

*Evaluating GSC Practices on ESG Evidence from the Textile Industry of
Pakistan*



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Abstract

This study's main purpose is to examine the impact of Green Supply Chain Management (GSC) practices on sustainability performance, specifically focusing on the textile industry in Pakistan. The independent variable in this study is GSC, which encompasses green purchasing, eco-design, waste management, and energy management. The dependent variables are sustainability performance indicators, including economic performance, social performance, and governance performance.

The research aims to provide evidence of the relationship between GSC practices and sustainability performance within the context of the textile industry in Pakistan. By adopting a quantitative research approach, data will be collected from textile companies in Pakistan through surveys and interviews. Statistical analysis, such as regression analysis, will be conducted to analyze the data and determine the extent to which GSC practices influence sustainability performance.

The findings of this research will contribute to the existing literature on GSC practices and sustainability performance in the textile industry. The results will provide valuable insights for textile companies in Pakistan and other similar industries, helping them understand the potential benefits of adopting GSC practices and enhancing their sustainability performance. Additionally, the research outcomes will contribute to the broader field of environmental sustainability and supply chain management, offering guidance for policymakers and industry stakeholders interested in promoting sustainable practices.

Keywords: Green Supply Chain Management, GSC practices, sustainability performance, economic performance, social performance, governance performance, textile industry, Twin cities of Pakistan.

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Chapter 1 : Introduction

1.1. Background of the study

The textile industry in Pakistan is one of the major economic contributors to the nation. It generates substantial foreign exchange and provides employment opportunities to millions of people. However, this industry has also been criticized for its negative impact on the environment and poor working conditions, which have led to labor rights violations and social injustice. As a result, there is an urgent need for the purpose of evaluating the environmental, social, and governance performance of the textile industry in Pakistan and identifying sustainable solutions to enhance its sustainability and competitiveness.

GSC practices have gained significant attention in recent years as a tool to address sustainability challenges in various industries. The textile industry has also embraced GSC practices, such as eco-friendly production processes, waste reduction, and worker safety, to improve its ESG performance. There is, however, lack of research information on the effectiveness of GSC practices in the textile industry, particularly in developing countries like Pakistan.

Therefore, this study aims to assess the GSC practices' impact on the ESG performance of the textile industry in Pakistan. By analyzing the empirical evidence, this study aims to provide insights into the variables that impact the GSC practices' adoption and effectiveness and their effect on the industry's competitiveness. This study's findings can inform policymakers, textile industry stakeholders, and other businesses in developing sustainable supply chain practices to improve their ESG performance and contribute to sustainable economic growth.

Institutional pressures, which encompass market, regulatory, and competitive forces, play a significant role as a moderator variable. These external influences can impact a company's implementation of Green Supply Chain (GSC) activities (Zhu and Sarkis, 2007). Younis, Sundarakani et al. (2019) conducted a comprehensive study on GSC practices and their impact on corporate performance, employing a mixed-method approach. Their research identified gaps

in the literature and recommended further exploration of the relationship between Environmental Management Systems (EMS) certifications like ISO14001 and GSC. To build on existing knowledge, it is valuable to consult the insights of other researchers, such as Zhu and Sarkis (2007).

Environmental sustainability should be considered a critical aspect of the supply chain rather than solely an organizational concern. (Vachon, S., & Klassen, R. D, 2006). To ensure the development of eco-friendly processes, products, and services, it is essential for all stakeholders in the supply chain to collaborate and avoid sub-optimization at the partner level, (Vasileiou and Morris, 2006).

Green supply chain management is a contemporary approach to management that integrates environmental considerations and resource efficiency into category management. It encompasses the assessment of the environmental impact of supply chain activities (Chen et al., 2009; Rabbi et al., 2020). Within green supply chain management, careful consideration is given to product selection, production processes, and the selection of upstream and downstream suppliers to promote effective environmental management and achieve carbon emission reduction goals (Zhu and Sarkis, 2004; Mafini and Loury-Okoumba, 2018).

Our contribution to the literature on (GSCM) involves the integration of recently developed constructs (Zhu et al., 2008a; Green and Inman, 2005; Esty and Winston, 2006) into a comprehensive model of GSCM practices. Additionally, we provide early empirical evidence on the effectiveness of this model.

Furthermore, we argue that the successful implementation of GSCM practices, such as green purchasing, waste management, eco-design, and energy management, will result in improved environmental and economic performance. These improvements, in turn, support enhanced operational and organizational performance.

When ESG is used for supply chain performance evaluation, it can overcome the lack of nonfinancial indicators that might impact our future society, such as environmental impact in the traditional credit rating system. It is conducive to promoting the participation of all supply chain members in the sustainable development, minimizing carbon emissions (Sardanelli et al., 2022).

Thus, incorporating ESG into green supply chain performance evaluation is necessary. We will also further work on economic performance, green purchasing, and environmental performance along with other variables.

1.2. Research Gap

Previous studies have demonstrated the significant effects of green supply chain (GSC) procedures on various aspects, such as operations, social issues, finances, and monetary activities. However, there is a lack of research specifically examining the impact of GSC practices on environmental, social, and governance (ESG) factors in Pakistan. Therefore, the aim of this study is to bridge this research gap by investigating the effects of GSC practices on the social, economic, and governance aspects of the textile industry in Pakistan. This research is particularly important as it focuses on the textile industry, which has received limited attention in previous studies.

Several studies have emphasized the notable influence of green supply chain management on diverse domains, including operations, social issues, finances, and monetary activities (Diab, N., Dibb, S., & Abdallah, H., 2022). Furthermore, there are few studies available for exploring the impact of green supply chain management practices on ESG factors in Pakistan. Limited research papers specifically address green supply chain management, particularly in relation to Pakistan.

1.3. Problem Statement

Pakistan's textile sector makes a considerable economic contribution, but it also has serious environmental impact due to high resource consumption, waste generation, and emissions. In response, many textile firms have implemented (GSC) practices to mitigate their environmental impact and enhance their corporate (ESG) performance.

Pakistan's textile industry, however, has received little research. As a result, the objective of this thesis is to evaluate the impact of GSC practices on the (ESG) performance of Pakistan's textile industry.

Limited implementation of GSC practices in the textile industry of Pakistan is a major issue, which is attributed to lack of awareness, expertise, and resources to implement GSC practices effectively (Yasmeen et al., 2021). Insufficient environmental performance is a significant problem in the textile industry of Pakistan.

The industry is a major contributor to environmental pollution, particularly with regards to air and water quality. While GSC practices have been implemented to address this issue, they have not been sufficient, and there is a need for greater commitment to sustainable practices. (Arshad et al., 2021; Li et al., 2019).

The textile industry in Pakistan is facing social issues, particularly poor labor conditions, such as low pay, lengthy hours, and dangerous workplaces. While GSC practices can help address these issues, their implementation has been limited. (Yasmeen et al., 2021)

The limited adoption of Green Supply Chain (GSC) practices in Pakistan's textile industry impacting its environmental, social, and governance (ESG) performance.

This study aims to evaluate the effectiveness of GSC practices and identify strategies to enhance the industry's sustainability and ESG outcomes.

1.4. Research Question

The findings of this study can help in selecting environmentally friendly partners, making better managerial decisions, and promoting green supply chain practices. This thesis will specifically address the following research questions:

1. How effectively do green purchasing practices contribute to improving the environmental performance of organizations?
2. How positively does the incorporation of eco-design principles impact the environmental sustainability of organizations?
3. To what extent does energy management contribute to improving the environmental sustainability of organizations?
4. How would you rate the level of awareness and understanding of ESG practices among suppliers and subcontractors within your supply chain?

1.5. Research Objectives

The main objective of this study is to evaluate the impact of GSC practices on ESG performance in the textile industry of Pakistan. The thesis aims to offer valuable insights into strategies that textile firms in Pakistan can adopt to improve their ESG performance and work towards achieving sustainable development. The following factors are included among the key objectives of this study:

- To assess the impact of green purchasing practices on the environmental performance of organizations.
- To evaluate the influence of incorporating eco-design principles on the environmental sustainability of organizations.
- To analyze the contribution of energy management practices to improving the environmental sustainability of organizations.
- To evaluate the impact of waste management GSC practice on the (ESG) performance of textile firms in Pakistan

1.6. Significance of Study

Millions of people are employed by Pakistan's textile sector, which accounts for a sizable share of the nation's exports and contributes significantly to the country's GDP. However, the industry also has a significant environmental impact, including high resource consumption, waste generation, and emissions (Hameed et al., 2021). As a result, there is a developing demand for sustainable and socially responsible business practices in the industry. Green supply chain (GSC) practices represent an approach that seeks to mitigate the adverse environmental and social impacts of the industry while ensuring economic sustainability (Zhu et al., 2018).

