The role of green supply chain management practices on the operational performances with organization culture as moderating variable in the manufacturing sector of Pakistan.

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Masters Of Business Administration

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Spring 2024

Majors: SCM

Major no. SCM4

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FINAL PROJECT/THESIS APPROVAL SHEET

Viva-Voce Examination

Viva Date 04 /07 /204

Topic of Research: The role of green supply chain management practices on the operational performances with organization culture as moderating variable in the manufacturing sector of Pakistan.

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ACKNOWLEDGMENT

All praise and thanks belong to Allah, the Most Merciful and Beneficent. I am deeply grateful to Mr. Raja Khalid Hafeez, my thesis supervisor, for his invaluable expertise and unwavering support throughout this research. His guidance, suggestions, and encouragement were instrumental in my completing this study.

I extend my heartfelt gratitude to my beloved parents and family especially my grandfather, whose constant support and encouragement were essential.

I am also indebted to my colleagues, friends, and social circle for their help and support in finalizing this research work

Abstract

This research delves into the intricate relationship between Green Supply Chain Management (GSCM) practices and operational performance within Pakistan's dynamic manufacturing industry.

Utilizing a quantitative methodology and a cross-sectional research design, data was collected from 333 respondents representing diverse manufacturing sectors in Pakistan, encompassing textiles, automotive, electronics, chemicals, food and beverage, and other industries. The study's comprehensive questionnaire captured insights into the extent of GSCM implementation, operational performance metrics, and various dimensions of organizational culture.

The findings unequivocally highlight a strong positive correlation between GSCM practices and operational performance. Companies actively engaged in GSCM initiatives, such as green procurement, eco-design, and green manufacturing, demonstrated superior performance in terms of efficiency, cost reduction, and customer satisfaction. This underscores the tangible benefits of integrating environmental considerations into every facet of the supply chain, from sourcing raw materials to delivering the final product.

Furthermore, the research emphasizes the pivotal role of organizational culture in amplifying the positive effects of GSCM. A supportive culture that values sustainability, encourages employee participation, and fosters environmental awareness was found to significantly enhance the impact of GSCM practices on operational performance.

In addition to examining the direct and moderating effects, the study also delves into the nuanced relationship between organizational culture and GSCM adoption. The results indicate that a positive organizational culture not only facilitates the implementation of GSCM practices but also enhances their effectiveness over time.

While this research offers valuable insights into the GSCM landscape in Pakistan's manufacturing industry, it also acknowledges certain limitations. The cross-sectional design provides a snapshot of the variables at a specific point in time, hindering the ability to establish causal relationships definitively. Finally, the study's focus on the Pakistani manufacturing sector limits the generalizability of findings to other industries or geographic regions.

In conclusion, this study makes a substantial contribution to the growing body of literature on GSCM and its impact on operational performance. By highlighting the critical role of organizational culture, it provides actionable insights for managers seeking to integrate sustainable practices into their supply chains and policymakers striving to promote sustainable industrial development in Pakistan.

Contents

Introduction

1.1 Background of the study

The advent of Green Supply Chain Management (GSCM) is the supply chain strategy of green purchasing that encompasses corporate social responsibilities and ethical values for buying beyond the regulatory requirements. So, where Eco strategies are introduced, incorporated and imbued in supply networks, it is possible to realize specific organizational benefits that include fulfilling ecological responsibilities whilst obtaining tangible returns which include the following; Reduction in costs associated with resources, increase in customer satisfaction, increased supply chain organizational reliability and the ability to effectively manage changing regulatory requirements (Zhu & Sarkis, 2004).

The abbreviation GSCM stands for Green Supply Chain Management; the idea of incorporating environmental issues into the supply chain management practice is an idea that has attracted much attention among businesspeople and scholars (Sarkis, 2020). In recent decades, companies have invested in environmental management programs and green supply chain initiatives to support their market prowess (Jabbour et al., 2019). At the same time, the green supply chain or the concept of green supply chain management (GSCM) has also received a lot of attention from researchers, and as such, several definitions have been put forward for GSCM (Azeem et al., 2021).

This research proposition seeks to examine the complex relationships between Green Supply Chain Management (GSCM) practices and their direct consequences on operational performance in the Pakistani construction industrial sector (Choudhury et al., 2023). This analysis considers organizational culture as a moderating variable integral to this exploration (Jabbour & Jabbour, 2016). The research will also look at ways businesses can improve their GSCM concerning their bottom lines or gain a competitive advantage while possibly improving processes (Wong et al., 2019). The study aims to fill this gap by presenting empirical evidence with a quantitative dimension and a case study approach to capture the underlying mechanisms and consequences of GSCM implementation (Roscoe et al., 2019).

The study aims to extend the existing body of knowledge by focusing on the specific context of the Pakistani construction industry, which faces unique challenges and opportunities in terms of environmental sustainability (Yu et al., 2022). The findings of this research will provide valuable insights for practitioners and policymakers in developing and implementing effective GSCM strategies that can enhance both operational performance and environmental sustainability (Khan et al., 2021).

Furthermore, this research will contribute to the ongoing debate on the role of organizational

culture in facilitating or hindering the adoption and implementation of GSCM practices (Ikram et al., 2020). By examining the moderating effect of organizational culture, this study will shed light on the contextual factors that influence the relationship between GSCM practices and operational performance (Dubey et al., 2018).

Given modern societies' focus on environmental protection, stricter standards, and attaining higher consumer and investor satisfaction, this work's significance cannot be overstated. The "green concept" is making its way into industrial organizations' manufacturing aspect, focusing on protecting company resources and reducing impacts on employee well-being and the environment (Khan & Dong, 2017). Supply chain management, the primary process of manufacturing organizations, is where most implement GSCM measures to reduce wastage, pollution, resource use, and emissions.

This study develops the following research objectives: evaluate the relationship between GSCM techniques and operational performance in Pakistan's manufacturing industry (Khan & Dong, 2017); examine organizational culture's role as a mediator, potentially enhancing or dampening the association between GSCM practices and operational performance; demonstrate how market competitiveness moderates the relationship between sustainability practices, organizational culture, and improved business performance; and provide empirical support and case studies to understand how and to what extent GSCM and organization culture influence operational performance in Pakistan's manufacturing industry.

The manufacturing industry plays a significant role in Pakistan's economy, comprising diverse establishments. A large portion of the population finds employment in this sector, which is crucial for Pakistan's development. The dominant sector is textile/apparel, followed by food and beverages, chemicals, construction & construction materials, and machinery & equipment. Pakistan's manufacturing sector is primarily export-oriented, with textiles contributing significantly to exports. Challenges include electricity shortages, limited infrastructure, and competition from overseas organizations (Jabbour & Jabbour, 2016). However, the government has been instituting policies to address these problems (Ashraf & Uddin, 2018).

1.2 Gap Identification

Muhammad Akbar Dzikriansyah, at el., 2023, performed similar research and highlighted that future researchers could use operational performance as a dependent variable.

In a study similar to that of the current research, Jiawei Xu, Yubing Yu, Ye Wu, Justin Zuopeng Zhang, Yulong Liu, Yanhong Cao, & Prajwal Eachempati, 2022 have also pointed out that organizational/institutional culture can be practiced as a moderating factor.

1.3 Problem Statement

Pakistan's manufacturing industry is among the most important in the country and contributes a lot to its economic growth (Khan et al., 2018), however, most manufacturing processes negatively affect the environment and are a threat to the limited natural resource capital (Sarkis & Dhavale, 2017). The conventional linear model of supply chain, often referred to as ''take-make disposed '' is unsustainable and is facing mounting criticism due to negative impacts it has on environment and society. Owing to increased awareness and more specifically, the pressure from the stakeholders, Pakistani manufacturing firms are in dire need of supply value chain transformation into green and sustainable model (Jabbour et al., 2018).

Green supply chain management (GSCM), has been identified as a possible solution to these challenges. But GSCM can be regarded as a set of practices, which focus on reduction of adverse impact of products and services on the environment, and on optimization of the use of resources in the supply chain starting from purchasing of inputs up to the disposal of end products (Srivastava, 2007). Nevertheless, the literature has documented that the introduction and application of GSCM practices in the manufacturing industries of Pakistan is comparatively less advanced and uncoordinated, and there is a dearth of research exploring the factors affecting its performance (Khan et al., 2018).

Prior studies covering GSCM practices have found out that it is capable to enhance the organizational operational performance in aspects of efficiency, cost decrease, innovations and risk management compared to non-GSCM practices (Zhu & Sarkis, 2004). However, it is stated that such benefits may be relatively sensitive to the following internal organizational metrics: Organization GSCM practices are conducted within, and Jabbour and Jabbour (2016) identified the organizational culture to be one of these metrics. Support for GSCM involvement might be

constrained or supported through organizational culture; this is the norms, beliefs and attitude of the employees regarding sustainable practices (Govindan et al., 2015).

It is hoped that the findings will help advance not only theoretical models and guidelines for sustainability interventions in supply chains, but also provide insights for managers interested in incorporating sustainable practices into their business strategies. Besides, this research shall enlighten the policymakers and other relevant stakeholders on the potentially positive effects of GSCM in enhancing sustainable industrial development in Pakistan.

1.4 Research Objective

The main objective of this study is to investigate the relation between GSCM practices and operational performance of manufacturing firms of Pakistan.

- To Find the Relationship Between Green Supply Chain Management Practices And Operational Performance In The Context Of Manufacturing Firms In Pakistan
- To Find the Moderating Effect Of Organizational Culture On The Relationship Between Green Supply Chain Practices And Operational Performance.
- To find the impact of Organization culture on Operational performance.
- To find the impact of Organization culture on GSCM practices.

1.5 Research Question

- What Is the Relationship Between Green Supply Chain Practices And Operational Performance Of Manufacturing Firms Of Pakistan?
- Does Organization Culture Moderate Relationship Between Green Supply Chain Practices And Operational Performance?
- What is the impact of Organization culture on Operational performance?
- What is the impact of Organization culture on GSCM practices?

1.6 Significance of This Study

The study speaks to the impact of green supply chain management practices on operational performance and the moderating impact of organizational culture. This supplements the dearth of knowledge and contributes to the growing body of literature on sustainability and supply chain management. The objective of the research is to test and refine, whenever necessary, the existing frameworks related to GSCM, organizational culture, and operational performance. It may identify new relationships or further evidence for the existing theories and, in this way, contribute to the development of conceptual models that are more robust. Can provide valuable insights into the complex relationships of GSCM practices, organizational culture, and operational performance, ultimately leading toward more sustainable and competitive businesses in Pakistan.

1.7 Definition of Key Terms

1.7.1 GSCM

GSCM can be defined as the integration of environmental considerations in SCM, including product design, the selection and outsourcing of materials, manufacturing processes, delivery of the final product to consumers and managing the disposal of the product at the end of its life cycle (Srivastava, 2007)

1.7.2 Operational performance

Operational performance according to Greene (2021) can be defined as the level by which all the units of business in an organization perform a team work to achieve the most important business goals. Additionally, it can be understood as the measurable features of an organization’s processes, such as dependability, production cycle time and inventory turn (Azim et al., 2015)

1.7.3 Organizational culture

It an essential component of an organization that has evoked various studies to determine and establish its" relationship with organizational performance and sustainability. It has always been considered to have deep impact and importance on the variety of organizational process,

employees and its performance and an important element to unify various company cultures in the corporate group structure (Kenny, 2012)

1.7.3 Manufacturing firms

Manufacturing enterprises are companies mainly engaged in using various industrial procedures for creating physical goods. These companies ordinarily employ manufacturing practices for converting raw materials or semi-finished goods to the end product. A wide spectrum of technologies ranging from assembly lines, equipment, and labor-intensive operations are involved in the production of goods for final use or consumption. Various fields, such as automotive, electronics, textiles, food processing, and many others, fall under manufacturing enterprises. Production and supply of tangible goods primarily to meet industrial and consumer needs is the focus of manufacturing enterprises.

