“Influence of green supply chain and sustainability culture on sustainable performance”

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INFLUENCE OF GREEN SUPPLY CHAIN AND SUSTAINABILITY CULTURE ON SUSTAINABLE PERFORMANCE

Abstract

The purpose of this study is to examine the influence of green supply chain practices and sustainability culture on sustainable performance in the Saudi Arabian manufacturing sector. Using a cross-sectional research design, data were collected in February 2025 from 329 managerial employees, including department heads, operations managers, environmental officers, and quality assurance supervisors working in ten medium to large-scale manufacturing companies located in Riyadh, Jeddah, and Dammam. These participants were selected through convenience sampling based on their direct engagement in green supply chains and sustainability practices, ensuring relevance to the research objectives. Data were gathered using a structured questionnaire distributed in person and via email. Structural equation modeling (SEM) with SmartPLS 4.0 was applied to analyze the data. The findings reveal that green supply chain practices (β = 0.335) and sustainability culture (β = 0.78) significantly influence management commitment, which in turn has a strong positive impact on sustainable performance (β = 0.896). Management commitment also mediates these relationships, with green supply chain practices (β = 0.421) and sustainability culture (β = 0.699) indirectly enhancing sustainable performance through their effects on management commitment. These results highlight the importance of integrating green supply chain initiatives, fostering a sustainability-oriented culture, and securing strong management commitment to achieve sustainability goals in the Saudi Arabian manufacturing sector.

Keywords sustainability, management, performance, business, supply chain

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INTRODUCTION

In recent years, sustainability has emerged as a critical priority for organizations worldwide, driven by increasing environmental concerns, regulatory pressures, and stakeholder expectations. Climate change, resource depletion, and environmental degradation have prompted governments, businesses, and consumers to demand more sustainable practices across industries (Yadegaridehkordi et al., 2023). For Saudi Arabia, sustainability is not just a global trend but a strategic imperative embedded in Vision 2030, the Kingdom's ambitious roadmap for economic diversification, social development, and environmental stewardship (Wasiq et al., 2023). As the nation seeks to reduce its reliance on oil revenues and transition toward a more sustainable and knowledge-based economy, the manufacturing sector, as a cornerstone of Saudi Arabia's industrial base, plays a pivotal role in achieving these goals (Ghaithan et al., 2021). This sector is not only a significant contributor to the Kingdom's GDP but also a major consumer of resources and energy, making it a key area for implementing sustainability initiatives. However, realizing sustainable performance in the manufacturing sector requires a holistic approach that goes beyond superficial changes. It demands the integration of green supply chain

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practices, the cultivation of a strong sustainability culture, and the unwavering commitment of top management (Abdelwahed et al., 2022). Green supply chain practices, which involve incorporating environmental considerations into supply chain operations, have gained significant attention as a means to enhance sustainability. These practices include selecting suppliers based on environmental criteria, engaging in eco-design, reducing waste, and requiring environmental certifications such as ISO 14000. Similarly, sustainability culture, which reflects an organization's values, norms, and practices related to social and environmental responsibility, is essential for driving sustainable outcomes (Aichouni et al., 2024). A strong sustainability culture ensures that employees at all levels understand and prioritize sustainability, embedding it into daily operations and decision-making processes. Yet, the success of these initiatives largely depends on the commitment of top management, which plays a critical role in allocating resources, setting priorities, and driving organizational change.

1. LITERATURE REVIEW AND HYPOTHESES

Green supply chain practices are increasingly recognized as a critical component of sustainable performance. These practices involve integrating environmental considerations into every stage of the supply chain, from sourcing raw materials to delivering finished products (Yildiz Çankaya & Sezen, 2019). Eco-design, which involves designing products with environmental considerations in mind, can lead to reduced resource consumption and waste generation (Rahman et al., 2023a). Additionally, requiring suppliers to obtain environmental certifications, such as ISO 14000, ensures that they follow standardized environmental management practices (Jermsittiparsert et al., 2019). By selecting suppliers based on environmental criteria, organizations can ensure that their supply chain partners adhere to sustainable practices, thereby reducing the overall environmental impact (Al-Ayed & Al-Tit, 2023). The adoption of green supply chain practices not only reduces the environmental footprint of organizations but also enhances their reputation and competitiveness (Chin et al., 2015). Customers, investors, and regulators are increasingly demanding that organizations demonstrate their commitment to sustainability. By implementing green supply chain practices, organizations can meet these demands and differentiate themselves in the market. Furthermore, these practices can lead to cost savings through improved efficiency and reduced waste, contributing to the financial performance of the organization.