Regardless of the rising adoption of GSC practices in the textile industry of Pakistan, there is a lack of empirical evidence on their effectiveness in improving (ESG) performance. This study attempts to fill this knowledge gap by analyzing the effect of GSC practices on ESG performance in the Pakistan textile sector. As a result, this study will add to the body of knowledge on sustainable supply chain management and offer guidance to businesses involved in the textile sector, government officials, and other stakeholders who are interested in advancing sustainable development.

The findings of this study will be particularly significant for textile firms in Pakistan, as they will provide evidence-based recommendations for the adoption of GSC practices to enhance their ESG performance. Policymakers can also use these findings to develop effective strategies and policies for sustainable business practices in the textile industry. Moreover, the study will contribute to the academic literature on GSC practices and ESG Sustainability Performance., particularly in the context of the textile industry of Pakistan, which has received limited attention in previous research.

Overall, this study's significance lies in its potential to promote sustainable development in the textile industry of Pakistan and contribute to the growing body of literature on sustainable supply chain management. The study's recommendations will be beneficial not only for textile firms and policymakers in Pakistan but also for other developing countries with similar industries and sustainability challenges.

1.7. Variable Definition

1.7.1. Independent variable:

Green Supply Chain Management Practices (GSC)

- Green purchasing: The practice of purchasing products and services that have been produced in an environmentally responsible manner.
- Eco-design: The practice of designing products and services with environmental considerations in mind.
- Waste management: The practice of managing waste in a way that minimizes environmental impact.
- Energy management: The practice of managing energy use in a way that minimizes environmental impact.

1.7.2. Dependent Variables:

Sustainability Performance (Economic Performance, Social Performance, Governance Performance)

- Sustainability performance: The organization's ability to operate in a way that meets the needs of the present without compromising the ability of future generations to meet their own needs.
- Economic performance: The organization's ability to generate revenue and profits.
- Social performance: The organization's ability to contribute to the well-being of society.
- Governance performance: The organization's ability to manage itself in a way that is fair, transparent, and accountable

Chapter 2 : Literature Review

2.1. Theoretical Concepts

The concept of ESG has gained widespread recognition in academia, politics, and industry since its introduction in 2006 (Atkins, 2020). As highlighted by Jayachandran et al. (2013), environmental aspects encompass numerous factors such as greenhouse gas emissions, air pollution, energy consumption, and effectiveness. These factors encompass efforts aimed at reducing carbon dioxide emissions, promoting energy efficiency, and facilitating the global achievement of carbon neutrality goals (IIGF, 2022).

A company's ESG performance is significantly influenced by its environmental practices (Wang and Sun, 2022). Dong et al. (2018) utilizes indicators such as carbon productivity and intensity to measure carbon emission performance. The proportion of revenue generated from green initiatives is used as an assessment of environmentally friendly development by companies (IIGF, 2019). Social factors encompass aspects like supply chain management and ensuring customer health and safety. Profits often serve as a metric to gauge a company's social responsibility, as higher profitability allows for greater resource allocation and capacity to undertake social responsibility initiatives. Failure to meet societal expectations can result in increased costs and negatively impact a company's cash flow (Abdul Rahman and Alsayegh, 2021).

Return on equity (ROE) and return on investment (ROI) are commonly used indicators to measure a company's profitability (Rajan et al., 2007; Nguyen and Nguyen, 2020). The level of cash flow can be assessed by metrics such as net sales margin and operating profit growth rate, which exhibit a significant positive correlation with profitability (Liu and Ma, 2014; Coad et al., 2017). Governance factors encompass elements like shareholder rights, stakeholder engagement, and relationship governance (NEA, 2012). In the context of supply chain operations, corporate governance can be evaluated through operational performance (Shi and Liao, 2015). Indicators such as inventory turnover and the proportion of products sold are utilized to assess governance risks (Choi and Ham, 2009). Total asset turnover represents the operational efficiency of a company (Houmes et al., 2018; Porebski and Tomczak, 2020; Almomani et al., 2021). The environmental aspect of ESG has garnered considerable attention

in academic research (Baid and Jayaraman, 2022), and ESG is considered a vital criterion for evaluating a company's environmental and social responsibility (Shakil, 2021). Enhancing ESG standards assists companies in achieving sustainable development (Whitelock, 2019).

ESG holds significant importance in the realm of supply chain management, with a notable interplay observed between ESG performance and supply chain operations (Dai and Tang, 2022). By enhancing corporate governance, companies can achieve improved productivity within their supply chains (Ziolo et al., 2019). Conventional supplier selection methods often prioritize financial metrics, neglecting the impact of factors like customer satisfaction and product quality. Additionally, the environmental aspects of supply chain decision-making are often overlooked. ESG can address the limitations of traditional credit rating systems when applied in the context of supply chains.

Moreover, promoting a greater understanding of environmental performance can drive enterprises to actively participate in sustainable development endeavors (Sardanelli et al., 2022). ESG has often been utilized in studies investigating various performance aspects such as financial performance, environmental performance, and corporate performance (Jayachandran et al., 2013). The current body of literature predominantly focuses on the use of ESG scores as a means to assess sustainability in supply chain performance (Rajesh, 2020). However, there is a limited amount of research specifically dedicated to examining the impact of ESG on green supply chain performance (Li et al., 2021).

Collaboration with customers has a direct influence on environmental performance, while its impact on economic performance is indirect, mediated through environmental performance. In our study, we found that cooperation with customers had the most substantial impact on environmental performance, followed by investment recovery and eco-design. Our findings are consistent with previous research by Zhu and Sarkis (2007), who did not identify a significant association between cooperation with customers and environmental or economic performance in Chinese manufacturers facing customer pressure to adopt environmental practices.

Theory of Planned Behavior

The theory of planned behavior offers a framework for understanding consumer behavior by identifying factors that influence consumers' subjective attitudes and behaviors and can be used to forecast their intentions and actual behavior (Ajzen, 1991). Intentions serve as the basis for evaluating consumers' orientation and behavior, indicating their readiness (Ajzen, 1991).

According to this theory, attitudes of consumers toward their decisions are influenced by their own behavioral beliefs and knowledge-based assessments of product purchasing decisions. Personal standards, objective requirements, and consumer motivations related to purchasing can all have an impact on these attitudes. (Ajzen, 1991). This theory has been widely used in numerous studies, with applications examining the impact of different factors on consumers' intention to purchase green products (Ruangkanjanases et al., 2022).

Sustainability encompasses ESG performance, and the literature in this area has seen significant development (Carter and Easton, 2011; Carter and Rogers, 2008).

In particular, Management of the environment has changed its focus from the organizational level to the supply chain level, with the concept of "environmental supply chain management" emphasizing the integration of material and information flows to meet customer demand for green products and services (Seuring, 2004). Organizations make decisions that support the integration and coordination of green supply chain management practices as customer demands for environmentally friendly products and services rise and supply networks work towards internal health and environmental sustainability. (Vachon and Klassen, 2006). Being early adopters of environmental sustainability and green supply chain practices can provide competitive advantages to supply chains and organizations (Handfield et al., 1997).

Supply chain research is expanding its scope by incorporating ideas and approaches from other disciplines and addressing global management concerns (Esper et al., 2019). Theory building in supply chain research can benefit from understanding theoretical dynamics and considering alternative models beyond the classic deductive approach (Walker et al., 2015). Institutional theory has been proposed as a means to enhance understanding of supply chain phenomena and provide management insights (Harrison et al., 2008).

In the context of the Pakistan textile industry, (GSCM) aims to minimize the environmental impact of products and reduce harm to the environment. Despite extensive research on industries such as cement, manufacturing, and automobiles in Pakistan, the textile industry has not received sufficient attention in terms of green supply chain practices (Lee et al., 2012; Green, 2006). Within the literature on GSCM, the focus has been primarily on the implementation of green supply chain practices in the textile service industry.

Resource Dependency Theory

This study aims to contribute to existing theories by examining the relationship between (GSC) practices and (ESG) factors in the Textile Industry of Pakistan. While previous research has shown the importance of GSC practices in various aspects, such as operations and finances, there is limited understanding of how these practices specifically impact ESG outcomes in the Pakistani textile industry.

Our research builds upon the existing theories, such as the Resource-Based Theory, which focuses on a firm's unique resources and capabilities.

The main theoretical contribution of our study lies in uncovering the link between GSC practices and ESG factors in the textile industry. By doing so, we aim to enhance our understanding of how sustainable supply chain practices can positively influence environmental sustainability, social responsibility, and corporate governance in this industry.