Literature review

2.1 Operational Performance

As with many other areas of management, operations management became a recognizable discipline in its own right due to many theorists and practitioners' contributions over the years. Frederick Winslow Taylor, who is often regarded as the founder of scientific management, and Henry Ford, renowned for his manufacturing and assembly line production techniques, both made early and significant contributions to the operations management principles we recognize today.

The actual term however didn't really become mainstream as the discipline developed and theorists and practitioners looked to officially define and structure operational process management as we know it today. Academics in the 1950s and 1960s such as Peter Drucker, indirectly contributed to the recognition and need for operations management as part of the overall organisation management function.

Operational Performance (OP) is a broad and complex term that forms a central aspect of business success. It represents the efficiency and effectiveness of an organisation in performing its primary business function which directly or indirectly affects its commercial viability and competitiveness. As Slack (2015) describes, operational performance is "the ability of an organization to deliver products or services that meet or exceed customer expectations while minimizing costs and maximizing resource utilization."

The evolution of OP can be traced back to the early days of scientific management in the early 1900s. Early theorists such as Frederick Taylor (1911), championed the need for work standardisation, the optimisation of task sequences and the use of time-and-motion studies to improve worker efficiency. This initial focus on optimising tasks at the lowest level in the organisation formed the foundation for the development of OP.

As industry developed, so did our understanding of operational performance. In the mid-1900s the philosophy of Total Quality Management (TQM), pioneered by W. Edwards Deming (1986), emerged and the focus of organisations shifted from simple efficiency to one of continuous improvement and customer focus. Deming (1986) stressed the importance of using

statistical process control and the Plan-Do-Check-Act (PDCA) cycle, concepts that transformed quality management (Moen & Norman, 2010).

The second part of the 1900s saw the development of Lean Manufacturing and Six Sigma practices, both focusing on waste reduction, defect reduction and process simplification. Womack et al. (1990) in their groundbreaking book "The Machine That Changed the World", introduced lean manufacturing which aimed to produce more customer value using fewer resources. Meanwhile, Mikel Harry and Richard Schroeder (1999) led the Six Sigma revolution, using statistical methods to detect and remove the root causes of process variation. Six Sigma implementation has been proven to have a profound effect on operational performance across many industry sectors (Antony et al., 2003).

In the 2000s, the internet and digital age has brought about a completely new era of operational performance management. The widespread use of big data, artificial intelligence and automation has allowed organisations to capture, analyse and make sense of enormous amounts of operational data in real time. This has provided organisations with unparalleled visibility of business processes, bottleneck identification and high-performance optimisation (Davenport & Harris, 2007). A study by Gunasekaran et al. (2017) demonstrates the impact of digital technology on operational performance.

One of the greatest influencers of operational performance was the management theorist Peter Drucker (1954). He advocated the need for organisations to establish objectives and to measure performance against these defined goals. His most well-known quote "What gets measured gets managed", highlights the fundamental importance of performance measurement in operational management (Neely et al., 2002).

Many researchers have proven that the implementation of Green Supply Chain Management (GSCM) practices can lead to substantial operational efficiency gains and cost reductions (Sarkis, 2020). These include the use of lean manufacturing, just-in-time inventory systems, and supplier partnerships. GSCM practices involving quality management, supplier development, and customer collaboration have also been shown to improve product quality and customer satisfaction (Khan et al., 2018). By collaborating with suppliers to provide quality incoming materials and components, and using customer feedback in product design and development, businesses are able to produce products that meet or exceed customer expectations (Wiengarten et al., 2022).

The performance thesis argues that better operational performance (OP) is a primary driver of sustainable success. Firms that consistently develop and deliver quality products or services, produce with greater efficiency, and effectively adapt their operations to shifting market conditions, are more likely to be successful in the competitive arena (Narasimhan et al., 2019). Research also reveals a positive relationship between operational performance and customer satisfaction (Akter et al., 2023). Yet, the anti-thesis suggests that firms can become rigid and less innovative if they overemphasize operational efficiency. Some researchers warn that a myopic focus on ever greater efficiency can make firms blind to disruptive technologies and emerging market trends (Govindarajan & Trimble, 2012). Thus, the synthesis required for sustained success (Teece, 2018), is a firm emphasis on both operational excellence and strategic agility.

The history of operational performance as depicted in research journals, reflects the dynamic character of the field itself. Early contributions were largely concerned with the quantitative, efficiency measures of performance, such as productivity and cycle time (Schniederjans et al., 2021). Yet, as the field of OP matured, researchers started to address the different aspects of performance, such as employee morale, customer satisfaction, and environmental responsibility (Bititci et al., 2015). One prominent researcher in the area of operational performance is Robert Kaplan. He is the co-author of the Balanced Scorecard (Kaplan & Norton, 2008). This approach to performance measurement effectively revolutionized the field, by adding non-financial measures of performance to the traditional financial indicators.

In conclusion, operational performance is a complex and evolving concept with a rich history and a promising future. It encompasses a wide range of activities, from process optimization to customer service excellence, and is influenced by a multitude of factors, including technology, leadership, and organizational culture (Schniederjans et al., 2021). By understanding the historical development, theoretical underpinnings, and practical applications of OP, organizations can unlock the full potential of their operations and achieve sustainable competitive advantage.

2.2 Green Supply Chain Management Practices

Green Supply Chain Management (GSCM) has emerged as a concept, in the era emphasizing a holistic approach to embedding environmental considerations throughout every aspect of thee supply chain. GSCM involves incorporating principles into stages of supply chain management including product design, material sourcing and selection manufacturing processes, product delivery and post use product management (Srivastava, 2007). This concept has significantly developed since its inception in the century due to the increasing awareness of environmental issues and the escalating pressure on businesses to reduce their environmental impact (Zhu & Sarkis 2004).

Initially GSCM primarily concentrated on preventing pollution and reducing waste within supply chains (Beamon, 1999). However, with expanding concerns came a scope for GSCM that now encompasses diverse issues such as resource preservation, energy efficiency and mitigating climate change effects (Seuring & Müller 2008). This shift reflects the acknowledgment that sustainable supply chains aim not to reduce impacts but also to make positive contributions towards environmental well-being.

Early studies were focused on defining GSCM and identifying challenges, within supply chains. Research frequently delved into strategies, for reducing waste improving energy efficiency and preventing pollution as practices in green supply chain management (Beamon, 1999). With the growing focus on issues studies, in GSCM evolved to encompass an array of approaches including sustainable procurement, ecofriendly design and reverse logistics (Srivastava, 2007). Additionally, scholars started examining how GSCM influences company performance and competitive edge.

New investigations should integrate GSCM along the supply chain, requiring participation from suppliers, manufacturers, retailers, and consumers. Studies indicate that sustainability performance is not easily measurable and that both collaboration and sharing of information has been required for meeting sustainability goals (Sarkis, 2011). Studies also examine the use of new technologies like blockchain and Internet of Things (IoT) to improve practices of GSCM.

Joseph Sarkis is one of the most important researchers of GSCM. He has an extensive publication record in the general area of GSCM, including on issues such as performance measurement, sustainable operations, and closed-loop supply chains. Sarkis sees GSCM as an integrated strategic approach to reducing the environmental impact associated with the creation and delivery of products and services as well as capturing both near-term opportunities and developing competencies for longer-term competitive advantages.

According to Sarkis (2020), GSCM is no longer just about compliance or risk mitigation. It is about creating a sustainable business model that benefits both the environment and the bottom line. He emphasizes the importance of innovation, collaboration, and continuous improvement in achieving GSCM goals.

The core thesis underpinning GSCM is that it represents an essential business strategy for achieving sustainability and reducing environmental impact. Proponents of GSCM argue that it is not merely an ethical imperative but also a strategic advantage for businesses. GSCM can lead to cost savings through improved efficiency, reduced waste, and optimized resource utilization (Hart, 1995). Moreover, it can help companies mitigate risks associated with resource scarcity, environmental regulations, and reputational damage due to unsustainable practices (Vachon & Klassen, 2001). GSCM adoption is further encouraged by consumers' increasing preference for eco-friendly products and services (Dubey et al., 2017).

The antithesis to the GSCM thesis is that it is an expensive and complex process that may not be feasible for all businesses, particularly smaller enterprises with limited resources. The integration of environmental practices can necessitate substantial investments in new technologies, processes, and training, which can be daunting for some companies (Zhu et al., 2017).

These challenges notwithstanding, a melding of problems comes to the fore when you take a closer look at the bigger picture. At this juncture it should be noted that although implementation of GSCM might demand investments in the short term and operational adjustments, the benefits for businesses and environment in long-run often offsets the initial costs. Sustainable products and services are gradually becoming demanded as strict environmental regulations are being put into place, consequently, GSCM is no longer a luxury but it is becoming a competitive requirement in the market (Rao & Holt, 2005). In addition to this, collaborative efforts with all supply chain partners can help bypass resource constraints and also promote GSCM practices adoption (Sarkis et al., 2019).

A deductive model can be applied to explain the logic of GSCM (Sarkis, 2020). If the propositions that GSCM is the integration of environmental thinking in supply chain management (Jabbour et al., 2022) and environmental thinking subsumes waste reduction, resource conservation, and climate change mitigation (Azevedo et al., 2021) are accepted, then it can be logically argued that GSCM facilitates firms' achievement of waste reduction, resource conservation, and climate change mitigation (Wong et al., 2023). The deductive logic explains why GSCM practices and positive environmental performance are intrinsically intertwined (Roscoe et al., 2022).

Green supply chain management is a multidimensional concept (i.e., strategy, technique, and philosophy) with diverse implications for business and the environment (Yu et al., 2021). It signifies a paradigm shift in supply chain management with focused attention on the integration of environmental thinking in all phases of the supply chain (Khan et al., 2020). Although the challenges pertaining to the complexity and cost of implementing GSCM practices persist (Ikram et al., 2022), the benefits of GSCM practices seem very enticing or attractive (e.g., cost savings, risk mitigation, and reputation enhancement) (Dubey et al., 2023). With the growing awareness among businesses about sustainability's strategic value (i.e., doing well by doing good) (Liu et al., 2020), GSCM is likely to play a vital role in redefining the future of supply chain management and making the global economy more environmentally responsible (Hussain et al., 2021). Researchers have also defined dimensions while discussing GSCM practices (R.A.D. Dillanjani Weeratunge et al., 2018).

2.2.1 Green Procurement

This means cutting down on environmentally-friendly materials and components from suppliers. Such assessment includes the selection of suppliers based on their relative environmental performance (Sarkis et al., 2020), the choice of environment-friendly products (Jabbour et al., 2019), and encouraging the use of recycled or renewable material (Zhu & Sarkis, 2004; Azevedo et al., 2019). This practice aims to minimize the environmental impact of the supply chain by reducing waste, conserving resources, and promoting sustainable practices (Wong et al., 2019).

2.2.2 Green Manufacturing

It aims at decreasing the environmental degradation suffered by production processes. This means less waste, less energy used and less greenhouse gases in the force. Green manufacturing encompasses cleaner production technologies, lean production, and recycling and reuse programs (Chiarini, 2018).

2.2.3 Eco-Design

This approach considers the environmental impact of a product throughout its entire lifecycle, from design and development to end-of-life. Eco-design involves using environmentally friendly materials, minimizing waste generation, and designing products for easy disassembly and recycling (McDonough & Braungart, 2002).

