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Saudi companies' approaches to environmental sustainability in the context of the Saudi Green Initiative: An assessment of organizational commitment

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ABSTRACT

This study examines the implementation of environmental sustainability strategies by Saudi companies within the framework of the Saudi Green Initiative. It explores the main factors influencing sustainability efforts, including organizational commitment, regulatory environmental influences, technological capabilities, and cultural values and norms. A quantitative research method was adopted using Structural Equation Modeling (SEM) to analyze data collected from 300 structured surveys distributed across different sectors in Saudi Arabia. The surveys assessed sustainability strategies in relation to the identified factors. SEM was used to investigate the relationships among variables and evaluate both direct and indirect effects. The analysis included model development, validation, and hypothesis testing to ensure reliable findings. The results show that four major factors significantly support environmental sustainability practices. Regulatory frameworks and internal organizational capabilities were also found to improve the effectiveness of sustainability strategies. Furthermore, companies that integrate environmental considerations into their core operations achieve stronger sustainability outcomes, consistent with the goals of the Saudi Green Initiative. The study provides practical recommendations for policymakers and business leaders to encourage sustainable practices, strengthen stakeholder engagement, and invest in green technologies. It also contributes to the literature on corporate sustainability in emerging economies.

1. Introduction

Environmental sustainability has emerged as a central concern for governments, corporations, and societies worldwide (Ogunkan, 2022). Heightened awareness of climate change, environmental degradation, and resource depletion has prompted a global transition toward sustainable development practices. Many nations are adopting comprehensive strategies to minimize environmental impacts while maintaining economic growth (Saqib et al., 2024). Saudi Arabia distinguishes itself through the Saudi Green Initiative (SGI), which demonstrates a significant commitment to environmental responsibility and sustainable development (Ghanem and Alamri, 2023).

Introduced in 2021, the Saudi Green Initiative represents the Kingdom's strategic objective to diversify its economy beyond oil dependence and address pressing environmental challenges (Nassar, 2025). The initiative prioritizes large-scale tree planting, reduction of carbon emissions, expansion of renewable energy, and promotion of sustainable urban development. This approach underscores Saudi Arabia's recognition of environmental sustainability as a core component of its national development strategy (Nematchoua et al., 2021). Achieving these objectives relies significantly on the strategic actions of Saudi companies across multiple sectors. These organizations play a crucial role in implementing sustainable practices, adopting green technologies, and aligning their operations with national environmental goals. Examining how these companies integrate sustainability into governance, engage stakeholders, report on environmental impacts, and invest in renewable energy offers important insights into their contributions to the

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Kingdom's environmental objectives (Ghanem and Alamri, 2023; Al-Zubairi et al., 2025). Although corporate environmental initiatives have gained prominence, it remains essential to understand the factors influencing the adoption and effectiveness of sustainability strategies in the Saudi context (Lutfi et al., 2023). Key determinants include organizational commitment, regulatory frameworks, technological capacity, and prevailing cultural norms. While Vision 2030 and the SGI provide a supportive policy environment, the degree of sustainable practice implementation varies according to internal leadership, resource allocation, stakeholder engagement, and cultural perspectives (Agyabeng-Mensah et al., 2022). Analyzing how these variables shape corporate strategies is critical for achieving national sustainability objectives. Such analysis can facilitate the dissemination of best practices and foster a robust sustainability culture within the private sector.

Aligning corporate strategies with national environmental initiatives is essential for advancing sustainable development in Saudi Arabia. The SGI provides a strategic framework that motivates companies to pursue innovation and leadership in environmental stewardship (Wasiq et al., 2023). This study evaluates the perceptions of stakeholders and policymakers regarding Saudi companies' strategic approaches to environmental sustainability, employing Structural Equation Modeling to examine the relationships among organizational commitment, regulatory context, technological capacity, and cultural norms. The results are intended to inform policymakers, corporate leaders, and stakeholders by identifying barriers and opportunities for enhancing sustainability initiatives. Policymakers may use these insights to design targeted regulations and incentives, while companies can pinpoint areas for strategic improvement and innovation, thereby aligning their operations with the national sustainability agenda and the objectives of the Saudi Green Initiative.