By bridging this research gap, our research adds to the current knowledge base by investigating previously unexplored aspects in the literature effects of GSC practices on ESG outcomes within the specific context of the Textile Industry of Pakistan. We aim to develop a more comprehensive understanding of how sustainable supply chain practices can positively influence environmental sustainability, social responsibility, and corporate governance in this industry.

2.2. Empirical Relationship

2.2.1. Green Purchasing Impact on ESG

The increasing global interest in sustainability has led to a shift in consumer behavior, as individuals are motivated to switch from conventional goods to environmentally sustainable or friendly purchases to address environmental issues and support sustainable development (Chen & Hsu, 2019). For organizations, green purchasing has become a key strategy to improve efficiency, reduce waste, and enhance competitiveness (Chen & Hsu, 2019). Green purchasing behavior involves buying products that are environmentally friendly and recyclable, benefiting the natural environment (Chen & Hsu, 2019; Lam, 2016). Institutions also recognize the significance of using green purchases to promote sustainable development, as it influences their performance and environmental protection practices (Lo et al., 2016).

An important factor is using green purchases in mitigating environmental threats, particularly related to packaging waste generated through the purchasing process. With the growing awareness of global warming and environmental issues, companies are increasingly adopting green purchasing practices to address these concerns (Lam, 2016). Green purchasing involves considering environmental and social responsibilities during the procurement process (Hsu & Liang, 2017). It encompasses initiatives such as sourcing products and services that align with environmental objectives, reducing waste, promoting recycling and reuse, and substituting materials (Lo et al., 2016). Key aspects of green purchasing include buying environmentally friendly raw materials, sourcing from certified green suppliers, and meeting environmental objectives (Chen & Hsu, 2019).

Utilizing dependable, recyclable, and reused materials allows for the reduction of harmful environmental effects throughout manufacturing and shipping operations. In the context of Malaysian manufacturing enterprises, this study focuses on examining the impact of green purchasing practices, including green products, green processes, and green suppliers, on environmental and financial performance. A survey was conducted among various industry sectors. The findings indicate that green products, green processes, and green suppliers significantly and positively contribute to environmental performance, with green products emerging as the primary predictor.

These results can provide valuable insights for implementing green purchasing practices in Malaysian manufacturing companies and serve as a foundation for further empirical research.

As environmental concerns continue to shape supply chain management, monitoring green supply chain performance can enhance decision-making capabilities and lead to sustainable competitive advantage (Sardanelli et al., 2022). The evaluation of green supply chain performance should encompass multiple dimensions, including environmental, operational, and economic aspects (Hervani et al., 2005). The goal of a green supply chain is to minimize negative environmental impact and resource waste throughout the entire process, from raw material extraction to transportation and consumption (Hervani et al., 2005). Evaluating green supply chain performance should consider the entire process and involve stakeholders along the supply chain. Green supply chains can drive the development of environmental, social, and governance (ESG) practices and attract attention from company managers (Rabbi et al., 2020). Probability models, such as Bayesian Belief Network (BBN), can be employed to predict green supply chain performance, aiding managers' decision-making processes (Rabbi et al., 2020). Studies have shown that offshore green supply chain management indirectly promotes sustainable economic, environmental, operational, and social performance of enterprises (Fernando et al., 2019).

H1: Green Purchasing has a positive impact on the ESG Sustainability Performance.

2.2.2. ECO Design and ESG

Eco-design has gained prominence as a vital approach to product design, particularly for manufacturing firms striving to achieve environmental sustainability and global competitiveness. The World Business Council for Sustainable Development (WBCSD), which created the idea first at the Rio Summit, encompasses a comprehensive and proactive set of project practices aimed at creating eco-efficient products and processes. It includes the extraction of raw materials, production, packaging, distribution, usage, recovery, and recycling at every stage of a product's life cycle (Jeswiet & Hauschild, 2005). According to Nowosielski, Spilka, and Kania (2007), eco-design entails identifying and implementing environmental factors into the product creation process. Karlsson and Luttrupp (2006) claim that it provides sustainable solutions by adjusting goods and services to reduce unfavorable sustainability

effects and increase favorable ones while considering economic, environmental, social, and ethical considerations both during and after the product's life cycle.

Eco-design is a process that takes into account design performance in connection to environmental, health, and safety concerns across the course of a product's and process's whole life cycle (Fiskel and Wapman 1994),. Eco-design is a key practice within (GSCM) and is known by various names such as design for the environment, green design, environmentally conscious design, life cycle design, clean design, and sustainable design. It is typically incorporated early in the product design phase to ensure comprehensive understanding of the product's environmental impact throughout its life cycle before manufacturing decisions are finalized (Gheorghe & Ishii, 2008).

The main goal of eco-design is to lessen the negative effects on the environment. However, it also provides other advantages like cost savings, access to new markets, and the introduction of new products, thereby boosting competitiveness (Knight & Jenkins, 2008), which is anticipated to improve financial performance. Scholars and practitioners have long been concerned about how much responsibility firms have to society (Salzmann, Ionescu-Somers, & Steger, 2005). Many organizations have stepped up their efforts in reviewing their environmental performance in response to heightened environmental concerns, public pressure, and regulatory constraints (Lundberg, Balfors & Folkesson, 2009).

Manufacturing firms in Mombasa County have been identified as major contributors to industrial pollution based on previous assessments (Mwaguni & Munga, 1997). These firms encounter various significant challenges, including sustainable consumption, management of solid and liquid waste, and compliance with stringent environmental regulations. Adoption of eco-design practices can contribute to substantial reductions in environmental footprint, waste generation, and material reuse. Furthermore, it enables efficient and effective utilization of scarce natural resources while maintaining a sustainable and pressure-free environment (Dallas, 2008).

This study's goal was to determine how eco-design practices affected the productivity of manufacturing companies in Mombasa County, Kenya. A population of manufacturing companies identified by the Kenya Association of Manufacturers (KAM, 2014) was the focus of the study, which used a cross-sectional survey research design. Data was gathered utilizing surveys on a sample of 65 businesses.

The results showed that the majority of Mombasa County's industrial companies have thought about adopting eco-design principles, with the adoption process at the planning/implementation stage. The study also identified the main obstacles to implementing eco-design practices, such as issues integrating eco-design, a lack of understanding of how to manage adjustments to design processes, and a lack of technical expertise in eco-design. Additionally, the findings showed that implementing eco-design principles improved organizational performance, notably in terms of lowering environmental impact and raising financial returns.

Based on the findings, the study recommends that manufacturing firms should receive adequate training and empowerment to successfully implement eco-design practices, reducing the fear of failure and promoting environmental sustainability. It also suggests that firms should act promptly to implement eco-design practices, as there are potential benefits such as improved environmental impact reduction and financial performance. Additionally, the researcher recommends that both government rules and regulations and organizational capabilities should be reviewed to ensure effective adoption and implementation of eco-design practices. Recognizing the importance of the environment as a foundation for economic and social development in Kenya, prioritizing environmental sustainability is crucial.

H2:ECO-Design directly and positively impacts ESG sustainability performance.

2.2.3. Energy Management and ESG

The textile industry, although not commonly recognized as energy-intensive, comprises numerous plants that collectively consume a substantial amount of energy. The share of energy consumed by the textile industry within a country's manufacturing sector depends on the overall structure of that sector. For example, in certain cases, the textile industry may contribute approximately 4% to the final energy consumption in manufacturing.

In terms of energy usage, the textile industry heavily relies on both electricity and fuels, with the specific distribution depending on the industry's structure within a particular country. For instance, electricity serves as the primary energy source in spun yarn spinning, while fuels play a significant role in wet processing. According to manufacturing census data from 2002 in the United States, fuels accounted for 61% of the final energy consumption in the textile industry, while electricity constituted 39%. Additionally, the U.S. textile industry ranked fifth among 16 major industrial sectors in terms of steam consumption. Furthermore, approximately 36% of the energy input to the textile industry is lost on-site, particularly in boilers, motor systems, and distribution.

The textile industry is a complex manufacturing sector characterized by fragmentation and the prevalence of small and medium enterprises (SMEs). While there are numerous energy efficiency opportunities within textile plants, these often remain unexploited due to limited knowledge on adopting energy-efficient measures. To address this gap, it is crucial to disseminate information and provide guidance on energy-efficient technologies and practices specifically tailored for the textile industry. This paper aims to contribute by offering insights into energy usage patterns, energy efficiency technologies, and applicable measures specific to the textile industry. It includes case studies from textile plants worldwide and provides relevant information on energy savings and costs whenever available.

A total of 184 energy efficiency measures suitable for the textile industry are presented in this paper, accompanied by a concise overview of the global textile industry, including an analysis of energy types and their distribution across different textile processes. Moreover, the paper highlights energy-efficiency improvement opportunities within major sub-sectors of the textile industry, providing concise explanations for each measure (Hasanbeigi, A., & Price, L., 2015).