2.2.4 Relationship Between GSCM Practices and Operational Performance

Implementation of green supply chain practices (GSCM) has also been proven to influence operational performance in multiple dimensions. Zhu and Sarkis (2004) in their study of Chinese manufacturing firms found a strong positive association between operational performance and the implementation of GSCM practices with emphasis on cost savings and quality enhancements. Firms found to be actively involved in GSCM practices were able to reduce waste and improve resource productivity while lowering the overall cost structure (Roscoe et al., 2019).

Furthermore, Vachon and Klassen (2006) analyzed the impact of broadening environmental practices throughout the entire supply chain from upstream suppliers to downstream customers (Yu et al., 2021). Results of their study showed that involving environmental considerations in both upstream and downstream activities results in enhanced operational efficiency as better coordination, communication, and resource allocation are achieved across the entire supply chain network (Khan et al., 2020). Additionally, recent studies have highlighted the positive impact of GSCM practices on inventory management (Ikram et al., 2022), production planning (Dubey et al., 2023), and logistics optimization (Liu et al., 2020), leading to improved operational performance and cost reduction.

The integration of GSCM practices with emerging technologies such as artificial intelligence (AI), blockchain, and Internet of Things (IoT) has further amplified the potential for operational excellence (Hussain et al., 2021). AI-powered analytics can provide valuable insights into resource utilization, enabling companies to optimize their processes and minimize waste. Blockchain technology can enhance transparency and traceability in the supply chain, ensuring ethical sourcing and reducing the risk of counterfeit products. IoT sensors can monitor and control various aspects of the supply chain in real-time, enabling proactive decision-making and minimizing disruptions (Sarkis, 2020).

GSCM practices can further stimulate innovation and improve competitiveness. Rao and Holt (2005) in their study revealed that firms using green supply chains are more inclined to create innovative products and processes which can be further converted to competitive edge in the market place. They attributed this to the fact that GSCM in many instances requires re-examination of conventional practices and therefore companies are forced to seek new unorthodox solutions that are both environmentally sound and economically beneficial.

In addition to operational enhancements, GSCM practices also positively influence stakeholder relations. Vachon and Klassen (2006) observed that firms found to be actively involved in GSCM tend to have better relations with their suppliers, customers and employees. This is due to the fact that GSCM practices demonstrate a commitment to sustainability and this is music to the ears of the stakeholders who are now more than ever placing more emphasis on environmental responsibility.

On the downside of things, GSCM is not without challenges. Sarkis, Zhu and Lai (2011) in their thorough literature review highlighted the need for organizational theory in studying adoption and implementation of GSCM practices. They pointed out that proper alignment of GSCM implementation with overall organizational goals and culture is imperative for successful implementation. Furthermore, Zhu and Sarkis (2004) identified initial capital costs and possible resistance to change as some of the impediments firms may face while trying to adopt GSCM practices. They recommended that proper change management procedures such as clear communications and training of employees be implemented to mitigate these obstacles.

Lastly, it has been identified that adoption of green supply chain practices provides multiple opportunities for operational performance from cost savings and efficiency enhancements to improved innovation and stakeholder relations. On the other hand, its implementation requires proper and well thought out strategic approach that takes into consideration both organizational and challenge factors. Collective research outcomes of Zhu and Sarkis (2004), Vachon and Klassen (2006), Rao and Holt (2005) and Sarkis, Zhu and Lai (2011) provide invaluable insights into the GSCM and operational performance relationship and the associated opportunities and challenges of adopting sustainable practices in supply chain management.

H1 Green Supply Chain Management practices (GSCMP) have a significant impact on operational performance (OP).

2.3 Organization Culture

Organization culture, like strategy, is multi-dimensional, integral and shared among members of a company. It relates to the values, beliefs, behaviors and norms of an organization. It is critical to investigate the organizational culture in relation to the practices of green supply chain management (GSCM) and operational performance. It is important to understand the forces that shape decisions, behaviors and performance of businesses.

Studies of organization culture began in the mid-1900s and pioneers such as Elliott Jaques made recognition of social systems in organizational life (Jaques, 1951). However, it was not until the 1980s when Edgar Schein published his seminal work that the field was truly established. His model of "Three Levels of Culture" is still a fundamental resource: artifacts (visible and tangible manifestations such as office layout or rituals; Hatch, 1993; Alvesson & Berg, 1992; Trice & Beyer, 1993; Smircich, 1983), espoused values (values that are said to guide the organization and are often found in official mission statements, policy manuals, etc.

One of the most influential models of organizational culture is Schein's (1992) three-level model, which distinguishes between artifacts (visible manifestations of culture), espoused values (explicitly stated values and beliefs), and basic underlying assumptions (unobservable deep-seated beliefs that direct behavior and perceived reality; Argyris & Schön, 1978; Kabanoff, 1997). However, it is important to note that Schein's contribution was that the espoused values may not reflect underlying assumptions (Kunda, 1992) and that the latter represent the true culture only when understanding the former (Schein, 2010). Since this model was proposed, research of culture has proliferated and fast. Some of the areas include: the effects of culture on organizational performance (Kotter & Heskett, 1992), creativity and innovation (Amabile, 1988), employee attitudes and behaviors (Saks, 2006), customer perception and satisfaction (Schneider et al., 1998) and financial performance (Flamholtz & Randle, 2011). Some prominent researchers include: Geert Hofstede who proposed six dimensions of national culture that are relevant to organizations (Hofstede, 2001) and Joanne Martin who argued against the concept of culture as homogenous and developed the idea of subcultures (Martin, 1992). Other valuable contributions include Cameron and Quinn's Competing Values Framework (2011) and O'Reilly and Chatman's studies of culture and its alignment with strategy (1996).

Organizational culture is significantly influential in determining the application and

effectiveness of green supply chain practices (GSCM) in companies, as various dissertations and study suggestions indicated. Studies and research have suggested that favorable organizational culture which encourages environmental concerns and longevity aids the application and integration of GSCM (Den Hartog et al., 2013; Khan, 2022). If the organizational culture fits the environmentally friendly issues, employees will probably accept and promote these types of methods across the provide chain. Organizational culture takes on a crucial function in the context of GSCM since it determines the acceptance, application and effectiveness of these environmentally friendly methods. Ageron et al, (2012) argued that favorable organizational culture which encourages longevity and environmental problems is critical for effectively implementing environmentally friendly methods across the offer chain.

Employee attitudes and behaviors affect organizational culture and that consequently affects the sustainability problems. Favorable organizational culture which encourages environmental consciousness leads higher degrees of employee dedication and involvement with GSCM (Ageron et al., 2012). Employees respond favorably and show higher levels of motivation to as get involved in environmentally friendly methods when these types of methods are considered section of company's values and identification.

Research proposed that powerful and adequate leadership assistance for GSCM sets the precedent for organizational culture and encourages the application of environmentally friendly methods (Djunaidi et al., 2018; Jermsittiparsert et al., 2019).

Organizational culture when properly aligned integrates GSCM in strategic objectives and choice making. When longevity turns into portion of company's organizational culture, it functions as the directional guideline for provide chain administration methods (Zhu & Sarkis, 2004). Organizational cultures that encourage innovation and continuous betterment are inclined to undertake GSCM (Sarkis, 1995a; Seuring & Mueller, 2008). Sustainable provide chain methods usually call for innovative alternatives and continuous betterment initiatives and therefore are more probably embraced in organizational cultures that worth these types of ideas.

A number of theories of organizational culture have been mentioned and used in the context of different study suggestions and the dissertation on the role of organizational culture especially in the context of green supply chain management (GSCM) practices.

Edgar Schein is often considered as some kind of father of scientific studies on organizational culture. His product which includes three concentrations of organizational culture - artifacts

and behaviors, espoused values and philosophies, and basic underlying assumptions - - taken for granted implicit beliefs has been very influential.

His function on organizational culture has formed how scholars and practitioners perceive, examine, and handle culture. Schein (1995) Hence, proposes that organizational culture consists of three concentrations: artifacts and behaviors (visible or manifested kinds), espoused values (consciously held beliefs and philosophies), and basic underlying assumptions (subconscious, taken for granted kinds). Research usually cited Schein's product in regards to the concentrations of organizational culture and the way they impact the acceptance, application and performance of environmentally friendly methods in the supply chain.

2.3.1 Organization Culture as A Moderator Between Green Supply Chain Practices and Operational Performance

Organizational culture is an important contingency factor that influences relationship between green supply chain practices (GSCM) and operational performance. Organizational culture refers to the underlying values that guide the operations of organization including environmental consciousness, top management commitment and employee empowerment (Oke et al., 2021). GSCM practices are more likely to flourish and yield positive impact on operational performance in organizations with strong environmental culture. For example, employee commitment to GSCM practices, such as waste reduction, recycling, and use of renewable energy sources, leads to lower operational costs, efficient use of resources and innovation. On the contrary, organizational culture can be unsupportive to GSCM practices. If a firm's culture is not people-oriented but profit-oriented in short-term, the employees may reject or even sabotage GSCM practices. Likewise, absence of top management commitment and employee involvement acts as barriers to effective implementation of GSCM practices (Jabbour & Jabbour, 2016). Consequently, the operational performance of firm would be suboptimal if GSCM practices are not embedded within the organization's culture. Hence, organizational culture mediates the relationship between GSCM practices and operational performance.

It could be concluded that organizational culture plays a important role in moderating the relationship between green supply chain practices and operational performance. Firms with people-oriented culture are more likely to flourish and yield positive impact on operational performance through adoption of GSCM practices. Future studies could investigate the underlying cultural factors that influence relationship between GSCM and operational performance to provide actionable guidelines for managers to develop organizational culture that ensures sustainability and superior operational performance.

H2 Organization culture (OC) positively moderates the impacts the of green supply chain practices (GSCM) practices on operational performance.

2.3.2 Relationship between Organization culture and Operational performance

Organizational culture and operational performance There are many publications in scientific literature about the relationship between organizational culture and operational performance.

Some empirical studies show a positive relationship between strong organizational culture and operational performance. Gordon and DiTomaso (1992) argued that culture strength – not its substance – predicts short term financial performance of companies. O'Reilly et al. (2014) revealed that organizational culture is significantly associated with various performance meausres , market to book value, reputation, and attitudinal measures.

Nikpour (2017) in his recent research confirmed that organizational culture has an indirect effect on ooperational performance via employees' commitment. It is suggested that positive culture leads to higher level of employeefOs' commitment and dedication resulting in higher productivity and efficiency.

Other scientific publications however argue that the relationship between organizational culture and operational performance is too complex and ambiguous (Hartnell et al., 2022). A recent literature review by Hartnell et al. (2022) highlights the lack of consensus among scholars regarding definitions of these constructs, as well as inconclusive empirical evidence. It suggests that the relationship between culture and performance may be moderated by different factors such as specific cultural characteristics (Al Ariss & Sidani, 2021), industry, and organizational structure (Haque et al., 2020).

Zhang (2012) argues that different patterns of organizational culture may have positive or negative impacts on operational performance. It reveals that culture high in innovation, collaboration (Gong et al., 2023), and customer orientation (Ramanauskaite et al., 2022) tends to have a more positive impact on efficiency and productivity than culture low in these characteristics. However, opposite arguments may be held for bureaucratic culture (Laroche et al., 2021), resistance to change (Al Saadi et al., 2021), and internal competitiveness (Husted & Folger, 2020) which may adversely impact on organizational performance.