Green supply chain practices involve integrating environmental considerations into supply chain operations, such as supplier selection based on environmental criteria, eco-design, waste reduction, and requiring environmental certifications (Zaid et al., 2018). These practices not only reduce the environmental impact of operations but also signal an organization's commitment to sustainability, which can influence managerial attitudes and priorities. However, the successful implementation of green supply chain practices requires strong management commitment. Managers play a crucial role in driving these initiatives, from setting sustainability goals to allocating resources and monitoring progress (Han & Huo, 2020). Without the support of top management, green supply chain practices may not be effectively implemented or sustained (Al-Ayed & Al-Tit, 2024). Therefore, management commitment is a key factor in translating green supply chain practices into sustainable performance outcomes. Green supply chain practices enhance organizational capabilities and foster a proactive approach to environmental management. When organizations adopt green supply chain practices, they often require strong leadership support to implement and sustain these initiatives, thereby increasing management commitment to sustainability.

Sustainability culture refers to the values, norms, and practices within an organization that prioritize social and environmental responsibility (Wang & Huang, 2022). A strong sustainability culture ensures that employees at all levels understand and align with sustainability goals, embedding them into daily operations and decision-making processes (Fok et al., 2022). This culture is characterized by a shared commitment to sustainability, where employees are encouraged to take responsibility for their actions and contribute to the organization's sustainability objectives

(Sapta et al., 2021). Organizations with a strong sustainability culture are more likely to achieve sustainable performance outcomes (Abualfaraa et al., 2022). This is because a sustainability culture fosters a sense of responsibility and accountability among employees, encouraging them to adopt sustainable practices in their work. Employees may be more likely to reduce waste, conserve energy, and support sustainability initiatives if they are embedded in the organizational culture. Additionally, a sustainability culture can enhance employee engagement and morale, as employees feel that they are contributing to a greater purpose.

Leadership plays a crucial role in cultivating a sustainable culture. Managers set the tone for the organization by demonstrating their commitment to sustainability and reinforcing sustainability values through their actions and decisions (Galpin et al., 2015). When leaders prioritize sustainability, they send a clear message to employees that sustainability is a core organizational value. This, in turn, encourages employees to align their behavior with sustainability goals, contributing to the overall sustainable performance of the organization (Fok et al., 2023). Organizations with a robust sustainability culture are more likely to have leaders who prioritize sustainability and allocate resources toward achieving sustainability objectives. When sustainability becomes a core organizational value, it fosters a sense of responsibility among managers, strengthening their commitment to sustainability initiatives.

Committed management ensures the allocation of resources, the establishment of clear sustainability goals, and the integration of sustainability into strategic planning. Without strong management commitment, sustainability initiatives may lack the necessary support and resources to be effectively implemented (Iranmanesh et al., 2019). Management commitment is a critical factor in driving sustainable performance, as it reflects the extent to which leaders prioritize and support sustainability initiatives (Syed et al., 2024). This is because committed managers are more likely to invest in sustainability initiatives, monitor progress, and make necessary adjustments to ensure success (Martínez-Falcó et al., 2024). Additionally, management commitment can enhance employee motivation and engagement, as employees are more likely to support sustainability initiatives when they see that their leaders are committed to these goals (Adebayo et al., 2020). Management commitment also plays a crucial role in overcoming barriers to sustainability. Implementing sustainability initiatives often requires significant changes to organizational processes, systems, and culture (Bakhsh Magsi et al., 2018). These changes can be challenging and may face resistance from employees or other stakeholders. Committed managers are better equipped to navigate these challenges, as they can provide the necessary support and resources to overcome obstacles and drive change (Hmeedat & Albdareen, 2022).