H3: Energy Management directly and positively impacts ESG sustainability performance.

2.2.4. Waste Management and ESG

Currently, a crucial aspect concerning the global acrylic fiber industry is the development of eco-friendly technology and the promotion of sustainable development (Vandevivere, P. C., Bianchi, R., & Verstraete, W. 1998). The textile industry is known for its high energy consumption and significant pollution levels (Vandevivere W. 1998). Textile production often involves extensive water usage and releases substantial amounts of pollutants into the environment (Melnyk, S. A., 2003). Therefore, it is imperative to mitigate its environmental impact through the establishment of effective waste management systems (Ozturk, H. K. 2005).

Implementing or enhancing using an environmental management system gives you the chance to assess how an organization controls its environmental responsibilities and facilitates the identification of more efficient and cost-effective solutions. By assessing the organization's practices and performance, an environmental management system can ensure its long-term viability and effectiveness. It is worth noting that an effective environmental management system is based on the principles of total quality management, addressing not only the actions but also the underlying reasons behind them. Over time, systematically identifying and rectifying system deficiencies leads to improved environmental and overall organizational performance (Melnyk, S. A., Sroufe, R. P., & Calantone, R. (2003)).

According to the European Commission for Environment, waste management plans are essential tools for implementing and achieving waste management policies and targets at the national level. These plans provide an overview of waste streams and treatment options (Stapleton, J. P., Margaret, A. G., & Davis, S. P. (2001)).

In the context of textile production, which is associated with high water consumption and environmental pollution, the establishment of a proper waste management system is of utmost importance. The present study focuses on developing and implementing a "Waste Management System" in a real-world scenario.

The waste policy primarily focuses on the reduction of solid waste, with a specific emphasis on waste fiber. This entails the establishment of a waste management team, data collection, monitoring reports, and audits. Based on the recommendations of the waste management team, an action plan is developed, and the associated cost savings are calculated. The key actions

outlined in the plan involve the installation of a new liquefaction unit for processing solid waste and the implementation of waste reduction practices through employee engagement.

By implementing these actions, there is a direct reduction in waste generation, leading to significant cost savings. The results demonstrate that the implemented waste management system is an effective tool for minimizing waste generation, mitigating the adverse environmental impact of textile production, and achieving cost savings. Furthermore, the waste management system presented in this study can be adapted for similar industries, allowing for wider applicability (Stapleton, J. P., 2001).

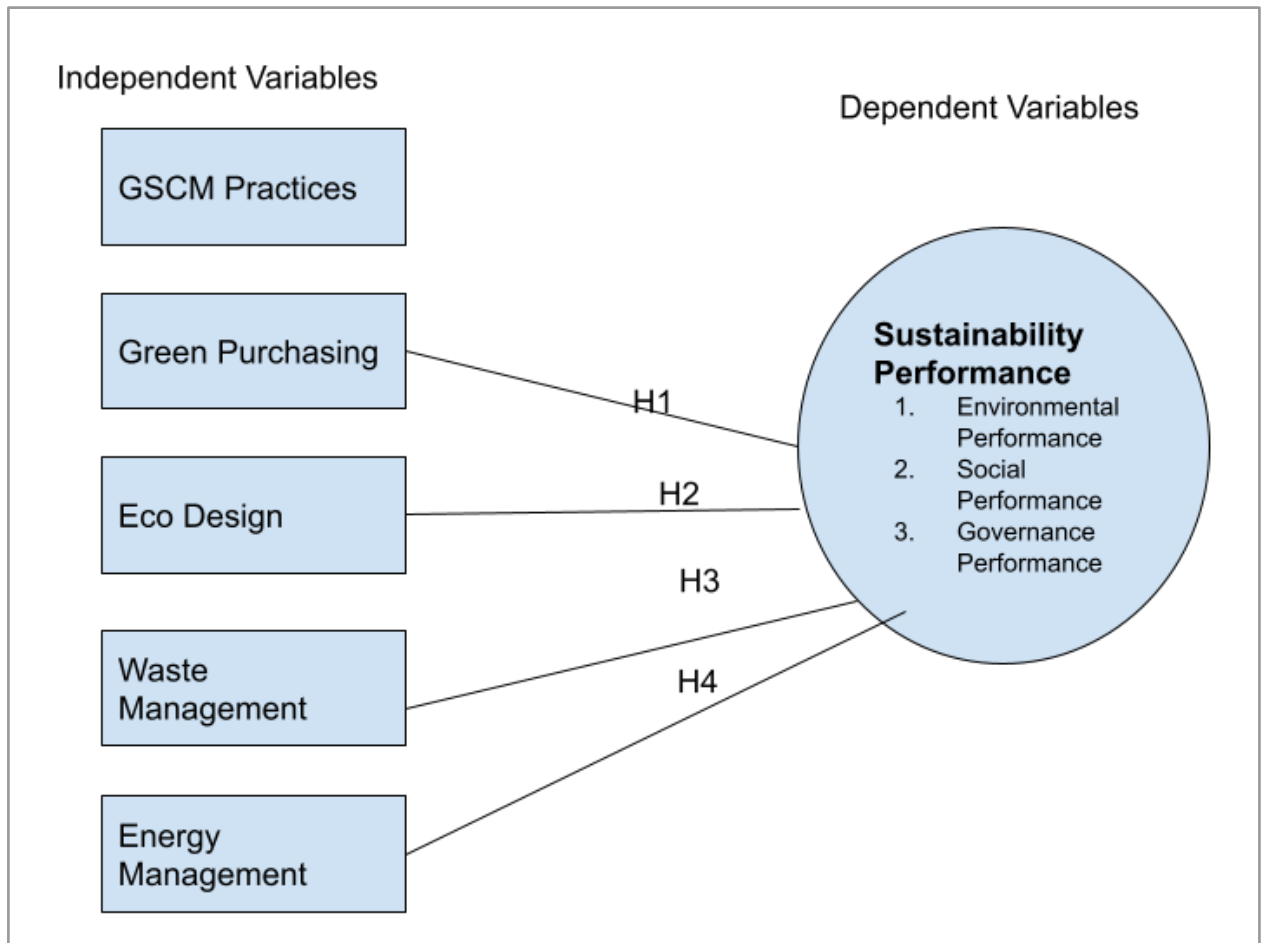
H4: Waste Management directly and positively impacts ESG sustainability performance.

2.3. Theoretical Framework

GSC practices can help firms to improve their sustainability performance, economic performance, social performance, and governance performance. For example, green purchasing can help firms to reduce their environmental impact, which can lead to lower costs and increased customer satisfaction. Increased sales and market share may result from businesses using eco-design to produce goods and services that are more environmentally friendly. Waste management can help firms to reduce their waste disposal costs, which can lead to higher profits. Energy management can help firms to reduce their energy costs, which can lead to higher profits.

The impact of GSC practices on sustainability (ESG) performance is likely to vary depending on the specific practices that are implemented and the context in which they are implemented. However, the RBV suggests that GSC practices can be a valuable resource for firms that are looking to improve their performance in all four areas.

Fig 2.3.1



2.3.1. Hypothesis

H1: Green Purchasing has a positive impact on the ESG Sustainability Performance.

H2: ECO-Design directly and positively impacts ESG sustainability performance.

H3: Energy Management directly and positively impacts ESG sustainability performance.

H4: Waste Management directly and positively impacts ESG sustainability performance.

Chapter 3 : Research Methodology

3.1. Introduction

In this section of the research, we will discuss how we analyzed the study. We will explain where we obtained the data and the methods we used for our research. We will also describe how we examined the data, understood its meaning, and shared our findings. Additionally, we will outline the process we followed to collect the data.

3.2. Research Approach

When conducting research, there are two common approaches: deductive and inductive. In this study, we chose the deductive approach and used the quantitative research method. Quantitative research involves collecting data through statistics, which allows for analytical evaluation. In this research, we applied the deductive approach to examine how GSC practices affect ESG factors, specifically focusing on the Textile Industry of Pakistan.

Using the deductive approach and quantitative research method has several benefits. One significant advantage is that a broader and larger sample group can be reached. Additionally, the use of tests and systems in quantitative research allows for the gathering and quantification of results, providing a comprehensive understanding of the impact on a specific sector. Conversely, qualitative approaches tend to result in findings being expressed in statements only. In this research, data was collected and analyzed through a questionnaire survey to obtain and interpret results.

3.3. Research Strategy

For this study we use the quantitative research strategy, the benefit of choosing a quantitative research strategy for this research is that we can hit the sample group as broadly as possible . The systematic you have been used in the quantitative method.

