An-Najah National University

Faculty of Graduate Studies

THE EFFECT OF GREEN SUPPLY CHAIN MANAGEMENT PRACTICES ON THE SUSTAINABLE PERFORMANCE OF THE PALESTINIAN CONSTRUCTION INDUSTRY: A CONCEPTUAL FRAMEWORK

By

Shurouq Fathi Hasan Sharqawi

Supervisors

Dr. Mohammed Othman

Dr. Yahya Saleh

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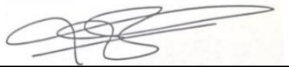
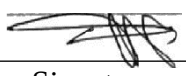
Shurouq Fathi Hasan Sharqawi

This thesis was discussed on 23/11/2024, and it was approved.

Dr. Mohammed Othman	
Supervisor	Signature
Dr. Yahya Saleh	
Co-Supervisor	Signature
Dr. Bahaa Razia	
External Examiner	Signature
Dr. Nidal Dwaikat	
Internal Examiner	Signature

Dedication

To the soul of my father, Fathi Hasan Sharqawi, my first love, my first teacher, and my forever godfather.

To my mother, who supported me through every step of my way.

To my dearest Daughter, Luna, who lightens my life.

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This work would not be accomplished without the motivation and support of my late father, beloved mother, wonderful daughter, a loving family, and outstanding friends; I would like to extend my thanks to them.

Decaration

I, the undersigned, declare that I have submitted the thesis entitled:

THE EFFECT OF GREEN SUPPLY CHAIN MANAGEMENT PRACTICES ON THE SUSTAINABLE PERFORMANCE OF THE PALESTINIAN CONSTRUCTION INDUSTRY: A CONCEPTUAL FRAMEWORK

I further declare that the work presented in this thesis, unless otherwise referenced, is the researcher's own work and has not been submitted elsewhere for any other degree or qualification.

Student's Name: **Shurouq Fathi Hasan Sharqawi**

Signature: *Shurouq Sharqawi*

Date: 23/11/2024

List of Contents

Dedication III
Acknowledgements IV
Decaration V
List of Contents VI
List of Tables IX
List of Figures X
Abstract XII
Chapter One: Introduction and Theoretical Background 1
1.1 Chapter Overview 1
1.2 General Background 1
1.2.1 Problem Statement and the Research Questions 2
1.2.2 The Significance of Research 4
1.2.3 Objectives of Research 4
1.2.4 Research Hypotheses 5
1.2.5 Structure of the Thesis 5
1.3 Theoretical Background 5
1.4 Construction Industry in Palestine 8
1.5 GSCM Practices in the Construction Industry 9
1.5.1 Green Design (Eco-design) 9
1.5.2 Green Procurement 10
1.5.3 Green Transportation 11
1.5.4 Green Recycling 11
1.5.5 Green Production 12
1.5.6 Green Warehousing 13
1.6 Institutional Sustainable Performance in the Construction Industry 13
1.7 Environmental Performance 13
1.8 Social Performance 14
1.9 Economic Performance 15
1.10 Institutional Theory and Institutional Pressures in the Construction Industry 16
1.11 Normative Pressure 17
1.12 Coercive Pressure 18

1.13 Mimetic Pressure 18
1.14 Conceptualization of the Proposed Model 19
Chapter Two: Methodology 20
2.1 Chapter Overview 20
2.2 Quantitative Research Approach 20
2.3 Research Methodology 20
2.4 Sampling Plan 22
2.5 Measurement Development and Questionnaire Design 22
2.6 Techniques of Data Analysis 23
Chapter Three: Results and Analysis 25
3.1 Chapter Overview 25
3.2 Survey Response Analysis 25
3.2.1 Rates of the Responses 25
3.2.2 Demographic distribution of the respondents 25
3.2.3 Common Method Bias (CMB) and Non-Response Bias 27
3.3 Questionnaires Analysis 27
3.4 Measurement Model Assessment (Outer Model) 28
3.5 Convergent Validity 29
3.6 Discriminant validity 31
3.7 Collinearity of Formative Indicators 32
3.8 Formative Construct Discriminant Validity 33
3.9 Structural Model Assessment 34
3.10 Constructs Collinearity 34
3.11 The Coefficient of Determination (R^2) 34
3.12 The Effect Size (f^2) 35
3.13 Goodness of Fit Index (GoF) 35
3.14 Model Fit 35
3.15 Path Coefficients Significance - Hypotheses Test 36
3.16 Moderating Effect Analysis 37
3.17 Managerial Framework 38
Chapter Four: Discussions and Conclusions 41
4.1 Chapter Overview 41
4.2 Results Discussion 41

4.3 Theoretical Implications 43
4.4 Practical Implications 44
4.5 Conclusions 45
4.6 Recommendations 45
4.7 Limitations of Research 46
4.8 Future Research 47
Appendices 60
الملخص .....ب

List of Tables

Table 1: Demographics of the participants 26
Table 2: Level Of Implementation of GSCM Practices, SP, and Institutional Pressures 28
Table 3: Cronbach's Alpha, Composite Reliabilities, and AVE values of Constructs 29
Table 4: Fornell-Larcker Criterion.....31
Table 5: Heterotrait-Monotrait Ratio (HTMT).....32
Table 6: Variance Inflation Factor (VIF).....34
Table 7: Coefficient of Determination R^2, R^2 Adjusted and Effect Size (f^2) Values 35
Table 8: Model fit.....36
Table 9: The Results Of Direct Relations.....37
Table 10: Indirect Relation (Moderating) Result 38

List of Figures

Figure 1: Research's Conceptual Model.....19
Figure 2: Research Methodology Flow Chart 21
Figure 3: Research Measurement Model 30
Figure 4: Decision-making process for keeping or deleting formative indicators ...33
Figure 5: PLS Bootstrapping Procedures.....36
Figure 6: The General Moderator Model.....37
Figure 7: Moderator Effect.....38
Figure 8: Managerial Framework 40

List of Appendices

Appendix A: Questionnaire.....60
Appendix B: Questionnaire (Arabic).....66
Appendix C: Tables.....72

THE EFFECT OF GREEN SUPPLY CHAIN MANAGEMENT PRACTICES ON THE SUSTAINABLE PERFORMANCE OF THE PALESTINIAN CONSTRUCTION INDUSTRY: A CONCEPTUAL FRAMEWORK

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Supervisors
Dr. Mohammed Othman
Dr. Yahya Saleh

Abstract

Green supply chain management (GSCM) has been a highly studied topic as it integrates the environmental aspects into traditional supply chain management concepts. As the construction industry is one of the biggest industries worldwide with tremendous and complex activities and influencing parties, greening the supply chain of this industry will enhance the sustainable performance of the companies and parties working within this industry.

This study presents an overview of GSCM practices in the Palestinian construction market and explores the relationship between GSCM practices and sustainable performance (SP), considering the effect of institutional pressures as a moderator on this relationship. A conceptual framework was developed according to the findings of previous studies to identify the primary constructs and their indicators. Data were collected through a structured questionnaire and distributed to a random sample; 97 responses were gathered from different stakeholders working in the construction industry in the West Bank. Smart-PLS 4.0 software analyzed the data through partial least squares structural equation modeling (PLS-SEM).

The results of this study reveal that GSCM practices, SP, and institutional pressures have high implementation levels among the targeted sample. A significant position relationship was confirmed between GSCM practices and SP. Additionally, it was found that institutional pressures have a negative significant moderating effect on the relationship between GSCM practices and SP.

To the best knowledge of the researcher; this study is considered the first study connecting the GSCM practices with the SP, considering the moderating effect of institutional pressures in the construction industry. Additionally; theoretical and practical implications were also included in this study along with a managerial

framework. Finally, the study limitations and future research recommendations were covered in the last section.

Keywords: Green supply chain management (GSCM), sustainable performance (SP), institutional pressures.

Chapter One
Introduction and Theoretical Background

1.1 Chapter Overview

This chapter introduces the research subject, covering the general background, literature review, problem statement, research questions, the significance of the research, goals, research hypotheses, and research structure.

1.2 General Background

The construction industry is considered one of the world's largest industries, spending over 13% of the world's gross development areas (GDA) (McKinsey et al., 2017). Awareness of environmentally sustainable practices has been widely considered during the last two decades. When construction industries tremendously develop as crucial economic and social pillars, adopting green practices has become vital to ensure countries' greening, resource reservation, and improving life quality.

Several research studies have been conducted to define and apply sustainable practices for the green construction industry to minimize and overcome environmental degradation and resource depletion caused by construction activities (Mojumder et al., 2021; Taghavi et al., 2021; Benachio et al., 2019; Wibowo et al., 2018; Durdyev et al., 2018). The main areas affecting sustainable construction management are supply chain relationships, market competitiveness, life cycle, and waste management (Benachio et al., 2019). Furthermore, greening in this industry includes considering ecological aspects in all phases: planning, design, implementation, close-up, and related maintenance requirements.

Green supply chain management (GSCM) integrates environmental considerations and aspects into traditional supply chain management (Farida et al., 2019) along the life cycle of projects from the planning phase to the close-up stages. The construction supply chain is complex due to its tremendous interrelated components, stakeholders, and factors. Applying green concepts to this multifaceted concept creates considerable challenges for investors, planners, engineers, and other related parties.

Although many studies and research have gone through sustainable performance concepts and green supply chain management practices, few have explored the relationship between those constructs in the construction industry (Gera et al., 2022). Some studies focused on the environmental pillars but did not consider sustainable performance (SP) as a comprehensive concept; social and economic performance was not further explored, and the focus was limited to the environmental performance dimension (Nazir et al., 2024). Showing the relationship between those two principles will highlight the role of adopting GSCM practices in achieving SP in the construction industry.

Moreover, exploring the effect of institutional pressures on the relationship between GSCM practices and SP will allow more understanding of these pressures' role in achieving a sustainable construction industry. Institutional theory summarizes and categorizes these pressures (DiNaggio et al., 1983). Most studies examined the adoption of GSCM using institutional theory as the underpinning theoretical framework (Zhu et al., 2013). The institutional theory recognizes three types of pressures - coercive, mimetic, and informative (Ahmed et al., 2020). In this context, primary GSCM practices in the construction industry are introduced, and the impact of those practices on institutional sustainable performance dimensions and the effect of institutional pressures on this relation are explored.

1.2.1 Problem Statement and the Research Questions

Greening the construction industry has become necessary to ensure the sustainability of global resources. This industry's environmental, social, and economic performance has brought its stakeholders' attention to cope with new global needs. Limited innovations, depletion of resources, and dumping of wastes are serious problems facing the construction sector's supply chain and causing severe environmental challenges. Those challenges have driven construction industry stakeholders to adopt GSCM to mitigate unwanted attachments to this sector.

Despite that, little research has examined the relationship between GSCM and SP, specifically in the construction industry (Al-Ma’aitah, 2018; Balasubramanian et al., 2017). The literature on the direct and indirect effects of the GSCM demands, practices, and performance constructs is inconsistent (Choudhary et al., 2022). Moreover, to

determine the cascading effect, a simultaneous analysis of institutional pressures, practices, and performance is needed (Choudhary et al., 2022).

The construction industry in Palestine is considered a pillar industry due to its economic role in establishing buildings and infrastructure, in addition to increasing employment chances and the high effect of other financial activities (Hanieh et al., 2022; Osaily, 2010). As a developing country adopting the greening concept of the construction industry in Palestine is not mature yet and has been recently applied by large and medium-sized companies that are working under foreign funding, such as the United States Agency of International Development (USAID), United Nations (UN), Japan International Cooperation Agency (JICA), Kreditanstalt für Wiederaufbau (KFW) and many others. Additionally, the Palestinian Environmental Quality Authority is setting and updating regulations to ensure the application of green concepts within all industries, including the construction industry.

This study contributes to filling the gap in current knowledge on the relationship between institutional pressures, GSCM practices, and institutional sustainability in this vital industry, specifically in the Palestinian construction market, highlighting institutional pressures' effect on the previously mentioned relationship.

In light of the problem statement, the main question to be answered in this study is what is the shape of the relationship between GSCM practices and SP in light of considering the moderating effect of the institutional pressures. In addition; the study will be able to answer the following questions:

RQ1: What are the current GSCM practices in the construction industry in the West Bank?

RQ2: What is the level of implementation of GSCM practices by Palestinian construction companies?

RQ3: How do GSCM practices affect SP in the construction industry?

RQ4: Do institutional pressures moderate the relationship between GSCM practices and SP?

RQ5: How can a conceptual framework for GSCM be effectively implemented within Palestinian construction companies to enhance SP?

1.2.2 The Significance of Research

To the best knowledge of the researcher, and upon performing a thorough review of relevant research that went through GSCM practices and SP, no study linked both concepts with institutional pressures in the construction industry. Showing the relationship between GSCM practices and SP will allow firms to understand the importance of adopting GSCM practices and linking those strategies to achieve solid institutional sustainability performance. The stakeholders of the construction industry in Palestine will be able to sort and identify critical GSCM practices to achieve SP for their business while maintaining global green standards.

Furthermore, highlighting the moderating effect of institutional pressures on the relationship between GSCM practices and SP will provide a primary database for local government authorities and other interested environmental parties to set and update regulations for the greening construction supply chain in Palestine, in addition to highlighting the role of funding agencies' restrictions and requirements to grant greening the construction projects.

1.2.3 Objectives of Research

This research mainly aims to determine the relationship between GSCM practices and institutional SP in the Palestinian construction market. Accordingly, the most influential ranking will indicate the best starting point for companies interested in converting to green construction (GSCM activities). Also, this study investigates the moderating role of institutional pressures between GCSM and SP. The objectives of this study are:

1. Identify the current GSCM practices in the construction industry in the West Bank.
2. Assess the level of implementation of GSCM practices by Palestinian construction companies.
3. Explore the relationship between GSCM practices and SP.
4. Assess the moderating role of the institutional pressures on the relationship between GSCM practices and SP.
5. Develop a conceptual framework for GSCM implementation by Palestinian construction companies.

1.2.4 Research Hypotheses

Based on the problem statement and the previous discussion, and to achieve and answer the research questions, these hypotheses are developed:

H_1: GSCM practices positively affect the institutional SP of construction firms in the West Bank.

H_2: institutional pressures positively affect the institutional SP of construction firms in the West Bank.

H_3: GSCM institutional pressures moderate the relationship between GSCM practices and the SP of construction firms in Palestine.

1.2.5 Structure of the Thesis

This thesis consists of four chapters. Chapter one provides a comprehensive overview of the problem statement, objectives, research hypothesis, and performed literature review related to the subject, in addition to discussing the framework of applying GSCM practices in the construction industry in Palestine and its relation to the sustainable performance of this industry. Furthermore, the moderating effect of the institutional pressures on the relationship between GSCM practices and SP is also discussed. Chapter two describes the methodology, research approach, sampling, data collection, and other research requirements to complete this thesis. Chapter three presents collected data, data analysis, and hypotheses testing. Finally, chapter four discusses results, conclusions, limitations, and future research recommendations.

1.3 Theoretical Background

The construction industry worldwide is rapidly developing, affecting several sectors according to the demand and supply model (Wibowo et al., 2018). A report generated by the United Nations Environment Programme (UNEO) emphasized that the construction industry consumes 36% of the world's energy and produces waste and about 40% of the carbon dioxide (CO2) emissions (IEA, 2018). Thus, and in light of the increasing investment in this industry, ensuring the greening construction industry is an essential requirement to maintain the sustainability of the global environment (Toljaga-Nikolić et al., 2020; IEA, 2018; Balasubramanian et al., 2017).

In order to achieve SP: economic, environmental, and social performance of the firms; companies had to apply complementary actions for all construction industry components and activities also should consider related manufacturing, transportation, and disposal stages (Taghavi et al., 2021; Oke et al., 2019; Wang et al., 2018; Zaid et al., 2018; Presley et al., 2010).