2.3.3 Relationship between Organization culture and GSCM practices

Researchers have featured quite literature on reflecting how organizational culture stands as a critical factor explaining the effectiveness of GSCM practices. Based on research studies (Jabbour et al., 2021), there is a positive relationship between a firm's organizational culture and GSCM practices with factors such as environmental sustainability (Wong et al., 2023), organizational innovation (Asif et al., 2019), and the culture of continuous improvement (Khan et al., 2021) depicted to have a strong relationship with enhanced GSCM practices in an organization. Similar with D2012, Govindan et al. (2014) underscore that organizational culture defining environmental practices has a strong positive impact on the implementation and effectiveness of GSCM practices. They posit that through environment management formalization (Jabbour & Jabbour, 2019), organizational culture and communication enhance efficiency in the management of resources and employees to encourage green culture. On the same note, Green et al. (2015) noted that leadership and culture have also been pointed out as significant success factors of GSCM. Through their study they arrived at a conclusion that positive organizational culture which has a strong correlation with transformational type of leadership fosters initiative environmental policies and measures (Weng & Chen, 2022).

Furthermore, Zhu et al. (2013) complement this argument by noting that organizational culture is instrumental in determining the level of motivation of the employees to engage in the GSCM practices. They, therefore, indicate that culture support or culture readiness is crucial for the implementation of GSCM as it motivates employees to advance sustainable practices in organizations through innovations and risks. Sarkis et al. (2014) also have a similar opinion and they endorsed the idea that corporate environmental culture rationalization predisposes positive and comprehensive GSCM formulations (Jabbour et al., 2020) that in turn enhance both environmental and operational performance. In conclusion, it can be asserted that, from the perspective of the literature, compliant organizational culture (Khan et al., 2019) can be considered as one of the most significant factors conducive to the application of GSCM practices; the culture that an organization culture influences the employees' attitude and behaviors towards sustainable issues (Zhang et al., 2018), promotes the integration of organizational activities with sustainable objectives (Sarkis, 2020), and over and above improves the efficiency of sustainable supply chain processes.

H4 Organization culture has a positive impact on the GSCM practices.

2.4 Hypothesis

Hypotheses for Research Proposal:

Based on the literature review and the context of the study on green supply chain management (GSCM) practices and operational performance within Pakistan's manufacturing industry, the following hypotheses are proposed:

Operational performance is the Dependent Variable.

Green supply chain practices are the Independent Variable.

Organization Culture is moderating Variable.

2.4.1 Hypothesis 1 (H1)

H1 Green Supply Chain Management practices (GSCMP) have a positive impact on operational performance (OP).

2.4.2 Hypothesis 2 (H2)

H2 Organization culture (OC+) positively moderates the impacts the of green supply chain practices (GSCM) practices on operational performance.

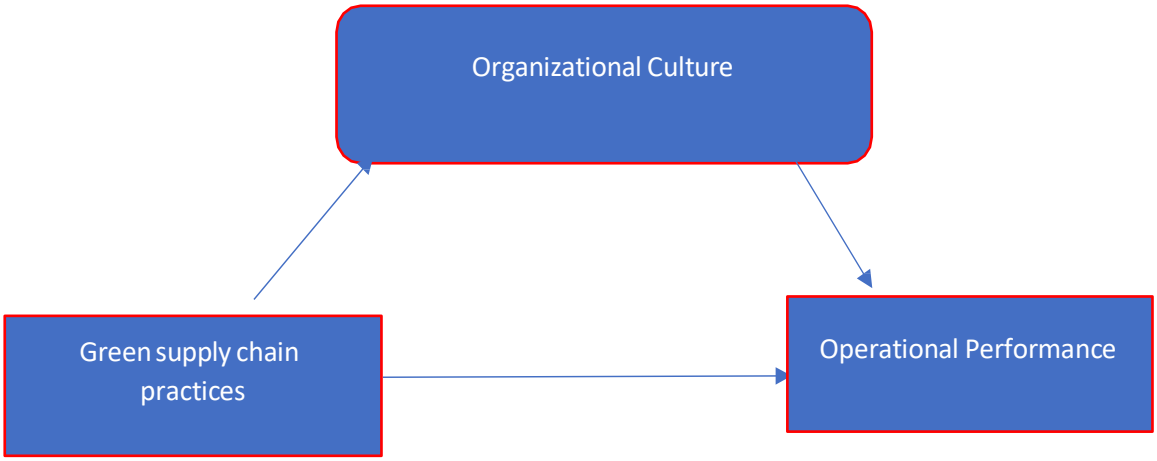
2.4.3 Hypothesis 3 (H3)

H3 Organization culture positively impacts the operational performance.

2.4.4 Hypothesis 4 (H4)

H4 Organization Culture positively impacts GSCM practices.

2.5Theoretical Framework



2.6 Foundational /Governing Theory

1.6.1 Resource-Based View (RBV) Theory

A number of studies have used RBV theory to study the link between GSCM practices and firm performance. For example, Zhu et al. (2007) discovered that firms which have better environmental capabilities (measured using RBV) are more inclined to practice GSCM and also report better environmental performance. Along the same lines, Hart (1995) also emphasized the need to create unique environmental competencies in order to obtain competitive advantage using GSCM. According to the Resource-Based View (RBV) theory, firms possessing strong environmental capabilities are more able to effectively apply GSCM practices and also obtain better operational performance (Hart, 1995; Zhu et al., 2007).

1.6.2 Institutional Theory

A number of studies have revealed that institutional pressures (for example, government regulations and industry developments) play an important role in explaining firms' decision to apply GSCM practices. For example, using a sample of manufacturing firms in Brazil, a recent study by Jabbour et al. (2010) revealed that institutional pressures explain firms' decision to apply GSCM. Along the same lines, Testa et al. (2016) provided evidence that institutional pressures influence the GSCM practices of firms in the Italian wine sector. According to the institutional theory, external pressures such as government regulations and industry developments influence firms' decision to apply GSCM practices (Jabbour et al., 2010; Testa et al., 2016).

1.6.3 Stakeholder Theory

A number of studies have employed the stakeholder theory to clarify how firms' interactions with stakeholders can affect their GSCM practices and performance. For example, using a sample of North American automotive suppliers, Vachon and Klassen (2006) discovered that firms possessing active stakeholder engagements (especially on environmental issues) are more inclined to practice proactive GSCM. Along the same lines, Carter and Jennings (2002) stressed the need to consider stakeholder pressure as it drives firms to adopt more sustainable supply chain practices. According to the stakeholder theory, the various stakeholders' interests need to be considered when business decisions are to be made, including decisions pertaining to GSCM practices (Carter & Jennings, 2002; Vachon & Klassen, 2000).

Methodology

3.1 Introduction

The current chapter highlights the research method that has been utilized to analyze the relationships between GSCM practices, operational performance, and organizational culture of manufacturing firms in Pakistan. The approach applied here is the Resource based theory (RBV) which focuses on integrating change and sustainability into processes and people, with the view of using organizational resources in the effort to optimally effect this change.

Organizational efficiency is a complex concept which has been defined and refined through the years beginning with the theories of efficiency outlined by De Giovanni (2018). The second is organizational culture which is defined as a common set of values, beliefs and assumptions that influence decisions and behaviors of the employees of a firm (Hartnell et al. , 2019). In light of the above discussion, this study has intended some little contributions in the existing literature by operationalizing GSCM practices, operational performance, as well as organizational culture as the three different concepts in the framework of manufacturing firms in Pakistan.

The role of this paper, therefore, will be to examine and analyze the relationships between the mentioned variables. It, therefore, became necessary to adopt a quantitative research design approach using structured questionnaires to ensure that the required level of reliability and validity of the findings was achieved (Creswell, 2023). The study data were collected from manufacturing firms of Pakistan which are located in Karachi and Lahore. Self-generated data on variable measures were obtained, using widely-accepted scales of measurement (Zhu et al., 2023; Denison & Mishra, 1995).

Structural equation modelling was used in testing hypotheses as proposed by Anderson and Gerbing (1988), while Pearson correlation and multiple regression analysis were employed for hypothesis testing as suggested by Field (2022). The conclusion is not very insightful for the current research, as the study is conducted within the context of the business environment of the Pakistani manufacturing industry (Khan, 2023). The practical contribution of this research is twofold; it is beneficial to the companies that want to address the issue of greening across all functions, processes, and activities in their organizations (Ahmad, 2022). This research will also contribute to enhancing the awareness of manufacturing firms in Pakistan regarding the environmental issues while at the same time assisting the firms in enhancing their operational performance (Malik et al., 2022; Hussain, 2023).

3.2 Research Approach

A quantitative research method was used. Quantitative research is a type of research method that focuses on the measurement of variables in terms of numbers and the examination of existing theories through hypothesis testing (Creswell, 2023). The selected approach of analysis is very suitable for the present study since this approach is more centered on measurement and analysis, especially of causal relationships between GSCM practices, operational performance, and organizational culture (Sekaran & Bougie, 2021).

A general feature usually associated with quantitative research is that quantitative research has some specific features such as a deductive approach to data collection, a factorized data collection process, statistically analysed data, and an emphasis on the general population (Bryman, 2022). This research study employs a deductive research approach in that the empirical hypothesis is deduced from a theoretical premise; or the evaluation of a theoretical construct or an existing theory with data (Saunders et al., 2021). In the present study, the theoretical foundation was established through following extended theories on GSCM (Govindan et al., 2022), operational performance (Worthington & Britton, 2021), and organizational culture (Hartnell et al., 2022). Primary data for this study were gathered by administering structured questionnaires, or a survey method, on a sample of manufacturing firms in Pakistan (Khan, 2023). The survey method is a widely used quantitative data collection technique that allows for the collection of data from a large number of respondents in a relatively short amount of time (Babbie, 2022).

The quantitative has been a common approach used in prior researches in comparing the impacts of GSCM practices on operational performance. For example, Zhu et al (2007) established a positive work relationship between GSCM practices and firm performance in China out of which they noted enhanced connection between firm performance as well as GSCM practices. Similar to what Govindan and Kusiak (2013) identified, another study by Govindan et al. (2015) investigated the influence of GSCM practices on environmental performance in India and indicated that GSCM practices positively influence environmental performance. Such previous works confirm the validity of utilizing the quantitative approach to analyze the correlations between GSCM practices, operational excellence, and other factors.

3.3 Research Design

This paper a descriptive research design to analyse relations between GSCM practice, operational performance, and organizational culture in the manufacturing firms of Pakistan. Thus, this design was appropriate with the quantitative nature of this study because it provided a structured and quantifiable means of collecting data to answer key questions and/or test hypotheses (Saunders et al., 2016; Creswell & Creswell, 2017). This paper had a descriptive research design with the overall aim of providing a cross-sectional picture of the research variables in relation to the context identified as the manufacturing firms in Pakistan. Consequently, specific data were gathered with standardized questionnaires on GSCM practices, operational performance metrics, and organisational culture dimensions and factors (Zhu et al. , 2018; Yang et al. , 2017). As a result of the measurement scale used in the questionnaires, attempt was made to use closed-ended questions so as to measure responses and ensure that the data collected was in comparable measure with data collected from other studies. Therefore, it can be concluded that by employing descriptive research design on this study it has made a contribution in the manufacturing firms of Pakistan regarding sustainable business practices. The outlined research method helps to conduct structured and systematic research hence enhances the reliability and validity of the collected data it gives useful information for future references for both academician and practitioners (Hair et al. , 2019). The outcome of this research can help manufacturing firms decide on the effective GSCM practice that they should emulate and adopt as well as ensure that the appropriate organizational culture is sponsored to support GSCM implementation to boost the operations' performance.