Organizations with strong management commitment are more likely to achieve sustainable performance outcomes, such as reduced environmental impact, improved compliance, and enhanced stakeholder trust (Rahman et al., 2023b). Management commitment not only directly influences sustainable performance but also acts as a mediator between green supply chain practices, sustainability culture, and sustainable performance (Syed et al., 2020). Green supply chain practices and sustainability culture create the foundation for sustainability initiatives, but their successful implementation depends on managerial support. Research suggests that management commitment bridges the gap between sustainability strategies and their execution, ensuring that green supply chain practices and sustainability culture translate into tangible outcomes (Alshura et al., 2023). Green supply chain practices may require managerial oversight to ensure compliance and continuous improvement, while sustainability culture relies on leadership to reinforce values and drive behavioral change. Managers set the tone for the organization by demonstrating their commitment to sustainability and encouraging employees to adopt sustainable practices (Fok et al., 2021). When leaders prioritize sustainability, they create a culture where sustainability is embedded in every aspect of the organization, from decision-making to daily operations. This, in turn, enhances the organization's ability to achieve sustainable performance outcomes.

The purpose of this study is to examine the influence of green supply chain and sustainability culture on sustainable performance. Figure 1 presents the research model. Thus, the following hypotheses are proposed:

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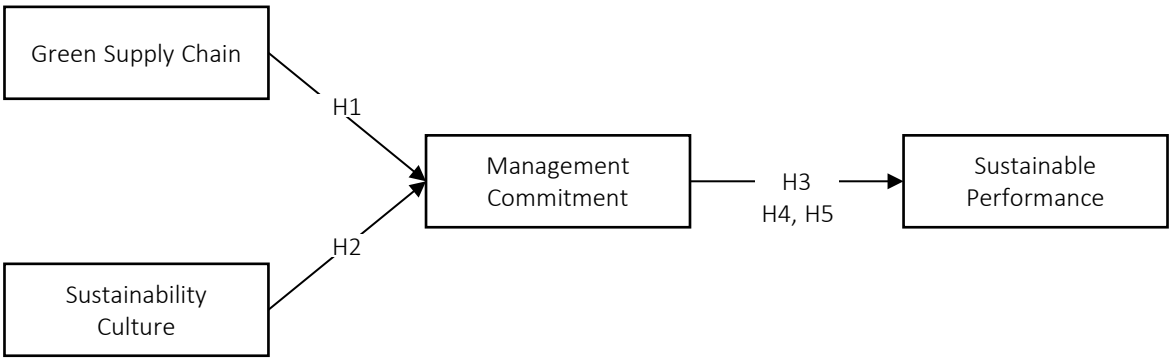

Figure 1. Research model

H1: Green supply chain influences management commitment.

H2: Sustainability culture influences management commitment.

H3: Management commitment influences sustainable performance.

H4: Management commitment mediates the link between green supply chain and sustainable performance.

H5: Management commitment mediates the link between sustainability culture and sustainable performance.

2. METHODS

This study employed a cross-sectional research design to examine the relationships between green supply chain practices, sustainability culture, management commitment, and sustainable performance. Data were collected from employees working in the manufacturing sector in Saudi Arabia, a key industry in the Kingdom's economy. The sample consisted of 329 respondents, ensuring adequate statistical power for analysis. Data collection took place in February 2025, using a structured questionnaire distributed to participants.

The manufacturing sector in Saudi Arabia comprises diverse industries, including food processing, petrochemicals, construction materials, and industrial equipment, all of which are central to the Kingdom's economic development. This study focused on ten medium to large-scale manufacturing companies located in Riyadh, Jeddah, and Dammam. These companies were selected through professional networks and industry directories based on three key criteria: (1) firms demonstrated engagement in sustainability and green supply chain initiatives, (2) alignment with the strategic goals of Vision 2030, and (3) practical accessibility for research participation. The selected firms represented a mix of national and multinational manufacturers, ensuring sectoral diversity. The respondents included managerial-level employees, specifically department heads, operations managers, environmental officers, and quality assurance supervisors, who hold direct responsibility for implementing and monitoring sustainability strategies within their respective organizations. Their positions provided them with a comprehensive understanding of internal practices, management commitment, and sustainability performance, making them suitable informants for this study. A convenience sampling approach was adopted to facilitate access to this specific group, justified by the exploratory nature of the research and the logistical challenges of engaging a broader or randomly selected population in an industrial context. This approach enabled focused data collection from informed individuals actively involved in sustainability-related decision-making processes.