Adopting green practices in the construction industry has become a significant requirement for many customers in the construction industry industry. Thus, organizations in this industry tend to apply green techniques to grant their customers satisfaction and, accordingly, their desired market share (Taghavi et al., 2021). Despite the low levels of adopting SP in the construction industry, applying SC concepts showed a significant effect on the environment, social lives, and economic levels (Durdyev et al., 2018)

Construction supply chain management aims to coordinate and integrate material, information, and budget flows between construction industry stakeholders to control logistics and activities. GSCM practices aimed at reducing the negative impacts of construction supply chain activities on the environment (Cataldo et al., 2021; Mathiyazhagan et al., 2018; Papadonikolaki et al., 2017).

Additionally, GSCM embraces the continuously developed process that requires upgrading standards, expectations, and technologies to overcome the negative externalities of the construction sector (Badi et al., 2019). These practices aim to reduce waste and improve and protect the environment (Benachio et al., 2019; Mathiyazhagan et al., 2018; Ketikidis et al., 2013) and to ensure accomplishing organizational objectives including reducing costs, time cycle, and market values in addition to employees' individual goals (Lee et al., 2012). In other words, competitive GSCM shall be lean, agile, and resilient (Cabral, 2012).

Several perspectives and models were discussed in previous studies to identify factors and, most importantly, drivers affecting the implementation of GSCM and comprehend relations involving the adoption of GSCM in the construction industry. Some researchers identified concepts and dimensions, while others identified motivations and barriers (Mojumder et al,, 2021; Taghavi et al., 2021; Benachio et al., 2019; Wibowo et al., 2018).

Sustainable practices were classified into two main categories: internal and external practices. Internal practices require individual methods of the manufacturers and their internal environmental management without the direct involvement of suppliers or clients. While external practices involve suppliers through reverse logistics (R), environmental cooperation (EC), and green purchasing (GP) (Taghavi et al., 2021; Zaid et al., 2018; Balasubramanian, 2012). In addition, external factors include supplier cooperation, government drivers, community drivers, awareness, and creating a culture about the effects of GSCM and economic benefits. At the time internal factors include eco-friendly design, management commitment, reverse logistics, organizational participation, and shareholder pressure (Taghavi et al., 2021).

Various barriers are observed while applying green practices in the construction industry due to the tremendous components and factors forming this industry. High costs, the poor commitment of management, lack of resources, lack of awareness, lack of information sharing, and inadequate government regulations are some examples of barriers to achieving sustainable performance in the construction industry (Rahman et al., 2020; Ojo et al., 2014; Ahn et al., 2013; Osaily, 2010). According to previous researchers' findings, the main barriers facing implementing GSCM were identified to be financial constraints such as high initial costs, training, lack of incentives (Rahman et al., 2020), overconsumption of resources, and lack of sustainable resources (Zaid et al., 2018; Ojo et al., 2015). Moreover, they are unwilling to exchange information (Elbarkouky et al., 2013), lack awareness, and lack obligatory green regulations (Shibani et al., 2021; Ojo et al., 2015; Dheeraj et al., 2012).

Zaid et al. (2018) explored the relationship between GSCM practices and SP. They showed that the internal practices of GSCM positively affect SP's three dimensions, while external practices only influence the firm's environmental performance. At the same time, Longoni et al. (2018) introduced the positive effect of GSCM practices on environmental and financial performance. However, we further extend this research from an institutional theory perspective.

Several theories were developed to overcome the barriers and enhance the will to adopt the GSCM practices, such as institutional theory, stakeholder theory, and natural resource-based view (Choudhary et al., 2022; Pham et al., 2021; Ahmed et al., 2020).

Institutional theory examines the effect of three institutional pressures (normative, coercive, and mimetic pressures) on applying GSCM practices. In contrast, stakeholder theory drives firms to apply GSCM practices through pressures from stakeholders' direct and indirect influences; no other choice is available but to meet their customers' demands (Ahmed et al., 2020). The natural resource-based view (NRBV) was presented to address the environmental problems brought on by human irresponsibility (Pham et al., 2021). In this study, institutional theory will be investigated to determine how it affects the application of GSCM practices.

1.4 Construction Industry in Palestine

The construction industry in Palestine forms one of the largest economic sectors in the country. Construction of various vital projects lies under this industry, such as infrastructure projects, residential units, hotels, hospitals, educational centers, and many others, in addition to associated industries that are directly linked and depend entirely on this industry, such as importing raw and manufactured materials (cement, reinforcement steel, cast iron, building material, electromechanical components, construction vehicles, gypsum works, and decorative material). Moreover, the construction industry affects the country's social situation by forming a labor market for residents (Hanieh et al., 2022; Musleh, 2018).

Considering the diverse extension of this industry and the tremendous inter-connected relation with other sectors, donors, firms, governmental parties, and other stakeholders are considering the sustainable performance of this industry and are putting efforts to ensure greening this industry. Although it has not been fully applied in the Palestinian territories, many agencies' and donors' regulations and requirements strictly demand environmental needs in the projects, starting from the design phase to the end of projects and even for operation and maintenance stages. As a developing country, adopting the greening concept of the construction industry in Palestine is not mature yet and has been recently applied only by large and medium-sized companies working under external funding.

1.5 GSCM Practices in the Construction Industry

A GSCM strategy optimizes material and information flows through the value chain (Hanna, 2021). In the construction industry, GSCM practices were classified into six vital green components: green design, green procurement, green transportation, green recycling, green production, and green warehousing (Ali et al., 2020; Dheeraj et al., 2020; Teixeira et al., 2018); other research added some other practices such as organizational participation, shareholder pressure government drivers, and suppliers (Taghavi et al., 2021; Wibowo et al., 2018; Ahn et al., 2013).

The first driver that steers construction firms to adopt GSCM practices is economic return, as the current market demands applying green practices, and thus, firms will keep their names on the candidates' lists and gain higher winning opportunities (Jing et al., 2019).

It was found through previous studies that GSCM practices adoption significantly affect the environmental performance and economic performance of construction projects (Taghavi et al., 2021; Ali et al., 2020; Ketikidis et al., 2013).

1.5.1 Green Design (Eco-design)

Green design can effectively reduce the adverse environmental effects of new products and processes (Wibowo et al., 2018) and can be considered a root practice leading to other green practices in the GSCM (Le, 2020). To meet the requirements of the green design process, two concepts are considered: environmentally conscious design (ECD) and lifecycle assessment (LCA). ECD focuses on designing products that consider environmental aspects, while LCA aims to decrease the negative impacts of products (Wibowo et al., 2018).

In the construction industry, the designing phase is considered to be the success key to projects where several outputs are severed, such as technical data, detailed engineering design (DED), material schedules, and other details (Wibowo et al., 2018), where new opportunities are offered to minimize adverse environmental impacts of new projects. Although negative short-term cost effects are attached to applying great design, long-term strategic outcomes are expected from this practice (Ketikidis et al., 2013). The design phase was the most critical phase in the construction industry life cycle applying

GSCM concepts (Benachio et al., 2019), and a positive relationship between green design and sustainable performance was found (Taghavi et al., 2021).

Owners, donors, and other controlling stakeholders have measures and ideas translated into technical requirements by construction designers and consultants. Greening desires of the construction industry are initiated at the design phase, where all the sustainable performance ideas are translated into requirements and conditions that shall be applied throughout the construction phase. Putu et al. (2021) described the practices that can be carried out under green design as considering the reduction of hazardous material, energy-saving systems, high-recycling content, utilization of non-degradable resources such as natural lighting and ventilation, recyclable wastes, and others.

1.5.2 Green Procurement

Green procurement shall be considered to achieve the desired environmental features of the procurement process, namely acquiring reusable material and recyclable components and minimizing or omitting the usage of hazardous material. Ali et al. (2020) and Ninlawan et al. (2010) highlighted that green procurement can enhance environmental parameters in addition to considering other global procurement goals, such as minimizing costs, improving quality, and increasing the reliability of products.

Green procurement in the construction industry includes considering purchasing environment-friendly material (Taghavi et al., 2021), in addition to selecting green suppliers who consider green standards and have already acquired environmental licenses like ISO14000 certification (Teixeira et al., 2018; Ninlawan et al., 2010). A study conducted by Azam et al. (2022) showed a positive impact of green purchasing on sustainable performance; additionally, green procurement addresses economic performance goals (Ali et al., 2020). This was strengthened by Taghavi et al. (2021), who also found a significant positive relation between green procurement, environmental performance, and economic performance in the construction industry.

1.5.3 Green Transportation

Material and personnel transportation occurs in the construction life cycle following the procurement stage. Green transportation in construction activities includes considering location selection, movement of material, fuel used, employee movements, loading size, and full-capacity loads, which can reduce expenses of the activities that affect economic sustainability (Lăzăroiu et al., 2021; Putu et al., 2021). Ali et al. (2020) mentioned that besides the large contribution of green transportation to projects' economic sustainability, it can significantly reduce expenses. Green transportation can enhance society's health by reducing hazardous emissions and contributing to construction workers building a healthy lifestyle (Putu et al., 2021).

Although green transportation was the least considered practice of GSCM in literature, a significant relation was found between this dimension and sustainable performance, specifically environmental (Rostamzadeh et al., 2015). As confirmed by another study, the reduction of negative environmental impacts associated with transportation activities in the construction industry is noticed (Putu et al., 2021).

1.5.4 Green Recycling

In the construction industry supply chain, green recycling or reverse logistics refers to reusing waste material resulting from construction activities in a useful, effective, and creative approach (Putu et al., 2021). Waste material can be used in the construction supply chain using different techniques, such as re-manufacturing, repairing, reusing, or refurbishing. However, it was found to be the least effective dimension in the construction industry in Pakistan due to the lack of resulting waste material (Ali et al., 2020).

Green recycling ability and probability are highly linked to measures and consideration of material selected during the design phase (Taghavi et al., 2021). Benachio et al. (2019) stated that green recycling in the construction industry could minimize quantities of dumped wastes, reduce negative environmental impact, and achieve a better circular supply chain.

Despite some barriers that face the recycling process in the construction industry, such as economic, legal, social, and time aspects (Le, 2020), a proper level of recycling can

result in enhancing firms' image as positive and responsible, which consequently results in enhancing firms reputation in the market (Putu et al., 2021).

1.5.5 Green Production

A green production process is considered in construction, aiming for high efficiency associated with less negative environmental impacts (Taghavi et al., 2021). Integration of this measure helps firms to reduce associated material costs and negative environmental impacts and enhance the efficiency of processes (Putu et al., 2021) and the environment shall be considered an asset and a resource (Le, 2020).

Ali et al. (2020) elaborated that green production took the second rank in GSCM practices after green warehousing. In the construction industry, products vary in materials, buildings, infrastructure elements, hospitals, residential units, and others. Production processes in this industry have a broad and diverse number of interconnected activities that primarily and continuously affect each other.

Green production is not only limited to controlling hazardous emissions and wastes (Le, 2020); many studies highlighted that integrating green production into the construction industry could lead to lowering consumption costs, enlarging project efficiencies, and reducing costs associated with environmental safety requirements (Putu et al., 2021; Ali et al., 2020; Le, 2020). Ali et al. (2020) advised that green production or green construction also aims to minimize environmental pollution resulting from construction activities to the air and water and summarized the benefits of green building:

- Cost reduction: A significant drop in associated expenses will be noticed upon effective adoption of green requirements.
- Incentives and tax reduction: Governments and other controlling stakeholders are going green and attempting to apply green policies in the construction industry.
- Market Share: Personnel know environmental requirements and are heading towards firms with a higher green reputation.

That is, eco-friendly practices and measures can be taken to gain sustainable performance for the sake of firms and the environment.

1.5.6 Green Warehousing

Warehousing considers mapping goods flow in addition to reducing associated costs and control time in the SC (Irizarry et al., 2013), companies became aware of green warehousing's role in reducing energy and costs (Rostamzadeh et al., 2015). On the one hand, many firms have adopted green warehousing to save on expenses and energy. On the other hand, green warehousing has been proven to reduce negative environmental impacts, specifically when proper location is considered (Ali et al., 2020; Wibowo et al., 2018).

Ali et al. (2020) performed a study to rank GSCM practices towards their effect on the economic performance of the construction industry, where it was found that green warehousing is the top-ranked practice among other GSCM dimensions. However, Rostamzadeh et al. (2015) highlighted that firms do not usually accept the initial costs associated with green warehousing needs.

1.6 Institutional Sustainable Performance in the Construction Industry

Economic, social, and ecological factors shall be considered to achieve an organization's sustainable performance (Ali et al., 2020). Sustainability offers new opportunities with higher cost savings, efficiency improvements, and new market shares (Hanna, 2021). Le (2020) found a positive relationship between applying environmental requirements and achieving sustainable construction performance. However, a study by Son and Choi (2018) concluded the same results but was not specified solely for the construction industry.

1.7 Environmental Performance

Worldwide, researchers are concerned about the environmental performance of developed and developing industries (Lu et al., 2020) and highlighted the importance of considering this measure when considering sustainable performance (Le, 2020). The environmental performance can be linked to the degree to which companies are reducing environmental accidents, solid wastes, and air emissions and improving the ecological situation (Song et al., 2018; Papadonikolaki et al., 2017; Laosirihongthong et al., 2013).

Environmental damages caused by constructed activities can be reduced by considering environmental measures (Ding, 2004). A set of standards is provided by the International Organization for Standardization (ISO) - ISO 14000, which includes a bible for construction firms to enhance their ability to improve their environmental performance and, at the same time, keep up their corporate goals (Le, 2020; Ding 2004).

Improvements in environmental measures are usually considered as additional cost measures, which result in slowly considering them in the construction industry due to its numerous and interconnected activities (Ding, 2004). However, it was concluded by later studies that improving environmental performance leads companies to better economic results in addition to larger market share (Jing et al., 2019).

Taghavi et al. (2021) showed that GSCM practices positively affect the environmental performance of construction firms, namely green design, manufacturing, and distribution, while green procurement had no significant effect on this measure. We formulated the following sub-hypothesis:

H_{1a}: GSCM practices positively affect the environmental performance of construction firms in the West Bank.

1.8 Social Performance

Social performance could be achieved when psychological needs, governmental participation, cultural aspects, ethical practices, health, safety, and equity are considered (Wang et al., 2018; Almahmoud et al., 2015). A gap is found in linking social performance with GSCM practices; few researchers, specifically in developed countries, went through this dimension for sustainability, especially for the construction industry (Taghavi et al., 2021; Yildiz Çankaya et al., 2019; Zuo et al., 2012).

Despite the enormous and complex social values engaged in the construction industry, stakeholders' satisfaction is the ultimate indicator of social sustainability; at a time when social needs within a project life cycle have resulted from the interaction of personal values among a specific community, social impact assessment (SIA) is carried to predict and assess associated social items effects (Almahmoud et al., 2015).

A qualitative study carried out by Zuo et al. (2012) showed that the social sustainability concept in the construction industry is overlooked in the construction industry, where it was advised that the most significant criteria for achieving social performance are safety requirements and protection, while barriers were found out that associated costs, lack of awareness, education, and knowledge.

For the supply chain of the construction industry, health, safety, and legislative issues are the most controlling measures for social performance rather than ethical or cultural aspects, which will lead to enhancing the firm's benefits if considered and will result in negative consequences if neglected (Wang et al., 2018). From another view, indicators for achieving social sustainability in GSCM of the construction industry, according to (Taghavi et al., 2021), were shortened to increasing professional education, enhancing employment opportunities, and growing healthcare facilities in the area, where creating and improving employment opportunities was found to be the highest loading factor. Yildiz Çankaya and Sezen (2019) followed another view for listing social performance indicators such as customer satisfaction, firms' image in the market, relations among stakeholders, safety, health, education, and training; however, this study was not specified in the industry. We formulated the following sub-hypothesis:

H_{1b}: GSCM practices positively affect the social performance of construction firms in the West Bank.

1.9 Economic Performance

When discussing industries in general, specifically the construction industry in developing countries, the highest priority is given to economic effects (Zhu et al., 2007). The financial performance of firms is considered a comprehensive indicator of their economic status in the market (Wang at al., 2018); by applying GSCM practices, both positive and negative economic performance are expected (Taghavi et al., 2021; Laosirihongthong et al., 2013).