3.4 Data Collection Method

The data collection for this study was done through a cross-sectional technique that employed data collection in a single point of time. This approach paints a picture of a state whereby the study variables are static with the approach offering a measure of insight into the current status of manufacturing organisations (Setia, 2016; Wang & Sarkis 2017). It was also favorable in the sense that it was easy to organize data collection and synthesis of results, which is good for achieving a general understanding of the phenomenon under study (Eisenbeiss et al. , 2019). The data also underwent descriptive statistical analysis alongside Inferential statistical analysis where Pearson correlation as well as multiple regression equations were used. Descriptive statistics include the tabulation of figures and numbers and gives an initial outline and measure

of the sample and variable of interest (Cohen et al. , 2018). Pearson coefficient also looks into the extent of the linear relationships and direction between the variables while providing the first perception concerning the pattern connecting the variables involved (Pandey & Chawla, 2016). Multiple regression results facilitate determining the collective influence of the multiple independent variables or predictors (GSCM practices and organizational culture) on the dependent variable, that is, operational performance. It also recognises interactive effects and point to the variables that cumulatively provide the best predictor to operation performance (Nath et al. , 2018).

3.5 Purpose of The Study

The targeted data collection method in this study was assortment of quantitative data by structured questionnaires because the data collected could then be subjected to statistical testing to identify and determine the presence of relationships, coefficients, or statistically founded influences among the key variables (Jabbour et al., 2018; Mangla set al., 2018). The primary research question was to find the impact of GSCM practices of OP and the moderating effect of Organization culture on this relationship in the context of manufacturing organizations in Pakistan. The research used a quantitative method in categorizing the data and collecting empirical data through frequencies, means, and standard deviation to find the effect that the environmental consideration and sustainable supply chain practice on its operation efficiency (Dubey et al., 2017; Singla et al., 2020). Furthermore, the moderating role of organizational culture was included in the study and sought to establish how the culture, in this case, the extent of cultural values and compliance enhances or dampens the impact of GSCM practices (Gunasekaran et al., 2020).

3.6 Time Horizon

The time horizon was decided to be Cross-sectional; this refers to a design whereby data collection and analysis were done on a given time only. These questionnaires were completed during a single time point, while the organizations were functioning actively. This eliminates the limitations associated with using cross-sectional time horizon which was adequate and effective in providing the broad but precise picture of the variables in question at a given point in time. The structured questionnaires were mailed to employees and retrieved at the fixed point of time in the study. The time horizon was therefore decided to be cross-sectional; this implies that data was collected and analysis at a given period of time. Also, it has been used by several

articles in the past as well, Therefore, Effects of green supply chain management practices on sustainability performance (Zhu, Sarkis, & Lai, 2013): This research adopted the cross-sectional survey questionnaire with manufacturing firms in China to explore the outcome of implementing GSCM practices on sustainability performance. Green supply chain management practices: Literature review (Razli Che Razak, 2020): This study elaborated on the GSCM practices based on 100 articles that were published during the time period of 2000 and 2019, out of which a significant number took cross-sectional (surveys) methodology.

3.7 Population

The population size for this study was determined by identifying 50 manufacturing companies in Islamabad, with a total workforce of 2500 employees.

3.8 Sample Size and Technique

Cluster sampling was used for population and using Morgan's table, the sample size required was calculated to be 332. A total of 345 responses were collected, out of which 333 were deemed usable and subsequently used for the analysis in this study.

3.9 Unit of Analysis

The unit of analysis of this research was the individual managers and personnel who worked in the manufacturing departments of the chosen firms located around Rawalpindi and Islamabad. In other words, every participant - was considered as separate unit of analysis in the unit of observation. The reason for choosing individual unit of analysis was due to the nature of the data collection which involved gaining insights, opinions and information from every chosen participant on individual level. The managers and personnel who worked in the manufacturing departments of the chosen firms were the chosen source of data collection in this study. They provided individual insights, knowledge, perceptions and attitudes in context to green supply chain management (GSCM) practices, operational performance and organizational culture. This showed the diverse and varied nature of the perspectives and opinions of the employees and managers in the chosen manufacturing firms in context to sustainability practices, organizational culture attributes and operational performance variables and therefore aimed to capture fine-grained differences and various nuances which existed in

the manufacturing context. Every individual manager and personnel provided relevant and actionable information about the dependent and independent variables of this study on personal level.

Analysis and results

4.1 Introduction

SPSS was used to sample data and 340 responses were collected there was a 97.8% response rate where 333 responses were deemed usable and they were used to perform analysis.

4.2 Frequencies

4.2.1 Gender

The sample consists of 333 respondents, with a significant majority being male. Specifically, 231 respondents (69.4%) identified as male, while 102 respondents (30.6%) identified as female. This gender distribution highlights a gender imbalance in the surveyed population.

Table 1

		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	Female	102	30.6	30.6	30.6
	Male	231	69.4	69.4	100.0
	Total	333	100.0	100.0	

4.2.2 What is the manufacturing industry in which your company operates

Respondents are from diverse sectors within the manufacturing industry. The largest group (30%) is classified under "Other," which might include various smaller sectors not specified in the survey. The Textiles industry represents 15.9% of the respondents, followed closely by the Automotive sector at 15.6%. The Electronics industry accounts for 14.4%, Chemicals for 12.9%, and Food and Beverage for 11.1%. This distribution indicates a broad representation across different manufacturing sectors, with a particularly notable presence in the Textiles and Automotive industries.

Table 2

		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	Automotive	52	15.6	15.6	15.6
	Chemicals	43	12.9	12.9	28.5
	Electronics	48	14.4	14.4	42.9
	Food and Beverage	37	11.1	11.1	54.1
	Other	100	30.0	30.0	84.1
	Textiles	53	15.9	15.9	100.0
	Total	333	100.0	100.0	

4.2.3 Company Size

The survey captures a range of company sizes, with nearly equal representation from medium-sized companies (50-499 employees). Companies with 200-499 employees constitute 28.8%, and those with 50-199 employees make up 28.5%. Large companies with 500 or more employees account for 26.4%, while small companies with fewer than 50 employees represent 16.2%. This indicates a diverse range of company sizes, with a slightly higher concentration in medium-sized firms.

Table 3

Variables	Frequency	Percent	Valid Percent	Cumulative Percent
200-499	96	28.8	28.8	28.8
50-199	95	28.5	28.5	57.4
500 or more	88	26.4	26.4	83.8
Less than 50	54	16.2	16.2	100.0
Total	333	100.0	100.0	

4.2.4 Annual Revenue

The annual revenue of the companies surveyed varies significantly. The largest group, 37.2%, reported annual revenues of less than 10 million rupees. Companies earning between 50 million to 100 million rupees make up 24%, and those earning more than 100 million rupees constitute 24.9%. Companies with annual revenues between 10 million to 50 million rupees represent 13.8%. This distribution suggests a predominance of smaller companies in terms of revenue, with a notable proportion of larger revenue companies as well.

Table 4

Variables	Frequency	Percent	Valid Percent	Cumulative Percent
10 million to 50 million rupees	46	13.8	13.8	13.8
50 million to 100 million rupees	80	24.0	24.0	37.8
Less than 10 million rupees	124	37.2	37.2	75.1
More than 100 million rupees	83	24.9	24.9	100.0
Total	333	100.0	100.0	

4.2.5 Years in Operation

The majority of companies surveyed have been in operation for a substantial period. Companies that have been operating for 6-10 years comprise the largest group at 44.1%. Those in business for more than 15 years account for 24.3%, and those operating for 11-15 years make up 18%. Companies in operation for 1-5 years represent 13.5%. This indicates that a significant portion of the companies have considerable experience in the industry, with a smaller segment of newer companies.

Table 5

	Variables	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1-5 years	45	13.5	13.5	13.5
	11-15 years	60	18.0	18.0	31.5
	6-10 years	147	44.1	44.1	75.7
	More than 15 years	81	24.3	24.3	100.0
	Total	333	100.0	100.0	

4.3 Cronbach Alphas

GSCM (Green Supply Chain Management): Cronbach's alpha = .928 (18 items). This is an excellent level of internal consistency. It suggests that the 18 items used to measure GSCM are highly intercorrelated and consistently measure the same underlying construct.

OP (Operational Performance): Cronbach's alpha = .895 (8 items). This is also a very good level of internal consistency, indicating that the 8 items measuring OP are strongly related and measure the same concept reliably.

OC (Organizational Culture): Cronbach's alpha = .912 (10 items). This is again an excellent level of internal consistency, suggesting the 10 items used to assess OC are highly reliable in measuring the same underlying construct.

The Cronbach's alpha values for all three constructs (GSCM, OP, and OC) are above .80, which is generally considered a good threshold for research purposes. This indicates that the

measurement scales used in the study are reliable and internally consistent. In other words, the items within each scale are measuring the same underlying concept effectively.

Table 6

Variables	**CA**	**items**
GSCM	.928	18
OPM	.895	8
OCM	.912	10

The Cronbach's alpha values for all three constructs (GSCM, OP, and OC) are above .80, which is generally considered a good threshold for research purposes. This indicates that the measurement scales used in the study are reliable and internally consistent. In other words, the items within each scale are measuring the same underlying concept effectively.

4.4 Descriptive Analysis

The descriptive statistics for the variables GSCM1, OPM1, and OCM1 were analyzed, revealing important information about their distributions. The variable GSCM1, based on a sample size (N) of 333, exhibited a minimum value of 1.11 and a maximum value of 5.00. The mean for GSCM1 was calculated to be 4.0252, with a standard deviation of 1.11835. For the variable OPM1, the sample size remained consistent at 333, with observed values ranging from a minimum of 1.00 to a maximum of 5.00. The mean value for OPM1 was determined to be 4.1227, accompanied by a standard deviation of 1.27523. The variable OCM1 was similarly assessed, showing a minimum value of 1.00 and a maximum value of 5.00, with a sample size of 333. The mean for OCM1 was found to be 3.8171, and the standard deviation was recorded at .97674. These statistics provide a comprehensive overview of the central tendencies and variabilities of the variables in question.

Table 7

Variable	**N**	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
GSCM1	333	1.00	5.00	4.0252	1.11835
OPM1	333	1.00	5.00	4.1227	1.27523
OCM1	333	1.00	5.00	3.8171	.97674
Valid N (listwise)	333				

4.5 Correlation

The correlation analysis results were assessed to understand the relationships between the variables GSCM1, OPM1, OCM1, and GSCM1xOCM1. Significant correlations at the 0.01 level (2-tailed) were observed among all variables.

The Pearson correlation coefficient between GSCM1 and OPM1 was .952, indicating a very strong positive relationship ($p < .001$).

GSCM1 was also strongly correlated with OCM1 ($r = .883$, $p < .001$) and GSCM1xOCM1 ($r = .966$, $p < .001$).

OPM1 showed a strong positive correlation with OCM1 ($r = .878$, $p < .001$) and GSCM1xOCM1 ($r = .928$, $p < .001$).

OCM1 and GSCM1xOCM1 had a strong positive correlation as well ($r = .944$, $p < .001$).

The number of observations (N) for each variable pair was consistently 333, confirming the reliability of the correlation results. These findings indicate that all variables are highly interrelated, with particularly strong associations between GSCM1 and the other variables.