Table 1 provides a detailed profile of 329 participants, categorized by gender, age, education level, current job position, and years of experience. In terms of gender, the majority of participants are male, constituting 62% (204 individuals), while females make up 38% (125 individuals). This indicates a male-dominated sample in the study. Regarding age, the participants are relatively

evenly distributed across age groups. The largest groups are those aged 25–34 and 35–44, each representing 30% (99 individuals) of the sample. Participants below 25 years old account for 10% (33 individuals), while those aged 45–54 and 55 and above make up 19% (63 individuals) and 11% (35 individuals), respectively. This suggests a focus on working-age adults, with a significant representation of individuals in their mid-career stages. In terms of education level, the majority of participants hold a bachelor's degree (52%, 171 individuals), followed by those with a master's degree (28%, 92 individuals). A smaller proportion (20%, 66 individuals) has an associate degree, indicating that the sample is highly educated overall. When it comes to the current job position, mid-level managers form the largest group at 48% (158 individuals), followed by senior managers at 33% (108 individuals). Executives or directors make up 19% (63 individuals), reflecting a sample primarily composed of mid-to-senior-level professionals. Finally, in terms of years of experience, the sample is fairly evenly distributed. Participants with 2–5 years of experience and those with more than 10 years of experience each represent 30% (99 individuals) and 25% (82 individuals), respectively. Those with 6–10 years of experience also account for 25% (82 individuals), while individuals with less than 2 years of experience make up 20% (66 individuals). This distribution suggests a mix of early-career, mid-career, and highly experienced professionals in the sample.

Table 1. Participant profile

Category	Subcategory	Frequency	Percentage
Gender	Male	204	62%
	Female	125	38%
Age	Below 25	33	10%
	25–34	99	30%
	35–44	99	30%
	45–54	63	19%
	55 and above	35	11%
Education Level	Associate degree	66	20%
	Bachelor's degree	171	52%
	Master's degree	92	28%
Current Job Position	Mid-level manager	158	48%
	Senior manager	108	33%
	Executive/Director	63	19%
Years of Experience	Less than 2 years	66	20%
	2–5 years	99	30%
	6–10 years	82	25%
	More than 10 years	82	25%

Note: *n* = 329.

The questionnaire utilized a 5-point Likert scale, ranging from "strongly disagree" to "strongly agree," to measure respondents' perceptions of the constructs under study (Appendix A).

The measurement items for the constructs were adapted from established scales in prior research. Specifically, five items for green supply chain were adapted from Singh and El-Kassar (2019), seven items for sustainability culture were adapted from Marshall et al. (2015), three items for management commitment were adapted from Fraj-Andrés et al. (2009), and six items for sustainable performance were adapted from Lin et al. (2013). These scales were chosen for their reliability and validity in measuring the respective constructs in sustainability-related studies. Data analysis was conducted using structural equation modeling (SEM), a robust statistical technique that allows for the examination of complex relationships between multiple constructs.

3. RESULTS

Table 2 presents the measurement model for four key constructs. Each construct is evaluated based on factor loadings, Cronbach's alpha, composite reliability, and average variance extracted (AVE), which collectively assess the reliability and validity of the measurement model. The green supply chain construct demonstrates strong reliability, as indicated by a Cronbach's alpha of 0.773, a composite reliability of 0.842, and an AVE of 0.552. The factor loadings for its five items range from 0.699 to 0.89, with the highest loading for the item related to engaging suppliers in product eco-design and development. This indicates that the items are strongly correlated with the construct. However, the AVE is slightly below the ideal threshold of 0.6, but it remains acceptable given the strong composite reliability and factor loadings.