Economic performance indicators include reducing material costs, waste disposal, and energy use (Putu et al., 2021) and increasing fines for environmental accidents and waste treatment (Taghavi et al., 2021). A study conducted by (Zhu et al., 2007) showed the significant relation between applying mimetic pressure and economic performance, which they divided into two types of performance:

- Positive economic performance: Decreasing costs of GSCM practices such as material purchasing and decreasing energy consumption costs, recycling fees, and environmental accidents.
- Negative economic performance: Increasing costs associated with applying green practices such as training costs, operational costs, and purchasing eco-friendly systems and materials.

While it was found that green design, green procurement, and green manufacturing have a positive significant effect on economic performance, green distribution was found not to affect this measure (Taghavi et al., 2021). Conversely; It was also indicated that high adoption of environmental mitigation measures could lead to insufficient economic performance (Wang et al., 2018), but then again; studies showed a positive and significant relation between applying GSCM practices and financial performance (Song et al., 2018). We formulated the following sub-hypothesis:

H_{1c}: GSCM practices positively affect the economic performance of construction firms in the West Bank.

Therefore, considering the previous studies, we have formulated the following main hypothesis:

H_1: GSCM practices positively affect the sustainable performance of construction firms in the West Bank.

1.10 Institutional Theory and Institutional Pressures in the Construction Industry

One of the most effective aspects that drive companies to implement GSCM practices is institutional pressure, which was classified in many research into three main isomorphic pressures: normative, coercive, and mimetic (Ahmed et al., 2020; Ketikidis et al., 2013; Zhu et al., 2007). The institutional theory supports that companies adopt green practices once pressures are validated by owners or related stakeholders (Dubey et al., 2015).

Institutional pressures have a moderating effect on the impact of TQM on environmental performance (Dubey et al., 2015). Based on their argument, institutional pressure should not be a mediating variable. However, this study supports the moderation role of institutional pressure since it drives GSCM adoption. Taghavi et al.

(2021) systematically reviewed the literature, exploring research on GSCM in the construction industry, highlighting that most previous studies linked GSCM to environmental and economic pillars rather than social dimensions (Dubey et al., 2017). Furthermore, moderator effects between GSCM and performance should be studied (Yildiz at al., 2019). Though few papers try to address the theoretical underpinnings of GSCM practices and performance, specifically in small and medium firms (Tseng et al., 2019), the relationship of GSCM with environmental or other performance outcomes is not consistent. According to Bhatia and Gangwani's (2021) findings, most existing studies have been done in the manufacturing sector. Few studies have been done in the construction sector (De Oliveira et al., 2018).

At a time when stakeholders of the construction industry included manufacturers, building material suppliers, contractors, consultants, engineers, laborers, and clients who were interconnected logistically and financially (Cataldo et al., 2021; Mathiyazhagan et al., 2018), the GSCM innovations are slowly accepted by those stakeholders (Cataldo et al., 2021). Ketikidis et al. (2013) stated that institutional pressure positively influences GSCM initiatives.

A previous study by Zhu et al. (2007) explored the moderating effect of institutional pressures on the relationship between GSCM practices and sustainable performance. Also, this study showed that institutional pressures affect the level of applying green supply chain practices and the resulting environmental and economic sustainability levels. However, the study was conducted in 2007 without focusing on a specific industry. A study conducted by Elbarkouky and Abdelazeem (2013) showed that ISO 14001 certification and market competition are the main drivers of adopting GSCM practices in the Egyptian construction industry, while weak regulations and societal pressure were the foremost barriers to applying those practices.

1.11 Normative Pressure

Environmental awareness has increased among external stakeholders, obligating companies to adopt greening throughout their activities (Ahmed et al., 2020; Zhu et al., 2007). Professionalization is the main cause of normative pressure as it determines the working conditions through regulations (Dubey et al., 2015).

Normative pressure, known as market pressure, pushes companies to adopt new practices and values. A study conducted by Aziz et al. (2017) showed a significant effect of this institutional pressure on adopting the greening concept. A previous survey showed a large positive impact of normative pressures on environmental performance (Berrone et al., 2013).

1.12 Coercive Pressure

Power and influence drive coercive pressure from higher dependent parties or cultural aspects (Ahmed et al., 2020; Sartipi, 2020). Coercive pressure could be formal and informal (Dubey et al., 2015). Mojumder et al. (2021) positively linked coercive pressure from stakeholders like environmental groups, governmental regulation, and donors to adopting GSCM practice in the Indian construction market. Ajibike et al. (2020) show a significant relationship between coercive pressure and the environmental performance of firms.

Several studies have linked this isomorphic pressure with environmental performance but have not explored its relationship with other sustainable performance constructs.

1.13 Mimetic Pressure

By imitating the performance of other successful competitors, companies can gain market share by keeping their names on the list of service providers (Sartipi, 2020; Zhu et al., 2007). Mimic and other successful construction companies that adopt ecological sustainability concepts often do so when firms are unsure of what is required in the market (Ajibike et al., 2020).

A study by He et al. (2016) showed a significant relationship between applying mimetic pressure and environmental performance. Another study showed that mimetic pressure, known as competitive pressure, significantly improves the economic performance of firms when GSCM practices are adopted (Zhu et al., 2007). Therefore, we have formulated the following main hypothesis:

H_2: Institutional pressures moderate the relationship between GSCM practices and the SP of construction firms in the West Bank.

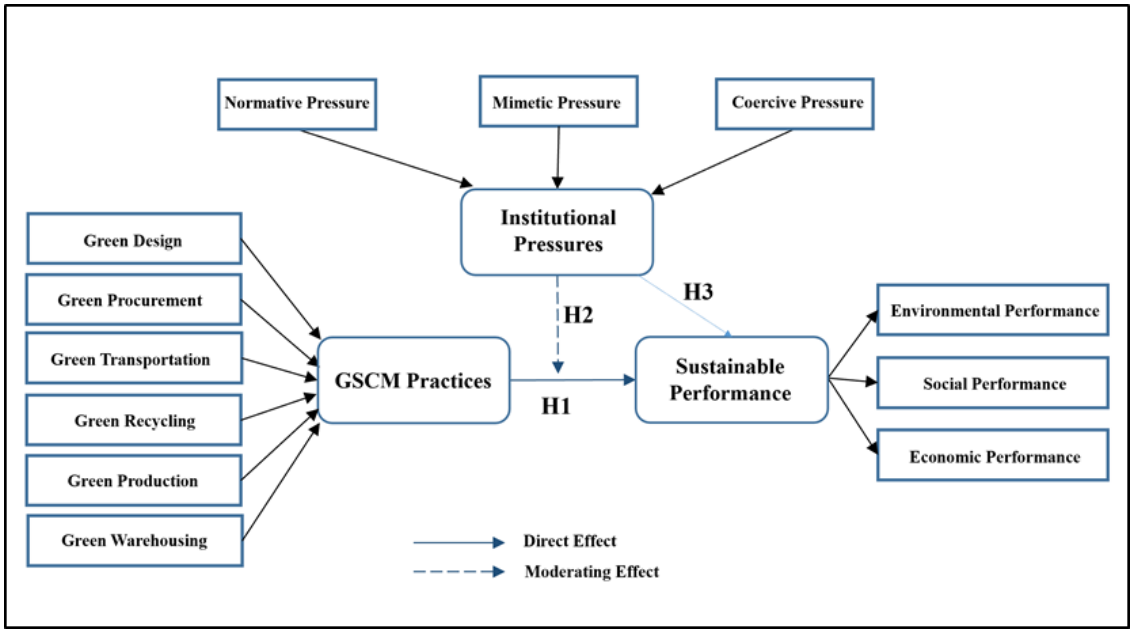
1.14 Conceptualization of the Proposed Model

Previous studies and various industries discussed and argued in the literature show the importance of GSCM practices in achieving sustainable performance for organizations and companies. Despite the significant effect of the construction industry on sustainable performance, few studies have been conducted in this industry.

The proposed model in this study consists of three constructs: GSCM, SP, and institutional pressures as a moderator. Upon literature-based research, indicators for each construct are detailed in Table 1 Appendix C. Figure 1 below presents the proposed conceptual framework.

Figure 1

Research's Conceptual Model



Chapter Two
Methodology

2.1 Chapter Overview

This chapter presents the research's methodology, including research design, data collection, questionnaire design and distribution, research content, reliability, and data processing and analysis methods.

A comprehensive review of issued articles and papers was done using scientific research databases such as Scopus, Web of Science, and Google Scholar. Gathering information and data from the resources assessed in better refining related constructs and indicators that allowed to answer the research questions. A qualitative research approach was accommodated to fill the gap in the literature and reveal relationships between the research variables.

2.2 Quantitative Research Approach

A quantitative tool for data collection was used, and a questionnaire was developed so that results could be used to achieve a comprehensive understanding of GSCM practices and their effect on sustainable performance using a quantitative approach. Each indicator was converted to a question with five options for the answers based on the five-point Likert scale, which are 5: strongly agree; 4: agree; 3: neutral; 2: disagree; and 1: strongly disagree. The survey participants were stakeholders of various industries within the construction industry, such as designers, contractors, material suppliers, donors, and governmental authorities with multiple positions, primarily managerial positions like general managers, quality managers, project managers, and chairpersons.

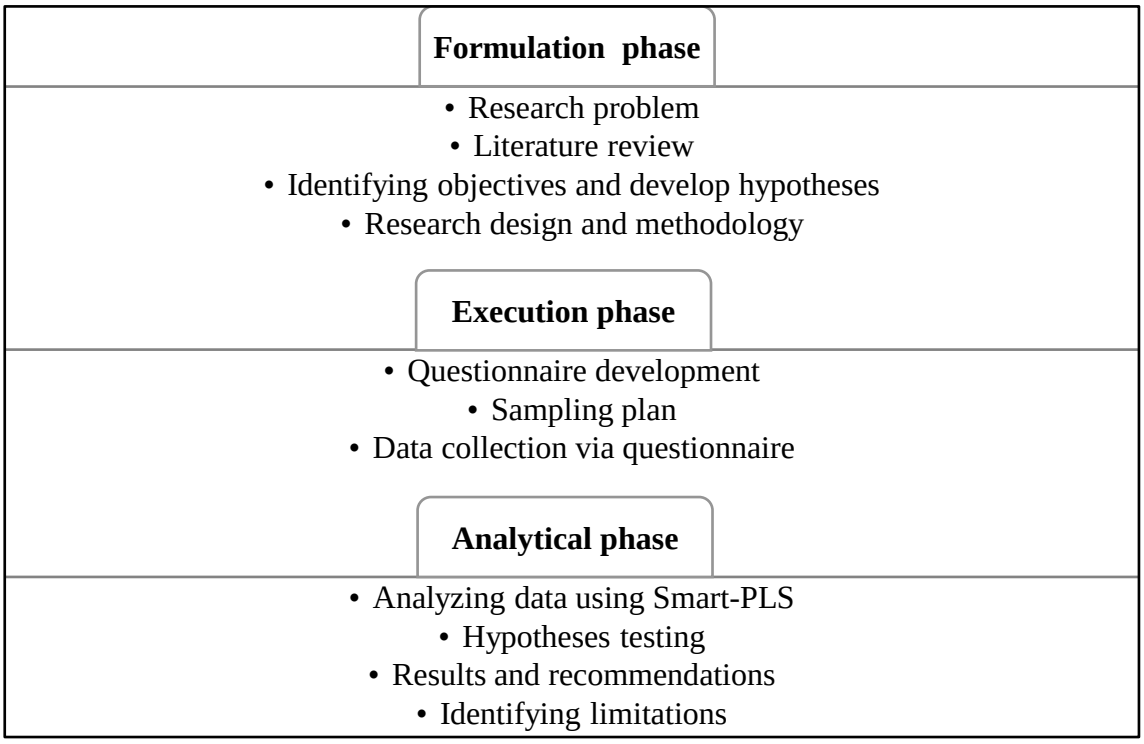
2.3 Research Methodology

The research methodology approach is a strategy that enables the researcher to develop, execute, and analyze data to conduct the research. In the formulation phase, the study problem is identified according to a deep review of existing literature, allowing the researcher to develop research questions and set objectives and hypotheses for the study. Selecting sampling methods, designing the questionnaire, and gathering data are performed within the execution phase. Finally, the analytical phase begins by analyzing

collected data and testing hypotheses to draw results, conclusions, and recommendations.

Figure 2 below shows the research flow chart of this study, starting by identifying the problem of adopting GSCM practices on the sustainable performance of entities working in the construction industry in Palestine and the role of the institutional pressures on the relation between GSCM practices and SP. The study hypotheses are developed upon reviewing the literature about the three main constructs, and the quantitative research approach is accredited.

Figure 2
Research Methodology Flow Chart



Upon finishing the formulation phase, the execution phase started by designing the questionnaire and selecting the study population. The developed questionnaire was distributed via email and other means. Finally, data obtained from questionnaire responses was analyzed using Smart-PLS software (Ringle et al., 2024), and the results were elaborated on and explained—the analytical phase ended by writing the discussion, recommendations, and the limitations of the study sections.

2.4 Sampling Plan

The research was conducted to cover the construction sector in Palestine, among relevant stakeholders who are performing, controlling, and monitoring the life cycle of the construction projects. Utilizing Google Forms within 40 days, about 159 electronic requests to participate in the questionnaire survey were sent to general managers, owners, quality control managers, project managers, and other stakeholders working in the construction industry in the Palestinian Territories; 97 responses were recorded with the respondent rate of 61.01%.

To determine the adequate sample size for the data, the 10-times rule method, the acceptable sample size shall be greater than the maximum model links at any latent variable within the model (Kock et al., 2018), and thus, the minimum sample size in this research is 60. However, Edeh et al. (2023) mentioned that this method is a rough guideline, and they recommend that the minimum sample size shall consider the statistical power of the estimates, which can be achieved either by considering Cohen's power tables or *G**Power software (Faul et al., 2009). Thus, aiming at achieving an 80% power level with a significance level of 5% and a minimum acceptable value for R^2 of 0.25, power tables (Table 2 in Appendix C) show that the minimum sufficient sample size is 59, which is also met by several gathered questionnaire's responses. In addition, we have provided the following setting in the *G**Power software: $f^2 = 0.15$ (Cohen, 1988), $\alpha = 0.05$, and number of predictors = 2, and the power was set at 0.9% (Gefen et al., 2011). The sample size required to achieve the desired confidence level (with a 95% confidence level) is 88 participants.

The sample population was selected to cover several supply chain members/ actors: owners, consultants, and contractors working within large and medium-sized companies that are working under foreign funding, such as the United States Agency of International Development (USAID), United Nations (UN), Japan International Cooperation Agency (JICA), Kreditanstalt für Wiederaufbau (KFW) and many others.

2.5 Measurement Development and Questionnaire Design

Referring to the literature review, constructs were determined, and indicators for each construct were determined, as shown in Table 3. The questionnaire form was developed in English and translated into Arabic using back translation, the local language in the

area. Both questionnaire forms are included in Appendix A and Appendix B, respectively.

To measure GSCM practices, 25 items were selected: green design (GD), green procurement (GPr), green transportation (GT), recycling (R), green production (GPd), and green warehousing (GW) with four to five items for each.
Sustainable performance (SP) was evaluated by selecting 16 items to assess Environmental performance (EnvP), Social performance (SPer), and Economic Performance (EPer) with five, five, and six items, respectively.

Finally, the institutional pressures construct was formulated through 14 items: normative pressure (NPr) with five items, coercive pressure (CPr) with five items, and mimetic pressure (MPr) with four items. Appendix C, table 1 summarizes the operationalization of the Model's Constructs.

All indicators were evaluated using the Likert scale (five points), where respondents were asked score level of the appliance of each measure - answers ranged as (1: Strongly disagree), (2: disagree), (3: Neutral), (4: agree), (5: Strongly agree).

Based on the ordinal scale to evaluate the significant degree and level of application for the indicators, the statistical agreement levels are classified into five levels: very low agreement (1-1.8), low agreement (1.81-2.6), moderate agreement (2.61-3.4), high agreement (3.41-4.2) and very high agreement for the values within the interval (4.21-5).