2. Theoretical underpinning

The theoretical framework for this study integrates four key variables: Organizational commitment to sustainability, the regulatory environment, technological capabilities, and cultural values. These variables interact to shape corporate sustainability strategies within the Saudi context. Central to this framework is Stakeholder Theory (Freeman, 1984), which posits that organizations must recognize and prioritize the expectations of diverse stakeholders, including customers, regulators, communities, and investors, to maintain legitimacy and achieve long-term success. This focus on stakeholder alignment highlights the significance of organizational commitment to sustainability, as firms that incorporate environmental considerations into their strategic priorities are better positioned to address stakeholder demands and maintain their license to operate. Institutional Theory further explains how organizations are shaped by external normative and regulatory pressures (DiMaggio and Powell, 1983). In Saudi Arabia, government policies, regulations, and incentive programs, such as those established by the Saudi Green Initiative, act as institutional forces that encourage or require companies to adopt sustainable practices. Firms comply with these institutional expectations to gain legitimacy and ensure survival within a changing regulatory landscape, demonstrating the influence of the regulatory environment on corporate behavior. The Resource-Based View (RBV) offers insight into the internal capabilities necessary for implementing sustainability initiatives (Barney, 1991). Technological capabilities, including access to renewable energy technologies and environmentally sustainable manufacturing processes, are considered essential organizational resources. Companies that acquire or develop these technological assets can distinguish themselves by executing more effective and innovative sustainability strategies, thereby achieving a competitive advantage. Cultural Theory highlights the influence of shared values, norms, and cultural attitudes at both organizational and national levels in shaping sustainability practices (Schein, 2010). In Saudi Arabia, cultural norms related to environmental responsibility affect organizational behaviors and the extent of commitment to sustainability. This perspective helps explain differences in corporate responses to environmental challenges and the integration of sustainability into core business strategies. Collectively, these theories establish a comprehensive framework that demonstrates how internal commitments, external pressures, technological resources, and cultural norms interact to shape corporate sustainability efforts. Examining these interconnected factors provides valuable insights into the mechanisms that drive environmental responsibility among Saudi companies, supporting alignment with national initiatives and promoting sustainable development.

2.1. Literature review

The Saudi Green Initiative (SGI) is a central component of Saudi Arabia's Vision 2030, with objectives to reduce carbon emissions, expand renewable energy, and promote sustainable business practices (Hegazy, 2024). Since its launch, the SGI has supported the development of green projects, encouraged the adoption of environmental management standards, and motivated companies to integrate sustainability into their strategic planning (AlQuhtani, 2025). Recent research has analyzed the strategies Saudi firms employ to advance environmental sustainability within the SGI framework. These studies reveal a growing recognition among businesses of their responsibility to address environmental challenges and their efforts to align corporate practices with national sustainability goals (Mansour et al., 2024). AlKhars et al. (2024) examined corporate social responsibility (CSR) initiatives in Saudi Arabia,

demonstrating how companies are incorporating environmental considerations into strategic planning. Their findings show that, while many organizations are adopting green technologies and engaging in environmental reporting, the consistency and scope of these initiatives vary significantly across sectors.

Similarly, Selim and Alshareef (2025) observed an increase in renewable energy projects undertaken by Saudi companies, primarily motivated by regulatory incentives and expected economic benefits. Their research indicates that frameworks such as Vision 2030 and the SGI serve as important drivers for environmental initiatives. However, some firms remain hesitant due to concerns about high implementation costs and uncertainties regarding regulatory enforcement, emphasizing the need for stronger policy support and awareness campaigns. Additional studies, such as those by Bhatti et al. (2025), highlighted the importance of technological adoption, particularly green technologies and digital innovations, in supporting sustainability strategies. Despite these insights, many studies lack a detailed analysis of how differences in technological readiness influence strategic decision-making across organizations, suggesting a need for further research in this area.

2.2. Organizational commitment

Organizational commitment to environmental sustainability refers to the extent to which a company prioritizes and integrates environmentally responsible practices within its core operations and strategic objectives. This commitment demonstrates an organization's dedication to minimizing its ecological footprint, conserving resources, and advancing sustainable development (Mishra, 2017). Such commitment is essential because it shapes organizational behavior, decision-making processes, and overall corporate culture, thereby influencing the company's reputation and long-term viability (Muralidhar et al., 2024). Studies show that organizations with strong environmental sustainability commitments are more likely to adopt eco-friendly technologies, implement sustainability policies, and involve stakeholders in environmental initiatives (Rehman et al., 2023). This commitment typically arises from internal values, leadership influence, and recognition of the strategic advantages of sustainability, including operational efficiencies and an improved brand image. Leadership is instrumental in cultivating a sustainability-oriented culture by establishing clear objectives, allocating resources, and emphasizing the importance of environmental responsibility throughout the organization (Altassan, 2025).

Sustainability is closely linked to the broader concept of corporate social responsibility (CSR), which highlights the moral and strategic responsibilities of companies to contribute positively to society and the environment. Organizations with strong commitments to sustainability often evaluate their progress through sustainability reporting and transparent disclosure, serving as mechanisms for accountability and for building trust with consumers and investors (Krasodomska et al., 2025). The level of commitment to environmental sustainability varies across organizations and industries, frequently influenced by external factors such as regulatory requirements, stakeholder expectations, and cultural norms. Organizations that proactively integrate environmental sustainability into their strategic frameworks are better positioned to adapt to evolving environmental policies and market demands, thereby increasing resilience in a dynamic global context (Cappellieri et al., 2025). Thus, organizational commitment to environmental sustainability is a key driver of effective environmental action and long-term business success.

H_1: Organizational commitment influences environmental sustainability.

2.3. Regulatory environmental influence

The Saudi Green Initiative (SGI), launched in 2021, exemplifies Saudi Arabia's commitment to environmental sustainability through comprehensive regulatory measures and the active involvement of domestic companies. The government assumes a central role by developing policies, laws, and frameworks that encourage sustainable practices across multiple industries (Ogwu et al., 2025). Regulatory authorities, such as the Ministry of Environment, Water and Agriculture (MEWA), set standards for emissions, waste management, water conservation, and renewable energy deployment (Abdelbaki, 2025). For example, regulations mandating the use of cleaner energy sources and imposing penalties for environmental violations incentivize companies to adopt environmentally responsible practices. Saudi Vision 2030 further emphasizes environmental reforms by providing a strategic framework for sustainable development. Saudi companies are key partners in implementing these regulations (Yusuf and Lytras, 2023). Major corporations, including Saudi Aramco and SABIC, are investing in renewable energy projects such as solar and wind farms to reduce reliance on fossil fuels and meet regulatory targets (Krane and Braun, 2024).