3.4. Research Philosophy

Positivism is a philosophy that believes in trusting knowledge gained from observation and measurement. In positivist studies, researchers collect data and interpret it objectively. These studies focus on observable and measurable findings. Positivism relies on quantifiable observations that can be analyzed using statistics. It follows the idea that knowledge comes from our experiences.

3.5. Research Design

The research design for this study is descriptive, which means it aims to understand the impact of (GSC) practices on sustainability in the Textile Industry of Pakistan. By analyzing current practices and their relationship with sustainability, the study gathers information from industry participants to gain valuable insights for stakeholders and policymakers.

3.6. Research Technique

The research technique employed for this study is survey circulation. Surveys are a common method used by researchers to collect data and information. In this study, surveys were conducted to gather information regarding the evaluation of (GSC) practices on (ESG) sustainability performance in the Textile Industry of Pakistan.

The survey questionnaire consisted of six sections. The first section focused on demographics, while the following four sections addressed the independent variables, namely green purchasing, eco design, energy management, and waste management.

The final section pertained to the dependent variable, which is ESG sustainability performance. The data was collected using a 5-point Likert scale for measurement.

The questionnaires were distributed to the target audience, considering the margin of error, to ensure a comprehensive data collection process. By utilizing the survey circulation technique, the study aims to gather relevant information from participants and gain insights into the relationship between GSC practices and ESG sustainability performance in the Textile Industry of Pakistan.

3.7. Measurement of scale

For data collection, a formal questionnaire was utilized as the primary tool. The questionnaire employed a Five-Point Likert scale to measure the responses obtained from the participants. The scale used in this study was adaptive, allowing for adjustments to the questionnaire statements as needed. The Likert scale included the following anchors:

1 = Not at all

2 = To a small extent

3 = To a moderate extent

4 = To a high extent

5 = To a very high extent

This scale was used to assess the varying degrees of agreement or disagreement with the statements in the questionnaire. By utilizing the adaptive Likert scale, the study aimed to capture a comprehensive understanding of the participants' perceptions and attitudes regarding the evaluation of (GSC) practices on (ESG) sustainability performance in the Textile Industry of Pakistan.

3.8. Population

The population of this research consists of the Textile industry in Pakistan, with a specific focus on companies based in Islamabad and Rawalpindi. The data collected and evaluated in this study aim to assess the impact of GSC Practices on (ESG) sustainability in the textile industry. The unit of analysis for this research report is the textile businesses operating in Pakistan.

The target population for this study includes five specific Pakistani textile companies: Kohinoor Textile Mills , DM Textile Mills , Yousuf Dewan Companies, Redco Textile Mill and Saif Textile Mills. The target population for this research was 200 , consisting of supply chain employees, logistics personnel, procurement staff, area sales managers, and textile shop representatives in Islamabad and Rawalpindi.

By focusing on these specific companies and gathering data from various roles within the textile industry, the study aims to provide insights into the impact of GSC Practices on ESG sustainability performance, specifically in the Pakistani context.

3.9. Sampling

Sampling is a method used to select a smaller group from a larger population. It involves choosing specific items from the population. In this research, we gathered data from 120 respondents, which is a portion of the overall population of 200. The sample frame for this study consisted of employees working in the supply chain of textile industries located in Islamabad and Rawalpindi.

3.10. Sampling Technique

In this study, a random sampling technique is used. More specifically, a simple random sampling approach was utilized to select 200 employees from the supply chain department in the textile industry of Islamabad and Rawalpindi. This sampling method ensured that each individual within the population had an equal chance of being selected, enhancing the representativeness of the sample. This sampling technique was chosen for its practicality and convenience in reaching out to individuals within the target population.

3.11. Sample Size

Size of the sample for this research derived from formauka and Krejcie & Morgan table 1970. Size of the sample for this research is 120 respondents.

3.12. Data Source

We used the primary for this research. A standardized questionnaire was circulated within the target population to collect information. Researcher originates primary data to examine impact of GSC Practices on ESG, evidence from the Textile Industry of Pakistan. The questionnaire was distributed through the web medium Google Forms;. To endorse fair outcomes and findings for analysis , data obtained through questionnaire was then synchronized accordingly.

3.13. Data Analysis

The study employed quantitative techniques to conduct an informative investigation. Quantitative data was collected through surveys and analyzed using STATA . The data was presented using tables,

figures, and provided insightful interpretations. Statistical tools, specifically regression and correlation analysis, were applied using Stata software to analyze the data and determine the relationship between the independent variables (Green supply chain practices: green purchasing, Eco-design, Waste management, Energy management) and the dependent variable (Sustainability ESG performance).

3.13.1. Regression Analysis

Regression analysis is a valuable statistical method that helps us understand how the dependent variable is affected by each independent variable. By employing regression analysis, we aim to assess the nature, strength, and significance of the relationships between these variables. This analysis will provide insights into how changes in the independent variables may impact the dependent variable, specifically in terms of how the implementation of green supply chain practices influences sustainability performance.

In this thesis, regression analysis is used to examine the connection between the dependent variable, sustainability performance, and the independent variables: Green purchasing, Eco-design, Waste management, and Energy management, which are part of Green supply chain practices.

3.13.2. Correlation Analysis

Correlation is a way to measure how strongly two variables are related to each other. It helps us understand the degree of association between the variables based on the available data.

The correlation coefficient is a number that ranges from -1 to +1. A correlation of -1 indicates a perfect negative relationship, which means that as one variable decreases, the other variable increases. Conversely, a correlation of +1 represents a perfect positive relationship, indicating that as one variable increases, the other variable also increases. A correlation close to zero suggests a weak relationship or little association between the variables.

Chapter 4 : Results and Analysis

4.1. Introduction

The results of the data gathered using the structured questionnaire has been reviewed in this section. The reader will have a thorough understanding of the data at the end of this part including how it was organized, where it came from, and the background and credentials of every relevant information. Evaluate the data on the SPSS statistics. This chapter presents the research findings by utilizing various statistical techniques, including descriptive statistics, reliability analysis, correlation analysis, and regression analysis.

4.2. Descriptive Statistics

The descriptive statistics provide valuable insights into the participants' characteristics and their perceptions of GSC practices and ESG sustainability performance. These statistics highlight the demographic characteristics of the sample population, such as gender, age, education, and work experience. Moreover, they reveal the participants' positive perceptions of GSC practices and ESG sustainability performance. These findings serve as a foundation for further analysis and interpretation within the thesis, providing a comprehensive understanding of the participants' perspectives on these key variables.

Table 4.2.1

Variable	obs	Mean	Std. Dev.	Min	Max
GENDER	120	1.083333	.2775443	1	2
AGE	120	1.941667	.9813028	1	5
EDUCATION	120	3.2	.4953566	1	4
Experience	120	2.858333	.8725105	1	4
GP	120	3.729762	.6396266	1	5
ECO	120	3.770833	.9346186	1	5
WM	120	3.633333	.9824796	1	5
EM	120	3.825	.7323555	2	5
ESG	120	3.882292	.4087719	2	5

The descriptive statistics table presents key findings regarding the variables included in the study. The variable "GENDER" indicates the gender of the participants, with a mean value of 1.083, suggesting a slightly higher proportion of male participants. The variable "AGE" represents the age of the participants, with a mean value of approximately 1.942, indicating a relatively young age distribution. The variable "EDUCATION" reflects the educational level of the participants, with a mean value of 3.2, indicating a moderately high level of education. The variable "Experience" measures the work experience of the participants, with a mean value of approximately 2.858, suggesting a moderate level of experience.

Regarding the variables related to GSC practices and ESG sustainability performance, the variables "GP," "ECO," "WM," "EM," and "ESG" capture the participants' ratings or perceptions. The mean values for these variables range from 3.63 to 3.88, indicating a positive perception of GSC practices and ESG sustainability performance among the participants. The participants had a moderately high level of education and work experience, with mean scores of 3.2 and 2.86, respectively. This suggests that the respondents possessed a certain level of knowledge and expertise in the field, which may contribute to their understanding and perception of GSC practices and ESG sustainability performance. The minimum and maximum values represent the range of the Likert scale used for rating these variables.

4.3. Reliability Test

Reliability analysis, specifically using Cronbach's Alpha, is a statistical method employed to assess the internal consistency or reliability of a measurement scale. It determines how consistently the items in a scale or questionnaire measure the same construct or concept. The reliability coefficient measures the extent to which the selected items in a set are positively correlated with each other. A higher reliability coefficient indicates stronger internal consistency.

In this study, Cronbach's Alpha was utilized to evaluate the reliability of several scales, including Green Purchasing (GP), Eco Design (ECO), Waste Management (WM), Energy Management (EM), and ESG Sustainability Performance (ESG).