2.6 Techniques of Data Analysis

The collected data from the questionnaire was imported through an MS Excel sheet where the statistical package was read directly from the sheet (i.e., the demographic distribution of the respondents), followed by partial least square modeling using Smart-PLS to investigate relationships of the conceptual model.

Upon performing the PLS algorithm analysis, validity and reliability for constructs and variables in the model were calculated, and the results were obtained. The analysis results are discussed thoroughly in chapter four of this study. Bootstrapping was also

conducted for the model using Smart-PLS to test and assess the significance level of the relationship and the research hypotheses.

Upon performing the analysis, one case out of ninety-seven cases was deleted, in addition to excluding some indicators (GD1, GPr2, CPr2, GPd1, GPd4, Sper3, Sper4, EPer5, EPer6, CPr1, CPr2, CPr5) to obtain composite reliability that does not exceed the allowable value. In chapter four, measurement model validity included convergent and discriminate (cross-loadings and Fornell-Larcker criterion), reliability, composite reliability, average variance extracted (AVE), Cronbach's alpha, and item loadings. Noting that ensuring the constructs' significance by examining the outer weight and outer loading.

Furthermore, structural model assessment, including calculation of the coefficient of determination (R^2), effect Size (f^2), the goodness of fit Inde (GoF), and path coefficients for testing the hypotheses, are presented in the subsection as proper. Moreover, the moderation effect of the institutional pressures is considered in this research.

Chapter Three
Results and Analysis

3.1 Chapter Overview

This chapter analyzes data collected through questionnaires from stakeholders working in the construction industry industry in the West Bank. The research model was evaluated by partial least squares structural equation modeling (PLS-SEM) using Smart-PLS 4.0 software to check measurement and structural models (validity, reliability, and other statistical aspects) and the proposed hypotheses.

3.2 Survey Response Analysis

3.2.1 Rates of the Responses

The questionnaire was distributed using the Google Docs website to contracting, consulting, and funder individuals, where 97 responses were received out of 159 electronic requests to participate in the survey, with a response rate of 61.01%.

3.2.2 Demographic distribution of the respondents

Table 1 below shows the aspects and descriptive characteristics of the sample. Analysis of respondents' characteristics shows that 59.8% hold a bachelor's degree, 41.2% have 11-15 years of working experience, and over 78% have CEO positions, project managers, and quality control managers. Regarding company aspects, 38.1% of the respondents work in contracting companies, 23.7% are owners and funders, 18.6% are consultants, and others work in construction industries procurement or governmental parties. Other features of the sample are shown in Table 1.

Table 1
Demographics of the participants

No.	items	Option	Frequency	Percentage
1.	Educational level	Diploma or less	2	2.1%
		Bachelor degree	58	59.8%
		Higher education	37	38.1%
		Total	97	100.0%
2.	Experience	less than 5 Years	15	15.5%
		6-10 Years	12	12.4%
		11-15	40	41.2%
		More than 15 years	30	30.9%
		Total	97	100.0%
3.	Position	General Manager/CEO	27	27.8%
		Project Manager	30	30.9%
		Quality Control Manager	19	19.6%
		Others	21	21.7%
		Total	97	100.0%
4.	Company	Consultant	18	18.6%
		Contracting	37	38.1%
		Owner/Funding	23	23.7%
		Procurement	11	11.3%
		Others	8	8.3%
		Total	97	100.0%
5.	Employees number	1-9	16	16.5%
		10-19	25	25.8%
		20-49	20	20.6%
		50 and more	36	36.1%
		Total	97	100.0%
6.	Limited contract Employee number	1-9	51	52.6%
		10-19	16	16.5%
		20-49	13	13.4%
		50 and more	17	17.5%
		Total	97	100.0%
7.	Engaging GSCM practices along projects' life cycle	Currently uses	50	51.6%
		Plan to use within 12 months	4	4.1%
		Plan to use within more than 12 months	4	4.1%
		Currently, there are no plans to use	19	19.6%
		Not sure	20	20.6%
		Total	97	100.0%
8.	Having Environmental Certifications	Currently, obtain	40	41.3%
		Plan to obtain within 12 months	5	5.2%
		Plan to obtain within more than 12 months	1	1.%
		Currently, there are no plans to obtain	24	24.7%
		Not sure	27	27.8%
		Total	97	100.0%
9.	Considering green suppliers, vendors, etc.	Yes	30	30.93%
		No	44	45.36%
		Not sure	23	23.71%
		Total	97	100.0%
10.	Technologies are included in the ' 'company's strategic planning	Yes	77	79.38%
		No	16	16.5%
		Not sure	4	4.12%
		Total	97	100.0%

All descriptive outcomes for constructs and data in this research are presented in Appendix C, table 4.

3.2.3 Common Method Bias (CMB) and Non-Response Bias

Common Methods Bias (CMB) could occur when both dependent and independent variables are measured within one survey and can affect the reliability and validity of the results in addition to conclusions (Kock et al., 2021). The present study uses Harman's one-factor test to assess potential common method bias (CMB) (Fuller et al., 2016). According to Podsakoff et al. (1986), the variance explained by a single factor should be less than 50% to indicate that CMB is not a significant issue. In this study, the variance explained was 43.6%, suggesting that CMB is not of significant concern.

Non-response bias shall be considered before checking the assumptions, such as constant variance and normality, as it might form a major source of error in the research (Magdolen et al., 2024). Non-response bias happens when those who engage in the study reply differently than those who do not. Using the t-test (Armstrong et al., 1977), we compared the early versus late responses to determine if there were any significant changes. No significant differences were found in identifying GSCM practices, institutional pressures, and sustainability.

3.3 Questionnaires Analysis

As Smart-PLS software is used to analyze un-normalized data and for smaller sample groups, it was employed in this research to use and analyze quantitative data gathered through distributed questionnaires among construction industry stakeholders in the Palestinian market. Smart-PLS uses the partial least squares structural equation modeling method (PLS-SEM) to assess the correlation among latent variables and their measures and reveal relationships between latent variables.

Among analysis using Smart-PLS, variables could be either exogenous or endogenous. Endogenous variables work as dependent variables in the model, while exogenous variables act as independent variables (Hair et al., 2017).

The outer model using PLS-SEM, or the measurement model, is used to evaluate relationships between latent variables and their indicators, while the inner model, or structural model, asses the relationships between constructs themselves.

In the model development, reflective indicators are considered for sustainable performance (EnvPr, Sper, and Eper), while formative indicators are considered for the

main constructs: GSCM practices (GD, GPr, GPd, GT, GR, and GW) and institutional pressures (CPr, NPr, and MPr). Formative measurements assume that indicators cause the constructs; arrows in the relationship paths point from the indicators to the construct. This effect indicates that each indicator represents a specific characteristic of the build and that deleting any indicator affects the construct's nature. In other words, formative indicators are independent causes of the construct's content and are not required to be correlated (Hair et al., 2017).

The levels of implementation of the selected indicators for GSCM practices, SP, and institutional pressures are shown in Table 2 below.

Table 2
Level Of Implementation of GSCM Practices, SP, and Institutional Pressures

Item	Mean	Standard deviation	Degree of Significance
Green design - GD	4.2552	1.0390	Very high
Green procurement – GP	4.0387	1.0619	High
Green production - GPd	4.0825	1.0631	High
Green transportation - GT	3.9021	1.0321	High
Green Recycling (Reverse Logistics) - R	4.0000	1.0831	High
Green warehousing – GW	4.0392	1.1266	High
Environmental Performance-EnvP	3.6412	1.0381	High
Social Performance – Sper	4.0742	1.0278	High
Economic Performance – Eper	4.0103	1.0429	High
Normative Pressures – NPr	3.7134	1.1401	High
Coercive Pressures – CPr	4.016	1.006	High
Mimetic Pressure – MPr	4.005	0.943	High

The implementation levels show that the implementation levels of GSCM practices are high for the selected indicators, except for a very high implementation level score for green design. The level of SP and institutional pressures is also considered high.

3.4 Measurement Model Assessment (Outer Model)

The measurement model assessment, also called the outer model in Smart-PLS, is utilized to interpret the relationships between latent constructs and the associated indicators variables, i.e., internal consistency of the constructs, and aims at evaluating the reliability and convergent validity of constructs. Determination of convergent validity includes evaluation of the reliability of indicators, composite reliability, and average variance extracted (AVE). Discriminant validity is assessed by determining the cross-loadings, the Fornell - Larcker criterion, and the Heterotrait - Monotrait ratio (HTMT).

3.5 Convergent Validity

Convergent validity assessment was carried out through three tests: factor loadings, composite reliability (CR), and average variance extracted (AVE) to decide the extent to which constructs come together as explanations for their indicators.

Cronbach's alpha values higher than 0.7 are recommended to evaluate internal consistency. This threshold was granted for all constructs in the study, as shown in table 3 below. Composite reliability (CR) is also assessed for all indicators; CR results are presented where they show values within the range of 0.7 to 0.95. All composite reliability (CR) values are greater than 0.8 and below 0.95, and all constructs are considered reliable (Hair et al., 2011). Also, AVE indicates the sum of squared loadings divided by the indicators' number for each construct. The minimum accepted value for AVE is 0.5, implying that the latent construct explains 50% of the indicators' variance (Hair et al., 2019).

Some variables were discarded from the study to obtain acceptable composite reliability values. The model shown above in Figure 3 is the final accredited model after excluding the following variables: GD1, GPr2, GPd1, GPd4, SPer3, SPer4, EPer5, EPer6, CPr1, CPr2, and CPr5.

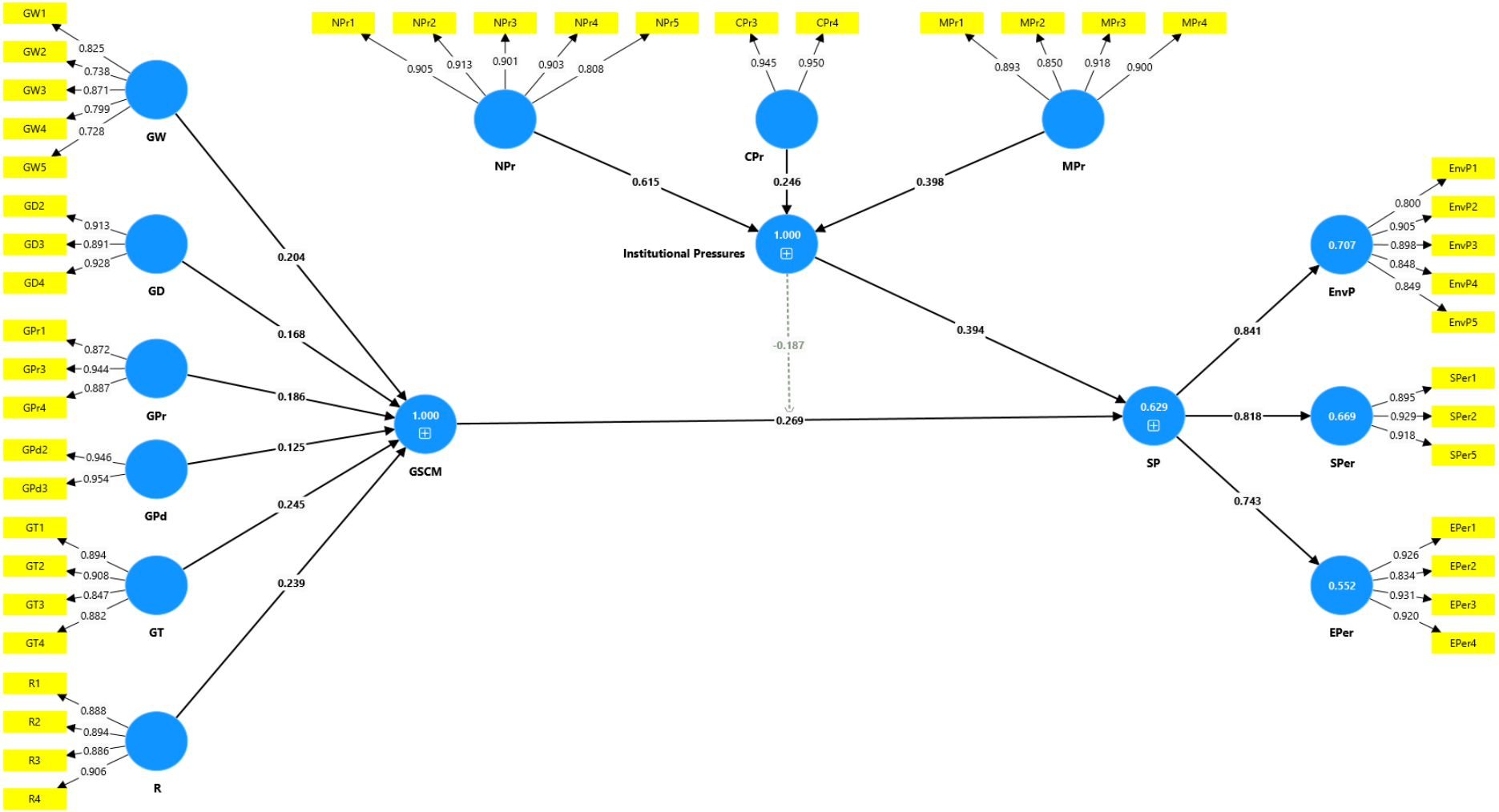
As shown in Table 3 below, all outer loading values are greater than 0.708, which indicates that variables share characteristics with the construct (Hair et al., 2011), and thus, outer loading complies with determining convergent validity.

Table 3
Cronbach's Alpha, Composite Reliabilities, and AVE values of Constructs

Variable	Cronbach's Alpha	VIF	Composite reliability (CR)	Average variance extracted (AVE)
GD	0.897	3.136	0.936	0.829
GPd	0.891	3.433	0.948	0.902
GPr	0.884	4.005	0.929	0.813
GT	0.906	3.923	0.934	0.780
R	0.916	3.251	0.940	0.798
GW	0.853	1.906	0.894	0.630
CPr	0.886	1.598	0.946	0.898
MPr	0.913	1.291	0.939	0.793
NPr	0.932	1.383	0.948	0.787
EPer	0.925	1.404	0.947	0.817
SPer	0.902	1.640	0.939	0.836
EnvP	0.912	1.497	0.934	0.741
SP	0.724	-	0.844	0.645

Figure 3

Research Measurement Model



Upon looking at the values in the table above, good convergent validity is noticed in addition to high internal consistency, which can be concluded by going through Cronbach's alpha values (larger than 0.7).

3.6 Discriminant validity

To determine the uniqueness of a construct relative to the other constructs in the model, discriminant validity shall be assessed. The Fornell-Larcker criterion is calculated primarily by finding the square root of the construct's AVE. A higher value than correlation values between constructs is accepted. Table 4 displays AVE square root values higher than other construct correlations, indicating confirmed discriminant validity.

Table 4
Fornell-Larcker Criterion.

	CPr	EPer	EnvP	GD	GPd	GPr	GT	GW	MPr	NPr	R	SPer
CPr	0.948											
EPer	0.365	0.904										
EnvP	0.469	0.373	0.861									
GD	0.274	0.316	0.407	0.911								
GPd	0.293	0.338	0.385	0.731	0.950							
GPr	0.425	0.392	0.514	0.757	0.657	0.902						
GT	0.335	0.400	0.557	0.696	0.753	0.791	0.883					
GW	0.488	0.416	0.388	0.485	0.580	0.617	0.624	0.794				
MPr	0.468	0.359	0.362	0.377	0.376	0.511	0.468	0.629	0.891			
NPr	0.521	0.441	0.429	0.467	0.452	0.414	0.398	0.474	0.312	0.887		
R	0.437	0.464	0.503	0.606	0.736	0.730	0.766	0.631	0.474	0.470	0.893	
SPer	0.424	0.463	0.562	0.544	0.556	0.571	0.590	0.555	0.433	0.601	0.472	0.914

Heterotrait-Monotrait Ratio (HTMT) values for measuring construct discriminant validity are less than 0.9 (Gold et al., 2001), which indicates supported discriminant validity.