Table 8

Correlations

Variable		GSCM1	OPM1	OCM1	GSCM1xOCM1
GSCM1	**Pearson Correlation**	1	.952	.883	.966
	Sig. (2-tailed)		.000	.000	.000
	N	333	333	333	333
OPM1	**Pearson Correlation**	.952	1	.878	.928
	Sig. (2-tailed)	.000		.000	.000
	N	333	333	333	333
OCM1	**Pearson Correlation**	.883	.878	1	.944
	Sig. (2-tailed)	.000	.000		.000
	N	333	333	333	333
GSCM1xOCM1	**Pearson Correlation**	.966	.928	.944	1
	Sig. (2-tailed)	.000	.000	.000	
	N	333	333	333	333

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

4.6 Regression

The regression analysis explores the relationships between Green Supply Chain Management practices (GSCM1), organizational culture (OCM1), their interaction term (GSCM1xOCM1), and operational performance (OPM1). The constant term (intercept) is estimated to be 0.840, suggesting a negative expected operational performance when all predictor variables are zero. The interaction term GSCM1xOCM1 shows a positive influence on operational performance, with a coefficient of 0.175, indicating a significant contribution to explaining variations in performance (t = 2.180, Sig. = 0.001). Organizational culture (OCM1) and GSCM practices (GSCM1) both exhibit strong positive relationships with operational performance, with coefficients of 0.357 (t = 3.224, Sig. = 0.000) and 1.084 (t = 8.267, Sig. = 0.000), respectively. These findings underscore the importance of both GSCM practices and organizational culture in driving operational performance improvements, highlighting the synergistic effects of their interaction on performance outcomes within organizations.

Table 9

Model	**Variables**	**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**
		B	**Std. Error**	**Beta**		
	(Constant)	.840	.186		4.517	.000
1.	GSCM1xOCM1	.175	.081	.928	2.180	.001
2.	OCM1	.357	.098	.273	3.224	.000
3.	GSCM1	1.084	.131	.951	8.267	.000

a. Dependent Variable: OPM1

b. Predictors: GSCM1XOCM1, GSCM1, OCM1

The second regression model focuses solely on the relationship between organizational culture (OCM1) and operational performance (OPM1). Here, the constant term (intercept) is estimated to be 0.168. This implies that when organizational culture is zero, the expected operational

performance is positive. The coefficient for organizational culture (OCM1) is notably high at 1.010, and it is highly statistically significant (t = 10.842, Sig. = 0.000). This suggests that a strong organizational culture has a substantial positive impact on operational performance. Overall, the results of this model emphasize the critical role of organizational culture in driving operational performance improvements.

Table 10

Model	Variables	Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.168	.117		1.442	.001
2	OCM1	1.010	.093	.883	10.842	.000

a. Dependent Variable: GSCM1

4.7 Hypothesis Testing

Table 12

Hypothesis	Statements	Accepted/Rejected
H1	Green Supply Chain Management practices (GSCMP) have a positive impact on operational performance (OP).	**Accepted**
H2	Organizational culture (OC+) positively moderates the impacts of green supply chain practices (GSCM) on operational performance (OP).	**Accepted**
H3	Organizational culture positively impacts operational performance.	**Accepted**
H4	Organizational culture positively impacts GSCM practices.	**Accepted**

Conclusion And Recommendations

5.1 Discussions

This research intended to establish the relationship between Green Supply Chain Management (GSCM) practices, operational performance (OP), and organizational culture (OC) in the manufacturing industry of Pakistan. The data used for this study was obtained form 333 respondents that are in the manufacturing sector, whereby the questionnaires used were structured and statistical tools were used to analyze the results.

The descriptive results reveal demographic information of the sample by gender distribution of participants, number of different industries represented, company size, revenue, and years of operation of all the firms involved in the study. The sample is also sixty-nine percent male with participants hailing from different industries especially textiles, automotive. Many organizations said that they were medium-scale in size in terms of their workers and their incomes were below 10 million rupees per year.

The Cronbach's alpha for all measures were greater than 0. The Cronbach's alpha values for GSCM, OP and OC were 0. Solutions to the total number of items in each scale were 80 indicating construct validity and internal consistency of the scales used in the current study. This means that the items that were used in scaling achieved the purpose of the scale and that the items within each scale were valid in terms of the construct.

Further correlational analysis also showed positive and significant relationships between all the variables proposed. Further, the data revealed the strongest relationship was with operational performance ($r = .952$, $p < .001$), which underlines the perfect relationship between implementing green supply-chain management practices and attaining a higher level of operational performance.

The findings of regression analysis bore with the hypothesis of the study. They substantiated the previous findings that identified the relationship between GSCM practices and operational performance besides, endorsing the key moderating influence of the organizational culture. When the organizational culture was stronger, there emerged a far-reaching pressure which was imposed on GSCM practices by its positive impact on the overall operational performance. In the second regression model that analyses he degree of organizational culture and the degree of GSCM practices it was shown that organizational culture has a very strong positive impact on the GSCM practices. This implies that when an organization has effective organizational culture that is positive it will help in adoption of GSCM practices.

Overall, the results align with prior research that emphasizes the importance of GSCM in enhancing operational performance (Zhu & Sarkis, 2004; Vachon & Klassen, 2006). The study also contributes to the existing literature by highlighting the moderating role of organizational culture, which is crucial in the Pakistani context where cultural factors significantly influence business practices.

5.2 Implications

The findings of this research underscore that pragmatic implementation of GSCM practices is indispensable for enhancing the operational performance of the manufacturing organizations in Pakistan. This information may be helpful for managers to incorporate the green practices into the company's activities, taking into account the fact that the organization has a beneficial impact on developing a sustainable culture. The completed research illustrates that crucial to the success of an organization encompasses driving a culture in regards to sustainability as well as environmental awareness, thereby presenting numerous advantages pertaining to sustained operation and financial gains.

5.3 Future Research Directions

The following research gaps are observed which implies further research in the area First, the research was conducted specifically for the manufacturing industry in Pakistan; it is suggested that further research should be made to understand if these issues are confined only to the manufacturing industry of Pakistan or are prevalent throughout other Industries as well as, other geographies of the world.? Secondly, longer and large-scale research could increase knowledge on how GSCM practices and organizational culture take time to reflect on operation performance. Thirdly, quantitative research methodologies could be used to pursue the subsequent explorations in order to gain a deeper insight of the channel by which organizational culture moderates the link between GSCM practices and operational performance. Lastly, there can be a separate investigation of certain GSCM practices, including green purchasing, environmental product design, and many others, and their overall impact on financial performance or environmental performance.

5.4 Limitations

There are some conditions that are applicable to this study, which need to be considered. The cross-sectional design's main weakness is that cross-sectional data analyses take a 'snapshot' of the variables at a certain point in time and do not allow for the examination of causal relationships due to temporal and spatial dimensions. The use of self-reports with an emphasis on questionnaires might be prone to such bias. In addition, the fact that our sample include only the manufacturing firms operating in Pakistan limits the transference of the findings to other industrial sectors or other geographic locations.

5.5 Conclusion

This paper will add to the existing body of knowledge on GSCM by providing a research study on its effects on operational performance in the manufacturing organizations of Pakistan. This indicates that organizational culture plays a moderating role and call for an increased accent on the right organizational culture that revels sustainability. The study therefore offers important insights to the managers as they continue to make efforts towards improving their companies' operational performance by implementing GSCM practices. Thus, this study not only contributes to the growth of the theoretical body of knowledge in the sphere of GSCM but also informs practical recommendations for enterprises willing to implement sustainable solutions into their strategies for the enhancement of competitive advantage in the vast and complex global economy.

References

Ahmad, N. (2022). Greening the Supply Chain: A Case Study of Pakistani Manufacturing Firms. *Journal of Cleaner Production, 345, 131098.*

Ageron, B., Gunasekaran, A., & Spalanzani, A. (2012). Sustainable supply management: An empirical study. *International Journal of Production Economics, 140(1), 168-182.*

Al Ariss, A., & Sidani, Y. (2021). The impact of organizational culture on innovation. *Journal of Innovation & Knowledge, 6(4), 283-291.*

Al Saadi, K. O., Al Hosni, S. A., & Al Lawati, H. M. J. (2021). Factors influencing employees' resistance to change in public organizations in the Sultanate of Oman: The mediating role of organizational commitment. *Journal of Public Affairs, 21(1), e2166.*

Alvesson, M., & Berg, P. O. (1992). Corporate culture and organizational symbolism: *An overview. Walter de Gruyter.*

Alvesson, M., & Deetz, S. (2000). Doing critical management research. Sage.

Amabile, T. M. (1988). A model of creativity and innovation in organizations. In B. M. Staw & L. L. Cummings (Eds.*), Research in organizational behavior (Vol. 10, pp. 123-167). JAI Press.*

Amirbagheri, K. (2019). An analytical study about the relationship between Green Supply Chain Management practices and Organizational Performance (Unpublished manuscript). [Institution name if applicable].

Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: *A review and recommended two-step approach. Psychological Bulletin, 103(3), 411-423.*

Antony, J., van der Wiele, T., & Kumar, M. (2003). Six Sigma in the UK service sector: results from a pilot study. *International Journal of Operations & Production Management, 23(10), 1183-1204.*

Argyris, C., & Schön, D. A. (1978). Organizational learning: A theory of action perspective. Addison-Wesley.

Asif, M., Jameel, A., & Hussain, A. (2019). Linking organizational culture and green supply chain management: The mediating role of environmental performance. Corporate Social Responsibility and Environmental Management, 26(6), 1426-1437.

Azevedo, S. G., Carvalho, H., & Cruz-Machado, V. (2016). LARG index: A benchmarking tool for improving the leanness, agility, resilience, and greenness of the automotive supply chain. Benchmarking*: An International Journal, 23(6), 1495-1523.*

Azim, M., Ahmed, H., & Khan, A. M. (2015). Operational Performance and Profitability: An Empirical Study on the Bangladeshi Ceramic Companies. Business *International Journal of Entrepreneurship.*

Azim, M., Ahmed, N., & Khan, M. (2015). Impact of operational performance on business performance: An empirical study on pharmaceutical firms in Bangladesh. *International Journal of Business and Management, 10(4), 197-206.*

Babbie, E. (2022). The Basics of Social Research (8th ed.). *Cengage Learning.*

Barney, J. (1986). Organizational culture: Can it be a source of sustained competitive advantage? *Academy of Management Review, 11(3), 656-665.*

Beamon, B. M. (1999). Designing the green supply chain. *Logistics Information Management, 12(4), 332-342.*

Bititci, U. S., Garengo, P., Dörfler, V., & Nudurupati, S. (2015). The interplay between performance measurement and management: a review. *International Journal of Operations & Production Management, 35(1), 23-51.*

Bryman, A. (2022). Social Research Methods (5th ed.). Oxford University Press.

Cameron, K. S., & Quinn, R. E. (2011). Diagnosing and changing organizational culture: Based on the competing values framework (3rd ed.). Jossey-Bass.

Carter, C. R., & Jennings, M. M. (2002). Social responsibility and supply chain relationships. *Transportation Research Part E: Logistics and Transportation Review, 38(1), 37-52.*

Chiarini, A. (2018). Sustainable manufacturing: From theory to practice. Springer.

Christensen, C. M. (1997). The innovator's dilemma: When new technologies cause great firms to fail. Harvard Business Review Press.

Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2018). Applied multiple regression/correlation analysis for the behavioural sciences. Routledge.

Cooke, R. A., & Rousseau, D. M. (1988). Behavioural norms and expectations: A quantitative approach to the assessment of organizational culture. *Group & Organization Studies, 13(3), 245-273.*

Creswell, J. W. (2014). Research design: Qualitative, quantitative, and mixed methods approaches. *Sage publications.*

Creswell, J. W. (2023). Research design: Qualitative, quantitative, and mixed methods approaches (5th ed.). *Sage Publications.*

Davenport, T. H., & Harris, J. G. (2007). Competing on analytics: *The new science of winning. Harvard Business School Press.*

Deal, T. E., & Kennedy, A. A. (1982). Corporate cultures: The rites and rituals of corporate life. Addison-Wesley.

