The Impact of Green Supply Chain Management Strategies on Operational Performance: Mediating and Moderating role of Green Innovation and Supply Chain Capability

By
Noor Muhammad

NATIONAL UNIVERSITY OF MODERN LANGUAGES
ISLAMABAD

DECEMBER 2023

The Impact of Green Supply Chain Management Strategies on Operational Performance: Mediating and Moderating role of Green Innovation and Supply Chain Capability

By
Noor Muhammad

MSBA, NUML Islamabad, 2023

A RESEARCH SYNOPSIS SUBMITTED IN PARTIAL FULFILMENT OF
THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF PHILOSOPHY

MANAGEMENT SCIENCES

To

FACULTY OF MANAGEMENT SCIENCES

NATIONAL UNIVERSITY OF MODERN LANGUAGES, ISLAMABAD

DECEMBER 2023

NATIONAL UNIVERSITY OF MODERN LANGUAGES
FACULTY OF MANAGEMENT SCIENCES

THESIS/DISSERTATION AND DEFENSE APPROVAL FORM

The undersigned certify that they have read the following thesis, examined the defense, are satisfied with the overall exam performance, and recommend the thesis to the Faculty of Management Sciences

Thesis/ Dissertation Title: The Impact of Green Supply Chain Management Strategies on Operational Performance: Mediating and Moderating role of Green Innovation and Supply Chain Capability.

Submitted By: Noor Muhammad
Name of Student

Registration #: NUML-S20-17327

Dr.Akhtar Tanweer
Name of Supervisor

_____
Signature of Supervisor

Dr. Fauzia Mubarik
Name of HOD (MS)

_____
Signature of HOD

Prof. Dr. M. Zahid Iqbal
Name of Dean (FMS)

_____
Signature of Dean (FMS)

Dr. Nadeem Talib
Name of Director Academics

_____
Signature

_____
Date

CANDIDATE DECLARATION FORM

(Declaration Form to be filled in by Candidate at the time of Submission of Thesis to the Supervisor for Internal and External Evaluation. Follow this pattern strictly, and also let the dotted lines appear on the page)

I, Noor Muhammad

Son of Zahid Hussain

Registration # NUML-S20-17327

Discipline Management Sciences

Candidate of MSBA (Supply Chain Management) at the National University of Modern Languages do hereby declare that the thesis (Title) The Impact of Green Supply Chain Management Strategies on Operational Performance: Mediating and Moderating role of Green Innovation and Supply Chain Capability**.**

Submitted by me in partial fulfillment of M.Phil degree, is my original work, and has not been submitted or published earlier. I also solemnly declare that it shall not, in future, be submitted by me for obtaining any other degree from this or any other university or institution.

I also understand that if evidence of plagiarism is found in my thesis/dissertation at any stage, even after the award of a degree, the work may be cancelled and the degree revoked.

_____
Signature of Candidate

_____
Date

Noor Muhammad

Name of Candidate

TABLE OF CONTENTS

ABSTRACT

Green supply chain management (GSCM), a cross-disciplinary field, grew during recent years with increasing interest from both academia and industry. GSCM considered emphasizing environmental issues in Traditional Supply Chain Management (TSCM). Due to the new trends in global warming, environmental sustainability became a greater concern among organizations and enterprises globally. This study focused on green supply chain management strategies in the presence of green innovation. Green innovation improved operational performance as well as products, leading to economic and operational performance. Different manufacturing sectors put pressure on implementing green supply chain management strategies and green innovation. This study focused on the manufacturing industry, specifically the automobile sector in Pakistan.

A non-probability sampling technique was employed to gather data from a sample size of 300 individuals. Data collection involved using a survey method based on an adapted questionnaire. The collected data underwent SPSS Regression analysis and correlation analysis. The research identified positive responses towards green supply chain management (GSCM) strategies within the context of the Pakistani automobile industry. Notably, operational performance demonstrated a favorable correlation with both GSCM and green innovation. Moreover, the study revealed that supply chain capabilities exerted a positive influence on both GSCM and green innovation, underscoring their substantial interrelationships. Consequently, the research contributes meaningful insights into the intricate dynamics of GSCM, green innovation, operational performance, and supply chain capabilities within the specified industry.

Key Words: Supply Chain Management Strategies, Green Innovation, Supply Chain Capability, Operational Performance, Automobile**,** Green Supply Chain**,** Innovation Strategy, Risk Strategy.

CHAPTER 1
INTRODUCTION

1.1 Background of the Study

In contemporary business dynamics, organizations are increasingly prioritizing the enhancement of both environmental and economic performance, driven by the imperative to fulfill corporate social responsibility. The safeguarding of the environment has emerged as a paramount concern for companies, given the heightened expectations of customers and regulatory authorities across diverse nations. Consequently, there is a pervasive organizational focus on environmental protection to align with evolving societal and regulatory norms. Companies, under increasing environmental pressure, navigate a competitive and regulatory landscape and they must reduce wastage and strategically minimize the environmental footprint of products and services (Shafique, Asghar, & Rahman, 2017).

Organizations, having attained a level of maturity, strategically formulate waste reduction strategies recognizing the dual impact on environmental responsibility and production costs. This proactive stance not only aligns with sustainability goals but also emphasizes the economic benefits of environmentally conscious practices. It serves as an inspiring notion for businesses, urging the application of green supply chain management skills to enhance both ecological footprint and overall operational efficiency, as suggested by (Jabbour et al., 2014). Environmental sustainability is also posited to positively influence economic performance, with financial success dependent on operational efficiency and the ability to meet customer demand for eco-friendly products (Green Jr et al., 2012), as the interplay of an organization's environmental, economic, and operational performance should drive improvements in its overall financial and marketing outcomes, as highlighted by (Lee and Min, 2015).

Green Supply Chain Management emerges not merely as a method for diverse goods and services but also as a strategy to mitigate the risks associated with subpar environmental performance by suppliers. It involves a comprehensive assessment of the environmental performance of suppliers, emphasizing the need for accountability in the supply chain. The significance of instituting a competitive framework for Green Supply Chain Management resonates strongly, underscoring its relevance not only in the commercial realm but also within

academic communities. These findings illuminate the imperative of fostering a robust system that ensures both environmental sustainability and competitiveness across various sectors (Sini et al., 2016) Nonetheless, there are a number of strategic elements that support managers. to implement greener supply chain management, including a favorable business reputation and more effective and innovative leadership (Testa & Iraldo, 2010). Green Supply Chain Management is also a strategy to lessen the possibility of major losses resulting from supply chain sustainability. The board has completely covered all stages of the product life cycle, with an emphasis on green production, green logistics, green purchasing, green investment recovery, and customer collaboration. An organization may achieve performance by concentrating on environmental, social, economic, financial, and operational performance by implementing green supply chain management and conducting board rehearsals (Albort-Morant et al., 2016).

The Green Supply Chain Management strategy addresses suppliers' environmental performance to mitigate potential losses. It is a versatile approach for various products and services, emphasizing the necessity of a competitive framework for widespread adoption in both academic and business communities (Sini *et al*.,2016).

On the other hand, there are several strategic factors encouraging managers to implement greener supply chain management, including a favorable business reputation and more effective and innovative leadership (Testa & Iraldo, 2010). Moreover, Green Supply Chain Management is a technique to lessen the possibility of major losses brought on by subpar performance (Reid & Toffel, 2009), harm to the company's name, reputation, and stock price, and consumer boycotts or order cancellations (Bansal & Clelland, 2004; Vachon & Hajmohammad, 2016).

The utilization of a current performance standard, approach utilized at first by the ford engine company with its providers and presently more every now and again by the other organizations for their supply chain, offers: (a) set up environmental performance benefits (Melnyk, S., and Calantone, 2003), (b) outsider or a careful distance management of execution, and a framework perceived worldwide by other organizations. (c) works on the efficacy of take-up by providers in light of the fact that the framework is perceived by the market furthermore, other industry individuals, reducing the ambiguity of wanted performance levels and limiting the requirement for customer inclusion. According to the point of view of upper hand, in any case,

the benefits are limited in light of the straight forwardness of implementation, an absence of uniqueness, and a developing use by other supply chains (Melnyk, Sroufe, & Calantone, 2003).

Closed-loop strategies, a newer facet of green supply chain management, involve the intricate process of reverse logistics. This encompasses capturing and recovering resources for reuse or high-value re-manufacturing, emphasizing circular economy principles to minimize waste and enhance sustainability (Kocabasoglou, 2007). These materials find application in production, post-use, and end-of-life stages. The closed-loop concept integrates the entire supply chain with environmental performance. Currently, few operational models for facilitated reusing or closed-loop movement in the supply chain exist. Notable examples include the return and reassembly of disposable cameras, Hewlett Packard's recovery of used printer cartridges, and BMW's end-of-life vehicle requirements for suppliers. Organizations are increasingly realizing the significance of such closed-loop practices for sustainability goals. Initiatives like product take-back programs and remanufacturing processes are gaining prominence, enhancing resource efficiency and reducing ecological impact. Embracing these circular economy principles contributes to environmental stewardship and bolsters the overall resilience and competitiveness of the supply chain (Souza, Ketzenberg, & Guide Jr., 2002).

The inspiration for a close-loop strategy continues to be low for more unfavorable reasons. disseminated command over the opposite supply chain, absence of available infrastructure, and the powerlessness of the supply chain to accept that such movement is economically suitable. Planning and effectively utilizing One of the most challenging supply chain initiatives a single firm may take on is the loop approach (Min et al., 2005). They define dynamic capabilities as an organizations capacity to construct, integrate and reconfigure its inner and outer assets and skills to adapt to the quick changes in the business climate. (George et al., 2002) contend that powerful capability empowers firms to recharge and reconfigure their asset base to meet involving customer demand and competitor strategy. The utilization of dynamic capability in the supply chain is turning out to be progressively significant (Witcher et al., 2010 and Fawcett et al., 2011). The developments of dynamic capability in the supply chain are because of the progressions in the long furthermore momentary market interest, market structure and client requirements (Ju, 2016).

Because of the uncertainty of the economic framework, dynamic supply chain capability assumes a significant part in firm survival. We, therefor, trust that Pakistan, as other dynamic

business sectors, is a magnificent setting inside which to examine dynamic store network abilities in contrast with markets with greater experience, where businesses occasionally adapt to substantial changes. Information is broken down using basic condition showing (Aslam et al., 2018) many studies examine the impacts of supply chain agility and capability, either individual or joined, on firm execution (Blome, Schoenherr, & Rexhausen, 2013; Dubey *et al*., 2018; Eckstein *et al*., 2015; Lee, 2004; Lee and Rha, 2016), in any case, the job of market detecting is generally ignored this is an curious oversight as it makes sense that supply chain management would require the capacity to detect open doors and dangers in the commercial center in the main example, to give an adaptable reaction (supply chain capability) as well as to longer-term rearrange the retail network (store network capability).

That dynamic supply chain capability is process of data trade, production network arrangement, and data innovation to address client issues and keep up with intensity in a powerful climate. (Aslam *et al*., 2018) proposed that supply chain dexterity and adaptability are sound parts of dynamic supply chain capability which ought to be coordinated to help supply chain ability to use both hands. Many examinations (Helfat et al., 2007, Ju *et al*., 2016 and Feng et al., 2018) contend that powerful capabilities are the high-request capabilities and this can be disaggregated into various limits. Along these lines, in our review, the store network dynamic capability was disaggregated into the collaboration capability, reconciliation ability, nimbleness capacity, what's more, responsiveness capacity. Every one of the four aspects mirrors an organizations capacity to address client needs and market prerequisites to accomplish feasible serious advantage in a dynamic environment.

Adaptive supply chain skills are essential. in business survival due to the ambiguity of the economic environment. As a result, we think Pakistan, like other volatile business sectors, is an excellent environment for examining dynamic retail network capabilities in comparison to countries with more experience, where firms occasionally adjust to significant changes. Many research evaluates the impacts of capacity and agility in the supply chain, either individual or joined, on firm's execution (Blome, Schoenherr, & Rexhausen, 2013., Dubey *et al*., 2018., Eckstein *et al*., 2015., Lee, 2004., Lee and Rha, 2016), nonetheless, the task of market detecting is often disregarded. Given that supply should be considered, this is an odd error.

In a powerful environment firm's striver to acquire competitive advantage and accomplish improve organizational company's performance (Guruand Matanda, 2019).

Relationship between operational success and internal improving efficiency, which might help it increase its market impact and intensity (Hong, 2019). Operational performance is a complex concept that integrates the potent transformation of functional competencies into a competitive advantage for the company. Productivity, quality, cost, delivery, flexibility, and customer satisfaction typically all go together. serve as its benchmarks for evaluation. (Gambi, 2015; Ju, 2016; Saleh, 2018).

Implementing a performance improvement program can significantly enhance an organization's bottom line. "Functional Performance Measurement: Increasing Total Productivity" guides the way, introducing a novel integrated theory of performance measurement with a previously unpublished model applicable to any business activity. This comprehensive approach outlines the factors that should be measured, provides guidelines for developing measurement systems, and instructs on how to analyze, interpret, and effectively utilize performance metrics. Various charts, tables, and models are employed to elucidate principles and methods, making them easily comprehensible and actionable for organizations seeking to optimize their operational efficiency and overall performance (Kaydos, 2020).

Three main categories of green innovation exist: green management innovation, green process innovation, and green product innovation. (Chen, Lai, & Wen, 2006) discovered a clear relationship between green manufacturing process and product innovation and corporate competitive advantage. He at that point, presented the idea of core competencies. His review showed that green core capabilities characterized as the aggregate learning and capability bout environmental management and green innovation impact an organizations capacity to foster green item and cycle innovation. These studies don't consider the effect of green innovation explicitly on environment performance or the impact of a greener supply chain on green innovation or performance (Chen, 2008). Al through using sustainable supply chain management board writing is rich generally little examination consideration has been centered on green development (Chen, Lai, & Wen, 2006).

Several studies have recently examined the factor that impact green innovation. (Lin et al., 2014) shown how market demand influenced green innovation. (Chang, 2011) identify business morals favorably impact green innovation. (Weng *et al.,* 2015) featured that outer and, inside Pressure from stakeholders is a fundamental factor that affects green innovation.

Environmental guidelines, mechanical and natural aptitudes, market and competitive pressure, and client green demand, according to (Cai and Li, 2018), are the factors that determine green innovation and further affect company performance. Finally, (Awan et al., 2019) pointed out that creativity encourages green innovation, which supports sustainable development. Environmentally conscious organizational capacities have an influence on green innovation, it has been revealed (Dangelico et al., 2017).

Despite the abundance of material on green innovation and sustainable event planning, the aspect of how CSR practices influence these is still not well highlighted (Zhu et al., 2019). This study hypothesizes that a plan for a sustainable environment may be a crucial sign of green innovation when The primary goals of green innovation include improving overall quality of life (de Mandojana & Caracuel, 2013; Amore and Bennedsen, 2016), achieving additional benefits (Dangelico, 2016), cutting cost by raising awareness of environmental responsibility (Tseng et al., 2013b), allocating resources to innovative work (Castellacci and Lie, 2017; Chen et al., 2012), directing (Dangelico et al., 2017), Due to natural obstacles, using dynamic natural approaches was made possible by the imposed and standardized strain on the execution of green innovation (Chen et al., 2018; Du et al., 2018).

1.2 Gap Analysis

Every research tried to find gap from pervious study and try his level best to close the gap as best he can. A research study to fill this knowledge gap would be possible. for analytical thinking and find undiscovered aspects of the job that were not investigated or handled till now. The research gap is depending upon the industry they can only focus on the electronic industry in Pakistan Therefore this study focuses on manufacturing industry in Pakistan like automobile industry. Because now Pakistan has assembled spare parts and motor vehicle and hybrid cars were also assembling in Pakistan. In recent time most of the customers prefer the hybrid car instead of other. From a managerial perspective, this study will be applied in firms to boost their supply chain management channel through novel ideas and procedures that will improve green innovation and operational performance (Shafique, Asghar, & Rahman, 2017).

Green innovation's use in automobile industry is a challenging and demanding activity that required involvement of the stakeholder (Silva et al., 2018). Barriers in green innovation seen as factor that prevents operational performance in automobile industry These limitations

may be both internal and external. In previous studies the limitation that concerned corporate social responsibility adoption by company that operating the automobile industry (Basavaraj *et al.*, 2018) and barrier that suppliers must deal with issues including inadequate supplier training. In simple it is important to investigate the relation between suppliers and automobile industry. As these elements' dedication is essential to the adoption of innovative green practices. Several studies have also examined the impact of the social and political context on the adoption of green innovation by leaders in the automotive sector (Gohoungodji et al., 2020).

1.3 Problem Statement

The automobile industry is currently struggling with a significant market challenge which is slow consumer adoption of hybrid and electric cars. In response, companies are innovating to control environmental pollution, which is paving the way for this study. Despite recognizing the global need for improved environmental and economic performance, the industry faces the market challenge of consumers hesitating to embrace sustainable vehicles. The study explores how Green Supply Chain Management (GSCM) can be a game-changer in overcoming consumer inertia, focusing on waste reduction, minimizing environmental impact, and operational efficiency.

The automobile industry had a traditional notion that considers environmental compliance to be an additional expense in the face of growing environmental concerns. The goal of the study is to demonstrate the transformative impact of green innovation practices, changing the perspective of the industry from one that views environmental compliance as an expense to one that sees it as a driver of operational excellence and sustainability.