Table 5
Heterotrait-Monotrait Ratio (HTMT)

	CPr	EPer	EnvP	GD	GPd	GPr	GT	GW	MPr	NPr	R	SPer
CPr	-											
EPer	0.401	-										
EnvP	0.093	0.252	-									
GD	0.35	0.762	0.365	-								
GPd	0.333	0.278	0.122	0.309	-							
GPr	0.175	0.196	0.616	0.445	0.116	-						
GT	0.357	0.178	0.182	0.216	0.443	0.214	-					
GW	0.065	0.311	0.685	0.496	0.138	0.728	0.125	-				
MPr	0.078	0.291	0.679	0.552	0.139	0.733	0.139	0.787	-			
NPr	0.074	0.141	0.615	0.379	0.103	0.726	0.257	0.595	0.682	-		
R	0.360	0.626	0.242	0.674	0.234	0.265	0.095	0.375	0.350	0.191	-	
SPer	0.403	0.578	0.356	0.77	0.283	0.271	0.344	0.268	0.293	0.294	0.621	-

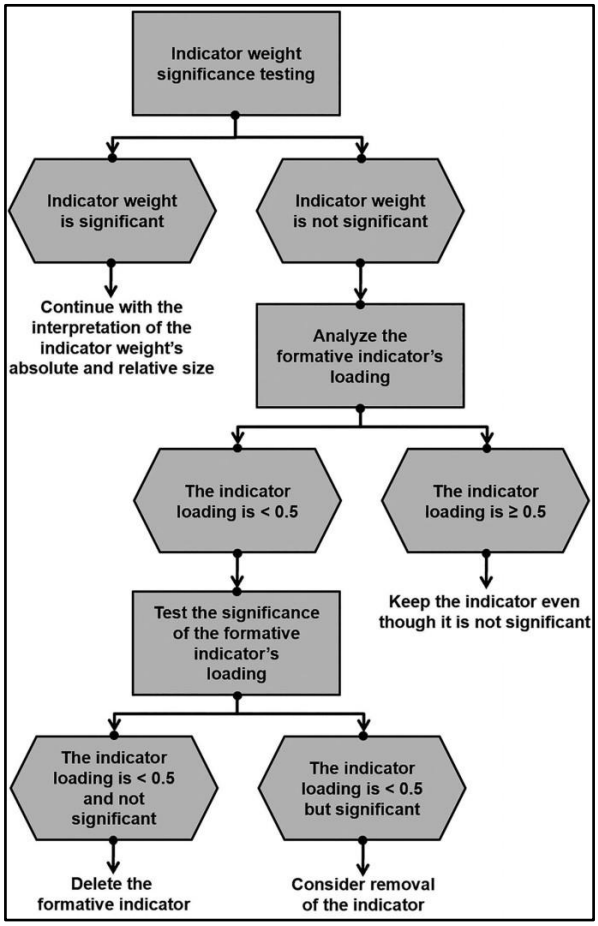
3.7 Collinearity of Formative Indicators

An evaluation shall be made to figure out if the formative indicators truly contribute to forming their constructs. Figure 4 illustrates the process for keeping or deleting formative indicators. First, it should be understood that high correlations, called collinearity, between two formative indicators are not highly expected. Secondly, the collinearity in the formative measurement model indicates a methodological and interpretational problem. Considering the existence of several indicators, the multicollinearity status shall be tested (Hair et al., 2017).

Collinearity can be measured through values of the variance inflation factor (VIF), defined as the reciprocal of tolerance. Where a VIF value equals or exceeds five and higher, a potential collinearity problem exists. Though this evaluation process; some formative indicators were deleted (GD1, GPr2, GPd1, GPd4, Sper3, Sper4, EPer5, EPer6, CPr1, CPr2 and CPr5.). Table 5 in Appendix C indicates that all remaining indicators (in the final mature model) have VIF values that are below 5. Thus, no collinearity case is observed in the outer model.

Figure 4

Decision-making process for keeping or deleting formative indicators



(Source: Hair et al., 2017)

3.8 Formative Construct Discriminant Validity

Bootstrapping in Smart-PLS software is employed to assess the importance of the constructs. In that context, formative model discriminant validity for the construct shall be determined. After applying the bootstrapping procedure, Table C.5 illustrates that the outer weights for GT, MPr, and NPr are statistically significant. However, the outer weights of the rest of the indicators are insignificant. If the outer weight is insignificant, researchers are advised to use the outer loading as long as it is above 0.50 (Ramayah et al., 2018). As presented in Table C.7, The outer loadings were above 0.5 (Hair et al., 2021), explaining the robustness of the studied constructs. Likewise, in Table C.5, the VIF values for all LOCs remained below 5 (Kock et al., 2012), thus validating the GSCM and Institutional pressures.

3.9 Structural Model Assessment

Following the measurement model assessment (outer model) and fulfilling the validity and reliability assessments, a structural model assessment (inner model) is performed to explore the relationships between constructs using the bootstrapping function in the Smart-PLS software. Structural model assessment consists of evaluating values and outcomes of coefficient of determination, effect size, goodness of fit index, and hypotheses testing.

3.10 Constructs Collinearity

Examining the structural model for collinearity is important as the path coefficients might be biased if critical collinearity is observed among predictor constructs (Hair et al., 2017).

To check the collinearity of constructs for the structural inner model, the Variance Inflation Factor (VIF) value should be lower than 3 (Hair et al., 2017), which illustrates an acceptable collinearity criterion, as shown in Table 6.

Table 6
Variance Inflation Factor (VIF)

Structural Model Inner Model	VIF
GSCM → SP	1.989
Institutional pressures → SP	1.762
Institutional pressures x GSCM → SP	1.369

3.11 The Coefficient of Determination (R^2)

The coefficient of Determination (R^2) is employed to evaluate the structural model as it presents the model's predictive accuracy; it is also referred to as in-sample predictive power. The value of R^2 depends on the model's complexity and shall be within the range of 0 - 1, where a higher value indicates a higher level of predictive accuracy. Endogenous latent variables with R^2 of 0.75, 0.50, or 0.25 are respectively described as substantial, moderate, and weak (Hair et al., 2017). Analysis shows a value of 0.651 for R^2 for dependent variable sustainable performance, which is considered moderate.

3.12 The Effect Size (f^2)

The effect size test (f^2) is calculated to determine the impact on endogenous variables and the effect of the independent constructs (Samartha et al., 2018); to illustrate the effect size significance, values of 0.02, 0.14, and 0.35 represent effect size classification: small, medium, and large respectively (Cohen, 1988).

Table 7 includes the effect size (f^2) of GSCM practices and institutional pressures on sustainable performance (SP).

Table 7
Coefficient of Determination R^2, R^2 Adjusted and Effect Size (f^2) Values

Variable	R^2	R^2 Adjusted	Result	f^2	
				GSCM Practices	Institutional Pressures
Sustainable Performance	0.651	0.640	Moderate	0.128 Medium effect	0.247 Medium effect

3.13 Goodness of Fit Index (GoF)

Goodness of Fit (GoF) is used to measure the ability to rely on the established model of the study. The value of GoF can be classified into four intervals less than 0.1; 0.1-.25; 0.25-.36 and larger than 0.36 are read as no, small, medium, and large, respectively.

It is calculated through the following equation:

$$\text{GoF} = \sqrt{\text{avg. R}^2 \times \text{avg. AVE}} \ldots \ldots \quad (1)$$

$$\text{GoF} = \sqrt{0.651 \times 0.7899} = 0.807$$

A GoF value of 0.807 is considered sufficient global PLS model validity; thus, we can rely on the research model.

3.14 Model Fit

Model fit indicates how well the model structure fits the empirical data to identify the model mis-specifications. Standardized root mean square residual (SRMR) is considered a good fit, defined as the root mean square discrepancy between the observed and model correlations, a value less than 0.08 (Hair et al., 2017). Additionally, the normed fit index (NF1), also named Bentler and Bonett Index, is used to indicate the

model fit, noting that the NFI values shall be within the range 0 and 1; the closer the NFI to 1, the better the fit (Hair et al., 2017). Accordingly, values obtained for model fit are shown in Table 8, which indicate a justifiable mode fit.

Table 8
Model fit

Variable	Saturated model	Estimated model
SRMR	0.064	0.061
NFI	0.884	0.898

3.15 Path Coefficients Significance - Hypotheses Test

Testing relationships among the study model is conducted by running the PLS-SEM algorithm for the structural model. Path coefficient test values shall range between -1 and + 1. The closer the value to +1, the stronger the indication for a positive relationship, while closer to -1 represents a stronger negative relationship. PLS-SEM does not assume a normal data distribution and depends on a non-parametric bootstrap procedure. As recommended by (Hair et al., 2017), 5,000 subsamples are used in the bootstrapping process. PLS bootstrapping testing results are presented in Figure 5 and Table 9 below; standard deviation values, T-values, and P-values for direct relations are presented.

Figure 5
PLS Bootstrapping Procedures

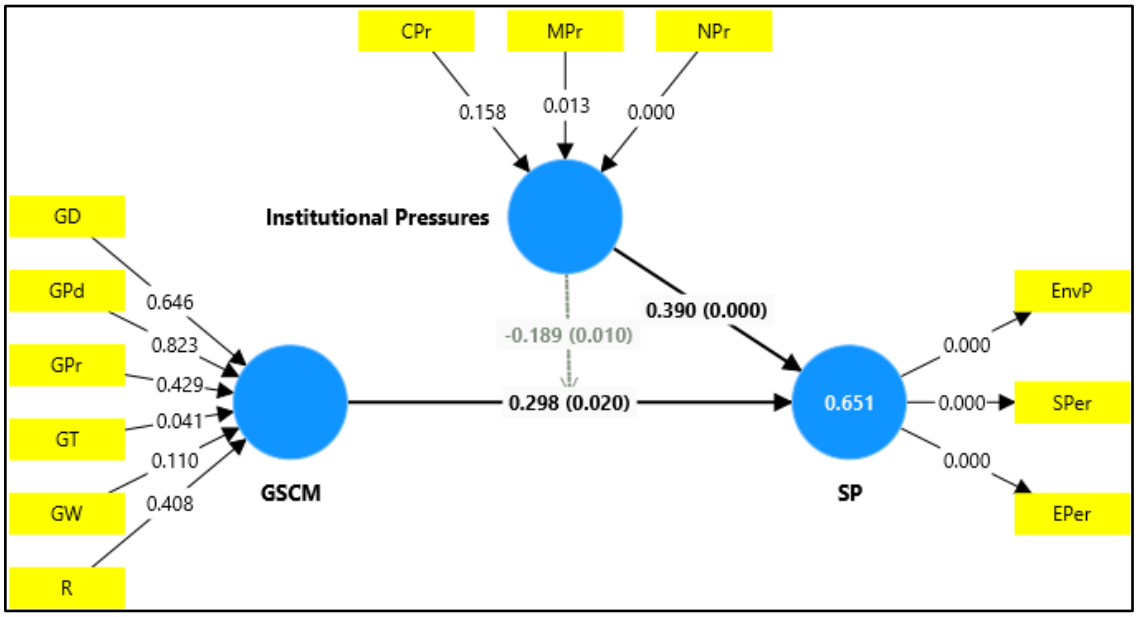


Table 9
The Results Of Direct Relations

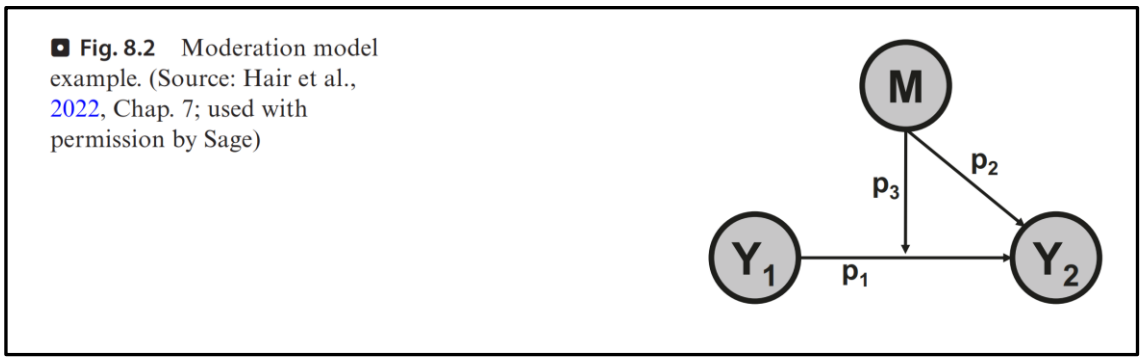
	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T-value	P values	Decision
GSCM Practices → SP	0.298	0.323	0.128	2.329	0.020	Supported
Institutional Pressures → SP	0.390	0.400	0.092	4.255	0.000	Supported

Table 9 shows that the proposed hypotheses (H_1) are supported as analysis results: β = 0.298, t = 2.239, and P-value =0.020. These results indicate a significant positive relationship between GSCM practices and sustainable performance. Interpreting results of the second hypothesis (H_2) suggest that a significant positive relationship was observed as β = 0.390, t = 4.255, and P-value =0.000.

3.16 Moderating Effect Analysis

The model presents institutional pressures (with its three second-order constructs: normative pressure, mimic pressure, and coercive pressure) as moderators. Moderation is a situation where the relationship between two constructs isn't constant and depends on the effect of a third construct, and this third construct can affect both the strength and direction of the relationship between the latent variables in the model. Figure 6 shows the moderator analysis procedure in PLS-SEM (Hair et al., 2017).

Figure 6
The General Moderator Model



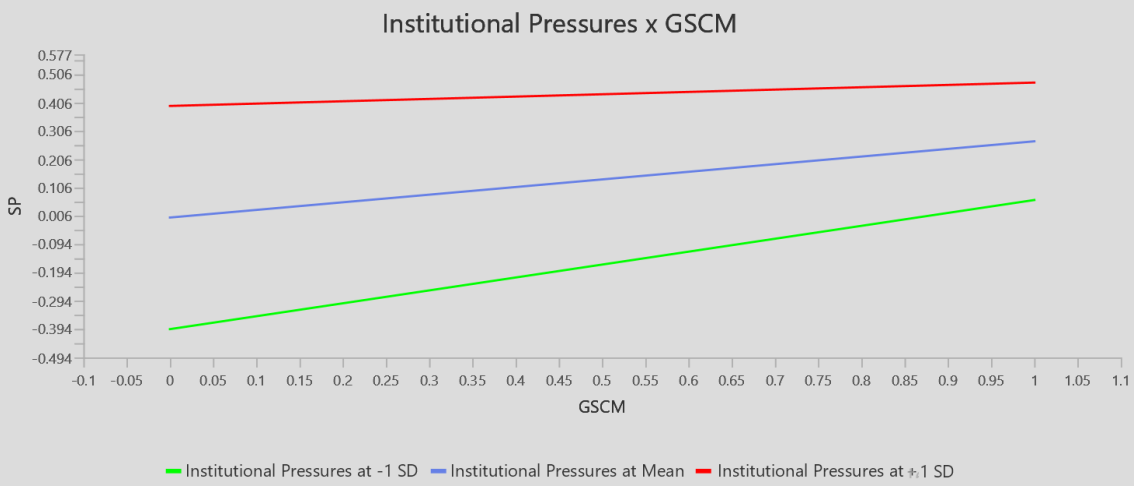
Upon examining the moderating effect of institutional pressure on the relationship between GSCM practices and sustainable performance, β = -0.160, t = 2.753, P-value =0.010, as shown in Table 10; thus, the impact of the construct is significant. However, the negative value of β-value indicates that the institutional pressures construct negatively affects the relationship between GSCM practices and sustainable performance.

Table 10
Indirect Relation (Moderating) Result

Indirect Effects						
Path	Path No	Sample (β)	Standard Deviation (STDEV)	T-value	P-value	Result
Institutional Pressures x GSCM -> SP	-0.189	-0.160	0.074	2.573	0.010	Supported

Figure 7 below illustrates the moderator's effect on the relationship between the two constructs: If institutional pressures increase (red line), the relationship between GSCM practices and SP will be reduced, while if institutional pressures decrease (green line), the impact of GSCM practices on the SP is high.