De Sousa Jabbour, C., Jabbour, A., Godinho Filho, L., & Ramalho, J. (2020). Green supply chain management practices and organizational performance: *A meta-analysis. Journal of Cleaner Production, 271, 122533.*

De Giovanni, P. (2018). Dynamic capabilities and supply chain resilience: The role of organizational culture. *International Journal of Physical Distribution & Logistics Management, 48(4), 472-494.*

Deming, W. E. (1986). Out of the crisis. MIT Center for Advanced Engineering Study.

Den Hartog, D. N., Boon, C., Verburg, R. M., & Croon, M. A. (2013). HRM, communication, satisfaction, and perceived performance: *A cross-level test. Academy of Management Journal, 56(1), 105-128.*

Denison, D. R. (1990). Corporate culture and organizational effectiveness. John Wiley & Sons.

Denison, D. R., & Mishra, A. K. (1995). Toward a theory of organizational culture and effectiveness. Organization Science, 6(2), 204-223.

Dzikriansyah, M. A., Masudin, I., Zulfikarijah, F., Jihadi, M., & Dwi Jatmiko, R. (2023). The role of green supply chain management practices on environmental performance: A case of Indonesian small and medium enterprises (Unpublished manuscript). [Institution name if applicable].

Eisenbeiss, S. A., van Knippenberg, D., & Fahrbach, C. M. (2019). Doing well by doing good? Analyzing the relationship between CEO ethical leadership and firm performance. *Journal of Business Ethics, 155(3), 741-755.*

Eltayeb, A., & Nga, H. (2020). Antecedents and consequences of green supply chain management practices: *An empirical analysis. International Journal of Logistics Research and Applications.*

Field, A. (2022). Discovering statistics using IBM SPSS statistics (5th ed.*). Sage Publications.*

Flamholtz, E. G., & Randle, Y. (2011). Corporate culture: The ultimate strategic asset. Stanford University Press.

Gong, Y., Cheung, S. Y., Wang, M., & Huang, J. C. (2023). High-commitment work systems, transactive memory systems, and innovative work behavior: The roles of perceived organizational support and knowledge sharing. *Journal of Applied Psychology.*

Govindan, K., Khodaverdi, R., & Jafarian, A. (2014). A fuzzy multi-criteria approach for measuring sustainability performances of a supply chain. *Ecological Indicators, 48, 425-434.*

Govindan, K., Kaliyan, M., Kannan, D., & Haq, A. N. (2022). Investigating the impact of green supply chain management practices on sustainability performance: A meta-analysis. *Business Strategy and the Environment, 31(2), 817-840.*

Govindarajulu, N., & Daily, B. F. (2004). A theoretical model for green supply chain management. *International Journal of Production Research, 42*(5), 983-994.

Green Jr, K. W., Zelbst, P. J., Meacham, J., & Bhadauria, V. S. (2015). Green supply chain management practices: Impact on performance. Supply Chain Management: *An International Journal, 20(3), 290-305.*

Greene, R. (2021). Operational performance: A practical guide to improving efficiency and effectiveness. Kogan Page Publishers.

Greene, R. J. (2021). Effective Performance Management in Public Sector Organizations. ICMA Journal.

Gunasekaran, A., Papadopoulos, T., Dubey, R., & Wamba, S. F. (2017). The role of digital technologies in supply chain performance: a review. *International Journal of Production Economics, 183, 519-531.*

Hair, J. F., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2019). A primer on partial least squares structural equation modeling (PLS-SEM). *Sage publications.*

Handy, C. B. (1993). Understanding organizations (4th ed.). Penguin Books.

Haque, A., Fernando, M., & Caputi, P. (2020). The relationship between organizational culture and structure: A systematic review and meta-analysis. *European Management Journal, 38(1), 127-141.*

Harris, L. C., & Crane, A. (2002). The greening of organizational culture: Management views on the depth, degree and diffusion of change. *Journal of Organizational Change Management, 15(3), 214-234.*

Harry, M., & Schroeder, R. (1999). Six Sigma: The breakthrough management strategy revolutionizing the world's top corporations. Currency Doubleday.

Hart, S. L. (1995). A natural-resource-based view of the firm. Academy of Management Review, *20(4), 986-1014.*

Hartnell, C. A., Ou, A. Y., & Kinicki, A. (2022). Organizational culture and organizational effectiveness: A meta-analytic investigation of the competing values framework's theoretical suppositions. *Journal of Applied Psychology, 107(6), 1061–1080.*

Hartnell, C. A., Ou, A. Y., & Kinicki, A. (2022). Organizational culture and organizational effectiveness: A meta-analytic investigation of the competing values framework's theoretical suppositions. *Journal of Applied Psychology, 107(6), 951–973.*

Hatch, M. J. (1993). The dynamics of organizational culture. Academy of Management Review, *18(4), 657-693.*

Hatch, M. J., & Cunliffe, A. L. (2006). Organization theory: Modern, symbolic, and postmodern perspectives (2nd ed.). Oxford University Press.

Hervani, A.A., Helms, M.M., Sarkis, J. (2005) Performance measurement for green supply chain management. Benchmarking*: An International Journal, 12(4), 330-353.*

Hofstede, G. (2001). Culture's consequences: Comparing values, behaviors, institutions, and organizations across nations (2nd ed.). *Sage Publications.*

Hofstede, G., Neuijen, B., Ohayv, D. D., & Sanders, G. (1990). Measuring organizational cultures: A qualitative and quantitative study across twenty cases. *Administrative Science Quarterly, 35(2), 286-316.*

Hussain, A. (2023). Environmental Sustainability and Operational Performance of Manufacturing Firms in Pakistan: The Mediating Role of Green Supply Chain Management. Business Strategy and the Environment, *32(5), 2354-2371.*

Husted, B. W., & Folger, R. (2020). Corporate social responsibility and competition. Business Ethics Quarterly, 30(4), 473-494.

Jabbour, C. J. C., & Jabbour, A. B. L. d. S. (2019). Building sustainability into supply chains: The role of human resource management. *International Journal of Production Economics, 217, 270-283.*

Jabbour, C. J. C., Jabbour, A. B. L. d. S., Latan, H., Teixeira, A. A., & Oliveira, J. H. C. (2018). Green supply chain management implementation and green human resource management: Moderating effect of top management commitment and mediating effect of employee green behavior. Corporate Social Responsibility and Environmental Management, *25(3), 362-378.*

Jabbour, C. J. C., Jabbour, A. B. L. d. S., Latan, H., Teixeira, A. A., & Oliveira, J. H. C. (2020). When titans meet—dynamic capabilities view of organizational ambidexterity and green supply chain management. Resources, Conservation and Recycling, *157, 104749.*

Jabbour, C. J. C., de Sousa Jabbour, A. B. L., Govindan, K., Teixeira, A. A., & de Sousa Filho, J. M. (2021). Barriers to the implementation of green supply chain management in emerging economies: The case of Brazil. Business Strategy and the Environment, *30(4), 1946-1963.*

Jabbour, C. J. C., & Jabbour, A. B. L. D. S. (2016). Green human resource management and green supply chain management: Linking two emerging agendas. *International Journal of Operations & Production Management, 36(5), 549-568.*

Jabbour, C. J. C., Jabbour, A. B. L. D. S., & Foropon, C. (2010). Environmental management, institutional pressures and environmental performance: Evidence from Brazilian companies. *Journal of Cleaner Production, 18(16-17), 1674-1685.*

Jaques, E. (1951). The changing culture of a factory. Tavistock Publications.

Jermsittiparsert, K., Namdej, P., & Somjai, S. (2019). Green supply chain practices and sustainable performance: Moderating role of total quality management practices in the electronic industry of Thailand. Sustainability, *11(18), 4840.*

Kabanoff, B. (1997). Organizational culture: How it is created, communicated, and sustained. In C. L. Cooper & S. E. Jackson (Eds.), Creating tomorrow's organizations: A handbook for future research in organizational behavior *(pp. 215-245). John Wiley & Sons.*

Kaplan, R. S., & Norton, D. P. (1992). The balanced scorecard—measures that drive performance. Harvard Business Review, 70(1), 71-79.

Kaplan, R. S., & Norton, D. P. (2001). Transforming the balanced scorecard from performance measurement to strategic management: Part I. *Accounting Horizons, 15(1), 87-104.*

Kenny, G. (2012). Building a winning organizational culture. Kogan Page Publishers.

Khan, M. T. (2022). The role of green supply chain management practices on the operational performances with organization culture as a moderating variable: A study of manufacturing firms of Pakistan (Unpublished doctoral dissertation). [Your University's Name].

Khan, S. (2023). The Impact of Environmental Regulations on the Competitiveness of Pakistani Manufacturing Firms. *Journal of Environmental Management, 331, 117175.*

Khan, S. A. R., Dong, Q. L., & Yu, Z. (2018). Barriers to green supply chain management adoption in Pakistan's manufacturing industry: An interpretive structural modeling approach. *Journal of Cleaner Production, 171, 862-873.*

Khan, S. A. R., Yu, Z., & Golpîra, H. (2019). Organizational culture and green supply chain management practices: An ethical leadership perspective. Corporate Social Responsibility and Environmental Management, 26(4), 756-772.

Kotter, J. P., & Heskett, J. L. (1992). Corporate culture and performance. Free Press.

Kunda, G. (1992). Engineering culture: Control and commitment in a high-tech corporation. Temple University Press.

Laroche, H., Habibi, M. R., & Richard, M. O. (2021). To be or not to be bureaucratic? A meta-analysis of the effects of bureaucracy on organizational performance. *Public Administration Review,* 81(2), 232-248.

Lee, H. L. (2002). Aligning supply chain strategies with product uncertainties. California Management Review, 44(3), 105-119.

Liu, J., Feng, Y., Zhu, Q., & Sarkis, J. (2023). Green supply chain management and the circular economy: Reviewing theory for advancement of both fields. *Journal of Cleaner Production*, 382, 135225.

Martin, J. (1992). Cultures in organizations: Three perspectives. Oxford University Press.

McDonough, W., & Braungart, M. (2002). Cradle to cradle: Remaking the way we make things. North Point Press.

Moen, R. D., & Norman, C. L. (2010). Circling back: Clearing up myths about the Deming cycle and seeing how it keeps evolving. Quality Progress, 43(11), 22-28.

Nath, V., Agrawal, R., & Mahavar, A. (2018). Green supply chain practices and its impact on organizational performance: Evidence from Indian manufacturing firms. *Journal of Manufacturing Technology Management*, 29(2), 234-259.

Neely, A. (1999). The performance measurement revolution: why now and what next? *International Journal of Operations & Production Management*, 19(2), 205-228.

Neely, A., Gregory, M., & Platts, K. (2002). Performance measurement system design: a literature review and research agenda. *International Journal of Operations & Production Management*, 25(12), 1228-1263.

O'Reilly, C. A., & Chatman, J. A. (1996). Culture as social control: Corporations, cults, and commitment. In B. M. Staw & L. L. Cummings (Eds.), Research in organizational behavior (Vol. 18, pp. 157-200). JAI Press.

O'Reilly, C. A., Chatman, J., & Caldwell, D. F. (1991). People and organizational culture: A profile comparison approach to assessing person-organization fit. *Academy of Management Journal*, 34(3), 487-516.

Oke, A., Walumbwa, F. O., & Myers, A. (2021). Green human resource management and employee green behavior: The role of psychological green climate and servant leadership. *Journal of Business Ethics*, 170(2), 227-245.