The adoption of GSCM tactics by consumers for environmental sustainability presents a significant problem. Despite prior concerns about unexpected costs, the sector is beginning to recognize how GSCM improves operational performance. This study emphasizes how GSCM may concurrently solve environmental issues and improve operational effectiveness. The study highlights the transformative potential of integrating GSCM, green innovation, and operational performance and emphasizes the need to change the industry mindset from seeing GSCM as an additional cost to a strategic driver for sustainability

This study emphasizes the significance of adopting sustainable strategies, presenting them as an environmental necessity and a strategic route to greater resilience and competitiveness within the context of the sustainability landscape and consumer reluctance towards eco-friendly automobiles. The study explicitly examines the positive impact of Green Supply Chain Management (GSCM) strategies on operational performance, explaining the function of Green Innovation and Supply Chain Capability. The study reveals how GSCM not only changes the way the industry views environmental compliance, but it also produces positive outcomes by strengthening supply chain capabilities and improving operational efficiency through innovative strategies.

1.4 Research Objectives

1. To explore the relationship between Green Supply Chain Management Strategies and Operational Performance.
2. To explain the mediatory role of Green Innovation between Green Supply Chain Management Strategies and Operational Performance.
3. To examine the moderating role of Supply Chain Capability between shared Green Supply Chain Management Strategies and Green Innovation.

1.5 Research Questions

1. What is the effect of green supply chain management strategies on Operational Performance?
2. What is the effect of Green Innovation on the supply chain capability?
3. What is the impact of Green Innovation on the relationship of Green Supply Chain Management Strategies and Operational performance?
4. What is the impact of Supply Chain Capabilities on the connection between Green Supply Chain Management Strategies and Green Innovation?
5. What is the impact of Supply Chain Capabilities on the relationship of Green Supply Chain Management Strategies and Operational performance?

1.6 Significance of the Study

This study contributes significantly to the literature by exploring the synergies between green innovation and supply chain strategies in Pakistan, highlighting their potential to enhance environmental conservation, reduce organizational costs, and improve operational performance. This study holds significant promise across industrial, social, managerial, and theoretical dimensions. This study contributes significantly in literature by examining how integrating green innovation and supply chain strategies in Pakistan enhances environmental conservation, reduces costs, improves operational performance. This study has practical impact, addressing literature gaps, presenting a model for Pakistan's industries toward eco-conscious practices, cost savings.

The study's industrial impact is characterized by its tailored insights, specifically attuned to the dynamics of Pakistan. This focused approach has the potential to establish a pioneering model for sustainable practices, thereby enhancing social relevance within various sectors. On the managerial front, the study delves into the specifics of how green supply chain strategies contribute to both environmental sustainability and cost reduction. By offering practical managerial frameworks, the research equips organizations with actionable insights to enhance their operational performance. In terms of theoretical contribution, the study enriches the broader landscape of theory by delving into the intricate relationships within green supply chain management and innovation, particularly within the unique context of Pakistan.

1.7 Scope of the Study

This extensive review holds significant value for both academics and management administrators. From an academic perspective, it serves to bridge existing gaps in the literature, offering fresh insights into operational performance. Moreover, it paves the way for future research by presenting alternative viewpoints on operational performance. The study establishes a direct correlation between operational performance and capabilities in the context of a green supply chain. Notably, it advances the exploration of an indirect link by examining the interplay between green supply chain strategies, operational performance, and green innovation within the framework of supply chain management capabilities. This dual focus on direct and indirect connections represents a novel approach not previously explored in a single study. The findings also underscore that the adoption of new green innovations within an organization contributes to a subsequent increase in operational performance.

CHAPTER 2

LITERATURE REVIEW

Industrial Background

The automotive industry, a cornerstone of the manufacturing sector, faces a recognized strategic imperative to improve both environmental and economic performance on a global scale. Companies operating within this sector are under increasing pressure to minimize waste and reduce the environmental impact of their products, highlighting the critical role of Green Supply Chain Management (GSCM) strategies (Shafique, Asghar, & Rahman, 2017). GSCM has emerged as a vital approach not only for goods and services but also as a strategic response to potential environmental risks stemming from suppliers (Sini et al., 2016).

In the automotive industry, GSCM involves a comprehensive assessment of the environmental performance of suppliers, emphasizing accountability within the supply chain (Sini et al., 2016). The competitive framework for GSCM is crucial, not only in the commercial realm but also in academic communities, underscoring its relevance and significance (Sini et al., 2016). Managers implementing GSCM strategies are motivated by factors such as a favorable business reputation and innovative leadership, recognizing the economic benefits and sustainability goals that come with environmentally conscious practices (Testa & Iraldo, 2010).

Closed-loop strategies, a newer facet of GSCM, involve reverse logistics and emphasize circular economy principles to minimize waste and enhance sustainability (Kocabasoglou, 2007). Notable examples include product take-back programs and remanufacturing processes, contributing to environmental stewardship and bolstering the overall resilience and competitiveness of the supply chain (Souza, Ketzenberg, & Guide Jr., 2002).

Despite the importance of closed-loop strategies, the adoption continues to face challenges, including dispersed control over the reverse supply chain, lack of infrastructure, and skepticism about economic feasibility (Min et al., 2005). Implementing a closed-loop approach requires dynamic capabilities, defined as an organization's capacity to construct, integrate, and reconfigure its resources to adapt to rapid changes in the business climate (George et al., 2002).

Dynamic capabilities in the supply chain are increasingly significant due to changes in market demand, structure, and customer requirements (Ju, 2016). In the face of economic uncertainty, dynamic supply chain capability plays a crucial role in a firm's survival (Aslam et al., 2018). The ability to detect opportunities and threats in the marketplace is essential for

supply chain management, aligning with the broader concept of dynamic supply chain capability (Aslam et al., 2018).

Operational performance is a key focus in the automotive industry, integrating various aspects such as productivity, quality, cost, delivery, flexibility, and customer satisfaction (Gambi, 2015). Implementing a performance improvement program is essential for enhancing an organization's bottom line, as highlighted in the book "Functional Performance Measurement: Increasing Total Productivity" (Kaydos, 2020).

Green innovation is another crucial aspect in the automotive industry, with three main categories: green management innovation, green process innovation, and green product innovation (Chen, Lai, & Wen, 2006). The relationship between green manufacturing processes, product innovation, and corporate competitive advantage is evident (Chen, Lai, & Wen, 2006). The impact of green innovation on environmental performance, supply chain management, and operational performance is an area that requires further exploration (Chen, 2008).

Studies have shown that factors such as market demand, business ethics, stakeholder pressure, and creativity influence green innovation in the automotive industry (Lin et al., 2014; Chang, 2011; Weng et al., 2015; Awan et al., 2019). However, the relationship between corporate social responsibility practices and green innovation is not well-explored (Zhu et al., 2019).

The focus on the manufacturing industry in Pakistan, particularly the automobile sector, is justified by the recent trend of assembling spare parts and hybrid cars in the country. The preference for hybrid cars among customers in Pakistan makes the automotive industry a relevant context for studying GSCM strategies, green innovation, and operational performance (Shafique, Asghar, & Rahman, 2017).

2.1 Introductory Literature

2.1.1 Green Supply Chain Management Strategies

Green Supply Chain Management (GSCM) Strategies involve the strategic integration of environmental criteria, aiming to minimize impact, address risks, and achieve specific environmental goals. Recently, there has been a heightened focus on the role of the supply chain in both influencing the environment and effecting changes in environmental performance. This shift in perspective is attributed to growing social awareness and regulatory modifications in packaging and end-of-life product management, identifying supply chain risks and emphasizing

environmental criteria throughout the customer-to-supplier continuum. Extensive research into the development of GSCM has led to a global acknowledgment of its significance and purpose.

Unlike a mere collection of disparate greening activities without a clear goal, there is considerable room for improvement in understanding the prospective methods of GSCM. The literature suggests evolving sets of various supply chain methods facilitating such activities and proposes future prospects, considering the rapid and rising growth in the field of GSCM. (Fisher, 1997) introduces the notion of determining the most fitting GSCM strategy for a specific product, cycle, or industry setting.

One of the most direct approaches to enhancing GSCM, in terms of cross-organizational cooperation and asset improvement, involves a risk reduction strategy. Firms adopting this strategy are advised to customize their actions based on partner requirements, particularly for organizations lacking internal environmental management tools or participating in supply chain greening programs. The success of this strategy hinges on effective inter-organizational cooperation, often paired with deviations from established international standards like ISO 14001. Proactive communication and training initiatives are deemed essential for seamless integration across the supply chain (King et al., 2005).

The number of organizations considering the integration of environmental practices into their business operations is consistently growing. Various drivers, including rule-driven programs and deliberate ecological initiatives, incentivize companies to become more environmentally friendly. The literature recognizes these ecological projects, encompassing creative and organizational improvement initiatives, as viable means of gaining or maintaining a competitive advantage. An area of growing importance within the environmental programmer is the attention to organizations' external links.

This research introduces a decision system designed to bolster administrative independence, facilitating the assessment of alternatives that influence the nexus between environmental practices and external relationships. This specialized decision system, oriented towards environmentally responsible strategic policies, thoroughly investigates the role of green supply chain executives and their pivotal function as the bedrock for the choice system. Additionally, the study delves into the potential application of a dynamic, non-linear multi-attribute choice model—the insightful organization process—within the framework of the green supply chain network. Furthermore, it explores the evolving concept of Modern Nature,

recognized as an effective organizational structure for environmental management. This concept portrays the contemporary world as an integral part of the local and global biosphere, offering valuable insights into achieving sustainable environmental performance.

The increasing trend among businesses to incorporate environmental principles into their strategic frameworks and daily operations stems from diverse motivations. These motivations include adherence to rule-driven programs and the initiation of deliberate ecological initiatives. These ecological projects, spanning creative and organizational improvement initiatives, are perceived as pragmatic avenues for organizations to either gain or sustain a competitive edge. Notably, a specific facet gaining prominence within the realm of environmental programming is the heightened emphasis on organizations' external links. This underscores the growing recognition of the interconnectedness between businesses and their external environment in fostering environmentally responsible practices.

Green supply chain management, or GSCM, improves productivity, quality of output, and system adaptability while using less resources, which lowers production costs. It also has a favorable effect on innovation in operations. Companies should give effective energy and material management top priority if they want to experience long-term success, as GSCM practices and innovation have a significant impact on sustainable organizational Operational performance. This advances GSCM and innovation, provides direction for creating ecologically friendly practices, and helps them gain a competitive edge (Khan et al., 2022).

2.1.1.1 Innovation Base Strategy

Innovation-Based Strategy in Green Supply Chain integrates specialized knowledge, resources for environmental performance, fostering ecologically friendly practices across product life cycles. A few Organizations have started to make sure that customers of their products are given a more thorough item life-cycle evaluation. The level of information exchange and social investment starts to vary if a supply chain starts to consider specialized cycles, innovations, or sophisticated performance criteria for providers like chemical avoidance. It takes specialist knowledge to transition from a green supply chain management system that is efficiency-based to one that integrates environmental performance more thoroughly into supply chains and product design. environment assets (Lenox and King, 2004).

More devoted natural assets, specialized people, and a plan are needed to stay current with changes to environmental legislation and prepare providers. For environmentally significant cycle adjustments. An organization can move to an innovative green supply chain management approach from one that is efficiency-based thanks to the improvement of such assets. The resources generated for products could be combined with innovative natural planning into specific item plans, attributes, uses, or activities connected to the life cycle (e.g., administration, fix, furthermore, reusing). They could be developed at the process level to promote ecologically friendly frameworks and methods for the production, distribution, and consumption of goods (Lenox and King, 2004).

The main variables of green innovation to work on general standard of living (de Mandojana & Caracuel, 2013; Amore and Bennedsen, 2016), to accomplish further benefit (Dangelico, 2016), to decrease costs through expanding familiarity with environmental responsibility (Tseng et al., 2013b), to put resources into innovative work (Castellacci and Lie, 2017; Chen *et al*., 2012), to lead green innovation preparation (Aid *et al.*, 2017; Woo *et al.*, 2014), to increment authoritative productivity (Yan, 2015), to reduce or wipe out utilization of toxic elements, contamination and waste (Dangelico, 2016), The positive effect of forced and standardizing tension on Green Innovation execution was (Chen *et al*., 2018; Du *et al.*, 2018), to utilize dynamic natural methodologies because of natural difficulties (Hsu *et al.*, 2011), to lay out a solid connection between natural similarity, green items improvement and administrations (Lee and Kim, 2011), to use eco-accommodating gear and 288 advances and to put resources into climate safeguarding measures (Qi *et al*., 2010)

Depending on whether you think an innovation is safe or not, you'll choose a different sort of innovation and level of risk for it. Your business may pursue many goals, necessitating the use of multiple tactics. Consider the kind of innovation approach that will help you achieve your goal once you've defined Describe your desired result and how it relates to your business.

Four different innovation approaches are available: proactive, active, reactive, and passive (Dodgson et al., 2008).

a) Proactive

Businesses with proactive innovation strategies frequently place a high priority on research, enjoy first-mover advantage, and dominate the technological market. They participate

in high-risk activities and learn from a range of sources. Examples include Singapore Airlines, DuPont, and Apple

- Innovative technologies that fundamentally alter the character of goods and services are used in proactive innovation strategies.
- incremental: Constant technological or procedural advancements that enhance the functionality of goods and services.

b) Active

Plans for active innovation must include the defense of existing markets and technologies as well as being prepared to move quickly once such markets and technologies have been verified. Companies that use this tactic often hedge their bets, have access to a broad spectrum of skills, and are exposed to medium- to low-risk situations. Examples include Microsoft, Dell, and British Airlines.

These companies mostly do internal relevant applied research and development

c) Reactive

Companies employ the reactive innovation method to:

• Who are your supporters?

• focus on operations;

• wait and see;

• focus on operations; • wait and see;

They replicate tried-and-true technologies and only use incremental innovators. The low-cost carrier Ryan Air is one example of how the no-frills service philosophy of Southwest Airlines was effectively applied.

d) Passive

Organizations Using detached development approaches, they wait until their customers ask for changes to their products or services. Auto supply companies are included in models because they believe that their clients would ask for revisions to the details before implementing these (Dodgson, Gann, & Salter, 2008).

2.1.1.2 Risk Base Strategy

A strategy centered on risk management involves the systematic identification and prioritization of compliance risks, directing attention to controlling, shaping policies, and

refining processes with an emphasis on mitigation rather than mere efficiency. The objective is to address and preemptively manage potential pitfalls that may emerge in the form of investigations, regulatory settlements, negative media coverage, or jeopardized business alliances, among others, as these pose the most significant threats to a company.

Each of these risks necessitates careful handling, all while considering the implications of compliance risks. Employing a uniform strategy to tackle these diverse risks would not only be inadequate but might also be perceived as ineffectual by regulatory authorities. This strategic process is a dual-phase endeavor, encompassing the identification and prioritization of specific hazards. Consequently, when referring to a risk-based approach, the term also implies a quality of agility—a capacity to adapt and respond dynamically to the evolving landscape of risks and regulations.

It would be prudent to have that in mind as you explain to top executives the need of compliance initiatives. A risk-based strategy is superior for managing compliance programmers but it isn't always more economical or quicker because efficiency and speed aren't the key goals. They are intended to lessen compliance risks instead. Risk assessment calls for a number of unique skills. Being able to do due diligence on third parties, to confirm their credibility, considering that they could join your larger business. Working with a third party will unavoidably include some risk, but the most crucial thing is that you be aware of those dangers. It suggests that one can also keep track of regulatory developments. It can imply new regulations for your company or harder-to-enforce current laws. You must thus comprehend how modifications to the external environment modify what constitutes an organizational compliance risk that is considered to be "high".

The utilization of a current performance standard approach utilized at first by the Ford Engine Company with its providers and presently more every now and again by other organizations for their supply chains provides: (a) setting up environmental performance benefits and (b) outsider or careful distance management of execution and a framework regarded globally by other companies. This third point of view focuses on the effectiveness of provider adoption in light of how the framework is seen by the market and other industry players, minimizing uncertainty regarding desired performance levels and lowering the need for customer participation. In any event, from the perspective of having the upper hand, the benefits are

limited due to the simplicity of implementation, the lack of uniqueness, and the growing usage by other supply chains (Melnyk et al.,2003)

A comparative way to deal with fundamental certification plans is the utilization of wide statements inside buying direction or standards to incorporate provider exercises among the association's ecological obligations. Such frameworks dependent on hazard minimization just and oversaw in an environment of low social speculation as it were ensuring production network consistence with neighborhood or public guidelines. The end result being that hazard can be limited and notoriety upgrade is conceivable, however no extra advancement or complementary monetary benefits are logical (King et al.,2005).

The least simple strategy of GSCM is one of risk minimization. Firms adopt this technique basically because of partner requests. This strategy works for associations that have not many environmental management recourses, or that have as of late presented a production network greening program. It depends on negligible between environmental engagements. Effort might include the consideration of fundamental statements in acquisition gets that expect providers to meet all applicable administrative necessities. Most frequently this approach takes on laid out worldwide principles, for example, ISO 14001 (environmental management) to guide operational processes.