Figure 7
Moderator Effect



3.17 Managerial Framework

As the construction industry in Palestine is still developing and the understanding and adoption of the GSCM practices are being freshly adopted by related stakeholders, specifically decision makers, governmental authorities, and funding agencies, the support of such parties is highly required due to their vital role in forcing and following up the application of greening requirements throughout various stages and components of this industry.

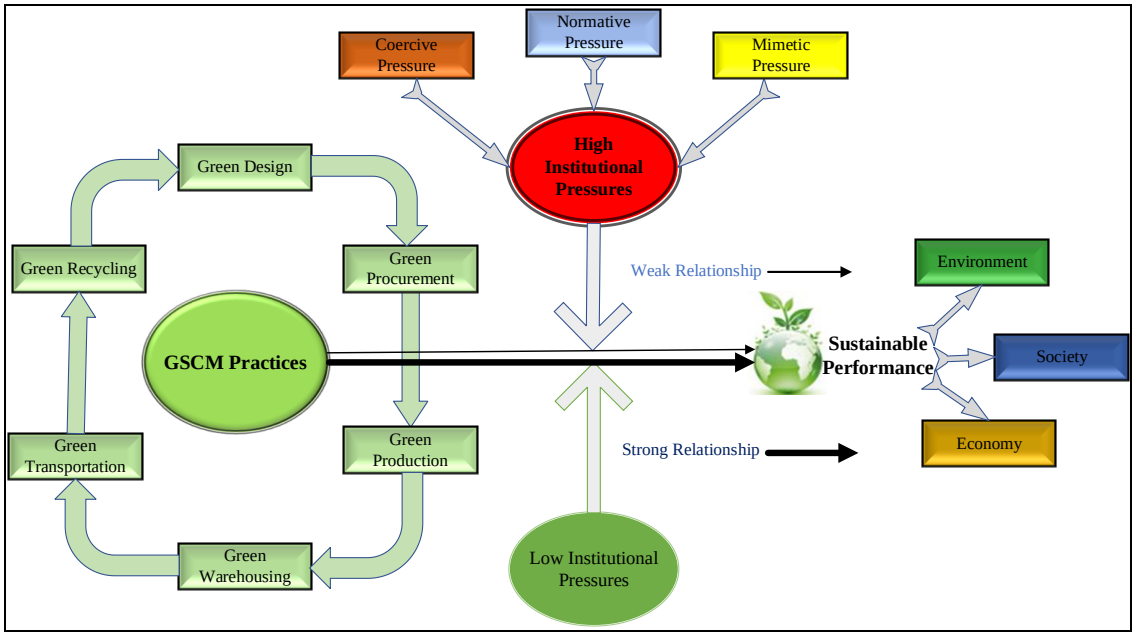
To provide stakeholders and decision-makers in the construction industry in Palestine with guidelines to integrate GSCM practices to achieve the sustainable performance of the industry, a simplified briefing of the relationships of the two main constructs in this study is presented, showing the high effect and positive influence of the GSCM

practices on the sustainable performance. A good framework connects the benchmark concept with practical implementations as it gives the companies a simplified, systematic, and comprehensive image outlining the practical application of the activity to increase the chance of achieving designated goals (Putu et al., 2021).

Achieving an acceptable level of sustainable performance and efforts towards improving this concept in the construction industry requires continuous implementation and ongoing monitoring and enhancing of the related factors that affect the results. The process starts by continuously and consistently adopting the GSCM practices in the construction industry's supply chain. To highlight the ongoing nature of GSCM, the process is divided into several key stages: green design, green procurement, green production, green warehousing, green distribution, and green recycling. This includes developing greening concepts in strategies, periodic reporting of commitment status, monitoring results and malfunctioning, considering corrections, and upgrading system requirements, including performing required training or incentives to the committed personnel and parties and considering the study outcomes regarding the moderating effect of the institutional pressures on the relationship between GSCM practices and SP. If there is high institutional pressure, the relationship between GSCM and SP is weakened because companies are more likely to implement GSCM practices reactively, reducing their effectiveness in delivering sustainable outcomes. On the other hand, with low institutional pressure, the relationship might be more robust, as construction companies can focus on fully integrating GSCM practices to enhance SP without feeling constrained by external pressures. Figure 8 was created to show the moderating effect of institutional pressures on the relationship between GSCM practices and SP for a better practical understanding.

Figure 8

Managerial Framework



Chapter Four
Discussions and Conclusions

4.1 Chapter Overview

This chapter presents the discussions of the performed analysis for the conceptual model of the research and the discussion related to the proposed hypotheses testing results. Theoretical and partial implications for the study, recommendations, highlights, and research limitations are also included in this chapter.

4.2 Results Discussion

This study aims to investigate the impact of GSCM practices on sustainable performance and evaluate the effect of applying institutional pressures as a moderator on the relationship between GSCM practices and sustainable performance within the construction industry in the Palestinian market. GSCM practices included six practices: green design, green procurement, green transportation, green recycling, green production, and green warehousing. In addition, sustainable performance consists of three dimensions: environmental performance, social performance, and economic performance. For the moderator construct, institutional pressures are considered in three dimensions: normative, coercive, and mimetic.

Through analyzing the gathered data of GSCM practices in the construction industry, six constructs are introduced: green design (GD), green procurement (GPr), green transportation (GT), green recycling (R), green production (GP), and green warehousing (GW). In Palestine, as a developing country, those practices have recently been adopted in many industrial fields, including the construction industry. However, the level of implementation shows that green design is the most adopted practice with a 4.2552 mean, which is considered very high; this value is considered logical as the design phase has the least effect on costs and theoretical assumptions and desires are connected with designs, which in turn are being performed based on global needs. The least applied practice was observed to be green transportation with a 3.9021 mean; this might refer to the fact that alternatives for greening the transportation systems used in the construction industries are limited to fuel-operated vehicles and machinery as environmentally friendly means of transportation are yet not available or affordable.

Generally, it was found that there are high levels of acceptance of the GSCM practices in the construction industry in Palestine and a good comprehension of the needs and importance of the greening concepts. Again, the sample of those results gathered is the top stakeholders working in medium- to large-scale construction companies committed to global regulations to apply funding agencies' requirements.

The understanding of the SP in the Palestine construction market might be limited to the economic performance as stakeholders, especially contractors, and owners (if not international companies or parties who are committed to applying the greening concepts), are considering applying greening requirements to the supply chain is a waste of money and efforts due to the lack of understanding of the importance of being environmentally-friendly throughout the tremendous interacted activities and processes of this industry. However, SP's other two important variables, social and environmental performance, shall not give attention to one part and neglect the other two. Gaining the SP is a long-term goal that should be achieved through aligning business strategies with sustainable performance. The level of acceptance of environmental performance was the lowest among SP, with a mean of 3.6412; this might be caused by the lack of material options and procedures to eliminate ecological accidents and reduce emissions caused by construction activities. Currently, no alternatives are being validated for this industry; factories have not developed a change in the strategies due to the assumed service period of the various elements and the low awareness and high cost of utilizing green needs. This is directly connected with the expenses associated with upgrading the supply chain to be environmentally friendly. Also, the economic performance of the institutions working in the construction industry in the Palestinian areas has a high level of acceptance due to the attention to human being wellness by reducing the risk caused by this industry activity and the orientation of allowing locals to be engaged through the required processes.

Referring to the proposed hypotheses in this research: H_1, H_2, and H_3. H_1 is supported as the results illustrate a positive relationship between GSCM practices and sustainable performance. This finding matches the previous research's outcomes between those two constructs within other industries, such as those found by previous studies (Ali et al., 2020; Le, 2020; Zaid et al., 2018; Zailani et al., 2012). However, Le (2020) found that green procurement has no direct effect on environmental performance in the

Vietnamese construction materials industry, contradicting the findings of Laosirihongthong et al. (2013), Esfahbodi et al. (2016) and Shukla (2017). Moreover, H_2, which shows the relationship between institutional pressures and SP, is positive and significant. This result matches the findings of previous studies between the two mentioned constructs (Pasamar et al., 2023; Habib et al., 2022).

Eventually, the moderating effect of the institutional pressures construct on the relationship between GSCM practices and sustainable performance shows that when institutional pressures increase, the relationship between GSCM and SP weakens. Conversely, when institutional pressures decrease, the impact of GSCM practices on the SP strengthens. It could be argued that the Palestinian construction industry is highly affected by political circumstances and economic and cultural aspects, which generally weakens the proactive strategies initiative to adopt GSCM practices. However, construction companies in the Palestinian market show more commitment when forced to green supply chain practices due to external pressures such as funding agencies' requirements or governmental regulations. Therefore, those practices are being applied without full commitment to the companies' strategic objectives, leading to a weaker relationship between GSCM practices and SP in light of institutional pressures. This result matches the finding of a previous study performed in the Pakistani industrial industry, where external pressures negatively affected the relationship between GSCM practices and economic performance (Saeed et al., 2018).

Conversely, organizations are willing to show commitment when institutional pressures are low. Thus, we can conclude that the greening concept's adoption and application align with the organization's goals, resulting in a higher commitment towards sustainability. So, the impact of GSCM practices on SP tends to be more robust (Zhu et al., 2007).

4.3 Theoretical Implications

The main theoretical implications of this study are evaluating and understanding the relationship between GSCM practices and the sustainable performance of the construction industry in Palestine, as well as the moderating effect of the institutional pressures on this relationship.

Few studies have been conducted linking GSCM practices and sustainable performance in the construction industry. Herein is a comprehensive demonstration of the GSCM practices and a link between the effect of the three main constructs on sustainable performance: social, environmental, and economic performance. Furthermore, the study examined the moderating effect of institutional pressures, namely normative, mimic, and normative pressures, on the relationship between GSCM practices and SP. This contribution is the first to address this effect in the West Bank region's construction industry. It is recommended that this be investigated within other areas to understand and further evaluate the relationships between the selected constructs. It is also feasible to revise those relationships considering other classifications, such as considering external and internal pressures separately or considering other classifications of populations, such as governmental parties or environmental entities, discreetly rather than considering the population to be inclusive to all stakeholders.

4.4 Practical Implications

Practically, the construction industry stakeholders shall consider and focus on applying green practices within this industry as it shows the significant and positive relationship between GSCM practices and SP. They are reconsidering the institutional pressures' effects on this relationship and understanding that locally, the impact of the external pressures, such as governmental parties or prequalification requirements of the funding agencies, leads to better adoption of GSCM practices and, consequently, better SP levels. From another point of view, external pressures might lead companies to willingly adopt the proactive narrative in their future strategies to maximize their chances of being qualified and selected to take on more projects.

The findings of this study can be used by environmental, governmental parties, funders, and high management level stakeholders of the construction industries concerned with applying greening concepts and regulations to grant adoption of the GSCM practices and achieving acceptable levels of SP. It is expected that some challenges might be faced while trying to achieve the desired results as other prominent players are taking essential roles within the Palestinian construction industry, such as occupational authorities, which are in control of the procurement streams and the limitation to access the sites and developing the production lines, machinery, and raw material. Furthermore, a challenge can be encountered due to economic restraints within

developing countries such as Palestine due to limited resources and alternatives; this could be resolved by implying a gradual change rather than a sudden transformation. This transformation shall take place by encouraging owners and management of construction companies to change and adopt proactive greening strategies and educating them on the long-term benefits of upgrading their strategy.

4.5 Conclusions

Recently, green practices within sectors have been a must for the stakeholders. As the construction industry consists of enormous interactive stages and components that significantly affect the global environment, greening this specific industry is necessary to add a significant long-term contribution to the environment. Companies in this industry are becoming more aware of the importance of their participation and roles in protecting the global climate to grant a better future for the coming generations.

Even though limitations, challenges, and difficulties are faced when applying greening concepts and requirements, this study shows a positive and significant relationship between applying GSCM practices and SP.

As far as the researcher is aware; this is the first study to investigate the moderating effect of institutional pressures on the relationship between GSCM practices and sustainable performance in the Palestinian construction sector. Hence, the study outcomes can be a base for performing wider studies in the construction industry in developed and developing countries to assess the moderating effect of applying institutional pressures and determine the defaults of applying these pressures on different samples.

4.6 Recommendations

GSCM practices and SP concepts are being adopted by developed countries and being applied by firms within the construction industry. However, adopting green practices is encouraged within the construction industry in Palestine and other developing countries worldwide. Social, economic, and political reasons mainly create some challenges. This research explores the effect of GSCM practices on the sustainable performance of construction institutions in Palestine.

For the high role of applying green practices and the benefits to meet sustainable performance, the following shall be considered:

- Enhance the knowledge of greening concepts throughout GSCM practices and do not neglect the importance of adopting this concept from the design phase up to the delivery stages.
- Enhance the awareness among stakeholders of the GSCM practices despite the difficulties that might be faced, especially the financial challenges that need to be addressed and understood to upgrade the levels of applying the greening process of the GSCM in construction.
- Motivate personnel to adopt and commit to green practices by activating reward systems.
- Work with the environmental regulatory authorities to clarify the requirements among steps and ensure the application systems meet those requirements, including developing control systems and fins to ensure the application of green practices within the construction industry.
- Encourage companies to develop control systems harmonized with local and global sustainable regulations.
- Assure including contractual terms for applying the sustainability concepts by increasing the effect of the institutional pressures.
- Adopt new technologies, such as Building Information Modeling (BIM), to control and assess the different stages of the construction business.
- Reduce the external institutional pressures towards applying the GSCM practices.
- Encourage the stakeholders to adopt proactive strategies willingly and apply GSCM practices to achieve desired levels of SP.

4.7 Limitations of Research

Several limitations were faced during the research. Initially, the data in this research was collected under severe political situations and ongoing war, which might affected the results especially economic performance and social performance. This might be explained that the current narrative among the construction industry is survival through the disturbed circumstances and emergency status in Palestine rather than considering other strategies. Also, due to the current war, collecting data was not easy or accessible.

In addition, the population who participated in this study was selected to include specific institutions and companies with several roles and authorities. In the construction industry; the perspectives of the owner and regulatory authorities differ from the perspectives of the suppliers and contractors, thus performing the study within specific population scope and comparing results would add more contributions.

4.8 Future Research

This study forms a holistic roadmap towards GSCM practices implementation to achieve acceptable levels of sustainable performance. First, enlarging the study population will ensure more precise results, especially in communities that are not biased by disturbed political and economic limitations. Second, carrying the study within categorized stakeholders will present interests and restrictions to each category of stakeholders, such as funders, contractors, and governmental parties. Third, performing a similar study within developed environments will confirm and enhance the results of this study. Finally, evaluating the moderation effect of institutional pressures on the relationship between GSCM practices and SP within proactive cultures will provide a more accurate image and present a clearer picture of the role of those pressures.

List of Abbreviations

Abbreviation	Meaning
AVE	Average Value Extracted
CR	Composite Reliability
GD	Green Design
GPd	Green Production
GPr	Green Procurement
R	Green Recycling
GSCM	Green Supply Chain Management
GT	Green Transportation
GW	Green Warehousing
HTMT	Heterotrait-Monotrait Ratio of Correlations
PLS-SEM	Partial Least Squares Structural Equation Modeling
SP	Sustainable performance
VIF	Variance Inflation Factor

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Appendices

Appendix A

Questionnaire

An-Najah National University

Faculty of Graduate Studies

Engineering Management Program

Questionnaire about the evaluation of the effect of green supply chain management practices on the sustainable performance with institutional pressures as moderating variable

Dear respondent,

Thank you in advance for your time and contribution to this questionnaire. This study targets the construction sector in Palestine. It aims to assess the effect of green supply chain management practices (GSCM), sustainable performance, and the relation between them in this vital industry sector, in addition to the impact of institutional pressures on this relationship. The questionnaire collects information for scientific research purposes to complete the requirements for obtaining a master's degree in engineering management at An-Najah National University.

The questionnaire includes two parts. The first one aims to gather general information about the respondent, the company, and the current status of environmental management in the company, while the second part consists of three sections. The first section aims to assess the degree to which GSCM practices are applied in construction companies in Palestine. The second part aims at measuring the sustainable performance of the company/ association. The third section assesses these practices' impact on sustainable performance. The third section also seeks to measure the impact of these practices on environmental sustainability.

