and distribution and transportation, with r =.194. Eco-design and green distribution and transportation have a very weak or negative association, as indicated by the value of r = -.109. According to r =.041, there is a positive and weak or low association between green distribution, transportation, and procurement. The association between technological elements and environmentally friendly distribution and transportation is weak or negative, as shown by the statistic r = -.037.

The link between the fifth reverse logistics practice and green manufacturing is positive but weak or low, as indicated by the correlation finding of r =.040. Reverse logistics and eco-design have a moderately good link, as indicated by r =.049. Reverse logistics and green procurement have a positive and weak or low link, as indicated by r =.220. According to r = -.037, there is a weak or low positive link between reverse logistics and green distribution and transportation.

4.5 Discussion of the Results

In the area of sustainable supply chain management (GSCM), reverse logistics, green distribution and transportation, green manufacturing, and eco-design are all essential strategies. This study set intended to determine the extent to which these methods are employed in BGI Ethiopia.

Purposive sampling was utilized in the study to choose a sample size of 281 participants from the intended audience. Five-point Likert scales were used to collect the data, and descriptive statistics and correlation analysis were used in SPSS version 24's analysis.

The demographic characteristics of the respondents indicate that there was an almost equal representation of male and female respondents, with most of the respondents coming from the department of supply chain management (SCM). In terms of education levels, most of the respondents held a degree, while a small percentage held a master's degree or diploma. Most of the respondents had work experience of 5 to 10 years, indicating that they had acceptable exposure to the work area and potential to bring about change in the organization.

The investigation showed that the mean score values for GSCM practice ranged between 3.5 and 3.9, indicating that BGI Ethiopia's GSCM practice is reasonably robust. The study also discovered that the GSCM practices had a strong correlation with one another, indicating that implementing one practice could benefit the implementation of the others

In general, this study provides valuable insights into the level of implementation of GSCM practices in BGI Ethiopia. The findings can be used to improve sustainable supply chain management practices in the organization and to promote sustainable and responsible business practices in the wider industry.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.1. Introduction

The summary, conclusions, and recommendations made in this chapter are based on the research and core findings of the factors impacting BGI Ethiopia plc.

5.2 Summary

The prime aim of the study was to assess the green supply chain management practices of BGI Ethiopia plc.

•The organization is currently using green supply chain management to consistently enter the market of competition. As a result, this study attempted to address the practices of green supply chain management in BGI Ethiopia as well as the research queries posed in the study's first chapter.

•Using a purposive sampling technique to pick a sample size of 281 respondents, the study examined the degree of application of green manufacturing, eco-design, green procurement, green distribution and transportation, and reverse logistics practices in BGI Ethiopia. The investigation revealed that BGI Ethiopia's GSCM practice is relatively robust, with mean score values for GSCM practice ranging from 3.5 to 3.9.

•The study discovered that the GSCM practices were highly connected, indicating that the adoption of one practice could have a beneficial effect on the adoption of the others.

•The study's findings offer important information that may be used to advance the organization's sustainable supply chain management procedures and advance ethical business conduct throughout the industry.

5.3 Conclusion

In order to reduce waste and boost productivity, firms are using effective and dependable production equipment, according to a review of participant comments on the topic of green manufacturing. To mitigate a variety of environmental effects, they are also implementing production techniques that require little inputs and have minimal negative environmental effects. Green manufacturing processes are being used more frequently, as evidenced by the usage of renewable energy sources like solar energy, recycling of raw materials, and biodegradable energy sources and materials. By reducing waste and boosting efficiency, green manufacturing seeks to increase the dependability and speed of industrial operations. According to the findings, green manufacturing techniques are primarily used in the beer industries, and it is crucial to use these techniques to ensure a sustainable future.

Regarding eco- design, most respondents strongly support BGI Ethiopia's eco-design practices. The mean score and standard deviation for the first group of questions indicate that customers have a similar sense of humor as the company and strongly agree that the organization should develop goods using less energy and material. Furthermore, the outcome of the second group of questions shows that most respondents support the business approach of designing products to maximize material and component recovery, reuse, and recycling. However, the neutral level response to the third group of questions indicates the need for further improvement in avoiding or reducing the use of hazardous products in the manufacturing process. In conclusion, BGI Ethiopia incorporates eco-design practices, promoting the use of sustainable materials, and maximizing the recovery, reuse, and recycling of product components to minimize the environmental impact.

Also in green procurement, it can be concluded that the majority of respondents held neutral opinions regarding BGI Ethiopia's collaboration with suppliers to achieve environmental goals through information sharing. The study also showed that the respondents had a neutral level of awareness of the organization's practices in supplier environmental audits and adoption of environmental systems such as ISO 14001 certificates. However, respondents indicated a belief that environmental friendliness should be included as an evaluation criterion in procurement practices. Therefore, it can be suggested that BGI Ethiopia may need to improve its information

sharing practices and increase its focus on environmental sustainability in its supply chain management.