The use of a current performance standard approach, first used by the Ford Engine Company with its suppliers and now more frequently by other organizations for their supply chains, offers: (a) establishing environmental performance benefits (Melnyk et al., 2003); and (b) outsider or careful distance management of execution and a framework that is recognized internationally by other companies. This third point of view reduces uncertainty over required performance levels and reduces the necessity for customer interaction by focusing on the success of provider adoption in light of how the framework is perceived by the market and other industry participants. In any case, from the standpoint of being in control, the advantages are few because of the ease of deployment, the absence of

From a competitive advantage point of view, the advantages of this strategy are limited in light of the fact that such techniques are not difficult to implement. Need uniqueness, and are effortlessly repeated by others. It is difficult to minimize risk using this technique, and even improve reputation. However, innovation or other complementary advantages are unlikely.

- The following are some benefits of using a risk-based strategy for regulatory compliance:

- Paying more attention across the board to regulatory results, resources, and actions.
- Better capacity to adjust to shifting situations.
- More responsibility and openness for results.
- Higher quality - All significant concerns are addressed
- In order of risk-severity, find the faults, analyze them, and fix them.
- A problem-solving action plan that outlines objectives, tactics, and recommendations can be created.
- It is possible to continually assess hazards to keep track of the project's progress and quality.
- Finding gaps will be made easier by connecting product risks to requirements.
- Risk-based processes are the most effective ones.
- Customer satisfaction will increase with effective tracking and reporting.
- By categorizing test results according to risk, the organization may intentionally select the You may concentrate more on the business project's risks than on the information system's structure.
- The risk analysis will be more accurate and complete.
- The risk-based strategy has benefits, but there are also drawbacks:
- Risk estimates that are excessively low and associated with unknown threats are potential drawbacks. Only if these threats materialize will they be a concern.
- The challenge with risk assessment is that it may be very subjective, which emphasizes the significance of risk identification and analysis as a basis for a risk-based strategy. This is due to the fact that there are no known objective standards, hence it is typical to rely on.
- In that situation, professional judgement. So, finding and choosing the appropriate stakeholders for risk assessment is a substantial difficulty.

2.1.1.3 Close Loop Strategy

Much like the methodology employed in data-driven marketing, closed-loop marketing relies on data and insights as a foundation for enhancing Return on Investment (ROI). In the context of closed-loop marketing, the term "closed-loop" specifically denotes the ongoing

collaboration between marketing and sales teams in a perpetual feedback loop focused on reporting leads. In the evolving landscape of contemporary organizational structures, the synergy between sales and marketing has encountered challenges. Although these departments traditionally collaborate to translate demand into revenue, the exchange of data and the organization of formal meetings between them are often lacking. Closed-loop marketing addresses this divide by establishing a formal and continuous connection between these interdependent departments. Through consistent communication and the exchange of valuable information, closed-loop marketing operations work to fortify the integration of marketing and sales in a cohesive manner, eliminating the barriers that hinder their effective collaboration.

There are several advantages to uniting the marketing and sales teams through a dedicated data sharing procedure. For instance:

- Decreased marketing expenses
- Better conversion rates
- Lower cost per lead
- Knowledgeable lead management techniques
- Shorter sales cycles
- Improved customer experience overall
- Accurate ROI assessments

With the help of closed-loop marketing, marketing and sales may collaborate in a data-driven way to provide solid outcomes and ongoing campaign performance improvement. Nevertheless, before implementing this tactic, be sure to give the cultural and technological requirements it introduces careful thought. Otherwise, before you notice the effects of the closed-loop paradigm, the project can be abandoned.

The motivation for a close loop approach is still weak for several fundamental reasons, including poor furthermore, dispersed control over the rival supply chain, a lack of infrastructure, and the inability of supply chains to see that such a movement is economically viable. One of the most difficult tasks a single firm can try inside its supply chain is planning and successfully implementing a close loop strategy (Richey,2005). In its most straightforward structure closing the loop might include item reclaim and switch logistics carried out just in the supply chain's retail sector. It can be difficult and expensive to build up a successful reverse logistics system. The cost of technology will rise along with the expense of transporting old items back to

production plants. Even if reduced waste might eventually cover these expenses, some businesses might find the initial financial strain to be too high. Utilized or outdated waste products and materials are recovered by the manufacturer and remanufactured or reused as compared to being thrown off in a landfill in more complicated closed-loop systems.

The close loop strategy not withstanding addresses a methodology that consistently coordinates issues of financial, functional organizations with a focus on environmental performance that are thinking about implementing a closed-loop supply chain need to have a large amount of control over the capture and recycling of waste materials. Data has exploded in recent years, new digital marketing channels based on social media and e-commerce have appeared, and more and more businesses are starting to understand the potential of big data. It is noted that the efficient use of big data may assist businesses in making better decisions; the emergence of data analysis firms and third-party Internet service platforms changed closed-loop supply chain management. To acquire better user data, comprehend and anticipate client needs, more businesses are choosing to collaborate with third-party Internet service plat forms needs more precisely.

To push corporate marketing change, Unilever, a publicly listed firm that offers food and laundry goods, even developed a new marketing executive post, the Big-Data Marketing Officer. Closed-loop supply chain companies can more effectively analyses user behavior, increase product exposure, improve brand goodwill (which refers to the comprehensive image of a brand in consumers' minds—including its attributes, quality, grade (taste), culture, personality, etc.) and improve consumer environmental awareness with the help of big-data marketing technology, according to research. Merchandise should be overseen for quality consideration and collection of assortments and arranging exercises permits for the creation of scale-based economies. Long stretches of development work are necessary for such a high level of cooperation between partners and socially complicated information. Connections that are focused on community and are socially complicated provide the foundation for a close-loop supply chain approach. (Guide, 2002).

The desire for a close loop approach is still weak for several fundamental reasons, including poor furthermore, Supply chains are unable to recognize that such a movement is economically viable due to a lack of infrastructure, scattered control over the competing supply chain, and many other factors. One of the most difficult tasks a single firm can try inside its

supply chain is planning and successfully implementing a close-loop strategy (Richey, 2005). Closing the loop might comprise item reclamation and switch logistics carried out just in the retail sector of the supply chain in its most basic form. It can be difficult and expensive to build up a successful reverse logistics system. The expense of extending monitoring systems and transporting old items back to production plants will both go up.

2.1.2 Operational Performance

Operational Performance (OP) entails the systematic evaluation of an organization's effectiveness, efficiency, and environmental responsibility in comparison to predefined or standard metrics. These metrics encompass a range of factors, including cycle time, productivity, waste reduction, and regulatory compliance (Business Dictionary, n.d.). Key Performance Indicators (KPIs) serve as the specific measurements employed in this assessment, and the choice of KPIs often varies across industries and sectors.

For instance, in the context of a brewery, key indicators may encompass cycle time, water usage per hectoliter of beer produced, energy consumption, biological oxygen demand (BOD), beer volume produced per hour, and other relevant metrics. These indicators play a pivotal role in contributing to the bottom line, influencing critical determinants such as the total cost of production per liter. The diverse set of KPIs reflects the industry-specific priorities and performance benchmarks essential for gauging and optimizing operational efficiency, sustainability, and overall success within the brewery sector.

The operational performance is improved from the even point of view of an incorporated supply chain. The operational competency is improved as far as coordination’s administrations including the capacity of a firm to offer administrations like without a time to spare and inventory management to make the simple accessibility of product to the customer. Also, it helps in adjusting rapidly to the distribution organization to satisfy demand (Derwik and Hellstrom, 2017). A process's effective planning and management actions produce its operational performance. The efficiency of an operation is influenced by planning, regulating, timing, and correct scheduling, which also aid in identifying potential deviations and urging a rapid and effective reaction. This entails constructing the procedures in accordance with the analogy of push or pull and the speed of the bottleneck step. “A push system is where material is moved on

to the next stage as soon as it has been processed whereas a pull system means material is moved only when the next stage wats it" (Slack, et al., 2013).

There is always a bottleneck in both systems—a process step that has a limited capacity and, as a result, runs slower than all other processes in the system. As it determines the pace, it must operate continuously, hence some type of control is necessary to ensure that operations that occur earlier do not to overindulge. Having stated that, the bottleneck dictates how much buffering to add at both ends of the operation, which has an impact on inventory control. Some others operational performances incorporate plan, cost, and delivery. The expense skill includes the capacity to reduce and control cost. The plan skill is the ability of a firm to make changes in item plan and present new items. The delivery skill is the capacity to offer items with quicker delivery. The results of this study have been published in literature (Ataseven and Nair, 2017).

The network theory Indicate a connection between operational performance and supply chain capability. The focus point of the organization viewpoint is on the cooperation among a several parties in the organization. The skills, assets, and capacities of individual firms are improved by the coordination systems and efforts. The competitive ability of ventures could be improved with movement and inner decision making between the firm and its outer partner (Antara and Sumarniash, 2019).

To achieve long-term success, businesses must emphasize efficient energy and resources management, since GSCM practices and innovation have a big impact on sustainable organizational operational performance. This makes GSCM and innovation more advanced, offers guidance for developing environmentally friendly practices, and gives them a competitive advantage (Khan et al., 2022). Moreover, it is recommended by a firm that creates non-substitutable, way dependent and incomparable ability with time, which is operational performance. Supply chain management capability assists a firm with accomplishing and support competitive advantage or implementation of supply chain management by a firm there is need for close collective connection with providers (Lee and Nam, 2016). It was pointed by that the circle of exercises is affected by the drawn-out essential connections of the firm. Besides, it was reported by (Giannoccaro et al.,2018) that a new avenue could be presented by provider combination for expanding the inside operational competencies. The capacity of a firm to create gains and coordinate its supply chain is decidedly impacted by this essential strategic task. It also impacts the serious capacity of the producer (Mourao, 2019).

A process' operational performance is the result of efficient planning and management efforts. Planning, controlling, timing, and proper scheduling affect an operation's efficiency. These factors also help identify possible deviations and encourage a prompt and effective reaction. In order to do this, the processes must be built using the analogy of push or pull and the speed of the bottleneck phase. "With a push system, material is transferred to the following stage as soon as it has been processed, whereas in a pull system, material is transferred only when the subsequent step is ready for it" (Slack, et al., 2013). There is constantly a bottleneck in both systems—a process step with limited capacity that, as a result, Runs slower than all other processes.

2.1.3 Supply Chain Capability

Supply chain capability is an organization's ability to adapt, collaborate, integrate, and respond effectively to dynamic market structures and customer requirements. The supply chain is changing as a result of the utilization of dynamic capabilities. out to be increasingly significant (Witcher et al., 2010 and Fawcett et al., 2011). The development of dynamic capability in the supply chain is because of the progressions in the long- and short-term market structures and customer requirement (Ju, 2016). In this way firms should have the ability to adapt their supply chains to these changes. Businesses may use dynamic supply chain capability to make a cooperative relationship with different organization, Customers and suppliers accurately forecast market demands, improving the supply chain responsiveness to fulfil their need (Sanders, 2014). A few studies have looked at the potent capacities from the perspective of the supply chain. (Mathiva thanan, 2017) argued that the to manage future requirements, the supply chain's development of dynamic capacities is crucial. According to (Gracious, 2019), dynamic supply chain capabilities are an organization's ability to recognize and take advantage of internal and external resources in order to enhance supply chain procedures in a useful and effective way. Moreover, they claim that exchanging data, coordination, integration, and supply chain responsiveness are examples of dynamic supply chain capabilities.

Numerous businesses are now dedicated to offering their product consumers more thorough attention throughout the entire product life cycle. As supply chains increasingly embrace advanced performance criteria for suppliers, considerations go beyond mere efficiency to include factors such as chemical avoidance, specialized processes, and technological

advancements. This shift indicates a transformation in information exchange practices and levels of social investment within supply chain management.

Transitioning from an efficiency-focused supply chain model to one rooted in the principles of Green Supply Chain Management (GSCM) requires specialized environmental resources. These resources play a crucial role in facilitating the integration of environmental performance considerations into both the supply chain and product design processes (Lenox and King, 2004). This strategic evolution reflects a growing commitment among businesses to not only meet operational goals but also to actively address environmental concerns, demonstrating a broader responsibility that extends across the entire lifecycle of their products (Lenox and King, 2004).

(Ju, 2016) argues that in order to fulfil customer wants and maintain intensity in a competitive environment dynamic supply chain capability are cycles of data exchange, supply chain layout and data innovation. (Aslam, 2018) suggested that the supply chain's flexibility and agility are consistent parts of dynamic supply chain capabilities which should be coordinated to help supply chain capabilities to use both hands. Many studies (Teece, 2007; Ju, 2016 and Yu, 2018) contend that dynamic capabilities are the high-request capability and this can be disaggregated into various capacities. Hence in this, the dynamic capabilities of the supply chain were broken down into the cooperation capability collaboration capability, integrate capability, and responsiveness capability. Every one of the four aspects mirrors an organization’s capability to address client demand and market requirement to accomplish supportable upper hand in a powerful climate collaboration capability refuse an organization’s ability to assemble a drawn-out association as far as supply chain operations and the sharing of information resources and risk to achieve shared goals (Bowersox, 2002). Supply chain coordinated effort capability, according to (Cao and Zhang, 2011), is an organization's capacity to exchange data, information, and assets while maintaining goal consistency. (Yunus, 2018) looked at the importance of provider cooperation, client collaboration, and internal teamwork in the cooperative supply chain. It has following steps.

Capacity Planning is essential for choosing the best use for an asset and is important for the dynamic cycle. It is a method for identifying and estimating the universe's overall capacity for creation. CP is utilized for capital-escalating assets like machinery, equipment, buildings, and so on. Scope quantification is crucial because it aids the organization in identifying its future requirements, ensures that operating costs are maintained at the lowest level possible without

compromising quality, and helps the organization remain competitive and complete its long-term development strategy.

A Capacity Planning process includes deciding how much creation limit is expected to fulfill changing need for items. Plan limit alludes to an association's most extreme ability to achieve work throughout a given time span in scope quantification. CP quantification process is involved by associations to decide their creation limit to meet the changing necessities of their items. A plan limit is an association's greatest capacity to finish a predetermined measure of work in a given time span, with regards to scope quantify. CP quantification is the demonstration of adjusting accessible assets to fulfill client interest or venture limit needs. In project the board and creation, limit alludes to how much work that can get finished in a given measure of time. The CP organization process is critical in project the board information regions, for example

- Asset the executives
- Using time productively
- Group the executives
- Work The executives

Creation limit, methodology arranging, and undertaking arranging remain closely connected. Arranging is the undertaking of booking the colleagues with the goal that the work gets finished on time. Limit the board is certainly not a set technique. Since each organization is particular and request continues to vary, project chiefs can utilize different scope quantification procedures to answer various circumstances.

There are three CP quantification systems to help you in fulfilling the need, covering your asset needs, and supporting the efficiency of your colleagues.

- The lag strategy involves having adequate assets to satisfy request as opposed to arranged request assessments. This scope quantification method is invaluable for more modest firms with restricted limit prerequisites.
- The essential technique involves having an adequate number of assets to fulfill request gauges. The lead methodology arranging strategy is gainful since your additional limit can oblige the rising interest.
- This method consolidates the lead and slack scope organization draws near. In this occurrence, project administrators should screen genuine interest, request arranging evaluations, and market advancements to adjust limit.

Capacity Planning Advantages

Capacity Planning is crucial for optimizing asset utilization in organizations with capital-intensive assets like machinery, equipment, and buildings. This strategic process involves identifying and estimating an organization's overall production capacity. It helps forecast future requirements accurately, maintain optimal operating costs, and ensure competitiveness while aligning with long-term development goals.

In project management and production, the concept of capacity is fundamental, representing the amount of work that can be effectively accomplished within a specified timeframe. Capacity Planning, a pivotal process in various project management knowledge areas, plays a significant role in optimizing organizational resources across asset management, operational efficiency, team coordination, and overall work management.

The quantification of planned capacity becomes a strategic imperative, acting as a yardstick for an organization's maximum capability to execute work within a defined time period. This quantification is a dynamic aspect of Capacity Planning, where organizations strategically align their production capabilities to adapt swiftly and effectively to evolving product requirements. This proactive approach ensures that the organization's operational capacities are well-matched to the demands of the projects at hand.

Successful project management hinges on the judicious utilization of resources, and Capacity Planning emerges as a linchpin in achieving this delicate equilibrium. By incorporating a robust Capacity Planning process, organizations can enhance their responsiveness to changing project scopes, allocate resources optimally, and ultimately bolster their overall project management efficiency. This process is integral to navigating the complexities of project execution, ensuring that teams are well-equipped to meet objectives while efficiently managing workloads and timelines.

Strategic approaches like Lag Strategy, Lead Strategy, and Match Strategy are employed in Capacity Planning to fulfill demand, cover resource needs, and optimize team productivity. These approaches contribute to an organization's adaptability and responsiveness to changes in market demand and supply dynamics.

The advantages of Capacity Planning are diverse and impactful. They include reducing stock-outs, identifying failures in the business cycle, and enhancing delivery capacity. Accurate

prediction of market and demand fluctuations enables organizations to proactively adapt to changes, ultimately enhancing operational efficiency and customer satisfaction.

Inventory Management & Optimization involves a significant investment to manage inventory effectively. This strategy aims to identify excess stock, optimize storage locations, and create scenarios based on organizational growth plans. The comprehensive process encompasses demand forecasting, inventory replenishment, managing inventory levels, inventory storage, and implementing best practices for supply chain inventory optimization.