Additionally, construction and infrastructure firms are adopting green building standards aligned with government regulations to promote sustainable urban development. Financial institutions and investment firms support sustainability goals by financing green projects and offering incentives for environmentally responsible investments (Fu et al., 2023). The public sector also advances corporate social responsibility (CSR) initiatives focused on environmental conservation, thereby fostering a culture of compliance and sustainability (Pan et al., 2022). In conclusion, regulatory frameworks and proactive engagement from Saudi companies are

essential to achieving the Saudi Green Initiative's objectives. This collaboration supports the transition to a greener economy by balancing environmental protection with economic growth.

H_2: Regulatory factors influence environmental sustainability.

2.4. Technological capabilities

Technological advancements are central to Saudi Arabia's efforts to achieve environmental sustainability goals as articulated in the Saudi Green Initiative (SGI) (Madkhali and Sithole, 2023). As the country seeks to diversify its economy and reduce reliance on fossil fuels, innovative technologies are critical for deploying renewable energy projects, improving resource management, and lowering carbon emissions (Anwar et al., 2025). The implementation of renewable energy technologies, particularly solar and wind power, represents a significant technological development (Oryani et al., 2021). Leading Saudi companies, including Saudi Aramco and SABIC, are investing heavily in solar energy projects, such as large-scale solar farms and green hydrogen production. These advancements enable cleaner energy generation and support the national objective of producing 50% of energy from renewable sources by 2030 (Al-Gahtani, 2024).

Smart technologies and digital transformation are essential for achieving sustainability objectives. Organizations are deploying Internet of Things (IoT) solutions to improve water and energy management, minimize waste, and optimize resource use (Nguyen et al., 2025). Smart grids help balance energy supply and demand, which reduces fossil fuel consumption (Al-Shetwi et al., 2025). Additionally, advancements in carbon capture, utilization, and storage (CCUS) technologies are crucial for lowering industrial emissions.

Saudi companies are developing CCUS projects to mitigate the environmental impact of established industries. Innovations in waste management and recycling technologies also contribute to reducing environmental pollution (Cheah et al., 2022). Both startups and established firms are creating eco-friendly materials and waste-to-energy systems, supporting circular economy initiatives (Ansari et al., 2025). Overall, technological factors are fundamental in enabling Saudi companies to meet SGI objectives and advance a sustainable, environmentally responsible future for the Kingdom.

H_3: Technological capabilities influence environmental sustainability.

2.5. Cultural values and norms

The Saudi Green Initiative (SGI), launched in 2021, exemplifies Saudi Arabia's commitment to environmental sustainability and climate change mitigation (AlQuhtani, 2025). The initiative seeks to plant billions of trees, reduce carbon emissions, and expand renewable energy sources, aligning with the broader Vision 2030 strategy for economic diversification and environmental conservation (Mohan et al., 2024). Cultural institutions and local companies are integral to achieving these objectives. Organizations in the arts, media, and education sectors increase public awareness of environmental issues and encourage positive behavioral change (Maziliauske, 2024).

These entities serve as platforms to promote sustainability principles, address ecological challenges, and foster a conservation-oriented culture. For example, media outlets and cultural festivals organize campaigns and activities to educate the public about afforestation, renewable energy, and waste reduction (Alonso-Vazquez and Ballico, 2021). Museums and cultural centers curate exhibitions that highlight Saudi Arabia's natural heritage, emphasize the importance of environmental responsibility, and cultivate a collective sense of duty rooted in national cultural identity (Mancini, 2023).

Krane and Braun (2024) indicated that numerous Saudi companies across various industries actively support the SGI's objectives. In the energy sector, companies such as Saudi Aramco and SABIC invest in renewable energy projects and adopt sustainable practices. For instance, Saudi Aramco is diversifying its energy portfolio by investing in solar and wind power, consistent with the SGI's renewable energy targets. Utility and infrastructure organizations, including the Saudi Water Partnership Company, focus on water conservation and sustainable resource management (Almulhim and Abubakar, 2023). Construction firms are implementing environmentally friendly building standards to promote sustainable urban development (Zumbraegel, 2022). Telecommunications companies, such as Saudi Telecom Company (STC), are deploying energy-efficient data centers and digital solutions to lower carbon emissions (Madkhali and Sithole, 2023). The SGI has also fostered the growth of green startups specializing in waste management, renewable energy, and eco-friendly products. Many of these startups collaborate with international organizations to facilitate technology transfer and knowledge exchange, accelerating Saudi Arabia's transition to a more sustainable economy (Zhou et al., 2025). In conclusion, cultural organizations and Saudi businesses are pivotal in advancing environmental sustainability within the SGI framework. Cultural institutions influence societal attitudes toward conservation, while local enterprises implement concrete measures to reduce emissions and promote renewable energy. The combined efforts of these sectors are vital for fulfilling Saudi Arabia's environmental commitments and establishing a sustainable future that integrates cultural heritage with economic development.