The results of the analysis demonstrate the level of internal consistency within each scale. The Cronbach's Alpha coefficient ranges from 0 to 1, with values closer to 1 indicating higher internal consistency.

Reliability Statistics (Collective)

Table 4.3.1

Variable	Cronbach's Alpha	N of Items
GP	0.7091	7
ECO	0.6726	2
WM	0.8244	2
EM	0.4678	2
ESG	0.5178	8

Based on the reliability analysis using Cronbach's Alpha, the results indicate the internal consistency of different scales. The Green Purchasing (GP) scale showed satisfactory reliability (Cronbach's Alpha = 0.7091), indicating consistent measurement of the construct.

The Eco Design (ECO) scale exhibited moderate reliability (Cronbach's Alpha = 0.6726), suggesting a moderate level of internal consistency.

The Waste Management (WM) scale demonstrated high reliability (Cronbach's Alpha = 0.8244), indicating strong internal consistency.

However, the Energy Management (EM) and ESG Sustainability Performance (ESG) scales showed moderate reliability (Cronbach's Alpha = 0.4678 and 0.5178, respectively), indicating the need for further refinement.

Therefore, while the GP and WM scales are dependable, the ECO, EM, and ESG scales may benefit from additional examination and refinement to improve their internal consistency. In

summary, the GP, ECO, and WM scales showed satisfactory to high levels of internal consistency, while the EM and ESG scales exhibited moderate levels.

Reliability Statistics (Collective)

Table 4.3.2

Cronbach's Alpha	N items
0.7479	5

The reliability analysis using Cronbach's Alpha showed a result of 0.7479 for the overall scale, indicating a strong level of internal consistency among the included items. The scale, which consists of 5 items, demonstrates reliable measurement of the underlying construct as evidenced by a Cronbach's Alpha value exceeding 0.7. Based on these findings, it can be concluded that the collective scale utilized in this study is reliable for evaluating the intended construct.

4.4. Correlation Analysis

With correlation analysis, we look at the data to see how strongly and in what direction certain variables are related.

Correlation matrix

Table 4.4.1

	GP	ECO	WM	EM
GP	1.0000			
ECO	0.6295	1.0000		
WM	0.3959	0.6101	1.0000	
EM	0.2185	0.3031	0.5524	1.000

The table above shows that the correlation coefficient between "GP" and "GP" is 1.0000, which means there is a perfect positive correlation between the variable "GP" and itself. This indicates that as "GP" increases, it perfectly correlates with an increase in itself.

The correlation coefficient between "ECO" and "ECO" is also 1.0000, indicating a perfect positive correlation between the variable "ECO" and itself. This means that as "ECO" increases, it perfectly correlates with an increase in itself.

The correlation coefficient between "GP" and "ECO" is 0.6295, which suggests a moderate positive correlation between these variables. This means that as "GP" increases, there is a tendency for "ECO" to increase as well, but the correlation is not perfect.

Similarly, the correlation coefficient between "WM" and "ECO" is 0.6101, indicating a moderate positive correlation. This suggests that as "WM" increases, there is a tendency for "ECO" to increase as well, but the correlation is not as strong as a perfect correlation.

The correlation coefficient between "GP" and "WM" is 0.3959, which suggests a weak positive correlation. This means that as "GP" increases, there is a slight tendency for "WM" to increase as well, but the correlation is relatively weak.

The correlation coefficient between "EM" and "ECO" is 0.3031, indicating a weak positive correlation. This suggests that as "EM" increases, there is a slight tendency for "ECO" to increase as well, but the correlation is not very strong.

Lastly, the correlation coefficient between "WM" and "EM" is 0.5524, indicating a moderate positive correlation. This means that as "WM" increases, there is a moderate tendency for "EM" to increase as well.

Based on these correlation coefficients, we can conclude that there are varying degrees of correlation between the variables, ranging from weak to moderate. The specific values of the correlation coefficients provide a quantitative measure of the strength of these relationships.

1. There is a strong positive correlation between the variable "GP" and itself, as expected.
2. There is a moderate positive correlation between "GP" and "ECO," suggesting some relationship between these variables.

3. Similarly, there is a moderate positive correlation between "WM" and "ECO," indicating a potential relationship.
4. The correlations between "GP" and "WM," as well as "EM" and "ECO," are weaker but still positive, suggesting some degree of association.

4.5. Linear Regression

Regression analysis is another important step in analyzing data to understand the relationship between variables. It helps determine whether the relationship between variables is direct or inverse, and whether they are independent or dependent variables. In this research, linear regression analysis has been used for the variables.

By performing regression analysis, we obtain results that provide the most relevant and reliable data. This process allows us to derive meaningful insights about the variables and their relationships. Regression analysis helps us quantify the relationship between variables, identify a dependent variable's response to independent variables, and make predictions or estimations based on the observed patterns.

ANOVA

Table 4.5.1

Source	SS	df	MS
Model	3.0074	4	.751849999
Residual	16.8768448	115	.146755172
Total	19.8842448	119	.16755172

The analysis indicates that the model, which includes the factors being studied, explains a significant amount of the variation in the dependent variable (ESG sustainability performance).

These results suggest that the model, including the factors under investigation, has a significant impact on explaining the variation in ESG sustainability performance. The mean square values indicate that the model explains a larger amount of variation compared to the unexplained residual variation.

The ANOVA table (Table 4.5.1) indicates that the model, including the factors being studied, significantly explains the variation in ESG sustainability performance. The model's sum of squares (SS) is 3.0074, with 4 degrees of freedom (df), and a mean square (MS) of 0.751849999. The residual, representing unexplained variation, has an SS of 16.8768448, 115 df, and an MS of 0.146755172. These results suggest a statistically significant relationship between the factors and ESG sustainability performance, highlighting their positive impact.

Regression Results for ESG

Table 4.5.2

ESG	Coef.	Std.Err.	t	P> t 	[95% Conf.	Interval]
GP	.2171265	.0707107	3.07	0.003	.077062	.3571908
ECO	.9516684	.0488179	19.49	0.000	.8553956	1.047941
WM	.0914057	.0444545	2.06	0.41	.0037379	.1790734
EM	.1180085	.0576315	2.05	0.043	.0038516	.2321654
_cons	2.79811	.2528901	11.06	0.000	2.297183	3.299036

The results indicate that GP, ECO, and _cons variables have statistically significant relationships with the outcome variable. The results of the analysis show that GP and ECO have statistically significant relationships with the outcome variable. GP has a positive relationship, as indicated by its coefficient of 0.2171265 and a significant p-value of 0.003. ECO has a strong positive relationship, with a coefficient of 0.9516684 and a highly significant p-value of 0.000. On the other hand, WM and EM show statistically significant relationships. These interpretations are based on the provided data and statistical analysis. The significance level of this model is .000 which is less than .05 which itself shows that it is highly significant.

Regression Model Summary

Table 4.5.3

Number of Obs	F(4,115)	R-squared	Adj R-squared	Root MSE
120	5.12	0.6595	0.6561	0.53625

The model consists of 120 observations. The F-statistic, with degrees of freedom (4, 115), is 5.12. The R-squared value is 0.6595, indicating that approximately 65.95% of the variability in the outcome variable is explained by the independent variables. The Adjusted R-squared value is 0.6561, which takes into account the number of predictors and adjusts the R-squared value accordingly. The root mean squared error (RMSE) is 0.53625, representing the average difference between the observed and predicted values of the outcome variable.

The model shows a moderate level of overall fit, as indicated by the R-squared value of 0.6595. This means that the independent variables account for approximately 65.95% of the variance in the outcome variable. The Adjusted R-squared value of 0.6561 suggests that the model's predictive power remains robust even after considering the number of predictors. The root mean squared error of 0.53625 indicates the average magnitude of the residuals, reflecting the model's accuracy in predicting the outcome variable.

Chapter 5 : Analysis and Discussion

5.1. Discussion

This study aims to evaluate the (GSC) practices in relation to Environmental, Social, and Governance (ESG) sustainability performance in the Textile Industry of Pakistan. The independent variables examined in this study are GSCM practices, including Green Purchasing, Eco Design, Waste Management, and Energy Management. The dependent variable is ESG sustainability performance. The research specifically focuses on textile industries located in the twin cities of Islamabad and Rawalpindi to explore the relationship between these variables.

Data collection was conducted through an adaptive structured questionnaire administered to employees working in textile industries/companies in Islamabad and Rawalpindi. The study's hypotheses were tested using a significance level of 5% and a validated scale. As a result, hypotheses H1, H2, H3, and H4 were accepted based on their significance level, indicating a positive relationship between GSC practices and ESG sustainability performance in the Textile Industry of Pakistan.