Demand Management is integral to assessing, forecasting, and managing customer demand for goods and services. This process enhances coordination between operations and marketing, resulting in a tighter alignment of strategy, capacity, and customer needs. Demand Management involves capturing and interpreting potential demands, translating them into actionable insights for relevant departments within the organization.

Master Production Planning (MPS) plays a critical role in orchestrating the production of goods by defining quantities, timing, and necessary production information. Serving as a contract between sales and manufacturing, MPS aligns production activities with demand forecasts, significantly impacting a company's efficiency and overall production planning.

Material Replenishment Planning (MRP), a computer-based system, determines components and materials needed for production. This involves inventorying available resources, determining additional requirements, and scheduling their development or purchase. MRP creates a draw-driven replenishment process, ensuring a continuous supply from the supplier.

Collectively, these operational strategies contribute to efficient resource utilization, streamlined processes, and improved responsiveness to market demands, positioning organizations for sustained success. The integration of these strategies within an organization's operational framework enhances its ability to adapt to dynamic market conditions, minimize risks, and achieve long-term sustainability.

Why it is important?

Material Replenishment Planning, which is mostly carried out through specialized software, ensures that the appropriate stock is available for the creative interaction precisely when it is necessary and at the least expensive rate feasible. MRP addresses these issues by focusing on the productivity, flexibility, and efficacy of assembly activities. It can increase the utility of

assembly line workers, improve product quality, and keep labor and material costs in check. MRP also helps manufacturers respond more quickly to increased demand for their products and avoid production delays and stock outs that might result in lost customers, which contributes to the growth and stability of their revenue.

MRP is broadly utilized by producers and has certainly been one of the critical empowering agents in the development and wide accessibility of reasonable shopper merchandise and, thus, has increased the expectation of living in many nations. Without a method for robotizing the perplexing estimations and information the executives of MRP processes, it is importable that singular producers might have increased tasks as quickly as they have in the 50 years since MRP programming showed up.

I. Order Management

The Order Management is a computerized method for dealing with an order's lifecycle. It keeps a record of all the data and processes, such as the request section, inventory control, customer satisfaction, and after-deals managerial staff. An OM offers both the customer and the corporation are deceived. Associations may well have nearly constant knowledge of inventories, and clients may check the timeliness of a request. Knowledge and skills are required to control the scheduling and reception of consumer orders. These components may be included in an integrated OM system:

- Product specifications (descriptions, attributes, locations, quantities)
- Sourcing and inventory available to promise (ATP)
- Suppliers, buying, and receiving
- Advertising (catalogues, promotions, pricing)
- Clients and potential clients
- Customer service and order input (including returns and refunds)
- Processing accounting (credit cards, billing, payment on account)
- Fulfilling orders (selection, printing, picking, packing, shipping)

Why it is important?

Request the board contacts essentially every framework and cycle in the production network. Most organizations never again hold request the executives inside their organization. They include different suppliers, such as manufacturers of components and components, gathering and bundling administrations or dispersion focuses, that make it simple to lose deceitfulness and

control of a request. An OMS can assist with controlling expenses and produce income via mechanizing manual cycles and lessening mistakes.

Remotely, request the board directly influences how a consumer views a company or brand. Customers expect a seamless experience in a Multi - channel distribution environment. A customer may place an online reservation but then phone to complete the request if they have any questions. The client anticipates seeing refreshes like messages in route when the request is fulfilled. If there is an issue, they may wish to return it through a legal route, like a store.Each guide in the excursion presents an open door toward give an extraordinary client experience and lift maintenance and income. The Omni channel Venture provides possibilities to strategically pitch ideas, up-sell goods, and raise profits.

Shop Floor Execution

It is the region where creation or collecting is carried out, whether by a computerized system, human workers, or a combination of both. Hardware, inventory, and stockpile areas may be included in the shop floor capacity. You can make for each item, customers may physically place orders and shop orders, or they can import shop orders from an ERP system. This shop request permission comprises a predefined quantity of the item to be based on the shop floor at the time it is manufactured or obtained. In industry, the shop floor alludes to the creation region/creation site as where worth is made. Shop floor the board contains cycles, techniques, and frameworks to guarantee the absolute most proficient creation. Shop floor the executives (SFM) centers on what occurs at the base.

Shop Floor Management is perceived as the enhancement of the board and initiative errands in a creation office. As per this, it is a compelling methodology with the objective of constant cycle improvement, which is the aftereffect of collaboration among workers and the executives. Shop floor the executives empowers the persistent improvement of all cycles towards the normal corporate objective of everyday satisfaction of client prerequisites.

When you characterize your creation Cycle and regulations on the production floor enable the execution of operations at an advanced stage. You may provide your association and clients with ongoing alerts as needed. In order to create ideal SF processes that meet your business needs, increase view creation work orders at any stage of assembly, and revamp instructions are sent directly to the plant floor, an SF provides an on-request perspective on the bill of materials, steering details, work guidelines, material accessibility, part and item pictures,

and projects. This information is used to organize processes effectively and improve customer service.

Supply Chain Continuity Planning

The interaction tries to enhance Inventory network procedure, processes, HR, innovation and information. Store network Progression Arranging controls, screens and assesses Store network risk, which shields against new vulnerabilities that might arise influencing productivity. The congruity of the organization is crucial for the drawn out progress of the business, in this day and age; all parts of the working of an association are powerless against disturbances and dangers. Inventory network Congruity Arranging controls, screens and assesses Inventory network risk. In business, production network progression is the continuous progression of materials and parts all over the production network, from provider to client. A disturbance in any connection in the chain can endanger the whole effort. To limit chances, organizations frequently construct emergency courses of action that give substitute causes of provisions or completed items if there should be an occurrence of a significant interruption.

The primary goal of supply chain continuity planning initiatives is to ensure the seamless operation of organizations in the face of disruptions, be they triggered by catastrophic events, economic downturns, pandemics, or any other unforeseen circumstances. The overarching aim is to proactively prevent or mitigate disturbances, allowing organizations to safeguard their reputations, financial stability, and, critically, their very existence.

Supply chain continuity planning involves a strategic and comprehensive approach to identify potential vulnerabilities and develop robust strategies for risk management. It encompasses proactive measures to build resilience, enhance responsiveness, and establish contingency plans that can be swiftly activated when disruptions occur.

In the contemporary business landscape, characterized by increasing complexities and interconnected global supply chains, the significance of continuity planning cannot be overstated. Organizations recognize that disruptions can emanate from various sources, and the ability to anticipate, respond, and recover swiftly is crucial for long-term sustainability.

By investing in supply chain continuity planning, organizations not only fortify their operational capabilities but also demonstrate a commitment to fulfilling commitments to customers, partners, and stakeholders. The comprehensive nature of these initiatives ensures that

organizations are better equipped to navigate uncertainties, adapt to evolving challenges, and, ultimately, thrive in an ever-changing business environment.

II. Supply Chain Visibility

Store network perceive ability (SCV) is characterized as the capacity of parts, components, or products that must be followed from the manufacturer to their final goal. SCV empowers you to perform "consider the possibility that" situations. Imagining these various situations can assist you with anticipating issues and issues that might emerge, and afterward plan for themselves as well as their answers.

Store network perceive ability is the ability to keep track of numerous products as well as goods that are in motion, providing a decent view on the stock and action. By managing stock movement, making pro-active notifications, limiting disruptions, and chance management, it enables transporters to improve customer service and cost controls. As a result, the production network will become more stable and agile during the course of having excellent perceptive ability.

The goal of inventory network perceive ability is to get advanced understanding about your inventory network's operation while reducing risk. When you combine such insights with other types of client data, the result is an inventory network that can be improved to be essentially as productive as may be reasonably anticipated with an outsider strategies supplier like C.H. Robinson, transporters like you can further develop client care, decrease expenses, and construct a more grounded production network. Here, we'll jump into the subtleties of how precisely this is accomplished.

Perceive ability permits individuals in the production network to see issues before they happen and do whatever it may take to keep away from the cost progressively. Perceive ability additionally gives understanding to settle on additional astute choices from the get-go in the request cycle (in the nick of time stock) and work more smartly reviews in the conveyance fixates on shipments coming in. At last, perceive ability can likewise be a significant driver expanding throughput in the current conveyance organization and hence postponing the requirement for expensive new DCs.

Key advantages of Supply Chain Visibility

The benefits of a more developed store network perception capability all result in extended benefits and a more developed work process. Moreover, improved perception skills

enable businesses to lower customer costs and risk. We should look at a few additional significant benefits of store network perceive ability.

- **Relieve Disturbances**

  The likelihood that interruptions may cause problems is reduced if you are aware of where they might occur beforehand. Operating within a production network that has identified areas of research and communication strength will limit the possibility of deviations and provide amazing results.

- **Empower Readiness:**

  The capacity to be agile is one of the main benefits and goals of developing perceptive ability. The capacity to perceive allows you to avoid the hassles of dealing with a retail network and to implement the necessary changes to support your productivity in any situation.

- **Speed Up:**

  When you come to informed decisions regarding your production network, you are free from the need to wait and hope that something will guide you in the right direction. When you know what's coming, you can move more quickly. Such advice is timeless and straightforwardly applicable to inventory network perceive ability. This remains closely connected with empowering dexterity.

- **Fulfil Client Needs:**

  Supply binds ought to be flexible enough to adapt to changing client demands. You may determine how you want to modify your store network to meet customer demands with the help of a store network specialist who has extensive knowledge of shop network procedures and who has seen countless examples of this in practice.

- **Information driven results:**

  Perceive You can get a lot of production network information if you have access to all areas of your store network. When Navisphere processes this data and combines it with an expert advisor's viewpoints, it helps transporters make quick, informed decisions that will lead to greater success for the store network.

Supply Chain Network

It is the assortment of actual places, transportation methods, and auxiliary structures through which the goods and services organization does business sectors are overseen and eventually conveyed; it tends to fabricate plants, capacity stockrooms, transporter, docks, significant dissemination habitats, ports, multi-purpose terminals whether claimed by an organization, providers, a vehicle transporter, an outsider strategies supplier, a retail location or an end client. Arising advancements and guidelines, for instance, the GS1 and the RFID are currently making it possible to continuously automate these scans, making them more efficient. effective.

A Supply Chain Network can be decisively planned so as to lessen the expense of the inventory network. Planning a SCN includes making an organization that consolidates every one of the offices, method for creation, items and transportation resources claimed by the association or those not possessed by the association but rather which quickly support the inventory network tasks and item stream. There is no conclusive method for planning a SCN as the organization impression the ability and limit and item stream all entwine and are reliant. Following on from this there is likewise no signal idea no signal ideal Scans configuration in planning the organization there is a clear compromise between responsiveness, risk resilience and proficiency. A production network organization (SCN) a growth of the crucial production network. Fast mechanical development allows associations with a basic store network to transform this chain into a more complex system. intricate design including a more significant level of relationship and network between additional associations; this comprises a production network organization.

A production network organization can be used to highlight organizations' cooperation's as well as to display how data and materials move across associations. More global than at any other moment in recent memory, inventory network networks are often divided into five important regions: exterior suppliers, creation focuses, conveyance focuses (DCs), request zones, and transportation resources.

2.1.4 Green Innovation

Green innovation is the creation of fresh concepts for effective service procedures or management systems that may be applied to address environmental issues (Rennings, 2000). Sustainable development may be achieved by using green innovation to successfully minimize

environmental pollution and the negative effects of resource and energy usage processes (Kemp and Pearson, 2007). (Lai, 2003) discovered that by satisfying stakeholder environmental criteria, green innovation may improve environmental performance. Green innovation will eventually become a prerequisite for legitimacy, rather than being a crucial means for businesses to achieve a competitive edge in the future.

Green innovation is a significant tool that can help society associations and organizations to accomplish natural maintainability and assumes a significant part in accomplishing upper hand, (Chu et al., 2019) and works on financial performance facing Green innovation difficulties and the \ climate. Then again, Green Innovation forestalls potential open doors for impersonation (Albort-Morant et al., 2018). Outer environmental pressure (political issues tensions and market pressures) and inner ecological main forces (development assets and advancement ability) make it possible for associations and organizations to choose Green innovation strategy with the effect of adjusting ecological familiarity with senior administration (Cao and Chen, 2019). Then again, a gathering of researchers in their examination have called attention to those Green Innovation techniques by implication impact Green Innovation through green authoritative recognizable proof and natural hierarchical authenticity (Soewarno et al., 2019).

Green innovation is as old as technology can imagine programming or hardware innovation. Green innovation is separated into both process and product innovation. In any case, the primary topic of green innovation is to ensure the environmental through reusing green purchasing, green manufacturing, eco-configuration, waste reduction, and pollution decrease (Chen et al., 2006). Organization can take on putting into practices green innovation of new hard product and programming. This will result in organizational enhanced economic and environmental performance. Hence, relying on green production and process innovation, every firm tries to embrace green innovation. to increase their organizational performance (Chiou, 2011).

We found six crucial components in the various definitions:

1. Product, process, service, or approach innovation
2. A focus on the market: meet requirements and compete on the market
3. With regard to the environment, minimize harm (the ideal outcome is zero harm).
4. The full life cycle must be taken into account (for material flow reduction)

5. Motive: The desire to reduce might be either economic or ecological.6. Level: Setting a new innovation/ green standard to the firm

interaction, administration, or strategy (such as a plan of action), and that it should satisfy a customer's need or solve a problem in order to be competitively available. Regarding the ecological perspective, all definitions mentioned agree that the development should have less negative effects (for example lower negative externalities). The ideal development would have no negative effects whatsoever on the climate. This point of view necessitates the linkage with current intra-or inter hierarchical other possibilities and can thus only be made briefly and vaguely. Just two of the four perspectives are present.

(Kemp and Pearson, 2007) and (Reid and Miedzinski, 2008). The authors specifically demand a thorough life cycle inquiry as well as a thorough analysis of all available data and outcome determinants. A decline in asset utilization is the key point. Here There may be a difference between the two theories since, in general, eco-development researchers demand precise effect analysis while researchers using the term green progress remain at a superficial level. Finally, the definitions emphasize that the intention behind the reduction may be wise or natural, emphasizing, for example, that the reduction of material consumption in another item improvement may have multiple causes.

The last perspective addresses difficulties related to the definition of development and climate well-disposed. The first two points of view are generic and apply to almost all definitions of development, stating that the development item may be because the two concepts are related and have no intrinsic value (for example any development could be new to the world, industry or the firm). The concepts appear to be establishing a new development/green standard to be firm. The first two points of view are the primary justifications for a logical discussion since they prevent experts from clearly distinguishing between green and non-green advances and determining the "greenness" of each. These fluffy viewpoints allow almost all firms to be included in the definition of a green pioneer due to the numerous types of development (see also (Andersen, 2008). In contrast to UN definition for manageability with the other three thoughts, the main distinction in the definition is the thought of the natural and social aspect. The improvement of feasible advancements in this manner carries out affordable, natural and social perspectives.

This is to our comprehension the primary distinction among "maintainable" and the other three thoughts which just incorporate the previous two perspectives. Having examined the four unique ideas in view of existing definitions and presumed that they are frequently utilized equivalently we chosen to remember every one of them for our writing survey. In the accompanying we frame our examination approach before we report our discoveries to grasp the improvement that field as of late and to distinguish the most dynamic researchers, foundations and significant commitments.

For the writing November 2010, data from the Google Researcher (GS) data collection were used to compile survey information. The query strings were used to collect distributions. "green development", "eco advancement", "natural development" and "feasible advancement". With this approach chose to look by subject and not by (top) diary to incorporate "all" distributed article in this field as recommended by (Webster and Watson, 2002). Our all-out dataset incorporates 8,516 distributions. The separated distribution types incorporate diaries, meeting procedures, book (- parts), extra diaries and working distributions.

The information was separated with the product "Distribute or Ward" (v3.1.3926). Rather than utilizing the Thomson ISI Web of Information data set, which is thought of as the "most ordinarily utilized wellspring of bibliometric information", we chose for the GS data set because of its more extensive information inclusion (for example counting meeting procedures, working papers, books) than the severe ISI models; albeit considered the impediment that the GS information base inclusion isn't as stringently systemic than the ISI data set but show that an examination in view of GS information brings about more complete reference inclusion, especially in the field of the board and worldwide business (Harzing and Wal, 2007).

To confirm whether the information we extricated from the GS data set covers the applicable writing, we contrasted our outcomes and those separated from the Thomson ISI Web of Information data set on an amassed level. The correlation of the GS information (8,516 outcomes) with the information extricated from the ISI data set (176 outcomes) results uncovers that relying upon the various ideas between 67-86% of the ISI distributions are remembered for our dataset. The removed distributions were breaking down in a three level examination utilizing bibliographic data of the creators, distribution years, diary names and reference recurrence. A first level examination gives an outline researching the improvement of distributions utilizing the four ideas on a collected level yet in addition for seven logical regions as accessible from GS.

The second level of our investigation limits and develops the examination to the particular discipline "business, organization, finance, financial matters".

The third level of our examination centers around distributions distributed in chosen diaries related with advancement the board. In this examination we included 10 diaries recorded in the 'sub-discipline' "The executives of Innovation and Advancement" of the 2009 VHB positioning of the German Scholarly Relationship for Business Exploration (Schrader and Hennig-Thurau, 2009) and 15 diaries recorded in the 'branch of knowledge' "development" of the meta-ranking that depends on 19 worldwide rankings (Harzing, 2011).