H_4: Cultural values and norms influence environmental sustainability.

2.6. Saudi Green Initiative

The Saudi Green Initiative (SGI), introduced in 2021, demonstrates Saudi Arabia's commitment to environmental sustainability and climate change mitigation (AlQuhtani, 2025). This national initiative seeks to plant billions of trees, reduce carbon emissions, and expand renewable energy sources, aligning with the broader goals of Saudi Vision 2030, which prioritizes economic diversification and environmental protection (Mohan et al., 2024). The SGI highlights the necessity of integrating environmental strategies into national development plans to secure long-term sustainability. Multiple sectors, including government agencies, private enterprises, and cultural institutions, support environmental sustainability within the SGI framework. Companies in the energy, utilities, and construction sectors are investing in renewable energy projects, such as solar and wind power, to reduce dependence on fossil fuels and lower carbon emissions (Krane and Braun, 2024). For instance, Saudi Aramco has announced investments in renewable energy to facilitate the nation's transition to cleaner energy sources. The private sector is also driving innovation through green startups that focus on waste management, sustainable products, and energy efficiency. These startups frequently collaborate with international organizations to promote technology transfer and knowledge exchange, thereby accelerating Saudi Arabia's transition to a sustainable economy (Zhou et al., 2025).

Cultural organizations play a vital role in raising public awareness and fostering a conservation-oriented mindset. Arts, media, and educational institutions implement programs and campaigns that encourage environmental responsibility and highlight the significance of natural heritage and sustainable practices (Maziliauske, 2024). Museums and cultural festivals provide platforms to address ecological challenges and reinforce collective responsibility grounded in Saudi cultural values (Mancini, 2023). The SGI illustrates that coordinated efforts across sectors can advance environmental sustainability. Through the integration of technological innovation, cultural engagement, and corporate responsibility, Saudi Arabia seeks to establish a development model that conserves natural resources while supporting economic growth.

H_5: Saudi Green Initiative influence environment sustainability.

2.7. Environmental sustainability

The Saudi Green Initiative (SGI) embodies a multifaceted strategy for advancing environmental sustainability by integrating regulatory frameworks, organizational engagement, technological progress, and cultural values. The Saudi government has implemented rigorous regulations and policies to promote environmental conservation, including requirements for renewable energy adoption and emissions reduction. These measures establish a regulatory environment that incentivizes both public and private sector involvement in sustainability initiatives (AlQuhtani, 2025). Organizations across diverse sectors have demonstrated commitment by embedding sustainability objectives into strategic planning and operational activities. Numerous companies are investing in renewable energy projects, adhering to green building standards, and adopting resource-efficient processes to meet national sustainability targets (Krane and Braun, 2024). Technological advancements are also pivotal to the progress of the SGI. Saudi Arabia has invested substantially in renewable energy infrastructure, such as solar and wind farms, and in digital solutions that enhance energy efficiency and waste management (Zhou et al., 2025). These innovations support the transition to a sustainable economy by optimizing resource management and minimizing environmental impact. Furthermore, international collaborations facilitate the transfer of advanced green technologies to Saudi Arabia, thereby enhancing the nation's capacity for sustainable development (Madkhali and Sithole, 2023). Cultural values and social norms significantly affect the effectiveness of sustainability initiatives. The national emphasis on stewardship and the preservation of natural heritage is consistent with environmental conservation objectives. Cultural institutions and media campaigns raise awareness and cultivate a societal ethos that prioritizes conservation and responsible resource use (Maziliauske, 2024). This cultural context fosters behavioral change and motivates community engagement in sustainability practices, thereby supporting the long-term aims of the SGI. In summary, the integration of a comprehensive regulatory framework, organizational dedication, technological innovation, and cultural values provides a robust foundation for realizing the goals of the Saudi Green Initiative and advancing sustainable development in the region.

Fig. 1 illustrates the proposed development framework showing the relationships among organizational commitment, regulatory factors, technological capabilities, cultural values, the Saudi Green Initiative, and environmental sustainability.

The proposed development framework illustrates how both internal and external factors influence the Saudi Green Initiative, subsequently affecting environmental sustainability. Organizational commitment, regulatory factors, technological capabilities, and cultural values are identified as key variables shaping green initiatives within organizations. Each variable is hypothesized to positively correlate with the Saudi Green Initiative, suggesting that increased commitment, strong regulatory support, advanced technological capabilities, and aligned cultural norms are expected to enhance the effectiveness of green initiatives. Green initiatives serve as mediators, translating

organizational and external influences into measurable sustainability outcomes. The direct association between the Saudi Green Initiative and environmental sustainability demonstrates that effective implementation of green practices contributes to ecological preservation and resource conservation. These relationships emphasize the importance of a supportive organizational culture, a strong regulatory environment, technological innovation, and value alignment in fostering successful green initiatives. Overall, the framework demonstrates that multiple interconnected factors work together to advance sustainable development, with green initiatives acting as the primary mechanism for achieving environmental benefits, as indicated in Appendix A.