The sustainability culture construct demonstrates excellent reliability and validity, with a Cronbach's alpha of 0.825, composite reliability of 0.742, and an AVE of 0.705. The factor loadings for its seven items range from 0.734 to 0.894, with the highest loading for the item related to promoting social sustainability as a major goal across all departments. This highlights the importance of this item

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in measuring sustainability culture. The AVE exceeds the 0.5 threshold, confirming strong convergent validity, indicating that the construct is well-measured by its items.

Management commitment also exhibits high reliability and validity, with a Cronbach's alpha of 0.831, composite reliability of 0.799, and an AVE of 0.747. The three items measuring this construct have factor loadings ranging from 0.782 to 0.858, with the highest loading for the item related to environmental strategies being driven by the top management team. This emphasizes the critical role of top management in driving environmental strategies. The AVE is well above the threshold, confirming robust convergent validity and reinforcing the strength of this construct.

Sustainable performance shows good reliability and validity, with a Cronbach's alpha of 0.731, composite reliability of 0.745, and an AVE of 0.742. The six items measuring this construct have factor loadings ranging from 0.713 to 0.894, with the highest loading for the item related to reducing paper use. This suggests that this item is a key indicator of sustainable performance. The AVE exceeds the 0.5 threshold, confirming strong convergent validity and indicating that the construct is effectively measured by its items.

Table 3 presents the discriminant validity of the constructs using the Fornell-Larcker criterion, which assesses whether each construct is distinct from the others by comparing the square root of the average variance extracted (AVE) for each construct (diagonal values) with the correlations between constructs (off-diagonal values). This indicates that each construct is distinct, confirming its discriminant validity.

Table 4 presents the path coefficients, which indicate the strength and significance of the relationships between the constructs in the proposed model. The path from green supply chain to management commitment has a beta value of 0.335, indicating a moderate positive relationship. The *T* statistic of 8.639 and a *p*-value of 0.00 (which is less than 0.05) confirm that this relationship is statistically significant. This sup-

Table 2. Measurement model

Items with Constructs	Loadings	Cronbach's alpha	Composite reliability	Average variance extracted (AVE)
Green Supply Chain				
GSC1	0.775	0.773	0.842	0.552
GSC2	0.699			
GSC3	0.89			
GSC4	0.77			
GSC5	0.825			
Sustainability Culture				
SC1	0.854	0.825	0.742	0.705
SC2	0.894			
SC3	0.817			
SC4	0.734			
SC5	0.862			
SC6	0.765			
SC7	0.856			
Management Commitment				
MC1	0.853	0.831	0.799	0.747
MC2	0.782			
MC3	0.858			
Sustainable Performance				
SP1	0.894	0.731	0.745	0.742
SP2	0.871			
SP3	0.713			
SP4	0.766			
SP5	0.789			
SP6	0.829			

Table 3. Discriminant validity (Fornell-Larcker criterion)

	Green Supply Chain	Management Commitment	Sustainability Culture	Sustainable Performance
Green Supply Chain	0.843			
Management Commitment	0.724	0.865		
Sustainability Culture	0.755	0.782	0.839	
Sustainable Performance	0.731	0.796	0.787	0.861

Table 4. Path coefficients

Paths	Beta	Standard deviation	T statistics	P values	Results
Green Supply Chain → Management Commitment	0.335	0.211	8.639	0.00	H1 supported
Sustainability Culture → Management Commitment	0.78	0.18	4.339	0.00	H2 supported
Management Commitment → Sustainable Performance	0.896	0.036	9.979	0.00	H3 supported
Green Supply Chain → Management Commitment → Sustainable Performance	0.421	0.194	6.624	0.00	H4 supported
Sustainability Culture → Management Commitment → Sustainable Performance	0.699	0.158	4.412	0.00	H5 supported

ports Hypothesis 1, suggesting that green supply chain practices have a positive influence on management commitment to sustainability.

The path from sustainability culture to management commitment has a beta value of 0.78, indicating a strong positive relationship. The *T* statistic of 4.339 and a *p*-value of 0.00 confirm that this relationship is statistically significant. This supports Hypothesis 2, suggesting that a strong sustainability culture within an organization significantly enhances management commitment to sustainability.