The component of green innovation is green product innovation. Green products, eco-planning, and green product manufacture are the three main focuses of this movement. This will result in less raw material waste, improved environmental performance, and energy savings. The green item innovation can be estimated through four elements. The main variable of green item innovation is that organizational development the techniques for less utilization of materials used during item plan and improvement (Fei, 2016). The second important factor that businesses should consider while developing green products is the utilization of energy. The item should consume less amount of energy while it is in good operating order.

The third important component of green manufacturing innovation is that businesses should develop processes so that products use less material. The fourth and most crucial factor in product innovation is that the thing should be repurposed (Chiou, 2011). It suggests that a company can efficiently disassemble the product and then manufacture it again using the same material. The product should be designed with the environment in mind. Hence, organizations should participate in the development of green products to enhance both their natural and financial performance (Sun, 2017).

In order to achieve organizational goals, companies must use new and innovative processes. The professional techniques to conserve energy during creation and other organizational processes are the main focus of the green process innovation (Dai& Zhang, 2017). Advancements in green technology also encourage businesses to recycle their garbage in an effort to reduce climate change. The use of green process innovation will result in a reduction in heavy materials and waste. When a company produces less garbage, it will have a negative impact on the environment (Geffen& Rothenberg, 2000). Because reducing waste lowers

manufacturing costs, the development of green innovations has a direct influence on economic and financial performances (Jakobsen & Clausen, 2010).

2.2 Supported Theories

Table 2.1

Theory	Description	Link With Study
Agency Theory	According to agency theory, information asymmetry results from the principal's propensity to use incomplete information while assessing the agent. Marketers vying for the agent's business may have a tendency to exaggerate their qualifications, capabilities, and abilities as well as make unrealistic promises (Davies & Prince, 2010). Agent overselling may cause principals to pick the incorrect agency for the job, a practice known as "adverse selection."	Agency theory highlights potential information asymmetry and adverse selection in the implementation of Green Supply Chain Management, affecting operational performance, with a focus on how green innovation and supply chain capability mediate or moderate these dynamics.
Innovation Theory	A product, service, method, or notion that people view as novel might be considered an innovation (Rogers, 1983, 2004). The term "newness" relates less to an item's inception date and more to the application's suitability for meeting a demand or resolving a particular issue. Those who are enthusiastic about utilising an item for themselves are said to be "new," even though they may have previously heard of it but never given it any attention.	The success of green supply chain management strategies in enhancing operational performance is intricately linked to the perceived novelty (innovation) and applicability of environmentally friendly practices, with green innovation and supply chain capability playing

		pivotal roles.
Resource Based View Theory	Organizations realize their strategies and weaknesses when they are conscious of their resources and skills. Organizations may develop appropriate strategies to gain comparative advantages when they are aware of their capabilities (Fikru 2016; Business Dictionary, 2017 and Rivard, 2006). In this study green supply chain strategy help in businesses gain a strategic advantage by helping them effectively understand and manage their assets. For supply chain management, companies often use software that can provide all the required documentation.	The Resource-Based View (RBV) theory's emphasis on recognizing and leveraging organizational assets aligns with this study, highlighting how a green supply chain strategy contributes to strategic advantages and operational performance through effective resource management and innovation
Transaction Cost Economy Theory	The assumption-based foundation of transaction cost theory, which describes governance is affected by both internal and external transactions. The agency theory is developed by this theory. Due to the fact that this idea differs from shareholder contracts (Kaplan, 2012; O'Brien, 2011).	. Transaction Cost Economy theory informs the efficient structuring of contracts, coordination mechanisms, and innovation strategies in the implementation of Green Supply Chain Management, impacting operational performance.
System Theory	It starts with the organization's input resources. Organizations then employ a variety of processes on these inputs to generate a variety of outputs under certain environmental circumstances. do some under particular environmental conditions, processes on various inputs result in some output	System theory underscores the interlinked nature of green supply chain activities, influenced by specific environmental

	(Environment and Ecology 2017; Bronfenbrenner 1992). For the green supply chain For this study's operational performance improvement, management activities such as buying, inventory management, suppliers relationships, and customer service are all connected.	conditions, shaping operational performance through connected processes and organizational resources, aligning with the study's focus on the impact of green supply chain management strategies

Related Theory (Organizational Cost Theory)

Organizational capability theory gives a useful theoretical lens for examining interactions among Organizational Strategy, Supply Chain Strategy, Supply Chain Integration, and performance Organizational capability can be explained as the "ability to perform more than once a useful task which relates directly or indirectly to an organizational capacity for making value through effecting the change of inputs into outputs" (Grant 1996, p. 377). It is a firm's planned or acknowledged operational efficiency or competitive performance in operations management (Peng et al., 2008). Several research looks into this relationship from the perspective of organizational capabilities (OC). The resource-based view (RBV), which emphasizes how resources and capabilities provide competitive advantages, and the organizational capability viewpoint are connected. (Armstrong and Shimizu, 2007; Bharadwaj, 2000; Newbert, 2007; Peng et al., 2008)

2.3 Empirical Literature

2.3.1 Green Supply Chain Management Strategies and Operational Performance

According to (Yu et al., 2014).'s study, there is a substantial link between green supply chain management methods and operational success in terms of delivery, quality, cost, and flexibility**.**

2.3.2 Green Supply Chain Management Strategies and Green Innovation

A research by (Chang, 2011) in Taiwan suggested a beneficial relationship between green products or green innovation and company environmental management, such as green supply chain management techniques. It is possible to justify the connection between green supply chain management techniques and green innovation. Green innovation is thought to offer ongoing strategies for innovating at every level of the supply chain in order to obtain a competitive edge and lessen environmental issues in the sector (Zailani et al., 2011). It is therefore hypothesized that green supply chain management methods and green innovation are positively and directly related.

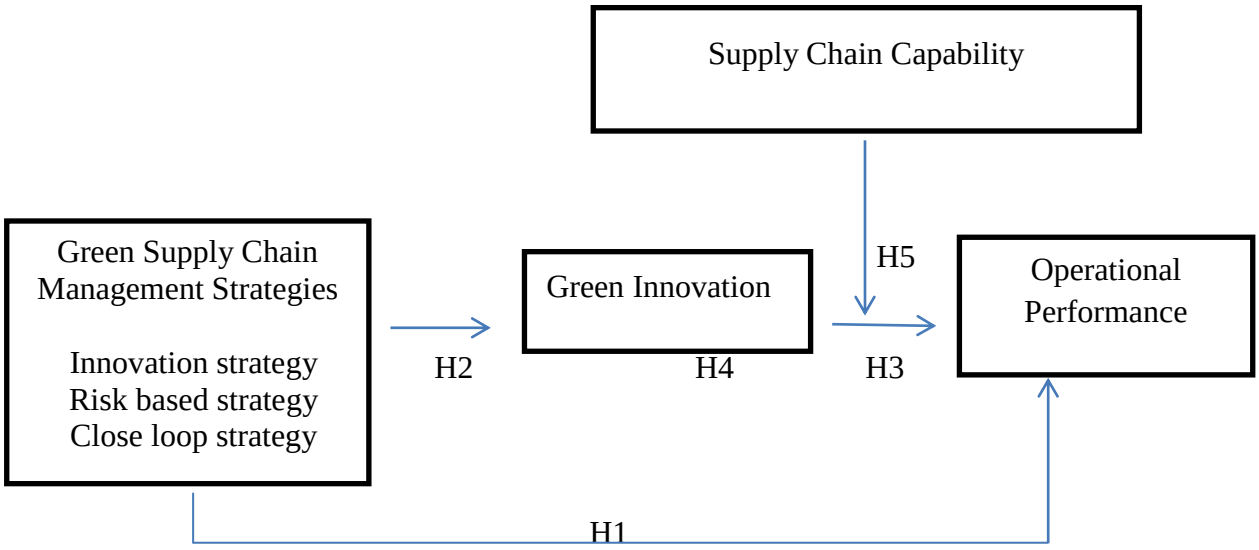
2.3.3 Green Innovation and Operational Performance

On the relationship between green innovation and firm performance aspects, it is examined how managerial environmental concern and absorptive ability interact. Previous research has shown that green innovation positively and significantly affects business performance. It also demonstrates that management concern and absorptive capacity promote these impacts. (Xue et al., 2019).

2.3.4 Supply Chain Capability and Operational Performance

The increasing complexity in the global supply chain has necessitated the need for manufactures to focus more on performance. Supply chain capability has been identified as the most important factors on operational performance improvement. However, some of the organization did not realize the importance of supply chain capability and thus did not focus and fully utilized the capabilities that they had. Based on the result of the literature review relation capability, IT capability and organizational cultural capability were the main component of supply chain capability in operational performance improvement (Naway and Rahmat, 2018).

2.4 Theoretical Framework



2.2 Theoretical Framework

2.5 Hypotheses

H1: Green Supply Chain Management Strategies have positive and significant impact on Operational Performance.

H2: Green Supply Chain Management strategies create a positive and significant impact on green innovation.

H3: Green innovation has a positive and significant impact on operational performance

H4: Green innovation mediates the relationship between green supply chain management strategies and operational performance.

H5: Supply chain capability moderates the positive relationship between green innovation and operational performance such that relations is strengthen when supply chain capability is high.

2.6 Definition of Operational Variables

2.6.1. Dependent variable

2.6.1.1 Operational Performance

Operational performance relates to a company's capacity to increase distribution capacity, improve the efficiency of using raw materials, and decrease management expenses (Heizer et al., 2008). Operational performance is significant to businesses because it helps to raise the efficiency of production processes and produce high-quality goods (Kaynak, 2003), which boosts sales and profits for businesses.

2.6.2. Independent Variables

2.6.2.1 Green Supply Chain Management Strategy

The term "green supply chain management strategy" refers to a supply chain management approach that incorporates "green" elements or environmental impact considerations from the time a company chooses and purchases materials from suppliers through product design, product processing, and consumer delivery (Srivastava, 2007). Green supply chain management was discovered through a ratio-based study of the company's annual report employing indicators. The following indicators were utilized in this analysis: (1) had iso 9000 or iso 14000 certificates, (2) green marketing and distribution, (3) reversible logistics, recyclable packaging, (4) close supplier relationship to determine buying criteria and quality of materials from suppliers, (Tseng & Chiu, 2013; Wibowo, 2018; Sharma et al., 2017)

2.6.3. Mediator

2.6.3.1 Green Innovation

Green innovation is the use and process of fresh concepts in the development of goods that might lessen the effects of environmental harm and are connected to pollution reduction, energy conservation, green product design, trash recycling, and corporate environmental management (Agustia et al., 2019). Using indicators and ratios, the company's annual report's examination of green innovation was measured. The following indicators were utilized in this analysis: The product used more non-polluting or hazardous substances (environmentally friendly materials), new technology was used in the production process to reduce energy, water, and waste, environmentally friendly products were used, and components or materials in the production process could be recycled or repurposed (Agustia et al., 2019).

2.6.4 Moderator

2.6.4.1 Supply Chain Capability

Supply chain capabilities, which include information technology, culture, and other factors, guarantee that tangible and intangible resources are distributed across supply chain players. relationships. This results in operational efficiency. According to (Gawankar et al. 2016), supply chain skills make suppliers more likely to provide satisfactory customer service, which boosts business operations performance. According to (Baker & Sinkula, 1999), increased company performance in recent years has been attributed in large part to changes in business culture. This is due to the fact that organizational culture significantly improves the performance of the global supply chain particularly in term of flexibility and responsiveness (Sukwadi et al., 2013).

CHAPTER 3
RESEARCH METHODOLOGY

3.1 Research Design

This research has been conducted under the quantitative approach therefore descriptive and casual research design has been used in this study. The questionnaire a customized questionnaire has been used in this study work as the primary data collection strategy. The population of the research has been decided upon as the automotive sector. In this study, probability will be used. There are basically two types of sampling methods; probability sampling and non-probability sampling. Given that the car industry in Pakistan is the one with the quickest rate of growth, 300 questionnaires were distributed to the employees working in the sector in Islamabad.

3.1.2 Unit of Analysis

The unit of analysis in this study refers to the entities or objects being investigated for research purposes, which, in this case, are the companies within the automobile industry located in Islamabad and Rawalpindi, Pakistan

3.2 Population of the Study

The population of the study in this research study is composed of car industry employees from Islamabad, Pakistan.

The population included automobile companies in Pakistan. The rationale for targeting these sectors lies in their organizational structure, which often involves unique setups. In such organizations within the automobile industry, the dynamics are notably unpredictable, posing challenges to achieving successful project outcomes. Around 384 questionnaires were distributed in the organizations. This sample size was suggested by (Sekaran & Bougie, 2016) and (Krejcie & Morgan, 1970) For legitimate responses, all respondents were guaranteed confidentiality and anonymity. A total of 300 responses were considered, which constitutes a 78% response rate. 84 responses were excluded because they were either incomplete or had been answered twice for some questions. Because of time and resource constraints methods were used for data collection in this study. Questionnaires were distributed online to get spontaneous responses.

3.3 Sampling Techniques

This study applies a non-probability sampling technique, chosen due to our prior knowledge of the industries and the specific sample collected from automobile companies. Non-probability sampling is utilized as it allows for the selection of participants based on predetermined criteria, ensuring relevance to the study's focus on green supply chain management practices. This method is suitable when specific characteristics or attributes are crucial for the research objectives, enabling a targeted and in-depth analysis of the chosen sample.

3.4 Sample Size

Selecting a sample size of 300 employees from specific organizations in the Islamabad, Pakistan automobile industry was driven by factors such as the study's objectives, required accuracy, associated risk, population variance, time and financial constraints, and the age range of the population.

The decision to focus on these specific organizations reflects a practical balance between obtaining meaningful insights and addressing constraints like time and finances. Each organization's designated sample size suggests a deliberate emphasis on operational activities within these companies, ensuring relevance to the study's objectives and facilitating an in-depth analysis. The choice of these particular organizations may be rooted in their significance within the automobile industry or their representation of diverse operational practices, contributing to a comprehensive understanding of green supply chain management strategies and operational performance.

Table 3.1 Companies of Automobile Industry

Automobile industry	**Sample**
Al Ghazi Tractors	30
Jolta Electric	25
Prince Motors	25
Ravi Motorcycles	25
Road Prince	25
MG Jaw Automobiles	30

Altas Honda	25
Isuzu (Ghandhara Industry)	30
Al Haj Faw Motors	30
Lucky Motors Corporation	25
Adam Motors	30
Total	**300**

3.5 Research Instrument

In this research, the adapted scale has been utilized as a research instrument. We required data collection regarding various subject while conducting research. Utilizing precise different questions and approaches of questioning can permit us access to the data we required. Normally questionnaires consist of various approaches to inquiries i.e. multiple-choice questions, closed-ended questions and open-ended questions. Respondents are required to point out the pre-define scale in some questionnaires, normally ranging from the most positive answer to the most negative answer. One of the most popular scale methods is the Likert scale. A specially designed questionnaire will be used in this study project. The questionnaire is divided into two sections: research variable and demographic (gender, age, education, income, etc.).

There are four different factors in total in this research study. various independent is green supply chain management strategies, the dependent variable is operational performance, green innovation has been used as a mediating variable and supply chain capability has been used as a moderating variable. We are going to change scales from earlier studies to assess those variables. There are 29 questions in all, and several scales will be utilized to measure each variable.

Green SCM Strategies: The scale of green supply chain management strategies was adapted from different research work.

Innovation Strategy: The scale of innovation strategy was adapted from the study of (Pearson,1990).

Close Loop Strategy: The scale of close loop strategy was adapted from the study of (Ming et al., 2015).

Risk Based Strategy: The scale of risk based strategy was adapted from the study of (Chandima et al., 2017).

Green Innovation: The scale of green innovation is adapted from the study of (Yu et al., 2006).

Operational Performance: The scale of operational performance is adapted from the study of (zhu et al., 2008).

Supply Chain Capability: The scale of supply chain capability is adapted from the study of (Brussetand Teller,2016)

Questionnaire design will be based on a 5 point Likert scale (Agree=1, strongly agree=2 maybe=3 disagree=4 and strongly disagree=5) the data has been analyzed using SPSS. The analysis has300 respondents' answers were first inserted into SPSS to begin the study. Research instrument, descriptive frequency analysis, and correlation techniques have all been used. Finally, the findings have been interpreted. It is crucial that the findings reached are in some manner corroborated. In order to ensure that the conclusions drawn from qualitative and quantitative data are tenable, trustworthy, and valid, this is done.

3.6 Data Collection Procedure

Organizational management was used to choose the respondents. The research's objective was explained to them from the beginning or before the questionnaire was given, and they signed a consent form as a result. This allowed them to complete the questionnaire with the proper responses. Also, the respondents have been assured of the privacy of their responses and their right to take part in the study. Direct distribution of the questionnaires to responders has been done thus to collect data. The validity of the data gathered will be examined.

3.7 Data Analysis

To check the relationship between green innovation, supply chain capability, dependent and independent variable, a descriptive statistic regression analysis and correlation analysis has been used in this study.