3. Methodology

This study employs a quantitative research methodology to investigate Saudi company workers' perceptions of environmental sustainability strategies within the framework of the Saudi Green Initiative. The main objective is to examine employees' attitudes towards corporate commitment to sustainability efforts and promote eco-friendly practices. The use of quantitative methods is suitable for this study, as they allow measurement and quantification of workers' perceptions, attitudes, and behaviors across some Saudi companies.

3.1. Data collection

Data collection utilized a structured, self-administered questionnaire distributed electronically to Saudi companies engaged in sustainability initiatives. The questionnaire was developed using existing, validated scales on environmental commitment with adaptations for the Saudi context as indicated in Appendix A. A random sampling technique was used to obtain a representative sample of some companies for the data. A validated scale from the prior research was adapted, with certain items customized to reflect initiatives specific to Saudi Arabia. Reliability and validity are assessed using Cronbach's alpha, composite reliability, and extracted variance extracted AVE and exploratory factor analyzed and ensure internal consistency and construct validity.

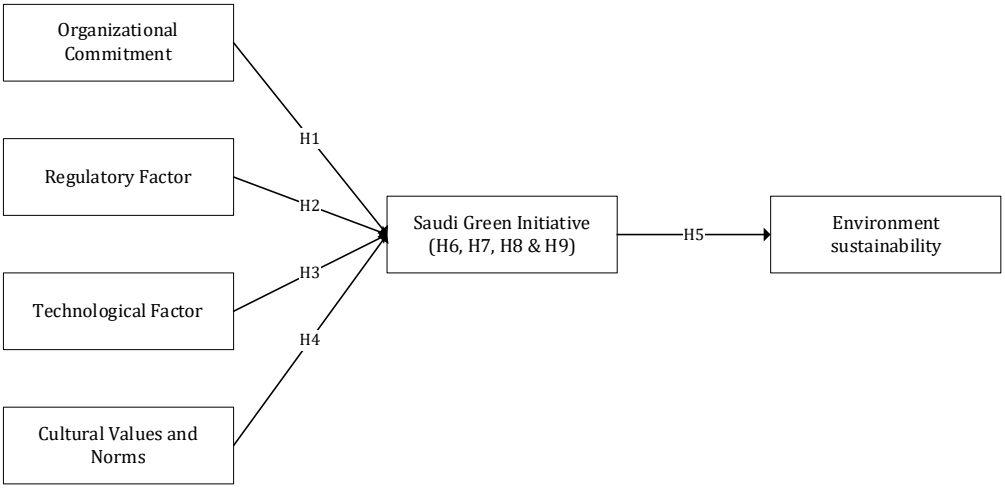

Fig. 1: Development framework

3.2. Data analysis

Data analysis was conducted using SPSS to generate initial descriptive statistics, including frequency distributions and regression. In examining hypothesized relationships among variables, SPSS software is used to analyze the research. Structural Equation Modeling (SEM) facilitates the simultaneous analysis of multiple relationships, offering insights into how perceived commitment influences marketing strategies and overall sustainability perceptions. This analytical approach provides a comprehensive understanding of the direct and indirect effects within the conceptual framework, supporting the objective of elucidating Saudi companies' perceptions and strategies regarding environmental sustainability under the Saudi Green Initiative. The demographic profile of the study participants is detailed in Table 1, covering gender, age, marital status, education, and employment sector. The sample includes 276 males (92%) and 24 females (8%). The age distribution shows that 90 individuals (30%) are between 20 and 30 years old, 135 (45%) are between 31 and 40 years old, 45 (15%) are between 41 and 50 years old, and 30 (10%) are over 50 years old. Regarding marital status, 180 respondents (60%) are married, while 120 (40%) are single. Educational levels vary: 81 (27%) have completed secondary school, 130 (44%) hold diplomas, 90 (30%) possess higher education degrees, and 9 (3%) hold postgraduate qualifications. In terms of employment, 30 participants (10%) work in small retail and wholesale businesses, 210 (70%) in small industrial or productive firms, and 60 (20%) in small service sectors. Overall, most respondents are male, aged 31-40, married, and hold at least a diploma, primarily working in industrial enterprises.

Table 1: Demographic respondents

Demographic variable	Category	Frequency	Percentage
Gender	Male	276	92
	Female	24	7
Age	20-30	90	30
	31-40	135	45
	41-50	45	15
	More than 50	30	10
Marital status	Married	180	60
	Single	120	40
Education	Secondary school	81	27
	Diploma	130	40
	Higher education	90	30
	Postgraduate	9	3
Sector	Wholesale commercial enterprises	30	10
	Small productive and industrial enterprises	210	70
	Small service enterprises	60	20

Table 2 presents the factor loadings and corresponding measures of reliability and validity for the constructs under investigation. The constructs include OrC (Organizational Commitment), RegF (Regulatory Factors), TechF (Technological Factors), SGI (Saudi Green Initiative), and ES (Environmental Sustainability). The factor loadings indicate that each item is strongly associated with its respective construct, with values generally exceeding 0.7. Composite reliability (CR) values range from 0.782 to 0.892, surpassing the recommended threshold of 0.7 and confirming strong internal consistency. Average Variance Extracted (AVE) values, representing the proportion of variance captured by the construct relative to measurement error, are all above 0.7, which supports convergent validity. Cronbach's Alpha (CA) values, reflecting internal consistency within each construct, range from 0.706 to 0.849, further substantiating reliability. Overall, these results demonstrate that the measurement model is both reliable and valid. Each construct shows strong factor loadings, high internal consistency, and satisfactory validity measures, confirming the robustness of the measurement instruments used in this study.