The path from management commitment to sustainable performance has a beta value of 0.896, indicating a very strong positive relationship. The *T* statistic of 9.979 and a *p*-value of 0.00 confirm that this relationship is statistically significant. This supports Hypothesis 3, suggesting that management commitment plays a critical role in driving sustainable performance within the organization.

The indirect path from green supply chain to sustainable performance through management commitment has a beta value of 0.421, indicating a moderate positive mediating effect. The *T* statistic of 6.624 and a *p*-value of 0.00 confirm that this indirect relationship is statistically significant. This supports Hypothesis 4, suggesting that green supply chain practices indirectly enhance sustainable performance by strengthening management commitment. Similarly, the indirect path from sustainability culture to sustainable performance through management commitment has a beta value of 0.699, indicating a strong positive mediating effect. The *T* statistic of 4.412 and a *p*-value of 0.00 confirm that this indirect relationship is statistically significant. This supports Hypothesis 5, suggesting that sustainability culture indirectly improves sustainable performance by fostering stronger management commitment.

The *R*-squared values in Figure 2 indicate the proportion of variance in the dependent constructs (management commitment and sustainable performance) that is explained by the independent constructs in the model. For management commitment, the *R*-squared value is 0.586, which means that 58.6% of the variance in management commitment is explained by the independent constructs in the model, specifically green supply chain and sustainability culture. This suggests that these two factors (green supply chain practices and sustainability culture) are strong predictors of management commitment. For sustainable performance, the *R*-squared value is 0.603, indicating that 60.3% of the variance in sustainable performance is explained by the independent constructs in the model, particularly management commitment. This high *R*-squared value underscores the significant role of management commitment in driving sustainable performance within organizations.

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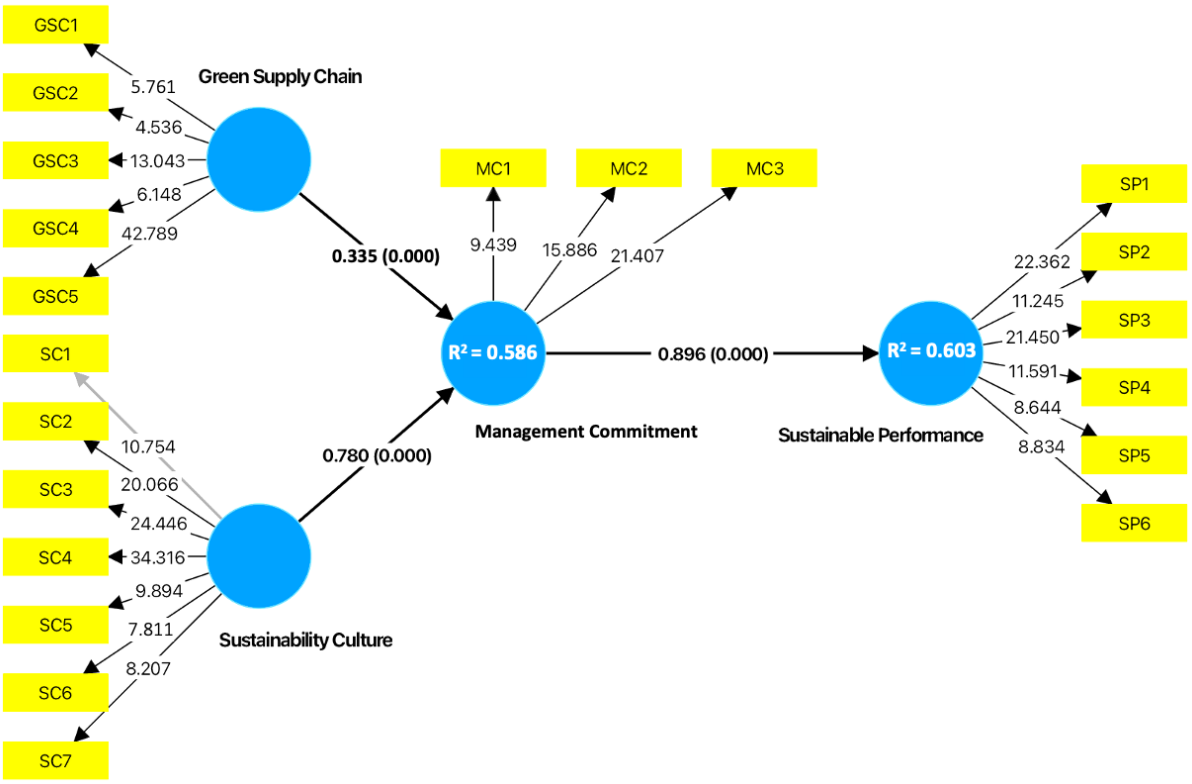