3.7.1 Data Analysis Technique

The data were analyzed in the SPSS version 22. The steps to analyze the data were:

1. Only those questionnaires were considered that were filled properly.
2. Descriptive statistics of demographics was analyzed.
3. Frequency tables of demographic variables.
4. Descriptive statistics like mean, standard deviations, and correlation were performed.
5. Inferential analysis like ANOVA was performed to check the significance of demographics.
6. All hypotheses were tested in the model through the Hayes process macro individually

CHAPTER 4

RESULTS AND DISCUSSIONS

This chapter's objective is to test the research study's predetermined hypothesis. Collected information and data was analyzed by utilization of SPSS program. The outcomes are appeared into different segments that identify with test attributes and analysis of inferential statistics examination. Result of this research study, level of respondents' agreeableness, importance and relationship between study variables were analyzed by using descriptive statistics technique, correlation analysis technique and regression analysis.

4.1: Descriptive Statistics of Demographic Variable

Table 4.1 **Descriptive Statistics**

Demographic variable	N	Minimum	Maximum	mean	Std. Deviation
Gender of respondent	300	1.00	1.00	1.0000	.00000
Age of respondent	300	1.00	2.00	1.3967	.49002
Experience of respondent	300	1.00	33.00	1.9167	1.96875
Education of respondent	300	1.00	3.00	1.9267	.83883
Answering of survey respondent	300	1.00	2.00	1.6133	.48780
category of company	300	1.00	3.00	1.9133	.78818
functional area of respondent	300	1.00	4.00	2.1933	1.09847
job level of respondent	300	3.00	4.00	3.3767	.48536
employees of company	300	1.00	3.00	1.9267	.81865
Valid N (list wise)	300				

In the above table 4.1 of descriptive statistics of these demographic variable is that the mean of gender that respond is 1.00 that's mean that the mostly respondent are male and the age of respondent are 30 to 40 because the mean is 1.39. The mean of 3rd question is 1.91 that mean mostly respondent have 5 to 10 year of experience. The mean of 4th question is 1.92 that's mean that the mostly respondent education are masters in their field. The mean of 5th question is 1.61 that's mean mostly people are answering the serve on behalf of their company. The mean of 6th question is 1.91 that's mean that the mostly companies are small. The mean of 7th question is 2.1 that's mean mostly respondent companies are manufacturing companies. The mean of 8th question is 4 that's mean mostly respondent are at the manager level and the 9th question mean is 3 that's mean that the number of employees are 151 to 200 in the company

4.2: Green Supply Chain Management Strategies

Table 4.2 Model summary

GSCMS		Percentage
favorable for gscm	Agree	73%
	strongly agree	10%
	may be	8%
	Disagree	6%
	strongly disagree	3%
helpful for op	Agree	64%
	strongly agree	15%
	may be	7%
	Disagree	11%
	strongly disagree	3%
creat new opportunity for gscm	Agree	66%
	strongly agree	16%
	may be	6%
	Disagree	8%
	strongly disagree	3%
close loop strategy save wastage of raw material	Agree	60%
	srtrongly agree	24%
	Maybe	9%
	Disagree	5%
	strongly disagree	2%
cost saving of raw material	Agree	67%
	strongly agree	16%
	Maybe	9%
	Disagree	6%
	strongly disagree	3%
aware employ about gscm	Agree	66%
	strongly agree	14%
	Maybe	11%
	Disagree	7%
	strongly disagree	3%
design green items	Agree	71%
	strongly agree	11%
	Maybe	12%
	Disagree	4%
	strongly disagree	1%
risk strategy effective for green items	Agree	65%
	strongly agree	17%
	Maybe	9%
	Disagree	8%
	strongly disagree	1%
help to reduce risk in gsc	Agree	72%
	strongly agree	13%
	Maybe	9%
	Disagree	5%
	strongly disagree	1%
reduce unnecessary cost of product	Agree	70%
	strongly agree	10%
	Maybe	10%
	Disagree	7%
	strongly disagree	3%

In green supply chain management strategies table 4.2 the 73% people are agreed that this strategy of inovation in favourable for the green supply chain management.only 3%

disagreed from this innovation theory. 64% people are agreed that the innovation theory are helpfullfor the operational work and mostly people are agreed that this innovation theory creat new opportunities for thepeope in automobile industry.

In the closs loop strategy 60% people are agreed that this strategy is usefuo to save the wastage of the raw material and 67% percent people are agreed that this theory is also cost saving for the company. The strategy of closs loop aware the employes aboust green supply chain management and 71% people are agredd that the closs loop strategy design the green supply chain.

In the risk based strategy 71% people are agreed tha this risk strategy are also effective for the green items and also helpful to reduce the risk in the green supply chain management because most of the serviar are agreed on that. The 70% people agreed that the risk based strategy reduce the unnecessary cost of the product and reduce the risk of high cost and also people agreed that the risk strategy is improve the profit of the organization because less risk increas the capacity of the product and increas profit for the organization

4.3: Green Innovation

Table 4.3 **Descriptive Statistics**

Green Innovation	N	Minimum	Maximum	mean	std. deviation
effectively reduce release of water	300	1.00	4.00	1.5233	.96569
recycle waste	300	1.00	4.00	1.4233	.92754
reduce consumption of water	300	1.00	4.00	1.3633	.83285
reduce use of raw material	300	1.00	5.00	1.2533	.73322
product development or design	300	1.00	4.00	1.5200	.98293
less amount of pollutin	300	1.00	4.00	1.2733	.72136
conducting product development	300	1.00	4.00	1.5067	.96595
Valid N (listwise)	300				

In the descriptive statistic of green innovation table 4.3 the mean of 1st question is 1.5 that's mean mostly people are agreed that the green innovation is effectively reduce the release of water. The mean of 2nd question is 1.42 that's mean mostly people are agreed that green

innovation recycle the waste of the product. In 3rd question the mean is1.36 that's mean mostly people think that the green innovation reduces the consumption of water.

In 4th question the mean is 1.25 that's mean most of the people think that green innovation reduces the use of raw material in automobile industry. In 5th question the mean is 1.5 that's mean mostly people are strongly agreed that the green innovation develop the design of the product in the industry. In the 6th question of green innovation people agreed that the green innovation reduce the population of the automobile industry because the mean is 1.27.

In the 7th question mostly viewers agreed that the product development is high in the green innovation because the mean is 1.5 and all the SD in the green innovation is less than 1which is suitable in green innovation.

Model Summary of Green Innovation

In green innovation 73% percent people are agreed that the green innovation reduce the release of waste. Most of the people agreed that the green innovation is the main concern of the waste recycle 80% people are agreed on that. In this table 81% people are agreed that the green innovation reduce the waste of water. The use of raw material in decrease in the green innovation and most of the people are agreed on that. More than 70% people are agreed that the green innovation develop the product and its design and same as people agreed that the green innovation less pollution in the environment. The company used fair amount of product raw material for the product design and most of the people in automobile industry are agreed on that

Table 4.4 **Green innovation**

Green Innovation		Frequency	Percentage
effectively reduce release of waste	Agree	220	73%
	strongly agree	28	9%
	maybe	27	9%
	disagree	25	8%
	strongly disagree	0	0%
recycle waste	Agree	240	80%
	strongly agree	18	6%
	maybe	17	6%

	disagree	25	8%
	strongly disagree	0	0%
reduce consumption of water	Agree	242	81%
	strongly agree	25	8%
	maybe	15	5%
	disagree	18	6%
	strongly disagree	0	0%
reduce use of raw material	Agree	260	87%
	strongly agree	16	5%
	maybe	16	5%
	disagree	4	1%
	strongly disagree	4	1%
product development or design	Agree	224	75%
	strongly agree	23	8%
	maybe	26	9%
	disagree	27	9%
	strongly disagree	0	0%
less amount of pollutin	Agree	255	85%
	strongly agree	19	6%
	maybe	15	5%
	disagree	11	4%
	strongly disagree	0	0%
conducting product development	Agree	226	75%
	strongly agree	20	7%
	maybe	30	10%
	disagree	24	8%

4.4: Operational Performance

Table 4.5 **Descriptive Statistics**

Operational Performance	N	minimum	maximum	mean	Std. deviation
improve performance of product	300	1.00	4.00	1.4833	.89763
product more important than other things	300	1.00	4.00	1.5200	.93408
reduce product cost	300	1.00	4.00	1.4167	.86345
operational performance is increase	300	1.00	4.00	1.3233	.73978
increase manufacturing of industry	300	1.00	4.00	1.4833	.94836
high moral of employees	300	1.00	4.00	1.3233	.77511
Valid N (list wise)	300				

In this table 4.5 the descriptive statistics of operational performance the mean of the improvement of the product is 1.48 and the mean of product importance is also 1.5. in operational performance of the organization the company reduce the cost of the product and also increase their performance of the company the mean of the performance is 1.32 that's mean mostly people are agreed on that. The manufacturing of the industry is increase because the performance of the employees is high and they work with its full energy and moral value of the employees is also increase the mean of all these things are greater than the 1 and mostly employees of the automobile industry is agreed on that the SD of the descriptive stat of operational performance in less than 1 and all these statements are suitable for the operational performance.

Model Summary of Operational Performance

In that table 4.6 of the frequency percentage of operational performance mostly people are agreed that in the operational performance the product performance is increase and the cost of the product in also decrease. The moral and improvement of the employees work in also increase in the operational performance. The increase of manufacturing show that the product is highly effective with in low price and good raw material.

In auto mobile industry use of raw material in now decrease and the performance of the employees are much higher than the other. The ration of the agreed people is high which is higher than the 70% and less amount of people are disagreed with that which is only 2 to 5%.

Table 4.6 Operational Performance

Operational Performance		Frequency	Percentage
improve performance of product	Agree	222	74%
	strongly agree	27	9%
	Maybe	35	12%
	Disagree	16	5%
	strongly disagree	0	0%
product more important than other things	Agree	216	72%
	strongly agree	33	11%
	Maybe	30	10%
	Disagree	21	7%
	strongly disagree	0	0%
reduce product cost	Agree	235	78%
	strongly agree	20	7%
	Maybe	30	10%
	Disagree	15	5%
	strongly disagree	0	0%
operational performance is increase	Agree	246	82%
	strongly agree	17	6%
	Maybe	31	10%
	Disagree	6	2%
	strongly disagree	0	0%
increase manufacturing of industry	Agree	230	77%
	strongly agree	17	6%
	Maybe	31	10%
	Disagree	22	7%
	strongly disagree	0	0%
high moral of employees	Agree	249	83%
	strongly agree	16	5%
	Maybe	24	8%
	Disagree	11	4%

strongly disagree	0	0%

4.5: Supply Chain Capability

Table 4.7 Descriptive Statistics

Supply Chain Capacity	N	Minimum	maximum	mean	Std. deviation
SCC impact op	300	1.00	4.00	1.5233	1.00640
SCC increase employee strength	300	1.00	4.00	1.3233	.77078
increase performance of employees	300	1.00	4.00	1.4000	.87706
increase business performance	300	1.00	4.00	1.4433	.86947
effect environment of organization	300	1.00	4.00	1.4000	.89592
Valid N (list wise)	300				

In this table 4.7 of supply chain capability, the mean of 1st point shown that supply chain capability is effect on operational Performance and increase the strength of the employee because the mean of both statement is 1.5 and 1.33 which is highly effective on capability and also increase the performance of the employee s and increase the business performance and the mean of the increased performance in 1.4 and 1.44.

In the end supply chain capability is also effect on the environment of the organization and the SD of all the statement are less than one which is suitable in the statement and supply chain capability.

Model Summary of Supply Chain Capability

In the above table 4.8 the value of the agreed people is 76% these people think that the SCC impact on the operational performance and same like that 83percent people think that the SCC impact on the strength of the employees. In this table 80% people think that the SCC increase the performance of the employees and mostly people agreed that the performance of the industry in increased with the help of SCC and it can be effective on the organization

environment and the ratio of agreed people are 76% and 81% the ration of disagreed people is less than 10% that SCC capability is effect the operational performance of the organization.

Table 4.8 **Supply Chain Capability**

SCC		Count	Percentage
SCC impact op	Agree	229	76%
	strongly agree	13	4%
	Maybe	30	10%
	Disagree	28	9%
	strongly disagree	0	0%
SCC increase employee strength	Agree	249	83%
	strongly agree	15	5%
	Maybe	26	9%
	Disagree	10	3%
	strongly disagree	0	0%
increase performance of employees	Agree	241	80%
	strongly agree	16	5%
	Maybe	25	8%
	Disagree	18	6%
	strongly disagree	0	0%
increase business performance	Agree	228	76%
	strongly agree	26	9%
	Maybe	31	10%
	Disagree	15	5%
	strongly disagree	0	0%
effect environment of organization	Agree	243	81%
	strongly agree	15	5%
	Maybe	21	7%
	Disagree	21	7%
	strongly disagree	0	0%

In the above table 4.8 the value of the agreed people is 76% these people think that the SCC impact on the operational performance and same like that 83percent people think that the SCC impact on the strength of the employees. In this table 80% people think that the SCC increase the performance of the employees and mostly people agreed that the performance of the industry in increased with the help of SCC and it can be effective on the organization environment and the ratio of agreed people are 76% and 81% the ration of disagreed people is less than 10% that SCC capability is effect the operational performance of the organization.

4.6: Inferential Statistics

Model 1:

$$OOP = \beta_o + \beta_1 GSCM + \varepsilon$$

Where

OOP = Operational performance

GSCM = Green Supply Chain Management

β_o = constant term

β_o = slope of the model

ε = error term

The estimated model is

Table 4.9 **Regression Coefficient**

Model		Regression Coefficient		T	Sig.
		B	Std. error		
1	(Constant)	.604	.087	6.943	.000
	GSCM	0.200	.061	19.586	.000

From the above table 4.9 the estimated model is

$$OOP = \beta_o + \beta_1 GSCM + \varepsilon$$

$$OOP = 0.604 + 0.20 \times GSCM$$

The above model states that if one unit change in GSCM then 0.20 times increase in OOP. So there is a positive relationship between both the Variable. The t-statistics of the slope coefficient is 19.586 with p-value 0.000 which shows that the performance of an organization's operational operations is statistically greatly affected by green supply chain management.

Table 4.10 **Correlation Model Summary**

Model	R	R square	Adjusted R Square
1	.750[a]	.563	.561

The above table 4.10 shows the model summary. The correlation relationship between green supply chain management and operational success of organizations is 0.75. The R^2 of the model is 0.563 which shows that the 56.3% of variation in Operational performance is due to Green Supply chain management strategies.

Table 4.11 **ANOVA of Regression**

Model		Sum of square	DF	Mean square	F	Sig..
1	Regression	119.316	1	119.316	383.607	.000[b]
	Residual	92.689	298	.311		
	Total	212.004	299			

The above table 4.11 is showing the results of ANOVA of regression model. The F-statistic of the regression model is 383.61 with p-value 0.000. It shows that model is statistically significant.

Operational performance ~ Green Innovation

Table 4.12 **Correlation Model Summary**

Model	R	R square	Adjusted R Square	Std. Error of the Estimate
1	.813[a]	.661	.660	.49079

The above table 4.12 shows the summary of model-2. The value in the 1st column shows the correlation between the "Operational performance" and "Green Innovation" that is 0.813. This indicates a high degree of correlation between them. The R^2 of the model is 0.661 which

shows that 66.1% of the variation is explained of the variation is explained in the model is due to our independent variable "Green Innovation" which is high.

Model 2:

$$OOP = \beta_o + \beta_1 GI\varepsilon$$

Where

OOP = Operational performance

GI = Green Innovation

β_o = constant term

β_o = slope of the model

ε = error term

The estimated model is

Table 4.13 **Coefficient**

Model		Coefficient		t	Sig.
		B	Std. error		
1	(constant)	.539	.071	8.912	.000
	GI	.629	.026	24.128	.000

From the above table 4.13 the estimated model is

$$OOP = \beta_o + \beta_1 GI + \varepsilon$$

$$OOP = 0.539 + 0.629 \times GI$$

From the above estimated model-2, the value of slope and intercept are 0.629 and 0.539 respectively. The value of slope shows that if one unit change in GI then the Operational performance changed by 0.629 time. As the value of slope is positive so there is a positive relationship between Operational performance and Green Innovation The t-statistic of the constant and slope term are 8.912 and 24.128 respectively, with p-value 0.000 which is less than 0.05 that shows that the Green Innovation has a statistically significant effect on Operational performance (OOP).

Table 4.14 **Regression ANOVA**

Model		Sum of square	DF	Mean Square	F	Sig.
	Regression	140.225	1	140.225	582.155	.000[b]
1	Residual	71.780	298	.241		
	Total	212.004	299			

The above the ANOVA table 4.14 shows the regression model forecasts the "Operational performance" statistically significantly well. From the first row of the table, the F-statistic of the regression model is 582.155 having p- value 0.000 < 0.05. This shows that the regression model is accurate. statistically significantly predicts the "Operational performance".

Supply Chain Capability ~ Green Supply Chain Management

Model 3:

$$GSCM = \beta_o + \beta_1 SCC + \varepsilon$$

Where

GSCM = Green Supply Chain Management

SCC = Supply Chain Capabilities

β_o = constant term

β_o = slope of the model

ε = error term

Table 4.15 **Correlation Model Summary**

Model	R	R square	Adjusted R Square	Std. Error of the Estimate
1	.806[a]	.650	.648	.31206

The model summary 4.15 shows that the variables have positive high correlation between them (r = 0.806). R2 has a value of 0.650. which shows that the 65.0% of the variation in GSCM is due to

Supply chain Capabilities.