Table 3 presents the results of the discriminant validity analysis among six variables: Organizational Commitment (OrC), Regulatory Focus (RegF), Technological Focus (TechF), Customer Value Focus (CuVF), Saudi Green Initiative (SGI), and Environmental Sustainability (ES). Discriminant validity assesses whether these constructs are distinct from each other, which is crucial for ensuring that each variable measures a unique concept. The diagonal values are not shown, but the off-diagonal correlations indicate relationships among the constructs. Generally, correlations below 0.85 indicate acceptable discriminant validity and suggest that the constructs are sufficiently distinct.

In Table 3, the highest correlations are between OrC and CuVF (0.762) and between OrC and SGI (0.682), both below the critical threshold, indicating good discriminant validity. Other correlations, such as those between RegF and TechF (0.679) and between SGI and ES (0.666), also remain within acceptable limits. Lower correlations, such as between TechF and CuVF (0.444), suggest that these variables capture different underlying concepts. Overall, the data indicate that these constructs are distinct and valid for further analysis, as their correlations do not threaten the discriminant validity. This supports the reliability of the measurement model and ensures confidence in subsequent analysis involving these variables.

Table 2: Factor loadings, reliability, and validity

Item	Factor loadings	CR	AVE	CA
OrC		0.879	0.791	0.849
OrC 1	0.762			
OrC 2	0.833			
OrC 3	0.822			
OrC 4	0.814			
OrC 5	0.738			
RegF		0.782	0.786	0.785
RegF1	0.755			
RegF2	0.818			
RegF3	0.768			
RegF4	0.784			
TechF		0.789	0.845	0.706
TechF1	0.826			
TechF2	0.863			
TechF3	0.847			
CuVF		0.892	0.838	0.819
CuVF1	0.766			
CuVF2	0.883			
CuVF3	0.851			
CuVF4	0.852			
SGI		0.781	0.768	0.731
SGI1	0.814			
SGI2	0.763			
SGI3	0.745			
SGI4	0.752			
ES		0.872	0.817	0.847
ES1	0.821			
ES2	0.772			
ES3	0.841			
ES4	0.834			

Table 4 summarizes the hypothesis testing results regarding the relationships among key constructs and their influence on the Saudi Green Initiative (SGI) and environmental sustainability (ES). The analysis investigates the effects of organizational commitment (OrC), regulatory focus (RegF), technological focus (TechF), and customer value focus (CuVF) on SGI, as well as the subsequent impact of SGI on environmental sustainability.

Table 3: Discriminant validity

Variable	OrC	RegF	TechF	CuVF	SGI	ES
OrC	0.702					
RegF	0.91	0.625				
TechF	0.657	0.679	0.617			
CuVF	0.762	0.661	0.444	0.714		
SGI	0.682	0.542	0.453	0.643	0.589	
ES	0.688	0.498	0.334	0.543	0.666	0.667

Table 4: Testing hypotheses

Hypothesis	Relationship	B	SE	CR	p-value	Decision
H_1	OrC ->SGI	0.320	0.069	4.640	< 0.001	Accept
H_2	RegF ->SGI	0.230	0.059	3.899	0.002	Accept
H_3	TechF ->SGI	0.211	0.045	4.688	< 0.001	Accept
H_4	CuVF ->SGI	0.301	0.080	3.762	0.004	Accept
H_5	SGI ->ES	0.404	0.090	4.488	< 0.001	Accept

All hypotheses (H1 to H5) are supported, demonstrating significant positive relationships. Organizational commitment (OrC) exerts a positive effect on SGI (B = 0.320, p < 0.001), indicating that strong organizational commitment motivates firms to adopt green initiatives consistent with stakeholder expectations. This finding is consistent with stakeholder theory, which posits that organizations must prioritize stakeholder interests to maintain legitimacy and support. Regulatory focus (RegF) also positively influences SGI (B = 0.230, p = 0.002), indicating that firms with a regulatory orientation are more likely to engage in environmentally responsible actions to comply with legal and societal norms.

Technological focus (TechF) significantly influences SGI (B = 0.211, p < 0.001), supporting the resource-based view (RBV) theory, which asserts that technological capabilities are valuable resources enabling firms to develop sustainable practices. Customer value focus (CuVF) demonstrates the strongest relationship with SGI (B = 0.301, p = 0.004), underscoring that customer preferences for sustainability drive organizations to integrate green initiatives into their core strategies. This finding further highlights the role of stakeholder expectations in shaping corporate behavior. The relationship between SGI and environmental sustainability (ES) is also supported (B = 0.404, p < 0.001). This result indicates that green initiatives directly contribute to sustainable environmental outcomes. These findings are consistent with both stakeholder and resource-based perspectives, which suggest that organizations leveraging their resources and stakeholder relationships are more likely to achieve sustainability goals. These findings also align with cultural theory, which emphasizes the influence of organizational culture on decision-making and strategic priorities. An organizational culture that prioritizes stakeholder engagement, regulatory compliance, technological innovation, and customer satisfaction supports the development of green initiatives. Overall, the results confirm that both internal and external factors shape sustainability efforts, consistent with theories that highlight the importance of stakeholder engagement, resource capabilities, and cultural influences in promoting sustainable development.