Figure 2. Structural model

4. DISCUSSION

The findings of this study provide significant insights into the relationships between green supply chain practices, sustainability culture, management commitment, and sustainable performance. The results support all hypothesized relationships, demonstrating the critical role of these constructs in driving organizational sustainability.

First, the study reveals that green supply chain practices and sustainability culture have a direct and significant impact on management commitment. The path coefficients (β = 0.335 for green supply chain practices and β = 0.78 for sustainability culture) indicate that both factors are strong predictors of management commitment, with sustainability culture having a particularly strong influence. This aligns with existing literature that emphasizes the importance of integrating environmental criteria into supply chain management and fostering a culture of sustainability within organizations (Wong et al., 2015). The high *R*-squared value of 0.586 for management commitment further underscores the explanatory power of these variables, suggesting that organizations aiming to enhance managerial commitment to sustainability should focus on both green supply chain initiatives and cultivating a strong sustainability culture.

Second, the study highlights the pivotal role of management commitment in driving sustainable performance. The path coefficient (β = 0.896) indicates a robust positive relationship, supported by a high *R*-squared value of 0.603 for sustainable performance. This finding is consistent with prior research that identifies management commitment as a critical enabler of sustainability outcomes (Agyabeng-Mensah et al., 2022). The results suggest that when top management is committed to sustainability, it significantly enhances the organization's ability to achieve sustainable performance, such as reducing waste, improving environmental compliance, and building partnerships with green organizations (Henao et al., 2019).

Third, the study demonstrates the mediating role of management commitment in the relationships between green supply chain practices, sustainability culture, and sustainable performance. The indirect effects (β = 0.421 for green supply chain practices and β = 0.699 for sustainability culture)

indicate that management commitment acts as a crucial bridge, translating green supply chain initiatives and sustainability culture into tangible sustainable performance outcomes (Al-Ayed, 2024a). This finding extends the literature by providing empirical evidence of the mechanisms through which green supply chain practices and sustainability culture influence sustainable performance. It suggests that organizations should not only implement green supply chain practices and promote a sustainability culture, but also ensure that these efforts are supported by a strong managerial commitment to achieve the desired sustainability outcomes (Henao & Sarache, 2022; Alateeg et al., 2024).

This study contributes to the literature by integrating green supply chain practices, sustainability culture, and management commitment into a comprehensive framework for understanding sustainable performance. The findings highlight the interconnectedness of these constructs and provide empirical evidence of their roles in driving sustainability outcomes. The study also advances the understanding of the mediating role of management commitment, offering new insights into how green supply chain practices and sustainability culture translate into sustainable performance. These contributions enrich the theoretical discourse on sustainability and provide a basis for further research in this area. For practitioners, the findings offer actionable insights into how organizations can enhance their sustainability performance. First, organizations should prioritize the implementation of green supply chain practices, such as selecting suppliers based on environmental criteria, engaging suppliers in eco-design, and requiring environmental certifications. These practices not only improve supply chain sustainability but also strengthen management commitment to sustainability. Second, fostering a strong sustainability culture is essential. Organizations should promote social sustainability as a core value, provide employees with information on sustainability, and integrate sustainability goals across all departments. Finally, securing top management commitment is critical. Organizations should ensure that sustainability strategies are driven by top management and that environmental efforts receive full support from leadership.