It will take 10-15 minutes to answer the questionnaire. Please read all parts carefully and choose the appropriate answer accurately and impartially. I fully appreciate your participation.

Regards,

Shurouq F. Sharqawi
Researcher, Master of Engineering Management
Email: shurouqsharqawi@gmail.com
Mobile: 059 9 397 061/ 056 9 121 519

Part one: General information

Please answer the following questions by putting an (X) in the answer that suits you.

1. Education degree
   ( ) Diploma or less ( ) Bachelor degree ( ) Higher education
2. Job experience
   ( ) 0-5 Years ( ) 6-10 Years ( ) 11-15 Years ( ) More than 15 years
3. Current position in the company
   ( ) General manager/CEO ( ) Procurement manager ( ) Project manager
   ( ) Quality manager ( ) other ……
4. Organization Work
   ( ) Consulting ( ) Contracting ( ) Design ( ) Funding ( ) other
5. Number of employees in the company
   ( ) 1-9 ( ) 10-19 ( ) 20-49 ( ) 50 and more
6. Number of limited-duration contract employees in your workplace
   ( ) 1-9 ( ) 10-19 ( ) 20-49 ( ) 50 and more
7. Does your organization engage GSCM practices in business operations along the projects' life cycle?
   ( ) Currently exists
   ( ) currently, there are no plans to implement
   ( ) Plan to implement within 12 months
   ( ) Plan to implement within a period of more than 12 months
   ( ) There are some practices through activities without a clear plan

( ) Not sure

8. Does your organization have a formal environmental issues or management systems certificate?
   ( ) Currently exists ( ) currently, there are no plans to implement
   ( ) Plan to implement within 12 months
   ( ) Plan to implement within a period of more than 12 months ( ) Not sure
9. Does your company endorse subcontractors, vendors, and material suppliers to commit to using green practices?
   ( ) Yes ( ) No ( ) Not sure
10. Does your company use new technologies and software to manage projects?
    ( ) Yes ( ) No ( ) Not sure

Part two:

Section 1: Green supply chain management (GSCM) practices assessment:

Green supply chain management includes a set of practices to protect the environment, such as green design, green procurement, green transportation, green recycling, green production, and green warehousing. This section aims to show to what degree the GSCM practices in the construction industry are applied. For each item, please mark with (X) the most suitable application level of the practice adopted in your organization/ firm/ association, etc., as appropriate.

	Green Supply Chain Management Practices	Response				
No.	Green design (Eco-design) - GD	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	Minimize raw material and energy consumption.					
2	Maximize reuse, recycling, and recovery of the used material and components.					
3	Minimize or avoid using hazardous raw materials or production techniques.					
4	Incorporate consumer feedback in the eco-design phase.					
	Green procurement - GP	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
5	Select Green suppliers.					
6	Select environment-friendly raw materials.					

7	Select environment-friendly machinery.					
8	Follow environmentally sustainable policies.					
	Green production - GPd	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
9	Adopt cleaner production practices.					
10	Promote reusable and recyclable material.					
11	Increase production efficiency and minimize waste of resources.					
12	Develop green initiatives.					
No.	Green transportation - GT	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
13	Adopt environmentally friendly and eco-friendly transportation channels like hybrid or electric vehicles					
14	Adopt environment-friendly and efficient distribution channels.					
15	Materials are transported in full truckload quantities.					
16	Reduce emissions (Materials are transported in fuel-efficient vehicles) and perform periodic maintenance.					
No.	Green Recycling (Reverse Logistics) - R	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
17	Recover scrap from projects at the end of their lifecycle.					
18	Utilize waste produced by others in an innovative, useful, and effective way.					
19	Environmental impact assessment during end-of-life demolition of projects.					
20	Materials from demolished projects are recycled.					
No.	Green warehousing - GW	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
21	Effectively sell off used products and scrap components.					
22	Effectively sell excess capital equipment.					
23	Reduce inventory levels.					
24	Perform periodic inventory.					
254	Utilize recyclable/ reusable packaging.					

Section 2: Sustainable Performance (SP)

The sustainable performance of the construction industry's dimensions includes environmental, social, and economic performance. Environmental performance handles all associated environmental practices and effects of the SC, while financial performance thinks about the economic situation and impact of the SC, and social performance concerns humanitarian effects and social aspects.

This section aims to reveal to what degree stakeholders in the construction industry in Palestine understand and apply sub-sustainability aspects. For each item, please mark with (X) the most suitable application level of the practice adopted in your organization/ firm/ association, etc., as appropriate.

No.	Environmental Performance - EP	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	The number of environmental accidents has declined.					
2	Energy consumption has decreased.					
3	Hazardous material use has decreased.					
4	Pollution is reduced.					
5	Improve an enterprise's environmental situation.					
No.	Social Performance - SP	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
6	Reduction in the impacts and risks to the general public.					
7	Improvement in occupational health and safety of employees.					
8	Providing more positions in the community.					
9	Improvement in the firm's image in the eyes of customers.					
10	Improvement in the firm's social reputation.					
No.	Economic Performance - EPer	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
11	Improvement in market share.					
12	Material expenses have decreased.					
13	Energy expenses have decreased.					
14	The cost of managing waste has decreased.					
15	Decrease of fee for waste discharge.					
16	Decrease fine for environmental accidents.					

Section 3: Institutional Pressures

In the literature, institutional pressures are classified into three isomorphic pressures: Normative, coercive, and mimetic. Institutional pressures' moderating effect on the relationship between GSCM practices and sustainable performance in the construction industry in Palestine will be assessed. For each item, please mark with (X) the most suitable application level of the practice adopted in your organization/ firm/ association, etc., as appropriate.

No.	Institutional Pressures Normative Pressures - NPr	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	Relevant punishment for violations					
2	Corporate code of conduct					
3	Relevant punishment for the violation of CSR norms.					
4	Socially responsible business philosophy in the industry.					
5	Sales to foreign customers					
No.	Coercive Pressures - CPr	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
6	Central governmental environmental regulations					
7	Regional environmental regulations					
8	Government departments require our organization to attach great importance to safety.					
9	Punishment system for corporations that violate relevant laws and regulations.					
10	Industry associations require our organization to attach great importance to safety.					
No.	Mimetic Pressure - MPr	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
11	Competitors' green strategies					
12	Professional group activities					
13	Peer organizations attach great importance to safety in other projects.					
14	Other project participant organizations attach great importance to safety.					

Notes……

Thank you

Appendix B

Questionnaire (Arabic)

جامعة النجاح الوطنية

كلية الدراسات العليا

برنامج ماجستير الإدارة الهندسية

استبانة حول أثر ممارسات إدارة سلاسل الإمداد الخضراء على الأداء المستدام للصناعات الإنشائية في فلسطين

عزيزي القارئ / عزيزتي القارئة،

تحية طيبة،

تستهدف هذه الدراسة المؤسسات والشركات العاملة في مجال الصناعات الانشائية في فلسطين (الضفة الغربية) والمتخصصة في مجال تصنيع المواد الانشائية والأبنية والبنية التحتية حيث تقوم الباحثة بإجراء دراسة بعنوان: أثر ممارسات سلاسل الإمداد الخضراء على الأداء المستدام للصناعات الإنشائية في فلسطين من خلال دراسة ممارسات سلاسل الإمداد الخضراء وأثرها على التنمية المستدامة بأركانها الثلاث: البيئية والإقتصادية والإجتماعية. كما تم تناول دراسة تأثير الضغوطات المؤسسية كوسيط على العلاقة بين الممارسات الخضراء لسلاسل الامداد والتنمية المستدامة للمؤسسات والشركات الفلسطينية العاملة في مجال الصناعات الانشائية على اختلاف تصنيفها.

نشكر لكم حسن تعاونكم في المشاركة في تعبئة الاستبانة آملين أن تعطوا 10–15 دقيقة من الوقت لتعبئتها، حيث ستساهم اجاباتكم في الحصول على فهم أفضل لموضوع البحث.

يرجى العلم أنه قد تم اختيار شركتكم للمشاركة في هذه الدراسة بناءً على عينة عشوائية مع العلم أن هذه الدراسة أكاديمية بحتة وسيتم استخدام البيانات لأغراض البحث العلمي فقط. إذا كنتم ترغبون في الحصول على نسخة من ملخص الدراسة بعد انتهائها يرجى تضمين بريدكم الالكتروني في نهاية الاستبانة (الملاحظات).

شكرا جزيلا على وقتكم وتعاونكم البنّاء.

مع وافر الاحترام

الباحثة: شروق شرقاوي

ماجستير الادارة الهندسية – جامعة النجاح الوطنية

محمول رقم: 121519 9 56 972+

أولاً: معلومات عامة

يرجى وضع إشارة (x) في المربع الذي ينطبق عليك:

1. **المؤهل العلمي:** ☐ دبلوم او اقل ☐ بكالوريوس ☐ دراسات عليا
2. **عدد سنوات الخبرة:** ☐ 0 – 5 ☐ 6 – 10 ☐ 11– 15 ☐ أكثر من 15 سنة
3. **طبيعة عملك في الشركة:** ☐المدير العام ☐ مدير مشتريات ☐ مدير مشروع ☐ مهندس ضبط الجودة ☐ غير ذلك.....
4. **مجال عمل الشركة:**☐ استشاري ☐ مقاولات ☐ تصميم ☐ ممول أو مانح ☐ غير ذلك.....
5. **عدد الموظفين في الشركة:** ☐ من 1–9 ☐ من 10–19 ☐ من 20–49 ☐ 50 فأكثر
6. **متوسط عدد موظفي العقود العاملين في الشركة هو:** ☐1–9 ☐ 10–19 ☐ 20–49 ☐ 50 فأكثر
7. **هل يقوم مكان عملك بتبني ممارسات سلاسل الامداد الخضراء في مراحل المشاريع المختلفة ؟**

☐ تستخدم حاليا ☐ لا يوجد خطط لاستخدامها حاليا ☐ تخطط لاستخدامها خلال اثنا عشر شهرا
☐ تخطط لاستخدامها خلال اكثر من اثنا عشر شهرا ☐ غير متأكد

8. **هل تمتلك شركتك شهادة رسمية متعلقة بالحفاظ على البيئة؟**

☐ تمتلك حاليا ☐ لا يوجد خطط لامتلاكها حاليا ☐ تخطط لامتلاكها خلال اثنا عشر شهرا
☐ تخطط لامتلاكها خلال اكثر من اثنا عشر شهرا ☐ غير متأكد

9. **هل يقوم مكان عملك بتقييد الموردين والشركات الفرعية والمقاولين وغيرهم بتبني ممارسات سلاسل الامداد الخضراء؟**

☐نعم ☐ لا ☐ غير متأكد

10.هل يتم تضمين الحصول على تقنيات وبرامج جديدة في الشركة؟

☐نعم ☐ لا ☐ غير متأكد

ثانياً: يرجى وضع إشارة (x) في العمود الذي يتفق مع الوضع الحالي لشركتكم أمام كل فقرة من الفقرات الآتية

الجزء الاول: الممارسات الخضراء المتعلقة بسلاسل الإمداد في الصناعات الإنشائية

إدارة سلاسل الامداد الخضراء في الصناعات الانشائية تتضمن مجموعة من الممارسات الخضراء خلال مراحل التصميم، التوريد، النقل، التنفيذ، إعادة التدوير والتخزين. يهدف هذا القسم إلى قياس درجة تطبيق الشركات ذات العلاقة في الصناعات الإنشائية في فلسطين لهذه الممارسات الخضراء.

يرجى اختيار مدى تطبيق مكان عملكم للمقاييس أدناه عن طريق وضع علامة (x) في العمود المناسب.

	المقياس	معارض بشدة	معارض	محايد	موافق	موافق بشدة
التصميم الأخضر Green Design						
1	اختيار المواد الأقل تلويثا للبيئة.					
2	الأخذ بعين الإعتبار قابلية المواد المختارة لإعادة التدوير					
3	اجتناب استخدم المواد و/ أوالانظمة الانتاجية الخطرة.					
4	اعتماد الملاحظات والمتطلبات البيئية الواردة من الأطراف ذات العلاقة.					
التوريد الأخضر Green Procurement						
5	اختيار موردين حاصلين على شهادات جودة بيئية					
6	توريد مواد مصادق عليها من جهات بيئية مختصة					
7	الحرص على توريد المعدات المصادق عليها من جهات بيئية مختصة					
8	اتباع سياسات التوريد البيئية النافذة في المنطقة					
التصنيع والإنتاج الأخضر Green Production						
9	اعتماد ممارسات التصنيع والانتاج صديقة البيئة					
10	الاستفادة من المواد المعاد استخدامها او المواد المعاد تدويرها					
11	رفع كفاءة عمليات الانتاج وتقليل المخلفات					
12	تبني المبادرات الخضراء والتقنيات الحديثة					
النقل والمواصلات الخضراء Green Transportation						
13	استخدام قنوات نقل صديقة للبيئة مثل الهايبرد او المركبات الكهربائية					
14	اعتماد طرق التوزيع واللوجستيات غير المضرة للبيئة					
15	تحميل معدات النقل بحمولة كاملة					

	المقياس	معارض بشدة	معارض	محايد	موافق	موافق بشدة
16	تقليل الانبعاثات الناتجة من وسائل النقل باجراء صيانة دورية					
إعادة التدوير Recycling						
17	الاستفادة من مخلفات المشاريع المنتهية					
18	تقليل المخلفات الناتجة عن الأنشطة الانشائية					
19	اتباع وسائل تقييم الأثر البيئي للانشطة الانشائية خلال مراحل المشروع المختلفة					
20	اعادة تدوير من مخلفات عمليات الهدم					
التخزين الأخضر Green Warehousing						
21	الاستفادة من المخلفات والمواد غير المستخدمة في المخازن بشكل دوري					
22	الاستفادة من المعدات غير المستخدمة (بيع او تبديل)					
23	تقليل حجم المواد المخزنة والمجرودات					
24	اجراء جرد دوري للمخازن والسيطرة على المحتويات بشكل فعال					
25	اعادة تدوير واستخدام المواد في المواقع					

الجزء الثاني :التنمية المستدامة

يهدف هذا القسم إلى قياس الدرجة التي تتحقق فيها أركان التنمية المستدامة في الصناعات الانشائية: البيئية والاقتصادية والاجتماعية، يرجى اختيار إلى أي مدى توافق على العبارات التالية من حيث صلتها بالتغيرات في أداء مؤسستك في العامين الماضيين بسبب الممارسات الحالية

	المقياس	معارض بشدة	معارض	محايد	موافق	موافق بشدة
الأداء البيئي Environmental Performance						
1	تم تقليل الحوادث البيئية الناتجة عن النشاط الانشائي مثل تقليل كميات المخلفات.					
2	تم تقليل استهلاك الطاقة في أنشطة سلاسل الامداد للمشاريع الإنشائية					
3	يتم الحرص على عدم استخدام المواد الخطرة الكيميائية وغير المتجددة					
4	تمت السيطرة على تلوث البيئة الناتج عن نشاطات الانتاج					
5	يتم الحرص على تقييم وتحسين الوضع البيئي للمؤسسة ومتابعة السياسات البيئية بشكل دوري من أجل مواجهة الانبعاثات					

	الضارة من عمليات التصنيع.					
الأداء الاجتماعي Social Performance						
6	تقليل الحوادث والمخاطر على المجتمع					
7	تحسين البيئة الوظيفية والسلامة للافراد العاملين في جميع مراحل الانتاج					
8	خلق فرص وظيفية لسكان المنطقة					
9	تحسين صورة الشركة في سوق العمل الانشائي					
10	زيادة الأنشطة التسويقية لسمعة الشركة وسياساتها البيئية في المجتمع المحيط					
الأداء الاقتصادي Economic Performance						
11	تحقيق حصة سوقية أكبر وزيادة الأرباح					
12	تقليل نفقات المواد وتخزينها ونقلها والتخلص منها					
13	تقليل مصروفات استهلاك الطاقة					
14	الاستفادة من المخلفات الناتجة في المشاريع					
15	تقليل تكاليف التخلص من المخلفات ومعالجتها					
16	تقليل التكاليف الناتجة عن الحوادث البيئة مثل الغرامات خلال دورة حياة المشاريع					

الجزء الثالث: الضغوطات التي تتعرض لها الشركات العاملة في القطاع الإنشائي

يوجد مجموعة من الضغوطات المؤسسية التي قد تؤثر على مستوى تبني السياسات الخضراء في عمليات سلاسل الامداد في القطاع الانشائي والتي تنقسم الى ضغوطات معيارية وقسرية وتنافسية. يهدف هذا القسم لتوضيح العلاقة بين الممارسات الخضراء لسلاسل الامداد والتنمية المستدامة.