Table 5 presents an analysis of the mediating role of Green Initiatives (SGI) in the relationships between organizational commitment (OrC), regulatory focus (RegF), technological focus (TechF), customer value focus (CuVF), and environmental sustainability (ES). The findings indicate that SGI partially mediates these relationships, suggesting that these antecedents affect ES both directly and indirectly through their influence on SGI. The mediation analysis demonstrates that the direct effects of OrC, RegF, TechF, and CuVF on ES are negligible, with all coefficients close to zero. This finding indicates that the influence of these factors on sustainability is primarily exerted through SGI. For instance, the direct effect of OrC is zero, while its indirect effect via SGI is also zero, confirming that the impact of organizational commitment on environmental sustainability is realized exclusively through the adoption of green initiatives. This result is consistent with stakeholder theory, which posits that organizations motivated by stakeholder interests, such as those of employees, customers, or regulators, are more likely to implement green initiatives that benefit the environment.

Table 5: Mediation role of green initiative

Hypothesis	Mediation path	Direct effect	Indirect effect	Mediation decision	Comments
H_6	OrC ->SGI->ES	0.000	0.000	Mediated	Partial mediated
H_7	RegF ->SGI->ES	0.002	0.000	Mediated	Partial mediated
H_8	TechF ->SGI->ES	0.004	0.002	Mediated	Partial mediated
H_9	CuVF ->SGI->ES	0.000	0.001	Mediated	Partial mediated

Similarly, RegF, TechF, and CuVF influence ES primarily by affecting SGI. The observed partial mediation indicates that these internal and external drivers shape sustainability outcomes mainly by promoting green initiatives. This finding supports the resource-based view (RBV) theory, which emphasizes that organizations utilize internal resources, such as technological capabilities and stakeholder relationships, to develop effective, sustainable practices. From a cultural perspective, these findings align with cultural theory, which highlights the influence of organizational culture on

strategic decision-making. An organizational culture that prioritizes stakeholder engagement, innovation, and customer satisfaction fosters the adoption of green initiatives, which subsequently lead to environmental benefits. The partial mediation observed indicates that, although internal factors such as culture and resources are important, their impact on sustainability is primarily realized through specific initiatives such as SGI. The partial mediation occurred as the direct and indirect arrows indicate a positive relationship between variables. The results demonstrate that green initiatives function as a critical mechanism connecting internal organizational and stakeholder factors to environmental sustainability. Theories, including stakeholder theory, resource-based view, institutional and cultural theory, collectively elucidate how organizational values, resources, and cultural norms influence the adoption of green practices that contribute to environmental objectives.

4. Discussion

The results of this research offer valuable insights into the factors that influence the adoption of green initiatives and their impact on environmental sustainability within organizations. Supported by hypothesis testing, the findings reveal a complex interplay among internal organizational factors, stakeholder influences, and cultural elements, which collectively contribute to sustainable outcomes. The direct relationships presented in Table 4 highlight the significance of organizational commitment (OrC), regulatory focus (RegF), technological focus (TechF), and customer value focus (CuVF) in promoting green initiatives (SGI). Each of these factors exerts a positive and significant influence on SGI, suggesting that organizations characterized by strong internal commitment, regulatory awareness, technological capability, and customer-oriented values are more likely to implement environmentally sustainable practices. This finding is consistent with stakeholder theory, which posits that organizations must address the interests of stakeholders such as regulators, customers, and internal personnel to achieve sustainability objectives. Furthermore, the resource-based view (RBV) is evident, as technological focus, a critical organizational resource, enhances the ability to develop green initiatives.

Moreover, the significant positive effect of SGI on environmental sustainability (ES) demonstrates that green initiatives are essential drivers of sustainable outcomes. These findings support the argument that strategic environmental actions, influenced by internal and stakeholder factors, can effectively advance broader ecological objectives. The mediation analysis in Table 5 further clarifies that SGI serves as a partial mediator between the antecedent factors and ES. The minimal direct effects, combined with significant indirect effects through SGI, indicate that organizations primarily affect sustainability outcomes by implementing green initiatives. This finding underscores the role of green initiatives as a strategic mechanism that connects internal motivations and external stakeholder pressures to the achievement of environmental objectives. These findings also demonstrate the influence of organizational norms and values on strategic decision-making. An organizational culture that prioritizes sustainability, innovation, and stakeholder engagement encourages the development of green initiatives, which subsequently lead to measurable environmental benefits. This observation aligns with cultural theory, which asserts that organizational culture shapes strategic priorities and practices. This research underscores the central role of green initiatives as a mediator connecting internal organizational factors, stakeholder influences, and cultural elements to environmental sustainability. The results emphasize the necessity of integrating internal resources, stakeholder expectations, and cultural values to promote sustainable development. Organizations that successfully leverage these factors through green initiatives are better equipped to contribute to environmental preservation, demonstrating the interconnectedness of strategic, cultural, and stakeholder considerations in achieving sustainability objectives.