Concerning green distribution and transportation the findings presented in the analysis, it can be concluded that BGI Ethiopia's collaboration with suppliers for achieving environmental sustainability goals through information sharing has received a neutral response from most of the respondents. This conclusion suggests that there may be opportunities for BGI Ethiopia to improve its communication and collaboration with its suppliers regarding environmental sustainability. Additionally, the study's findings indicate that while respondents had a neutral level of awareness regarding the organization's practices in supplier environmental audits and adoption of environmental systems such as ISO 14001 certificates, there is a belief that environmental friendliness should be included as an evaluation criterion in procurement practices. This conclusion highlights the potential for BGI Ethiopia to actively incorporate environmental considerations into its procurement practices to align with the broader industry trend towards environmental sustainability. Therefore, the finding suggests that BGI Ethiopia may need to focus more on improving its information sharing practices and increasing its efforts towards environmental sustainability to enhance its supply chain management practices. In doing so, BGI Ethiopia could not only meet changing stakeholder expectations, but also position itself as a leader in responsible business practices in the industry.

Finally, in reverse logistics, costs of service and logistical performance have a strong relationship. The result demonstrates that cost of service has a 22.9 percent effect on the logistics performance of the organization when all other variables are held constant, indicating that there was a problem with logistics activity and that the organization's operational performance was dependent on this variable. Besides, because this variable has a substantial impact on logistics performance, the organization's logistics performance is dependent on it frequently. The study concluded from the findings that the company should place more emphasis on operational costs than other factors because costs are what drive all of the company's daily operations.

5.4 Recommendations

The researcher offers the following ideas as solid solutions to the issue based on the study's findings. The following suggestions are made in light of the findings and conclusions reached.

The analysis suggests that organizations are adopting green manufacturing practices to reduce waste and increase productivity. This includes the use of efficient and reliable machinery, production processes with reduced environmental impacts, and environmentally friendly energy sources and materials.

The findings highlight that green manufacturing practices are mostly applied in BGI Ethiopia. For eco-design, customers strongly support BGI Ethiopia's practices of designing products to maximize material and component recovery, reuse, and recycling. However, more work needs to be done to prevent or minimize the usage of dangerous products in the production process.

In green procurement, the study shows that most respondents held neutral opinions regarding BGI Ethiopia's collaboration with suppliers to achieve environmental goals through information sharing. Therefore, BGI Ethiopia may need to improve its information sharing practices and increase its focus on environmental sustainability in its supply chain management.

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APPENDIX

ADDIS ABABA UNIVERSITY

SCHOOL OF COMMERCE GRADUATE STUDIES

DEPARTMENT OF LOGISTICS AND SUPPLY CHAIN MANAGEMENT

QUESTIONNAIRE TO BE FILLED BY RESPONDENTS

Dear respondents,

The aim of this questionnaire is gathering data used for a thesis on the title of **Assessment of Green Supply Chain Management Practice: The Case of BGI Ethiopia** for the partial fulfilment of the requirements for the Masters of Logistics and Supply Chain Management Degree. Your genuine answer is significantly respected and will contribute a lot to the accuracy of this study. The information collected from this questioner will merely be used for academic purpose and will be treated with strict confidentiality.

Thank you for your time and consideration!

Name – Yohannes Abate

E-mail Address – Yohannesabate97@gmail.com

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

Part I: Questions related with Background Information of the respondent

1. **Gender** Male ☐ Female ☐
2. **State your highest level of education?**
   Diploma ☐ BA/BSC ☐ MA/MSC ☐ PHD ☐
3. **What is your position in the company?**
   Production Manager ☐ Maintenance☐ Supply chain department ☐
   Human Resource ☐ Sales and Marketing ☐
4. **How long have you been working in the company?**
   Less than 5 years ☐ 5-10 Years ☐ 10-15 Years☐ Over 15 years☐

Part II

Objective 1: Questions related with **Green Supply Chain Management practice.** Please indicate your level of agreement by using a tick (✓) mark. The five Likert Scale points denote 1=Strongly Disagree, 2=Disagree, 3=Neutral 4=Agree 5= Strongly Agree.

No	Parameter	1	2	3	4	5
Green Manufacturing						
1	The company use fast, reliable and energy efficient production equipment to eliminating wastes and improving productivity.					

2	The company adopts production processes that use inputs with minimal or reduced environmental impacts.					
3	The company use efficient technology to reduced raw materials and resources to reach low input, high output and low pollution.					
4	The company use environmentally friendly energy sources like solar energy, recycling of raw materials and use biodegradable energy sources and materials.					
Eco-Design						
5	The company design products for reduced materials and energy consumption.					
6	The company design products for reuse, recycle, recovery of material and component parts.					
7	The company design products to avoid or reduce use of hazardous products and /or their manufacturing process.					
Green Procurement						
8	The company cooperate with suppliers for environmental objectives.					
9	The company provides design specification to suppliers with environmental requirements.					
10	The company conducts environmental audit for suppliers' internal management.					
11	The company demands its supplier to adopt environment system such as ISO 14001.					
12	The company has second-tier supplier environmentally friendly practice evaluation criteria in its procurement.					
Green Distribution and Transportation						
13	The company reduce its energy to add value for warehousing its products.					
14	The company involves the activities of obtaining superior financial and environmental performance.					
15	The company design an opportunity for improving its image and to reduce its costs.					

16	The company also provides transportation system's efficiency and enhancement of customer association can be obtained to create more profitability.					
Reverse Logistics						
17	The company return its product; reduce its source, materials substitution, reuse of materials, waste disposal repair and remanufacturing.					
18	Recycling and waste logistics need for collection, classification, processing, handing, storage, and distribution.					
19	The company involves the activities to avoid returns, to reduce materials in the forward system.					
20	The company flow back and ensure reuse and recycling of materials for reducing materials.					

Thank you for your cooperation.