While this study provides valuable insights, it has some limitations. First, the data are cross-sectional, limiting the ability to establish causal relationships. Future research could employ longitudinal designs to explore causal dynamics. Second, the study focuses on specific industries or regions, which may limit the generalizability of the findings. Future studies could expand the sample to include diverse industries and geographic contexts. Third, the study examines only a few constructs; future research could explore additional factors, such as organizational size, industry type, or external regulatory pressures, to provide a more comprehensive understanding of sustainable performance. This study underscores the importance of green supply chain practices, sustainability culture, and management commitment in achieving sustainable performance. The findings provide a robust framework for understanding the mechanisms driving sustainability outcomes and offer practical guidance for organizations seeking to enhance their sustainability initiatives. By integrating these insights into their strategies, organizations can contribute to a more sustainable future while achieving a competitive advantage.

CONCLUSION

The purpose of this study is to examine the influence of green supply chain and sustainability culture on sustainable performance. The findings highlight that both green supply chain practices and sustainability culture positively influence management commitment, which in turn exerts the strongest direct effect on sustainable performance. Moreover, the study confirms the mediating role of management commitment, suggesting it serves as a vital mechanism through which green initiatives and cultural values are translated into measurable performance outcomes. From a practical perspective, these findings emphasize the importance of fostering leadership engagement and commitment in driving sustainability efforts. Organizations, especially in the Saudi manufacturing sector, can leverage this insight by investing in leadership training, sustainability-oriented policies, and accountability mechanisms that

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embed environmental priorities into managerial roles. Theoretically, this analysis contributes to the growing body of literature by validating management commitment as a core construct in sustainability performance frameworks, especially within the context of emerging economies. Future research should consider longitudinal studies to assess the stability and evolution of these relationships over time. Additionally, cross-sectoral or cross-national comparisons could offer deeper insights into contextual differences and the broader applicability of these findings.

AUTHOR CONTRIBUTIONS

Conceptualization: Sura Alayed.
Data curation: Sura Alayed.
Formal analysis: Sura Alayed.
Investigation: Sura Alayed.
Methodology: Sura Alayed.
Project administration: Sura Alayed.
Resources: Sura Alayed.
Software: Sura Alayed.
Supervision: Sura Alayed.
Validation: Sura Alayed.
Visualization: Sura Alayed.
Writing – original draft: Sura Alayed.
Writing – review & editing: Sura Alayed.

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APPENDIX A

Table A1. Questionnaire

Items	Source
Green Supply Chain	
Has your company ever taken the following action with your main suppliers or subcontractors?	Singh and El-Kassar (2019)
GSC1: "Supplier selection on environmental criteria"	
GSC2: "Advising suppliers on environmental technical issues"	
GSC3: "Engaging suppliers in product eco-design and development"	
GSC4: "Appraising environmental performance of the suppliers"	
GSC5: "Requiring suppliers or subcontractors to obtain a third-party certification of an environmental management system, such as ISO14000"	
Sustainability Culture	
SC1: "In my firm, I provided information to all employees to understand the importance of social sustainability"	Marshall et al. (2015)
SC2: "I tried to promote social sustainability as a major goal across all departments"	
SC3: "Our firm had a clear policy statement urging social sustainability in every area of operations"	
SC4: "Social sustainability was a high-priority activity in our firm"	
SC5: "Social sustainability was a central corporate value in our firm"	
SC6: "Our firm had a responsibility to be socially sustainable"	
SC7: "Our firm worked hard for an image of social sustainability"	
Management Commitment	
MC1: "The top management team in our firm is committed to environmental preservation"	Fraj-Andrés et al. (2009)
MC2: "Our firm's environmental efforts receive full support from our top management"	
MC3: "Our firm's environmental strategies are driven by the top management team"	
Sustainable Performance	
SP1: "Our company adheres to reducing paper use"	Lin et al. (2013)
SP2: "Our company adheres to reducing hazardous waste/scrap"	
SP3: "Our company adheres to reducing the consumption of gasoline/fuel"	
SP4: "Our company adheres to building partnerships with green organizations and suppliers"	
SP5: "Our company adheres to improving environmental compliance"	
SP6: "Our company adheres to using environmentally friendly materials"	

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