Table 4.16 **Coefficients Model summary**

Model		unstandardized coefficients		T	Sig.
		B	Std. Error		
1	(Constant)	.033	.058	.568	.010
	SCC	.478	.020	23.506	.000

$$GSCM = \beta_o + \beta_1 SCC + \varepsilon$$

The estimated model is

$$GSCM = 0.033 + 0.478 \times SCC + \varepsilon$$

The value of the constant term and slope are 0.033 and 0.478. This directs that, if one unit change in SCC then 0.478 times change in GSCM. The t-statistic of the intercept and slope are 0.568 and 23.506

Table 4.17 **ANOVA**

Model		Sum of square	DF	Mean square	F	Sig.
1	Regression	53.808	1	53.808	552.533	.000[b]
	Residual	29.020	298	.097		
	Total	82.828	299			

The ANOVA table 4.17 shows that the model predicted statistically significantly well, as the value of the F-statistic is 552.533 having p-value 0.000 < 0.05. therefore, we can say that the supply chain capabilities have significant effect on "Green Supply Chain Management"

Supply Chain Capability ~ Green Innovation

Model 4:

$$GI = \beta_o + \beta_1 SCC + \varepsilon$$

Where

GI = Green Innovation

SCC = Supply Chain Capabilities

β_o = constant term

β_o = slope of the model

ε = error terms

Table 4.18 Correlation Model Summary

Model	R	R square	Adjusted R square	Std. Error of the Estimate
1	.895	.801	.800	.48740

The above summary 4.18 of model-4 states that the correlation between supply chain capabilities and Green Innovation is very strong (r = 0.895). The R^2 shows the model's goodness of fit as the R^2 is 0.801 which indicates that the model is best fitted. So, 80.1% of the variation occurs in Green Innovation is due to Supply chain capabilities.

Table 4.19 Coefficients Model Summary

Model		Unstandardized Coefficients		T	Sig.
		B	Std. Error		
1	(constant)	-.476	.090	-5.292	.000
	SCC	0.98	.032	34.581	.000

$$GI = \beta_o + \beta_1 SCC + \varepsilon$$

The estimated model is

$$GI = -0.476 + 0.98 \times SCC + \varepsilon$$

The value of the constant term and slope are -0.476 and 0.98. This directs that, if one unit change in GI then 0.98 times change in SCC. The t-statistic of the intercept and slope are -5.292 and 34.581 respectively with p-values 0.00 which is less than the significance value 0.05 so it can be say that the Green innovation is statistically significantly impacted by supply chain capacity.

Table 4.20 ANOVA

Model		Sum of squares	df	Mean square	F	Sig.
1	Regression	284.087	1	284.087	1195.847	.000[b]
	Residual	70.793	298	.238		
	Total	354.880	299			

The above ANOVA table 4.20 shows that the model-4 predicted statistically significantly good, as the value of the F-statistic is 1195.84 having p-value 0.000 < 0.05. therefore, we can say that the supply chain capabilities have significant effect on "Green Innovation"

Supply Chain Capability ~ Operational performance

Model 5:

$$OOP = \beta_o + \beta_1 SCC + \varepsilon$$

Where

OOP = Operational performance

SCC = Supply Chain Capabilities

β_o = constant term

β_o = slope of the model

ε = error term

Table 4.21 **Model Summary**

Model	R	R square	Adjusted r square	Std. Error of the Estimate
1	.802[a]	.644	.643	.50331

The above summary 4.21 of model-5 states that Efficiency of supply chains and organization operational performance have a strong and favorable association. (r = 0.895). The R2 shows the model's goodness of fit as the R2 is 0.643 which indicates that the model is good fitted. So, 64.3% of the variation happens in Operational performance are due to Supply Chain Capability.

Table 4.22 **Coefficient**

Model		Undependable Coefficients		Standardized Coefficients	T	Sig.
		B	Std. error	Beta		
1	(Constant)	.138	.093		1.489	.038
	SCC	.761	.033	.802	23.215	.000

$$OOP = \beta_o + \beta_1 SCC + \varepsilon$$

The estimated model is

$$OOP = 0.138 + 0.761 \times SCC$$

The value of the constant term and slope are 0.138 and .761. This directs that, if one unit change in SCC then 0.762 times change in Operational performance. The t-statistic of the intercept and slope are 1.489 and 23.215 respectively with p-values 0.00 which is less than the significance value 0.05 so it can be say that the supply chain capability has a statistically significant effect on Operational performance

Table 4.23 **ANOVA**

Model		Sum of squares	DF	Mean Square	F	Sig.
1	Regression	136.516	1	136.516	538.915	.000[b]
	Residual	75.488	298	.253		
	Total	212.004	299			

The above ANOVA table 4.23 shows that the model-5 is statistically significant, as the value of the F-statistic is 538.915 having p-value 0.000 < 0.05. therefore, we can conclude that the supply chain capabilities have significant effect on "Organizational Operation performance"

4.7: Accumulated Statistics

Table 4.24: Descriptive Statistics of Demographic Variable

Demographic variable	N	Minimum	Maximum	mean	Std. Deviation
Gender of respondent	300	1	1	1	0
Age of respondent	300	1	2	1.3967	0.49002
Experience of respondent	300	1	33	1.9167	1.96875
Education of respondent	300	1	3	1.9267	0.83883
Answering of survey respondent	300	1	2	1.6133	0.4878

Category of company	300	1	3	1.9133	0.78818
Functional area of respondent	300	1	4	2.1933	1.09847
Job level of respondent	300	3	4	3.3767	0.48536
Employees of company	300	1	3	1.9267	0.81865
Valid N (list wise)	300				

Green Innovation - Descriptive Statistics

Green Innovation	**N**	**Minimum**	**Maximum**	**mean**	**std. deviation**
Effectively reduce release of water	300	1	4	1.5233	0.96569
Recycle waste	300	1	4	1.4233	0.92754
Reduce consumption of water	300	1	4	1.3633	0.83285
Reduce use of raw material	300	1	5	1.2533	0.73322
Product development or design	300	1	4	1.52	0.98293
Less amount of pollution	300	1	4	1.2733	0.72136
conducting product development	300	1	4	1.5067	0.96595
Valid N (listwise)	300				

Operational Performance - Descriptive Statistics

Operational Performance	**N**	**minimum**	**maximum**	**mean**	**Std. deviation**
Improve performance of product	300	1	4	1.4833	0.89763
Product more important than other things	300	1	4	1.52	0.93408
Reduce product cost	300	1	4	1.4167	0.86345
Operational performance is increase	300	1	4	1.3233	0.73978

Increase manufacturing of industry	300	1	4	1.4833	0.94836
High moral of employees	300	1	4	1.3233	0.77511
Valid N (list wise)	300				

Supply Chain Capability - Descriptive Statistics

Supply Chain Capacity	N	Minimum	maximum	mean	Std. deviation
SCC impact op	300	1	4	1.5233	1.0064
SCC increase employee strength	300	1	4	1.3233	0.77078
Increase performance of employees	300	1	4	1.4	0.87706
Increase business performance	300	1	4	1.4433	0.86947
Effect environment of organization	300	1	4	1.4	0.89592
Valid N (list wise)	300				

Table 4.25: Operational performance ~ Green Supply Chain Management

Regression Coefficient

Model			Regression Coefficient		T	Sig.
			B	Std. error		
	1	(Constant)	0.604	0.087	6.943	0
		GSCM	0.2	0.061	19.586	0

Correlation Model Summary

Model	R	R square	Adjusted R Square
1	.750a	0.563	0.561

ANOVA of Regression

Model			Sum of square	DF	Mean square	F	Sig.
	1	Regression	119.316	1	119.316	383.607	.000[b]
		Residual	92.689	298	0.311		

		Total	212.004	299		

Operational Performance ~ Green Innovation

Coefficient

Model			Coefficient		T	Sig.
			B	Std. error		
	1	(constant)	0.539	0.071	8.912	0
		GI	0.629	0.026	24.128	0

Correlation Model Summary

Model		R	R square	Adjusted R Square	Std. Error of the Estimate
	1	.813[a]	0.661	0.66	0.49079

ANOVA of Regression

Model			Sum of square	DF	Mean Square	F	Sig.
		Regression	140.225	1	140.225	582.155	.000[b]
	1	Residual	71.78	298	0.241		
		Total	212.004	299			

Supply Chain Capability ~ Green Supply Chain Management

Coefficients Model summary

Model			unstandardized coefficients		T	Sig.
			B	Std. Error		
	1	(Constant)	0.033	0.058	0.568	0.01
		SCC	0.478	0.02	23.506	0

Correlation Model Summary

Model		R	R square	Adjusted R Square	Std. Error of the Estimate
	1	.806[a]	0.65	0.648	0.31206

ANOVA of Regression

Model			Sum of square	DF	Mean square	F	Sig.
		Regression	53.808	1	53.808	552.533	.000[b]
	1	Residual	29.02	298	0.097		
		Total	82.828	299			

Supply Chain Capability ~ Green Innovation

Coefficients Model summary

Model	Unstandardized Coefficients	T	Sig.

			B	Std. Error			
	1	(constant)	-0.476	0.09	-5.292	0	
		SCC	0.98	0.032	34.581	0	

Correlation Model Summary

Model	R	R square	Adjusted R square	Std. Error of the Estimate
1	0.895	0.801	0.8	0.4874

ANOVA of Regression

Model			Sum of squares	df	Mean square	F	Sig.
		Regression	284.087	1	284.087	1195.847	.000[b]
	1	Residual	70.793	298	0.238		
		Total	354.88	299			

Supply Chain Capability ~ Operational performance

Coefficients Model summary

Model			Undependable Coefficients		Standardized Coefficients	T	Sig.
			B	Std. error	Beta		
	1	(Constant)	0.138	0.093		1.489	0.038
		SCC	0.761	0.033	0.802	23.215	0

Correlation Model Summary

Model	R	R square	Adjusted r square	Std. Error of the Estimate
1	.802[a]	0.644	0.643	0.50331

ANOVA of Regression

Model			Sum of squares	DF	Mean Square	F	Sig.
		Regression	136.516	1	136.516	538.915	.000[b]
	1	Residual	75.488	298	0.253		
		Total	212.004	299			

The study investigated the relationship between Green Supply Chain Management (GSCM), Green Innovation, Supply Chain Capability (SCC), and Operational Performance in the automobile industry. The majority of respondents were male, aged 30-40, with 5-10 years of experience and a master's degree. Positive perceptions were observed, indicating that GSCMS was favorable for innovation, operational work, and creating opportunities.

Green Innovation practices were highly regarded, with respondents agreeing on their effectiveness in waste reduction, recycling, and resource consumption reduction. Operational Performance metrics showed positive perceptions, emphasizing improvement in product performance, cost reduction, and increased manufacturing importance. SCC demonstrated a positive correlation with GSCM, Green Innovation, and Operational Performance, indicating its crucial role in sustainability, innovation, and operational success.

Regression analyses revealed significant positive relationships between Operational Performance and both GSCM and Green Innovation. The positive relationship between GSCM and SCC suggested that strong supply chain capabilities contribute to effective green practices. Similarly, the positive relationship between Green Innovation and SCC highlighted the role of robust supply chain capabilities in successful green innovation implementation.

CHAPTER 5

CONCLUSION

The study's conclusion is speculative. Because of the association that has been established in this study between organizational success, supply chain capabilities, and green innovation. The statistical test of spearman correlation has been used to examine this relationship. The impact of green supply chain management solutions on organizational performance is also investigated using a regression test. This regression test's outcome significantly supports the initial hypothesis.

Thus, the study's initial hypothesis, “Green Supply Chain Management Strategies have positive and significant impact on Operational Performance” have been shown and accepted. The second premise of this research is “Green supply chain management strategies create a positive and significant impact on green innovation” was put through its paces using regression and moderated regression, and it succeeded with findings that were significant. The third premise of this investigation is “Green innovation has a positive and significant impact on operational performance.” This hypothesis was tested for mediation and the significance of the direct and indirect effects was evaluated and demonstrated. Therefore, this theory is also supported.

Fourth hypothesis of this research is “Green innovation mediates the relationship between green supply chain management strategies and operational performance” This hypothesis was tested for the mediation between strategies and performances. Fifth hypothesis of this study is “Supply chain capability moderates the positive relationship between green innovation and operational performance such that relationship is strengthen when supply chain capability is high”. This hypothesis was tested for the relationship and strength of the mediator and dependent variable

The research significantly advances our comprehension of the intricate interplay between green practices, innovation, supply chain capabilities, and operational performance in the specific context of the automobile industry. These findings have the potential to inform future studies, guide strategic decisions, and shape sustainable practices in the field.

The study's findings affirm the positive relationships among green supply chain management strategies, green innovation, and operational performance in the automobile industry. These results align with and contribute to the evolving literature on the strategic importance of environmentally sustainable practices for organizational success and performance

improvement. The study enhances academic discourse by methodologically reinforcing complex relationships through statistical methods like Spearman correlation, regression tests, and mediation analyses.

5.1: Recommendation and Future Work

The complete the study's model has been approved, and hypothetically proved. Some Limitations are the limitations or boundaries that a researcher must operate inside during the whole project. Researchers provide some ideas for future study for up-and-coming researchers in this sector of the automobile industry based on these restrictions. The first limitation of the study is depending on variables. Just four variables in green supply chain management were examined in this study. strategies, Supply Chain Capability, green innovation and organizational Operational organizational performance when other factors, such as organizational structure and new organizational tactics, are having an impact, although these factors and strategies had been ignored in this study.

This study's second restriction is regional in character. While more research on the automotive sectors of other countries is possible, this study only focused on Pakistan. This study's third limitation is based on industry or sector. While further research could be conducted on other industries like the dairy sector and the manufacturing sector like FMCG, this study only focused on the automotive business. The other recommendation respondents are used in data collecting to not free at every time. So in the future research take the appointment on call or Before meeting the respondent send him a letter, and go when they are free to provide the data. This study may be applied at the management and academic levels. From a managerial perspective,

5.2: Theoretical Implications

Through fresh concepts and processes, this study may be used in firms to improve their supply chain management strategies. Enhance innovation and performance of the organization. This study will be implemented in Automobile industry in Pakistan needs to improve its organizational and operational performance. through green innovation. Moreover, this study may be used outside of Pakistan and in a variety of industries, including the manufacturing and dairy industries. From an academic viewpoint, this study may offer up new avenues and perspectives for future research in the fields of Green Supply Chain Management supply chain capability,

green innovation, and operational performance. As a result, this study was applied practically on both sides.

5.3: Academic Implications

The study's academic implications are significant, contributing to the theoretical understanding of the interplay between Green Supply Chain Management (GSCM) strategies, green innovation, and operational performance. The use of statistical methods such as Spearman correlation, regression tests, and mediation analyses enhances methodological rigor, providing a template for future research in this field. These findings offer valuable insights into the complex relationships among organizational success, supply chain capabilities, and green innovation, enriching academic discourse in the domains of environmental management, supply chain studies, and innovation research.

5.4: Organizational Implications

From an organizational perspective, the study's outcomes provide actionable insights for firms, particularly those in the automotive industry. The confirmation of the positive impact of GSCM strategies on operational performance underscores the strategic importance of environmentally sustainable practices. The substantiation of the relationships between GSCM strategies, green innovation, and operational performance highlights areas for organizational focus. For instance, the identified mediation of green innovation and moderation by supply chain capability suggests that organizations can enhance their operational performance by fostering a culture of green innovation and investing in robust supply chain capabilities. This practical guidance supports informed decision-making for organizations aiming to align their operations with sustainability goals and improve overall performance.

REFERENCE

Abu, S, N., Govindan, K., Mardani, A., Zakuan, N., Mat, S, M., Hooker, R., Ozkul, S., The mediating effect of green innovation on the relationship between green supply chain management and environmental performance, *Journal of Cleaner Production (2019)*, doi: https:// doi.org/10.1016/j.jclepro.2019.03.211.

Alan. W. p., innovation strategy& D Research Unit, Manchester business school, university of manchester, Manchester M 15 6PB IU. K. I.

Albort-Morant, G., Leal-Millán, A., & Cepeda-Carrión, G. (2016). The antecedents of green innovation performance: A model of learning and capabilities. *Journal of Business Research*, 69(11), 4912-4917.

Amore, M. D., & Bennedsen, M. (2016). Corporate governance and green innovation. *Journal of Environmental Economics and Management*, 75, 54-72.

Aref, A.H., Marilyn., M.Helms.,& Sarkis, J., (2005) "Performance measurement for green supply chain management" *Benchmarking: An International Journal* Vol. 12 No. 4, 2005 pp. 330-353.

Aslam, H., Blome, C., Roscoe, S., & Azhar, T. M. (2018). Dynamic supply chain capabilities: How market sensing, supply chain agility and adaptability affect supply chain ambidexterity. *International Journal of Operations & Production Management*, 38(12), 2266-2285.

Bansal, P., & Clelland, I. (2004). Talking trash: Legitimacy, impression management, and unsystematic risk in the context of the natural environment. *Academy of Management journal*, 47(1), 93-103.

Baofeng, H.,(2017) The impact of supply chain integration on company performance: an organizational capability perspective.

Blome, C., Schoenherr, T., & Rexhausen, D. (2013). Antecedents and enablers of supply chain agility and its effect on performance: a dynamic capabilities perspective. International *Journal of Production Research*, 51(4), 1295-1318.

Bruno, M, R., Pais. S,, Ana, B., Lopes, d, Sousa., Jabbour, C, J., Chiappetta, J., and Rosa, M, D., The green bullwhip effect, diffusion of green supply chain practices, and institutional

pressures: evidence from the automotive sector,Intern. *Journal of Production economics*, http://dx.doi.org/10.1016/j.ijpe.2016.08.033.