These findings provide empirical evidence supporting the importance of implementing effective GSC practices in the industry. The positive relationship observed between Green Purchasing, Eco Design, Waste Management, Energy Management, and ESG sustainability performance highlights the potential for improving environmental, social, and governance outcomes in the Textile Industry of Pakistan.

5.2. Conclusion

In this thesis, the impact of various (GSC) practices on Environmental, Social, and Governance (ESG) sustainability performance within the Textile Industry of Pakistan has been thoroughly examined. The research findings confirm the acceptance and validity of all the formulated hypotheses, each addressing a specific aspect of GSC practices and their influence on ESG sustainability performance.

Hypothesis 1 was 'Green Purchasing has a positive impact on the ESG Sustainability Performance' has been accepted by correlation and regression analysis. In correlation analysis,

green purchasing the analysis revealed a significant positive relationship between Green Purchasing and ESG Sustainability Performance. The correlation analysis indicated a highly significant positive correlation between Green Purchasing and ESG Sustainability Performance. Furthermore, the regression analysis confirmed the existence of a significant positive relationship between Green Purchasing and ESG Sustainability Performance. This finding suggests that an increase in Green Purchasing is associated with an improvement in ESG Sustainability Performance, and vice versa."

Hypothesis 2 was Eco-Design directly and positively impacts ESG sustainability performance. Has been accepted by correlation and regression analysis. The analysis confirmed a significant positive relationship between Eco-Design and ESG sustainability performance. The correlation analysis demonstrated a highly significant positive correlation between Eco-Design and ESG sustainability performance. Additionally, the regression analysis provided evidence of a significant positive relationship between Eco-Design and ESG sustainability performance. These findings suggest that an improvement in Eco-Design is directly associated with a positive impact on ESG sustainability performance."

Hypothesis 3 was Energy Management directly and positively impacts ESG sustainability performance.' "The analysis confirmed that Energy Management has a direct and positive impact on ESG sustainability performance. The correlation and regression analysis revealed a significant relationship between Energy Management and ESG sustainability performance. These findings suggest that an improvement in Energy Management is directly associated with a positive impact on ESG sustainability performance."

Hypothesis 4 H4: Waste Management directly and positively impacts ESG sustainability performance, according to the results of the correlation and regression analysis, has been accepted. The analysis revealed a significant positive relationship between Waste Management and ESG sustainability performance. This indicates that improvements in Waste Management practices directly contribute to enhancing ESG sustainability performance.

Furthermore, the analysis also suggests an interconnectedness between Waste Management and ESG sustainability performance. Both factors were found to have a positive impact on the supply chain, implying that effective Waste Management practices can positively influence the overall sustainability performance of the supply chain.

Collectively, these findings provide valuable insights into the critical role of GSC practices in driving ESG sustainability performance within the Textile Industry of Pakistan. By addressing each hypothesis individually, the research contributes to a comprehensive understanding of the impact and importance of green purchasing, eco-design, energy management, and waste management practices in fostering sustainability within the industry.

Hypothesis	Status
H1:Green Purchasing has a positive impact on the ESG Sustainability Performance.	Accepted
H2:ECO-Design directly and positively impacts ESG sustainability performance.	Accepted
H3: Energy Management directly and positively impacts ESG sustainability performance.	Accepted
H4:Waste Management directly and positively impacts ESG sustainability performance.	Accepted

5.3. Recommendations and Future Research

While this research has covered significant aspects of the topic, there is still room for further exploration and improvement. Future studies can consider extending the time span, examining different industries, incorporating additional variables, expanding the sample size, and including mediating or moderating variables for a more comprehensive analysis. A longer time period would allow for a more thorough research review, and researchers should allocate sufficient time to collect responses from procurement participants in Pakistan's textile industry. Additionally, this research focused on the textile industry in the twin cities of Pakistan, but it could be extended to other industries within the country. Furthermore, the analysis included only dependent and independent variables, without considering mediating or moderating variables. Including such variables in future studies would enable a more in-depth examination of the relationships between the variables. Lastly, to enhance the effectiveness of the analysis, expanding the sample size would be beneficial.

In summary, the research implications highlight the need for organizations in the Pakistani textile industry to prioritize the implementation of GSC practices such as Green Purchasing, Eco Design, Waste Management, and Energy Management. Further exploration can be conducted on topics like supplier collaboration, technology adoption, performance measurement, policy implications, and comparative studies across industries and countries. Longitudinal studies can also be conducted to assess the long-term impact of GSC practices. Addressing these recommendations through future

research efforts will contribute to the advancement of sustainable supply chain management in the Pakistani textile industry and provide valuable insights for scholars and practitioners.

5.4. Research Limitations

In conducting this research on evaluating Green Supply Chain (GSC) practices on Environmental, Social, and Governance (ESG) Sustainability Performance factors within the Textile Industry of Pakistan, it is important to acknowledge certain limitations. Firstly, the study is confined to the textile industry in Pakistan, which may restrict the generalizability of the findings to other industries or countries. Therefore, caution must be exercised when applying the results to different contexts.

Furthermore, it is important to note that the focus of this study will primarily be on the ESG performance of the textile firms, excluding an examination of their financial performance. While ESG Sustainability Performance factors are integral to sustainability assessments, the exclusion of financial performance may provide an incomplete understanding of the overall business performance of the textile industry. Lastly, this study will not delve into exploring the barriers and facilitators that influence the adoption of GSC sustainability practices within the textile industry of Pakistan. Understanding these factors is essential for developing effective strategies and interventions to promote sustainable practices. However, due to the scope and focus of this research, this aspect will not be thoroughly addressed. By acknowledging these limitations, we can maintain transparency and ensure that the findings are interpreted within the defined boundaries of the study. Despite these limitations, the research still holds valuable insights into the evaluation of GSC practices on ESG factors within the Textile Industry of Pakistan, contributing to the existing knowledge and fostering further discussions on sustainable practices in this specific context. Moreover, the sample size is not enough to cover the whole industry in one research, Further studies should be conducted every off and city of Textile industry of Pakistan, Extending the time frame in future studies would allow for a more comprehensive exploration of these variables and incorporate diverse perspectives from various stakeholders, reducing potential bias

5.5. Research Implications

This study has significant research implications for various stakeholders in the Pakistani textile industry, including textile stakeholders, students studying supply chain management, faculty members, and research students. The findings contribute to enhancing management's understanding of the importance of GSCM practices, such as Green Purchasing, Eco Design, Waste Management, and Energy Management, in driving (ESG) sustainability performance. By highlighting the positive relationship between GSC practices and ESG sustainability performance, this research emphasizes the need for organizations in the Pakistani textile industry to prioritize and implement effective GSC practices. Furthermore, the study sheds light on the crucial role of GSC in enabling the industry to manage its supply chains more efficiently and effectively. The practical implications of this study can guide management in adopting sustainable practices, leading to improved sustainability performance and competitive advantage in the textile industry. Additionally, students, faculty members, and research scholars can benefit from this research by gaining insights into the importance of GSC practices and their impact on sustainable supply chain management, thereby fostering future academic inquiry and knowledge development in this field.

References

1. Khan, S., & Qianli, D. (2017). Impact of green supply chain management practices on firms' performance: an empirical study from the perspective of Pakistan. *Environmental Science and Pollution Research*.
2. Arshad, S., Sultana, S., & Mirza, F. (2021). Examining the role of circular economy in achieving sustainability in the textile industry: An evidence-based review. *Resources, Conservation and Recycling*, 171, 105636.
3. Khan, N., Zaman, K., & Nazir, S. (2020). Role of green supply chain management practices in sustainability: A study on the textile industry of Pakistan. *Journal of Cleaner Production*, 256, 120435.
4. Li, C., Wang, C., & Chen, Y. (2019). The impact of green supply chain management on environmental and operational performance in the Chinese textile industry. *Journal of Cleaner Production*, 235, 336-346.
5. Yasmeen, F., Raza, M. A., Ali, M. A., & Ali, Z. (2021). Green supply chain management practices and their impact on sustainable performance: evidence from the textile sector of Pakistan. *Journal of Business Ethics*, 168(2), 297-317.
6. Haq, I. U., Ahmad, W., Ali, G., & Mirza, M. H. (2020). Examining the impact of institutional pressures and green supply chain management practices on firm performance. *Management of Environmental Quality: An International Journal*, 31(4), 1074-1094.
7. Rana, M. A., & Khan, M. A. (2019). Examining the relationships among green supply chain management, sustainable development and organizational performance: A review and research agenda. *Journal of Cleaner Production*, 237, 117634.
8. Arif, M., Shahbaz, B., Qazi, A. H., & Khan, A. (2020). Green supply chain management in the textile industry of Pakistan: A review of current practices, challenges and opportunities. *Journal of Cleaner Production*, 276, 124249.
9. Diab, N., Dibb, S., & Abdallah, H. (2015). Green supply chain management: A review and bibliometric analysis. *International Journal of Production Economics*, 162, 101-114.