5. Conclusion

In conclusion, this research highlights the pivotal role of green initiatives as mediators between internal organizational factors, stakeholder influences, and environmental sustainability. The results indicate that organizational commitment, regulatory focus, technological capabilities, and customer value orientation significantly shape green initiatives, which subsequently drive sustainable outcomes. The minimal direct effects and substantial indirect effects through green initiatives suggest that organizations primarily influence environmental sustainability by adopting environmentally friendly practices rather than through direct actions alone. Furthermore, organizational culture is essential in cultivating green initiatives that align with stakeholder expectations. This study demonstrates the necessity of integrating internal resources, stakeholder interests, and cultural values to advance sustainability. Organizations that strategically utilize these elements through green initiatives are more likely to achieve substantial environmental benefits and contribute to broader ecological and societal objectives.

6. Limitations and future studies

This research is limited by its reliance on self-reported data, which may introduce bias and social desirability effects. The study's scope was confined to specific industries or geographic regions, potentially limiting the generalizability of its findings. The cross-sectional design further constrains the ability to establish causal

relationships or to assess the long-term effects of green initiatives on sustainability outcomes.

Future research should adopt longitudinal approaches to better understand the evolution of green initiatives over time and their sustained impact on environmental sustainability. Furthermore, examining the influence of external factors such as government policies and technological innovations could yield a more comprehensive understanding of the dynamics shaping green initiatives and sustainability efforts.

Appendix A. Measurement items

This appendix presents the primary measurement items employed in the study to evaluate factors affecting organizational practices. The factors assessed include Organizational Commitment, Regulatory Factors, Technological Factors, Cultural Values and Norms, the Saudi Green Initiative (SGI), and Environmental Sustainability (ES). Each item is designed to capture distinct aspects of these factors, thereby facilitating a comprehensive analysis of their respective roles and impacts. Table A1 presents the measurement items used in the study. All items were measured using a five-point Likert scale (1 = strongly disagree, 5 = strongly agree).

Table A1: Measurement item

Construct	Code	Measurement item
Organizational commitment	OrC1	Our organization prioritizes environmental sustainability in its strategic goals.
	OrC2	Management actively encourages employees to adopt environmentally friendly practices.
	OrC3	The organization allocates sufficient resources to support green initiatives and sustainability projects.
	OrC4	Employees feel motivated and committed to implementing environmentally sustainable activities.
	OrC5	Our organization's values strongly emphasize environmental responsibility and sustainability.
Regulatory factors	RegF1	Current environmental regulations effectively promote sustainable practices within our organization.
	RegF2	Regulatory policies encourage our organization to adopt environmentally friendly technologies.
	RegF3	The regulatory framework provides sufficient incentives for implementing green initiatives.
	RegF4	Changes in environmental regulations influence our organization's decisions regarding sustainable development projects.
Technological factors	TechF1	Advanced technological tools enable our organization to reduce its carbon footprint effectively.
	TechF2	The adoption of new technologies improves our ability to manage waste and minimize environmental impact.
	TechF3	Technological advancements help us monitor and measure environmental performance more accurately.
Cultural values and norms	CuVF1	Our organization's cultural values prioritize environmental conservation and sustainability.
	CuVF2	Cultural norms within our community encourage responsible use of natural resources.
	CuVF3	Prevailing cultural attitudes support the adoption of environmentally friendly practices.
	CuVF4	Societal cultural expectations motivate our organization to implement sustainable initiatives.
Saudi Green Initiative	SGI1	The Saudi Green Initiative has improved environmental practices within organizations.
	SGI2	The Saudi Green Initiative has contributed to reducing carbon emissions within the community.
	SGI3	The Saudi Green Initiative encourages organizations to adopt sustainable and eco-friendly technologies.
	SGI4	The Saudi Green Initiative has increased awareness of environmental issues among stakeholders.
Environmental sustainability	ES1	Our company demonstrates strong commitment to environmental sustainability.
	ES2	Our company's sustainability practices align with the goals of the Saudi Green Initiative.
	ES3	Environmental sustainability is important in our company's long-term strategic planning.
	ES4	Our company regularly reports its environmental sustainability performance.

List of abbreviations

AVE	Average variance extracted
B	Beta coefficient
CA	Cronbach's alpha
CCUS	Carbon capture, utilization, and storage
CR	Composite reliability
CSR	Corporate social responsibility
CuVF	Customer value focus
ES	Environmental sustainability
IoT	Internet of Things
MEWA	Ministry of Environment, Water and Agriculture
OrC	Organizational commitment
RBV	Resource-based view
RegF	Regulatory factors
Rel	Relationship
SE	Standard error
SEM	Structural equation modeling
SGI	Saudi Green Initiative
SPSS	Statistical Package for the Social Sciences
STC	Saudi Telecom Company
TechF	Technological factors

Compliance with ethical standards

Ethical considerations

Participation in this study was voluntary, and informed consent was obtained from all participants before completing the questionnaire. Respondents were informed that their participation was anonymous and that the collected data would be

treated confidentially and used only for research purposes. No sensitive personal data was collected.

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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