Brusset. X., and Teller. C., (2016) Supply chain capabilities, risks, and resilience, intern. *Journal of Production Economics*, http://dx.doi.org/10.1016/j.ijpe.2016.09.008j.

Castellacci, F., & Lie, C. M. (2017). A taxonomy of green innovators: Empirical evidence from South Korea. *Journal of Cleaner Production*, 143, 1036-1047.

Chandima. R.M., & Antosz. K., (2017) Risk-based maintenance assessment in the manufacturingindustry: minimisation of suboptimal prioritization.

Chen, Y. S. (2008). The driver of green innovation and green image–green core competence. *Journal of business ethics*, 81, 531-543.

Chen, Y.-S.; Lai, S.-B.; Wen, C.-T. 2006. The Influence of green innovation performance on corporate advantage in Taiwan, *Journal of Business Ethics* 67: 331–339. https://doi.org/10.1007/s10551–006–9025–5.

Dangelico, R. M. (2016). Green product innovation: Where we are and where we are going. *Business Strategy and the Environment*, 25(8), 560-576.

Dangelico, R. M., Pujari, D., & Pontrandolfo, P. (2017). Green product innovation in manufacturing firms: A sustainability-oriented dynamic capability perspective. Business strategy and the Environment, 26(4), 490-506.

Dayuan, Li., Zheng, M., Cuicui, Cao., Xiaohong, Chen., Shenggang, Ren. & Huang, M (2016) '' The impact of legitimacy pressure and corporate profitability on green innovation: Evidence from China top 100''.

de Mandojana, N. O. M., & Caracuel, J. A. (2013). Una visión panorámica de la literatura sobre la gestión ambiental en la empresa. Cuadernos económicos de ICE, 86, 11.

de Sousa Jabbour, A. B. L., Jabbour, C. J. C., Latan, H., Teixeira, A. A., & de Oliveira, J. H. C. (2014). Quality management, environmental management maturity, green supply chain practices and green performance of Brazilian companies with ISO 14001 certification: Direct and indirect effects. Transportation Research Part E: Logistics and Transportation Review, 67, 39-51.

Dodgson, Mark, Gann, David and Salter, Ammon. 2008. The Management of Technological Innovation: Strategy and Practice. Completely rev. and updated. Oxford: Oxford University Press.

Eckstein, D., Goellner, M., Blome, C., & Henke, M. (2015). The performance impact of supply chain agility and supply chain adaptability: the moderating effect of product complexity. *International Journal of Production Research*, 53(10), 3028-3046.

Fawcett, S. E., Wallin, C., Allred, C., Fawcett, A. M., & Magnan, G. M. (2011). Information technology as an enabler of supply chain collaboration: a dynamic-capabilities perspective. *Journal of supply chain management*, 47(1), 38-59.

Feng, M., Yu, W., Wang, X., Wong, C. Y., Xu, M., & Xiao, Z. (2018). Green supply chain management and financial performance: The mediating roles of operational and environmental performance. Business strategy and the Environment, 27(7), 811-824.

Forry, A. N., and Rahmat, A., (2018) The mediating role of technology and logistic integration in the relationship between supply chain capability and supply chain operational performance: Department of education management, faculty of educational sciences, gorontalo state university, Indonesia b lecturer of community education departemen, faculty of educational sciences, gorontalo state university, indonesia.

George, G., Zahra, S. A., & Wood Jr, D. R. (2002). The effects of business–university alliances on innovative output and financial performance: a study of publicly traded biotechnology companies. *Journal of business Venturing*, 17(6), 577-609.

Gohoungodji, P., N'Dri, A. B., Latulippe, J.M., LeiriaBarreto M., Adriana., (2020). What is stopping the automotive industry from going green? A systematic review of barriers to green innovation in the automotive industry. *Journal of Cleaner Production*, 123524–. doi:10.1016/j.jclepro.2020.123524.

Green, K. W., Zelbst, P. J., Meacham, J., & Bhadauria, V. S. (2012). Green supply chain management practices: impact on performance. *Supply chain management: an international journal*, 17(3), 290-305.

Helfat, C. E., Finkelstein, S., Mitchell, W., Peteraf, M., Singh, H., Teece, D., & Winter, S. G. (2009). Dynamic capabilities: Understanding strategic change in organizations. John Wiley & Sons.

Hing, K, C., Rachel W.Y., Jing D. a., & Ming, K. L., (2015) ‘’ The moderating effect of environmental dynamism on green product innovation and performance’’.

Ibrahim, N., Razak, R. C., Wahab, M. H. A.-A. A., Osman, A. A., & Rahman, S. M. A. (2021). Supply chain risks and roles of the strategy of green supply chain management practices.

International Journal of Academic Research in Business and Social Sciences, 11(7), 752–771.

Ivan, M., Roberto, B.& Francesco, T., (2017) ‘’Green practices and financial performance’’: A global outlook, *Journal of Cleaner Production* (2017), doi: 10.1016/ j.jclepro.2017.01.058

Jakobsen, S., Clausen T., Innovating for a greener future: the direct and indirect effects of firms' environmental objectives on the innovation process, *Journal of Cleaner Production* (2015), doi: 10.1016/j.jclepro.2015.06.023.

Jeffrey, A. Miles.,(2012) Management and organization theory one montgomery street, suite 1200, San Francisco, CA 94104-4594—www.josseybass.com.

Jipeng, F., Ying, W., Yue, Y., Shiyuan. & Qiang, Z., (2016) ‘’Towards eco-city: the role of green innovation’’ Energy Procedia 104 (2016) 165 – 170.

Kareem, M.A., &Reddy, H.V., (2020) “The Impact of Supply Chain Dynamic Capabilities on Operational Performance”.

Kaydos, W. (2020). Operational performance measurement: increasing total productivity. CRC press.

Khan, M. T., Idrees, M. D., Rauf, M., Sami, A., Ansari, A., & Jamil, A. (2022). Green supply chain management practices' impact on operational performance with the mediation of technological innovation. Sustainability, 14(6), 3362.

Laari. S., Töyli, J., Ojala L.,(2016) Supply chain perspective on competitive strategies and green supply chain management strategies, *Journal of Cleaner Production* (2016), doi: 10.1016/ j.jclepro.2016.09.114.

Lang.M., Ming.T., Wai.L.,& Wong. P., (2015)"Sustainable supply chain management: a closed-loop network hierarchical approach", Industrial Management & Data Systems, Vol. 115 Iss 3 pp.

Lee, H. L. (2004). The triple-A supply chain. Harvard business review, 82(10), 102-113.

Lee, K. H., & Min, B. (2015). Green R&D for eco-innovation and its impact on carbon emissions and firm performance. *Journal of Cleaner Production*, 108, 534-542.

Lee, K.H. & Min, B., (2014) ‘’ Green R&D for eco-innovation and its impact on carbon emissions and firm performance’’.

Lee, S. M., & Rha, J. S. (2016). Ambidextrous supply chain as a dynamic capability: building a resilient supply chain. Management Decision, 54(1), 2-23.

Lenox, M., & King, A. (2004). Prospects for developing absorptive capacity through internal information provision. *Strategic management journal*, 25(4), 331-345.

Melnyk, S. A., Sroufe, R. P., & Calantone, R. (2003). Assessing the impact of environmental management systems on corporate and environmental performance. *Journal of operations management, 21(3), 329-351.*

Min, S., Roath, A. S., Daugherty, P. J., Genchev, S. E., Chen, H., Arndt, A. D., & Glenn Richey, R. (2005). Supply chain collaboration: what's happening?. *The international journal of logistics management*, 16(2), 237-256.

Morant, G.A., Millán, A.L.& Carrión, G.C., (2015) ‘’ The antecedents of green innovation performance: A model of learning and capabilities’’.

Morita, M., Machuca, J.A.D., Pérez, R, J.L., Integration of product development capability and supply chain capability: the driver for high performance adaptation, *International Journal of Production Economics* (2018), doi: 10.1016/j.ijpe.2018.03.016.

Patrick L. M., and Jonathan P. O., (2010) “Transaction cost economics and corporate governance: The Case of CEO Age and Financial Stake”.

Peter, W.S., & Afifi, R., (2004),"Toward a contingency theory of supply chains", Management Decision, Vol. 42 Iss 9 pp. 1131 – 1144.

Qi, Y., Huo, B., Wang, Z., Yeung, H. Y. J., (2017). The impact of operations and supply chain strategies on integration and performance. *International Journal of Production Economics*, 185(), 162–174. doi:10.1016/j.ijpe.2016.12.028 .

Qinghua, Z..& Joseph, S.,(2004) ‘’ Relationships between operational practices and performance among early adopters of green supply chain management practices in Chinese manufacturing enterprise.

Rao, P. & Holt, D., (2005) “Do green supply chains lead to competitiveness and economic performance”.

Reid, E. M., & Toffel, M. W. (2009). Responding to public and private politics: Corporate disclosure of climate change strategies. *Strategic management journal*, 30(11), 1157-1178.

Sarkis, J., Zhu, Q.,& Lai, K.H.,(2010) “An organizational theoretic review of green supply chain management literature”.

Shafique, M., Asghar, M., & Rahman, H. (2017). The impact of green supply chain management practices on performance: Moderating role of institutional pressure with mediating effect of green innovation. Business, Management and Economics Engineering, 15(1), 91-108.

Shahzad ,M., Ying, Q., Javed,S.A., Zafar, A.U., &Rehman,S.U., “Relation of environment sustainability to csr and green innovation”: A case of pakistani manufacturing industry, *journal of cleaner production* (2019), https://doi.org/10.1016/j. jclepro.2019.119938.

SILVA, F. C. D., Shibao, F. Y., Barbieri, J. C., Librantz, A. F. H., & SANTOS, M. R. D. (2018). Barriers to green supply chain management in the automotive industry. Revista de Administração de Empresas, 58, 149-162.

Simpson, D.,&Samson, D., (2008) “Developing strategies for green supply chain management”

Slack, N., Brandon-Jones, A. & Johnston, R., 2013. Operations Management. 7th ed. Harlow: Pearson Books.

Souza, G. C., Ketzenberg, M. E., & Guide Jr, V. D. R. (2002). Capacitated remanufacturing with service level constraints. Production and operations management, 11(2), 231-248.

Taklo,, Salim. K., Tooranloo., Hossein. S., Shahabaldini. p, Z., (2020). Green Innovation: A Systematic Literature Review. *Journal of cleaner production*, 122474–. doi:10.1016/j.jclepro.2020.122474.

Testa, F., & Iraldo, F. (2010). Shadows and lights of GSCM (Green Supply Chain Management): determinants and effects of these practices based on a multi-national study. *Journal of cleaner production*, 18(10-11), 953-962.

Tseng, M. L., Tan, R. R., & Siriban-Manalang, A. B. (2013). Sustainable consumption and production for Asia: sustainability through green design and practice. *Journal of Cleaner Production*, 40, 1-5.

Tzu, Y.C., Hing, K.C., Fiona, L., & Sai, H.C., (2011) “The influence of greening the suppliers and green innovation on environmental performance and competitive advantage in Taiwan”.

Vachon, S., & Hajmohammad, S. (2016). Supply chain uncertainty and environmental management. *Asian Journal of Sustainability and Social Responsibility*, 1, 77-89.

Voss, C. A., Åhlström, P. & Blackmon, K., 1997. Benchmarking and operational performance: some empirical results. *International Journal of Operations & Production Management*, 17(10), pp. 1046-1058.

Weerakkody,v., Omar, A., Haddadeh, R.E. & Busaidy, M.A. (2016) ‘’Digitally-enabled service transformation in the public sector: The lure of institutional pressure and strategic response towards change’’ GOVINF-01180; No. of pages: 11; 4C.

Will. K., (2020) Operational performance measurement increasing total productivity https://doi.org/10.4324/9780367802103.

Witcher, B. J., Chau, V. S., & South-Western, C. L. The On-Line Encyclopaedia of Strategic Management: Notes & Concepts.

Xue.M., Francis. B., and Yu X.(2019). "The penetration of green innovation on firm performance: effects of absorptive capacity and managerial environmental concern" sustainability 11, no. 9: 2455. https://doi.org/10.3390/su1109245.

Yaw. A.M., Esther, N. K. A., & Martilex C.G.A (2019) “The intermediary role of supply chain capability between supply chain integration and firm performance” *Journal of Supply Chain Management Systems* 8 (2) 2019, 32-44 http://publishingindia.com/jscms.

Yu. W.,Chavez. R., Feng. M., and Wiengarten. F., (2014), "Integrated green supply chain management and operational performance", Supply Chain Management, Vol. 19 No. 5/6, pp. 683-696. https://doi.org/10.1108/SCM-07-2013-0225

Yu.S.C., Bao. S., Lai. C.& Wen.T.,(2006) The influence of green innovation performance on corporate advantage in Taiwan.

Zailani S, Govindan K, Iranmanesh M, Shaharudin MR., Green innovation adoption in automotive supply chain: The malaysian case, *Journal of Cleaner Production* (2015), doi: 10.1016/j.jclepro.2015.06.039.

Zhou, y., XU,li. & Sheikh, G.M., (2019) “valuating and Prioritizing the Green Supply Chain Management Practices in Pakistan: Based on Delphi and Fuzzy AHP Approach”.

Zhu, Q., Sarkis, j. & Geng,Y., (2004) “Green supply chain management in China: pressures, practices and performance”.

Zhua. Q.,Sarkisb. J., Lai.H.K., (2008) Confirmation of a measurement model for green supply chain management practices implementation.

APPENDIX

QUESTIONNAIRE

The Impact of Green Supply Chain Management Strategies on Operational Performance: Mediating and Moderating Role of Green Innovation and Supply Chain Capability

The study is being conducted by Noor Muhammad, student of MSBA, National University of Modern Language Islamabad. The primary objective of this study is to find out that how does Green Supply Chain Strategies and Green Innovation will affect the Operational Performance of Organization: Supply Chain Capabilities in the Automotive Industry in Islamabad, Pakistan. I wish to assure you that any response you make will be strictly confidential. If you have any query, you can contact at E-mail: noormuhammad4567na@gmail.comor Cell: 03336483923.

Section: 1 (Demographic Variables)

1. Gender: Male ☐ Female ☐

2. Age: 30- ☐ 40 41- ☐ 50 51- ☐ 60

4. Experience: <5 ☐ 5-10 ☐ 11-15 ☐

   16-20 ☐ >20 ☐

5. Education: Bachelor ☐ Master ☐ Other ☐

6. Name of your Industry/ organization_____

7: Are you answering the survey: (chose one)

1: As an individual

2: on behalf of your company

8: Please mention the category of your industry/organization

☐ Micro ☐ Small ☐ Medium

9: What are the functional areas that describe the area of your responsibility?

1: Managing

2: Planning

3: Manufacturing

4: Other

10: What is your current job level?

1: Vice president

2: Director

3: Manager

4: Other

11: How many employees your company has?

1: 0 – 100

2: 101 – 150

3: 151– 200

4: 201 – 250

12: To what extend your company is successful in managing its Green supply chain in general?

1: Not successful at all

2: Not successful

3: Somewhat successful

4: Successful

5: Very successful

Part B-

A= agree, SA= strongly agree, MB= maybe, DA= disagree, SDA= strongly disagree

SR#	Questions	A	SA	MB	DA	SDA
a.	**Green Supply Chain Strategies**					
1	My organizational strategies are favorable for green supply chain management.					
2	My organizational strategy is helpful for the operational performance of organization.					
3	My organizational strategy creates new opportunities for green supply chain.					
4	My organizational close loop strategy is useful to save the wastage of raw material.					
5	My organizational strategy is helpful for the cost saving of raw material.					
6	My organizational strategy help to aware employees about green supply chain management.					
7	My organizational strategy is used for the green design for items.					
8	My organizational risk Strategy is effective for the green items.					
9	My organizational risk strategy helps to reduce the risk in green supply chain.					
10	My organizational risk strategy helps to reduce the unnecessary cost of product.					
11	My organizational risk strategy helps to improve the profit of organization.					
b.	**Green Innovation**					
12	The manufacturing processes of the company effectively reduce the release of waste?					
13	The manufacturing processes of the company recycle					

	waste and allow them to be treated and re-used?					
14	The manufacturing processes of the company reduce the consumption of water, electricity, coal, or oil?					
15	The manufacturing processes of the company reduce the use of raw materials?					
16	The company chooses the materials of the product that consume the fewer amounts of energy and resources for conducting the product development or design?					
17	The company chooses the materials of the product that produce the less amount of pollution for conducting the product development or design?					
18	The company uses the fewer amounts of materials to contain the product for conducting the product development?					
c.	**Operational Performance**					
19	The company encourages and studies to improve the performance of product?					
20	The company regards quality of product more important than other things?					
21	The operational performance cause to reduce the product cost?					
22	Through green innovation the company operational performance in increase?					
23	The operational performance increases the manufacturing of industry?					
24	The increases in operational performance cause the high moral of employees?					
d.	**Supply Chain Capability**					
25	The Relationship of supply chain capability impacts the					

	performance of an organization?					
26	The supply chain capabilities increase the employ strength?					
27	The supply chain capabilities increase the performance of the employees of organization?					
28	The capabilities increase the business performance?					
29	The capabilities effect the environment of organization?					