Papadas, K., Avlonitis, G.J., & Carrigan, M. (2017). Green marketing orientation: Conceptualization, scale development and validation. Journal of Business Research, 76, 41-54.

Rakhmawati, A., Nizar, M., & Rahardjo, K. (2019). Green Supply Chain Management and SME's, A Qualitative Study in Indonesian Marketplace. Proceedings of the 3rd International Conference on Sustainable Innovation 2019- Beyond Traditional Management (ICoSI 2019). Atlantis Press.

Ramanauskaite, K., Mandravickaite, J., & Skudiene, V. (2022). The impact of market orientation culture on organizational performance: The mediating role of innovation capability. *Journal of Business Research*, 139, 1222-1231.

Rao, P., & Holt, D. (2005). Do green supply chains lead to competitiveness and economic performance? *International Journal of Operations & Production Management*, 25(9), 898-916.

Rehmani, S. S. (2019). Consumer's attitude towards green supply chain practices and its impact on their intentions to buy at fast food restaurants in Bahawalpur, Pakistan. Sustainable Business and Society in Emerging Economies, 1(1), 55-64.

Roth, A. V., Menor, L. J., & Schroeder, R. G. (2008). Operational excellence and customer value: how to measure and implement it. *Journal of Operations Management*, 26(2), 227-243.

Sarkis, J. (2020). Supply chain sustainability: Learning from the COVID-19 pandemic. *International Journal of Operations & Production Management*, 41(1), 63-73.

Saunders, M., Lewis, P., & Thornhill, A. (2021). Research Methods for Business Students (8th ed.). Pearson Education.

Sekaran, U., & Bougie, R. (2021). Research Methods for Business: A Skill-Building Approach (8th ed.). Wiley.

Sarkis, J., & Dhavale, D. G. (2017). Green supply chain management performance measurement: A review and bibliometric analysis. *International Journal of Production Economics*, *191*, 179-197.

Sarkis, J. (2011). A boundaries and flows perspective of green supply chain management. *Supply Chain Management: An International Journal*, *16*(2), 99-109.

Sarkis, J. (2014). Green supply chain management. *Journal of Manufacturing Technology Management*, *25*(5), 617-619.

Sarkis, J. (2020). *Supply Chain Management for a Sustainable World*. Springer.

Sarkis, J., Zhu, Q., & Lai, K. (2011). An organizational theoretic review of green supply chain management literature. *International Journal of Production Economics*, *130*(1), 1-15.

Sathe, V. (1985). *Culture and related corporate realities*. Richard D. Irwin.

Schein, E. H. (1985). *Organizational culture and leadership*. Jossey-Bass.

Schein, E. H. (1992). *Organizational culture and leadership* (2nd ed.). Jossey-Bass.

Schein, E. H. (2004). *Organizational culture and leadership* (3rd ed.). Jossey-Bass.

Schein, E. H. (2010). *Organizational culture and leadership* (4th ed.). Jossey-Bass.

Schneider, B., White, S. S., & Paul, M. C. (1998). Linking service climate and customer perceptions of service quality: Test of a causal model. *Journal of Applied Psychology, 83*(2), 150-163.

Setia, M. S. (2016). Methodology series module 3: Cross-sectional studies. *Indian Journal of Dermatology*, *61*(3), 261-264.
Shrivastava, P. (1995). Environmental technologies and competitive advantage. *Strategic Management Journal, 16,* 183-200.

Shah, R., & Ward, P. T. (2007). Defining and developing measures of lean production. *Journal of Operations Management, 25*(4).

Saunders, M. N., Lewis, P., & Thornhill, A. (2016). *Research methods for business students*. Pearson Education.
Slack, N. (2015). *Operations management*. Pearson Education.

Smircich, L. (1983). Concepts of culture and organizational analysis. *Administrative Science Quarterly*, *28*(3), 339-358.

Srivastava, S. K. (2007). Green supply-chain management: A state-of-the-art literature review. *International Journal of Management Reviews, 9*(1), 53-80.

Srivastava, S. K. (2008). Green supply chain management: A state-of-the-art literature review. *International Journal of Management Reviews, 9*(1), 53-80.

Taylor, F. W. (1911). *The principles of scientific management*. Harper & Brothers.

Wilson, J. M. (2010). The origin of material requirements planning in Frederick W. Taylor's planning office. *International Journal of Production Research*.

Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal, 18*(7), 509-533.

Testa, F., Iraldo, F., & Frey, M. (2016). Institutional pressures, supply chain relationships, and sustainability practices: Evidence from the wine industry. *Journal of Cleaner Production, 113*, 890-901.

Trice, H. M., & Beyer, J. M. (1993). *The cultures of work organizations*. Prentice Hall.

Turri, M., Coro, R., Ballarin, G., & Rampioni, P. (2022). The impact of corporate culture on sustainable supply chain management: A structured literature review. *Journal of Cleaner Production*.

Vachon, S., & Klassen, R. D. (2006). Extending green practices across the supply chain: The impact of upstream and downstream integration. *International Journal of Operations & Production Management, 26*(7), 795-821.

Venkatraman, N., & Ramanujam, V. (1986). Measurement of business performance in strategy research: A comparison of approaches. *Academy of Management Review, 11*(4), 801-814.

Vermeulen, W. J. V. (2015). Self-governance for sustainable global supply chains: Can it deliver the impacts needed? *Journal of Supply Chain Management, 51*(2), 5-25.

Wang, Z., & Sarkis, J. (2017). Corporate social responsibility governance, outcomes, and financial performance. *Journal of Cleaner Production, 162*, 1607-1616.

Weng, L. C., & Chen, C. C. (2022). Green organizational culture and green supply chain management: Does transformational leadership matter? Sustainability, 14(21), 13953.

Wong, C. W. Y., Wong, C. Y., & Boon-itt, S. (2023). Does organizational culture matter for sustainability? A meta-analysis of the relationship between corporate sustainability performance and organizational culture. Journal of Cleaner Production, 382, 135307.

Womack, J. P., Jones, D. T., & Roos, D. (1990). *The machine that changed the world: The story of lean production*. Harper Perennial.

Yang, C., Lin, R. J., Krumwiede, D., & Sheu, C. (2017). Efficacy of purchasing activities and strategic involvement: An international comparison. *International Journal of Production Research, 55*(18), 5202-5215.

Yu, W., Chavez, R., Feng, M., & Wiengarten, F. (2020). Integrated green supply chain management and operational performance. *International Journal of Operations & Production Management, 40*(1).

Xu, J., Yu, Y., Wu, Y., Zhang, J. Z., Liu, Y., Cao, Y., & Eachempati, P. (2023). Green supply chain management for operational performance: anteceding impact of corporate social responsibility and moderating effects of relational capital. *Environmental Science and Pollution Research, 30*(1), 1-18

Zhang, B., Wu, Y., & Yang, Y. (2018). Does green human resource management enhance green supply chain management practices? An empirical investigation. Corporate Social Responsibility and Environmental Management, 25(1), 109-121.

Zhang, Y. (2012). The effect of organizational culture on firm performance: A meta-analysis of the competing values framework. Asia Pacific Journal of Management, 29(1), 89-111.

Zhu, Q., Sarkis, J., & Geng, Y. (2013). Green supply chain management in China: Pressures, practices and performance.

Zhu, Q., & Sarkis, J. (2004). Relationships between operational practices and performance among early adopters of green supply chain management practices in Chinese manufacturing enterprises. *Journal of Operations Management, 22*(3), 265-289.

Zhu, Q., Sarkis, J., & Lai, K. H. (2007). Green supply chain management: pressures, practices and performance within the Chinese automobile industry. *Journal of Cleaner Production, 15*(11-12), 1041-1052.

Appendix

This survey is designed to collect information on your company's practices and performance. Your responses will be kept confidential and will be used solely for academic research purposes.
Thank you for participating in my study, which aims to **examine** the impact of green supply chain management practices on the operational performance of manufacturing firms in Pakistan, with a focus on the role of organizational culture as a moderating variable. Your insights and experiences are invaluable in helping me understand how sustainable practices influence efficiency, productivity, and overall performance in the manufacturing sector.

GENERAL

Gender: Male/Female

Industry Information: Textile, Automobile, Electronic, Food and Beverage, Chemicals, Others

Company Size Employees: Less than 50, 50 to 199, 200 to 499, 500 or more

Annual Revenue: Less than 10 million, 10-50 million, 50 to 100 million, More than 100 million

Years in Operation: 1-5 years, 6-10 years, 11-15 years, More than 15 years

6.1 Questionnaire

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

1.GREEN SUPPLY CHAIN PRACTICES		1	2	3	4	5
GREEN MANUFACTURING Implementing eco-friendly processes and practices in production to reduce environmental impact.						
GM1	Our organization's product is recyclable and reusable					
GM2	Manufacturing operations guarantee less frequent use of hazardous compounds					
GM3	The product lifecycle method is utilized to improve environmental performance and efficiency					
GM4	Efforts are made to limit material, water, and energy consumption in production					
GM5	A waste management program ensures compliance with all applicable requirements					
GM6	The use of renewable energy is optimized in manufacturing operations.					
GM7	Harmful waste is minimized during production					
ECO-DESIGN Creating products with a focus on minimizing environmental impact, including energy efficiency, recyclability, and the use of sustainable materials throughout the product's lifecycle.		1	2	3	4	5
ED1	Our company adheres to stringent product design guidelines to decrease material and energy usage					
ED2	Our product design allows for reuse, recycling, and recovery of materials and parts					

ED3	Our product design eliminates or limits the use of hazardous goods and processes.					
GREEN PURCHASING Choosing Suppliers and products that adhere to environmental standards, focusing on reducing carbon footprints, promoting recycling, and supporting eco-friendly practices.		1	2	3	4	5
GP1	Environmental criteria for bought products are provided to vendors in design specifications.					
GP2	Our organization collaborates with suppliers to achieve environmental goals					
GP3	Internal environmental audits are performed for suppliers' management					
GP4	The ISO 14001 certification of suppliers is performed					
GP5	Environmentally friendly practices of second-tier suppliers are reviewed					
GP6	Environmental parameters are used to choose suppliers					
GP7	Products are eco-labeled					

2.OPERATIONAL PERFORMANCE Assessing how well an organization utilizes its resources to achieve its goals efficiently, including measures of productivity, quality, and cost-effectiveness.		1	2	3	4	5
OP1	We create high-performing products that meet customer expectations					
OP2	Scrap, rework, and faults are decreasing.					
OP3	Customer complaints are decreasing.					
OP4	Productivity is increasing.					
OP5	Manufacturing unit costs are decreasing					
OP6	We respond quickly to changes in market demand.					
OP7	Our organization prioritizes sustainability in its decision-making and operations					
OP8	Our organization is quick to respond to changes in the external environment.					

ORGANIZATION CULTURE The collective values, beliefs, attitudes, and behaviours that shape how employees interact and work within a company, influencing its overall environment and success.		1	2	3	4	5
OC1	I feel encouraged to take initiative and participate in decision-making processes.					
OC2	Our organization is quick to respond to changes in the external environment.					
OC3	There is a clear sense of purpose and direction in our organization					
OC4	Our organization has a strong and cohesive internal culture.					
OC5	People in this organization readily help each other out.					
OC6	This organization is constantly experimenting with new ways of doing things.					
OC7	Our organization prioritizes sustainability in its decision-making and operations					
OC8	Our organization is committed to reducing waste and conserving resources					
OC9	Our organization takes responsibility for its environmental impact and works to minimize harm.					
OC10	Our organization actively contributes to the well-being of the community and society.					

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