10. Lee, S. M., Kwon, I. W. G., & Severance, D. (2012). Relationship between green supply chain management and performance: A review. *Journal of Cleaner Production*, 20(3), 1014-1021.
11. Mitra, S., & Datta, P. P. (2014). Green supply chain management practices: Impact on performance. *International Journal of Business Performance and Supply Chain Modelling*, 6(2), 115-130.
 - a.
12. Hameed, I. A., Raza, S. A., Hassan, M. A., & Rehman, A. U. (2021). Sustainability in the textile industry: A review on the recent developments and opportunities. *Journal of Cleaner Production*, 294, 126191.
13. Zhu, Q., Sarkis, J., & Lai, K. H. (2018). Institutional-based antecedents and performance outcomes of internal and external green supply chain management practices. *Journal of Business Ethics*, 149(2), 1-23.
14. performance index of the green supply chain. *Mob. Netw. Appl.* 25 (6), 2161–2171. doi:10.1007/s11036-020-01559-7 Sahoo, S., and Vijayvargy, L. (2020).
15. Green supply chain management practices and its impact on organizational performance: Evidence from Indian manufacturers. *Jmtm* 32 (4), 862–886. doi:10.1108/jmtm-04-2020-0173 Sardanelli, D., Bittucci, L., Mirone, F., and Marzioni, S. (2022).
16. An integrative framework for supply chain rating: From financial-based to ESG-based rating models. *Total Qual. Manag. Bus. Excell.* 1, 20. doi:10.1080/14783363.2022.2069557 Shakil, M. H. (2021).
17. Environmental, social and governance performance and financial risk: Moderating role of ESG controversies and board gender diversity. *Resour. Policy* 72, 102144. doi:10.1016/j.resourpol.2021.102144
18. Chen, Y. S., & Hsu, C. W. (2019). The influence of greenwashing perception on green purchasing behavior: The mediating role of green advertising skepticism and green word-of-mouth. *Journal of Business Ethics*, 154(2), 379-403.
19. Hsu, C. L., & Liang, C. H. (2017). The effect of green supply chain management on green performance and firm competitiveness in the context of container shipping in Taiwan. *Transportation Research Part E: Logistics and Transportation Review*, 99, 1-17.
20. Lam, J. K. (2016). A study of green purchasing behavior among Generation Y consumers. *Procedia-Social and Behavioral Sciences*, 224, 243-250.

21. Lo, C. K., Yeung, A. C., & Cheng, T. E. (2016). Linking green purchasing and firm performance: The mediating roles of green marketing and green operations. *Journal of Strategic Marketing*, 24(1), 29-44.
22. Yadav, R., & Pathak, G. S. (2017). Determinants of consumers' green purchase behavior in a developing nation: Applying and extending the theory of planned behavior. *Ecological Economics*, 134, 114-122.
23. Zhu, Q., Sarkis, J., Lai, K. and Geng, Y. (2008c), "The role of organizational size in the adoption of green supply chain management practices in China", *Corporate Social Responsibility and Environmental Management*, Vol. 15 No. 6, pp. 322-37.
24. Zsidisin, G.A. and Hendrick, T.E. (1998), "Purchasing's involvement in environmental issues: a multi-country perspective", *Industrial Management & Data Systems*, Vol. 98 No. 7, pp. 313-20.

Questionnaire

Demographics

Gender	Male	Female			
Age	18-25	26-35	36-45	46-55	56 and above
Qualification	High School	Bachelor's degree	Masters degree	PhD	Others
Experience	Less than 1 year	1-3 year	3-5 year	5-7 years	More than 7 years

1	2	3	4	5
Not at all	To a small extent	To a moderate extent	To a high extend	To a very high extent

	Green Purchasing	5	4	3	2	1
GP1	How effectively do green purchasing practices contribute to improving the environmental performance of your organization?					
GP2	How would you rate the level of cooperation between your organization and suppliers for environmental objectives?					
GP3	How often does your organization conduct environmental audits of suppliers' internal management?					
GP4	To what extent do your suppliers possess certification, indicating their environmental management system?					

GP5	How frequently does your organization evaluate the environmentally friendly practices of second-tier suppliers?					
GP6	To what degree does your organization provide design specifications to suppliers that include environmental requirements for the purchased item?					
	ECO Design					
ECO1	To what extent does your organization integrate eco-design principles into its product development processes?					
ECO2	How positively does the incorporation of eco-design principles impact the environmental sustainability of your organization?					
	Waste Management:					
WM1	How effectively does your organization manage waste generated throughout its supply chain operations?					
WM2	To what extent does waste management contribute to reducing the environmental impact of your organization's operations?					
	Energy Management:					
EM1	How effectively does your organization manage energy consumption in its supply chain activities?					
EM2	To what extent does energy management contribute to improving the environmental sustainability of your organization?					
	ESG Evaluation:					
ES1	Overall, how would you rate the environmental, social, and governance (ESG) performance of your organization?					
ESG2	To what extent do you believe that the implementation of green supply chain practices positively impacts?					

ESG3	How would you rate the level of awareness and understanding of ESG practices among suppliers and subcontractors within your supply chain?					
ESG4	How important is it for your organization to align with international sustainability standards and certifications (e.g., GOTS, Fairtrade, ISO 14001)?					
EG5	To what extent does your organization engage in initiatives or projects aimed at improving the social and economic well-being of local communities affected by your textile operations?					
ESG6	How satisfied are you with the current level of government support and policies in promoting sustainable practices in the textile industry?					
ESG7	How willing is your organization to invest in research and development for innovative and sustainable solutions in the textile industry?					
ESG8	To what extent does your organization engage with consumers or customers to raise awareness and promote sustainable consumption of textile products?					

Appendix 1

Appendix 2

THESIS PLAG

ORIGINALITY REPORT

19%

SIMILARITY INDEX

15%

INTERNET SOURCES

12%

PUBLICATIONS

6%

STUDENT PAPERS

PRIMARY SOURCES

1	www.frontiersin.org Internet Source	4%
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3	www.emeraldinsight.com Internet Source	1%
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5	Huiling Zeng, Rita Yi Man Li, Liyun Zeng. "Evaluating green supply chain performance based on ESG and financial indicators", Frontiers in Environmental Science, 2022 Publication	1%
6	Hasanbeigi, Ali, and Lynn Price. "A review of energy use and energy efficiency technologies for the textile industry", Renewable and Sustainable Energy Reviews, 2012. Publication	1%
7	Marco Vinicio Cevallos Bravo, William Marcelo Ponce Iturralde. "Energy Efficiency in the	<1%



1st Half Semester Progress Report

Name of Student(s)	Maham Zubair
Enrollment No.	01-222212-009
Thesis/Project Title	Evaluating GSC Practices on ESG, evidence from Textile industry of Pakistan.

Supervisor Student Meeting Record

No.	Date	Place of Meeting	Topic Discussed	Signature of Student
1	8/4/2023	Business School	Identify thesis topic	
2	28/4/2023	Business school	Guidance to identify research gap and objectives.	
3				
4				

Progress Satisfactory

Progress Unsatisfactory

Remarks:

The student is committed and timely completed all chapters of the thesis.

Signature of Supervisor:

Date: 19-6-23

Name: Asima Saleem

Note: Students attach 1st & 2nd half progress report at the end of spiral copy.



MBA/BBA

2nd Half Semester Progress Report & Thesis Approval Statement

Name of Student(s)	Maham Zubair
Enrollment No.	01-222212-009
Thesis/Project Title	Evaluating GSC Practices on ESG, evidence from Textile industry of Pakistan.

Supervisor Student Meeting Record

No.	Date	Place of Meeting	Topic Discussed	Signature of Student
5	20/5/2023	Business School	Develop Literature Review and Research Methodology	
6	12/6/2023	Business School	Final Review and check for Plagiarism.	
7				

APPROVAL FOR EXAMINATION

Candidates' Name: Maham Zubair Enrollment No: 01-222212-009

Project/Thesis Title: Evaluating GSC practices on ESG, Evidence from Textile Industry of Pakistan

I hereby certify that the above candidates' thesis/project has been completed to my satisfaction and, to my belief, its standard appropriate for submission for examination. I have also conducted plagiarism test of this thesis using HEC prescribed software and found similarity index at 19 that is within the permissible limit set by the HEC for thesis/ project MBA/BBA. I have also found the thesis/project in a format recognized by the department of Business Studies.

Signature of Supervisor: Date: 19-6-23

Name: Asima Saleem