لكل مؤشر ، يرجى اختيار إلى أي مدى توافق على أثر المقياس على تطبيق الممارسات الخضراء وذلك بوضع علامة (X) في الخانة المناسبة.

	المقياس	معارض بشدة	معارض	محايد	موافق	موافق بشدة
الضغوطات المعيارية (الصادرة عن الجهات المهنية والصناعية) Normative Pressure						
1	توفر العقوبات لعدم الالتزام بالضوابط البيئية					
2	تنفيذ قواعد الممارسات الخضراء					
3	تنفيذ نظام العقوبات لانتهاك قواعد المسؤولية الاجتماعية للشركات.					
4	انتشار ثقافة المسؤولية البيئية لدى الشركات					
5	الرغبة ببيع الخدمات الانشائية المختلفة للجهات الأجنبية					
الضغوطات القسرية الصادرة من الهيئات الحكومية والبيئية Coercive Pressure						
6	توفر تشريعات ولوائح ملزمة مختصة بالمواضيع البيئية					

	المقياس	معارض بشدة	معارض	محايد	موافق	موافق بشدة
7	توفر مرجع خاص ملزم للمتطلبات البيئية في المنطقة					
8	توفر قوانين للسلامة العامة من قبل المشرعين					
9	توفر نظام عقوبات قضائي ملزم للتجاوزات البيئية					
10	تتطلب جمعيات واتحاد الصناعات تحقيق متطلبات السلامة العامة وسلامة البيئة في خلال مراحل المشروع					
ضغوطات المحاكاة (الضغوطات التنافسية) Mimetic Pressure						
11	وجود منافسين في سوق العمل يقومون بتبني وتحقيق المتطلبات البيئية					
12	ارتفاع حس التنافس بين الشركات					
13	تزايد اهتمام الشركات والمؤسسات المنافسة بمتطلبات السلامة العامة					
14	تزايد اهتمام الأطراف المشاركة في الاعمال الانشائية بتحقيق متطلبات السلامة العامة					

إذا كان لديكم اية ملاحظات اخرى يرجى اضافتها هنا

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مع بالغ الشكر والتقدير لتعاونكم

Appendix C

Tables

Table C.1
Operationalisation Of Model's Constructs

Formative constructs	Construct items	Adopted from
Green design	Minimize raw material and energy consumption. Maximize reuse, recycling, and recovery of the used material and components. Minimize or avoid using hazardous raw materials or production techniques. Incorporate consumer feedback in the eco-design phase.	(Ali et al., 2020; Balasubramanian & Shukla, 2017)
Green procurement	Select Green suppliers. Select environment-friendly raw materials. Select environment-friendly machinery. Follow environmentally sustainable policies.	(Ali et al., 2020; Putu Artama Wiguna et al., 2021)
Green Production	Adopt cleaner production practices. Promote reusable and recyclable material. Increase production efficiency and minimize waste of resources. Develop green initiatives.	(Ali et al., 2020)
Green Transportation	Adopt environmentally friendly and eco-friendly transportation channels like hybrid or electric vehicles. Adopt environment-friendly and efficient distribution channels. Materials are transported in full truckload quantities. Reduce emissions (Materials are transported in fuel-efficient vehicles) and perform periodic maintenance.	(Ali et al., 2020; Balasubramanian & Shukla, 2017; Wibowo et al., 2018)
Reverse logistics Recycling	Recover scrap from projects at the end of their lifecycle. Utilize waste produced by others in an innovative, useful, and effective way. Environmental impact assessment during end-of-life demolition of projects Materials from demolished projects are recycled.	(Balasubramanian & Shukla, 2017a; Farida et al., 2019)
Green warehouse	Effectively sell off used products and scrap components. Effectively sell excess capital equipment. Reduce inventory levels. Perform periodic inventory. Utilize recyclable/ reusable packaging.	(Ali et al., 2020; Putu Artama Wiguna et al., 2021; RezaHoseini et al., 2021; Wibowo et al., 2018)
Environmental Performance	The number of environmental accidents has declined. Energy consumption has decreased. Hazardous material use has decreased. Pollution is reduced. Improve an enterprise's environmental situation.	(Ali et al., 2020; Yildiz Çankaya & Sezen, 2019)
Social Performance	Reduction in the impacts and risks to the general public Improvement in occupational health and safety of employees Providing more positions in the community Improvement in the firm's image in the eyes of customers Improvement in the firm's social reputation.	(Wang & Dai, 2018)
Economic Performance	Improvement in market share.	(Laosirihongthong

	Material expenses have decreased. Energy expenses have decreased. The cost of managing waste has decreased. Decrease of fee for waste discharge Decrease of fines for environmental accidents	et al., 2013; Putu Artama Wiguna et al., 2021; Wang & Dai, 2018)
Normative Pressures	Relevant punishment for violations Corporate code of conduct Relevant punishment for the violation of CSR norms. Socially responsible business philosophy in the industry.	(Li et al., 2019)
	Sales to foreign customers	(Zhu & Sarkis, 2007a)
Coercive Pressure	Central governmental environmental regulations Regional environmental regulations Government departments require our organization to attach great importance to safety.	(Zhu & Sarkis, 2007)
	Punishment system for corporations that violate relevant laws and regulations.	(Li et al., 2019)
	Industry associations require our organization to attach great importance to safety.	(He et al., 2016)
Memetic Pressure	Competitors' green strategies Professional group activities Peer organizations attach great importance to safety in different projects.	(Zhu & Sarkis, 2007)
	Other project participant organizations attach great importance to safety.	(He et al., 2016)

Table C.2

Sample Size Recommendations In PLS-SEM For A Statistical Power of 80%

Maximum Number of Arrows Pointing at a Construct	*Significance Level*											
	1%				*5%*				*10%*			
	Minimum R^2				*Minimum R^2*				*Minimum R^2*			
	0.10	*0.25*	*0.50*	*0.75*	*0.10*	*0.25*	*0.50*	*0.75*	*0.10*	*0.25*	*0.50*	*0.75*
2	158	75	47	38	110	52	33	26	88	41	26	21
3	176	84	53	42	124	59	38	30	100	48	30	25
4	191	91	58	46	137	65	42	33	111	53	34	27
5	205	98	62	50	147	70	45	36	120	58	37	30
6	217	103	66	53	157	75	48	39	128	62	40	32
7	228	109	69	56	166	80	51	41	136	66	42	35
8	238	114	73	59	174	84	54	44	143	69	45	37
9	247	119	76	62	181	88	57	46	150	73	47	39
10	256	123	79	64	189	91	59	48	156	76	49	41

Source: Cohen, J. A power primer. *Psychological Bulletin*, 112, 155–519.

Note: Refer to Hair et al. (2011),

Table C.3

Descriptive Analysis of All Aspects of the Questionnaire

Indicator	Items	Mean	Standard deviation
GD2	Maximize reuse, recycling, and recovery of the used material and components.	4.0309	1.0553
GD3	Minimize or avoid using hazardous raw materials or production techniques.	4.3918	1.0263
GD4	Incorporate consumer feedback in the eco-design phase.	4.268	0.9844
GPr1	Select Green suppliers.	3.9897	1.1226
GPr3	Select environment-friendly machinery.	4.1031	1.0556
GPr4	Follow environmentally sustainable policies.	3.9897	1.0458
GPd2	Promote reusable and recyclable material.	3.8969	1.1225
GPd3	Increase production efficiency and minimize waste of resources.	4.2474	1.0311
GT1	Adopt environmentally friendly and eco-friendly transportation channels like hybrid or electric vehicles.	3.8557	0.9788
GT2	Adopt environment-friendly and efficient distribution channels.	4.0103	1.0458
GT3	Materials are transported in full truckload quantities.	3.7732	0.9948
GT4	Reduce emissions (Materials are transported in fuel-efficient vehicles) and perform periodic maintenance.	3.9691	1.1035
R1	Recover scrap from projects at the end of their lifecycle.	3.9072	1.1095
R2	Utilize waste produced by others in an innovative, useful, and effective way	4.1546	1.064
R3	Environmental impact assessment during end-of-life demolition of projects	4.0722	1.0231
R4	Materials from demolished projects are recycled.	3.866	1.1239
GW1	Effectively sell off used products and scrap components.	4.0206	1.1085
GW2	Effectively sell excess capital equipment.	4.3505	0.8297
GW3	Reduce inventory levels.	4.0825	1.115
GW4	Perform periodic inventory.	4.0412	1.154
GW5	Utilize recyclable/ reusable packaging.	3.701	1.3004
EnvP1	The number of environmental accidents has declined.	3.6804	0.9953
EnvP2	Energy consumption has decreased	3.6289	0.9929
EnvP3	Hazardous material use has decreased	3.8144	1.0929
EnvP4	Pollution is reduced.	3.4845	1.0115
EnvP5	Improve an enterprise's environmental situation.	3.5979	1.0865
SPer1	Reduction in the impacts and risks to the general public	3.9897	1.0849
SPer2	Improvement in occupational health and safety of employees	4.0206	0.9998
SPer5	Improvement in the firm's social reputation.	4.134	1.027
EPer1	Improvement in market share.	4.0206	1.0306

EPer2	Material expenses have decreased	4.0825	0.9538
EPer3	Energy expenses have decreased	4.0928	1.0417
EPer4	The cost of managing waste has decreased	3.9381	1.1069
NPr1	Relevant punishment for violations	3.7835	1.2182
NPr2	Corporate code of conduct	3.6598	1.1805
NPr3	Relevant punishment for the violation of CSR norms.	3.7113	1.1176
NPr4	Socially responsible business philosophy in the industry.	3.732	1.1041
NPr5	Sales to foreign customers	3.6804	1.0949
CPr3	Government departments require our organization to attach great importance to safety	3.9794	1.0605
CPr4	Punishment system for corporations that violate relevant laws and regulations.	3.9897	0.9842
MPr1	Competitors' green strategies	3.9381	0.9221
MPr2	Professional group activities	3.8763	0.9044
MPr3	Peer organizations in other projects attach great importance to safety	4.1237	0.9158
MPr4	Other project participant organizations attach great importance to safety	4.0825	1.0172

Table C.4
VIF Outer Model

	VIF
CPr3	2.731
CPr4	2.731
EPer1	4.663
EPer2	2.357
EPer3	4.730
EPer4	3.604
EnvP1	2.284
EnvP2	3.841
EnvP3	3.766
EnvP4	2.815
EnvP5	2.958
GD2	2.850
GD3	2.418
GD4	3.414
GPd2	2.829
GPd3	2.829
GPr1	2.402
GPr3	3.898
GPr4	2.580
GT1	3.518
GT2	3.756
GT3	2.239
GT4	2.559
GW1	1.904
GW2	1.786

GW3	2.463
GW4	2.010
GW5	1.752
MPr1	3.557
MPr2	3.014
MPr3	4.854
MPr4	4.513
NPr1	3.860
NPr2	4.074
NPr3	3.557
NPr4	3.648
NPr5	1.990
R1	2.864
R2	2.845
R3	2.757
R4	3.197
SPer1	2.562
SPer2	3.159
SPer5	2.974

Table C.5
Outer Weights

	Original sample (O)	VIF	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
CPr -> Institutional Pressures	0.234	1.598	0.166	1.412	0.158
MPr -> Institutional Pressures	0.377	1.291	0.151	2.493	0.013
NPr -> Institutional Pressures	0.643	1.383	0.120	5.368	0.000
GD -> GSCM	0.129	3.136	0.281	0.459	0.646
GPd -> GSCM	-0.052	3.433	0.231	0.224	0.823
GPr -> GSCM	0.188	4.005	0.238	0.790	0.429
GT -> GSCM	0.413	3.923	0.202	2.041	0.041
GW -> GSCM	0.308	1.906	0.192	1.600	0.110
R -> GSCM	0.163	3.251	0.198	0.827	0.408

Table C. 6
Outer loadings

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
CPr -> Institutional Pressures	0.745	1.598	0.108	6.887	0.000
MPr -> Institutional Pressures	0.687	1.291	0.098	6.977	0.000
NPr -> Institutional Pressures	0.882	0.865	0.063	13.979	0.000
GD -> GSCM	0.769	0.743	0.081	9.486	0.000
GPd -> GSCM	0.776	0.733	0.108	7.161	0.000
GPr -> GSCM	0.887	0.844	0.093	9.502	0.000
GT -> GSCM	0.929	0.888	0.077	12.116	0.000
GW -> GSCM	0.817	0.792	0.086	9.553	0.000
R -> GSCM	0.851	0.813	0.108	7.900	0.000

جامعة النجاح الوطنية
كلية الدراسات العليا

أثر ممارسات إدارة سلسلة الامداد الخضراء على الأداء المستدام لصناعة الإنشاءات الفلسطينية: إطار عمل مفاهيمي

إعداد
شروق فتحي شرقاوي

إشراف
د. محمد عثمان
د. يحيى صالح

قدمت هذه الرسالة استكمالا لمتطلبات الحصول على درجة الماجستير في الإدارة الهندسية، من كلية الدراسات العليا، في جامعة النجاح الوطنية، نابلس–فلسطين.

2024

أثر ممارسات إدارة سلسلة الامداد الخضراء على الأداء المستدام لصناعة الإنشاءات الفلسطينية: إطار عمل مفاهيمي

اعداد

شروق فتحي شرقاوي

إشراف

د. محمد عثمان

د. يحيى صالح

الملخص

تُعد إدارة سلاسل الإمداد الخضراء المتعلقة بالقطاع الإنشائي قضية بحثية مهمة تمت دراستها مؤخرا في العديد من الابحاث العلمية نظرا لأهميتها وتأثيرها على البيئة العالمية. تناولت هذه الدراسة أثر ممارسات سلاسل الإمداد الخضراء على الأداء المستدام للصناعات الإنشائية في فلسطين في ظل وجود الضغوطات المؤسساتية كمتغير وسيط.

لتحقيق الأهداف من الدراسة، تم تطوير نموذج بحثي للربط بين ممارسات سلاسل الإمداد الخضراء والأداء المستدام من خلال مراجعة الأبحاث السابقة المشابهة لموضوع البحث. كما تم جمع البيانات من خلال توزيع استبيان لجهات عاملة في القطاع الإنشائي في فلسطين، تم الحصول على 97 استبانة ومن ثم أجري تحليل البيانات المحصلة بواسطة برنامج Smart PLS.

اوضحت نتائج التحليل أن مستويات تبني وتطبيق ممارسات سلاسل الإمداد الخضراء والأداء المستدام بالإضافة للضغوطات المؤسساتية تعتبر عالية في وسط القطاع الإنشائي الفلسطيني. كما تم توضيح أثر تطبيق الممارسات الخضراء في سلاسل الامداد على الاداء المستدام للشركات والمؤسسات العاملة في هذا المجال. علاوة على ذلك، تم دراسة دور الضغوطات المؤسساتية كمتغير وسيط على هذه العلاقة بالاضافة

لتقديم مقترحات لتحسين دور المؤثرين واصحاب القرار على تطبيق الممارسات الخضراء في سلاسل الامداد وتحسين الاداء المستدام لهذه الصناعة.

ساهمت الدراسة في تلخيص الممارسات الخضراء والاداء المستدام والضغوطات المتعلقة بسلاسل الإمداد في القطاع الانشائي في فلسطين. كما اوصت الدراسة بتعميم النهج خلال بيئات مختلفة في الدول النامية والمتطورة بهدف تقديم دراسة نوعية للمتغيرات وأثرها على البيئة العالمية.

الكلمات المفتاحية: إدارة سلسلة الامداد الخضراء، الأداء المستدام، الضغوط المؤسساتية،