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Exploring the sustainability landscape in an academic institutions

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ABSTRACT

Academic institutions emphasize sustainability to achieve an equilibrium of institutional image, social effect, and environmental responsibility. Previous studies have left gaps in their understanding of how institutional policies, organizational culture, and leadership styles could affect AIs' sustainability outcomes. The present research investigates how these elements impact environmental sustainability, social responsibility, and institutional reputation through communication techniques, institutional resources, cooperation, and commitment acting as mediating variables. Data was collected from 512 academic and non-academic members across Saudi Arabia using a quantitative research method and analyzed using Structural Equation Modeling-Partial Least Squares (SEM-PLS). The results show transformational leadership, a strong sustainability culture, and well-organized institutional policies which greatly improve sustainability results. Furthermore, the perspectives of academic and non-academic staff about sustainability significantly influence green initiatives within AI. The present study adds to the body of knowledge by carefully examining the gaps in earlier studies, especially regarding the lack of attention provided to how institutional frameworks and leadership interact to promote sustainability in academic environments. The findings provide valuable insight for university officials trying to include sustainability on their campuses. AI can significantly promote sustainability at a more significant level of society by supporting sustainable leadership and creating policies that support social and environmental responsibility.

Contribution/Originality: This study contributes to sustainability research in academic institutions, particularly in Saudi Arabia by integrating transformational leadership, organizational culture, institutional, and stakeholder theories into a comprehensive framework. Using SEM-PLS, it provides empirical evidence on key sustainability determinants, examining mediation and moderation effects often overlooked in prior studies. The findings offer practical insights for policymakers and academic leaders to enhance sustainability-driven policies, institutional reputation, and engagement in green initiatives.

1. INTRODUCTION

AI is key in promoting sustainability, yet many struggle due to weak leadership, cultural resistance, and ineffective policies (Trevisan, Eustachio, Dias, Filho, & Pedrozo, 2024). In recent years, the focus on sustainable leadership has increased with awareness of the significance of environmental and social responsibility (Khaw et al., 2023; Lukwago, Martins, & Tefera, 2023). Sustainable practices can be a valuable instrument for AIs to use in promoting sustainability (Aung & Hallinger, 2023; Nogueiro & Saraiva, 2023). Sustainable management considers the community, economy, and environment while making decisions (Liao, 2022; Sudan & Zuin, 2022). Although

companies have been extensively examined in this field, AI—especially in areas like Saudi Arabia has not received much attention. Examining how institutional policies, organizational culture, and leadership style affect sustainability results in institutions helps address that knowledge gap. The objective is to offer valuable insights that enable AIs to build stronger policies for social and environmental responsibility and a strong sustainability culture. Understanding what motivates sustainability in academic environments can help decision-makers and policymakers develop plans to make AIs more sustainable and significant. Sustainable leadership and its role in organizational sustainability are increasingly being studied (Blas, Riera-Roca, & Bulmer, 2022; Jayashree, El Barachi, & Hamza, 2022; Merma-Molina, Urrea-Solano, Baena-Morales, & Gavilán-Martín, 2022). Sustainable leadership in academia has been rarely studied. There is little research on how sustainable leadership might promote sustainability in AIs despite growing academic awareness of sustainability. Sustainable leadership at AIs must be learnt to encourage environmental and social responsibility (Alkaher & Avissar, 2018). AIs face unique challenges in promoting sustainability (Nguyen et al., 2021). These intricate organizations have students, teachers, staff and community stakeholders. They also encounter institutional inertia, budgetary limits, and conflicting demands (Najafian & Karamidehkordi, 2018) resulting in challenges that make it difficult for AIs to promote sustainability and environmental and social responsibility (UNESCO, 2018).

1.1. Research Question

How do sustainable leadership practices, organizational culture, institutional policies, and faculty/staff attitudes and behaviors impact environmental sustainability, social responsibility, and organizational reputation in AIs?

This research examines educational sustainability to determine how leadership styles, corporate cultures, and institutional rules impact companies' environmental sustainability, social responsibility, and institutional reputation. This study also examines mediating variables such as communication techniques, institutional infrastructure collaboration, and commitment. This research intends to illuminate what drives sustainability activities at Saudi universities and colleges and recommend enhancing strategies. It hopes to add to the body of knowledge on academic sustainability practices and guide academic leaders and policymakers in promoting a culture of sustainability and improving sustainability outcomes in educational settings. It aims to fill the literature gap, promote environmental and social responsibility in academic institutions, and advise academic leaders and policymakers. Its goals are to analyze sustainability, identify significant elements, examine its impact, identify hurdles, and recommend solutions to promote environmental and social responsibility through sustainable leadership. The research emphasizes education, particularly in Saudi Arabia, and its purpose is to identify significant factors and make sustainable suggestions.

2. LITERATURE REVIEW

2.1. Theoretical Framework of the Study

The research focuses on the hypothesis that "sustainability practices" are important in increasing concern for the environment and society inside academic institutions. Transformational leadership theory, organizational culture theory, institutional theory, and stakeholder theory are all parts of this study's overarching theoretical framework as shown in Figure 1.

2.2. Conceptual Framework of Study

The present study investigates the impact of leadership, organisational culture, and institutional policies on sustainability initiatives within academic institutions with a particular emphasis on Saudi Arabia. It provides novel perspectives by integrating various theories and employing sophisticated data analysis (SEM-PLS) to identify the primary factors that influence sustainability. In contrast to prior research, it investigates the impact of

collaboration, resources, and communication on outcomes. The results provide academic leaders and policymakers with practical advice on how to establish more sustainable and environmentally friendly institutions while simultaneously improving their reputations.

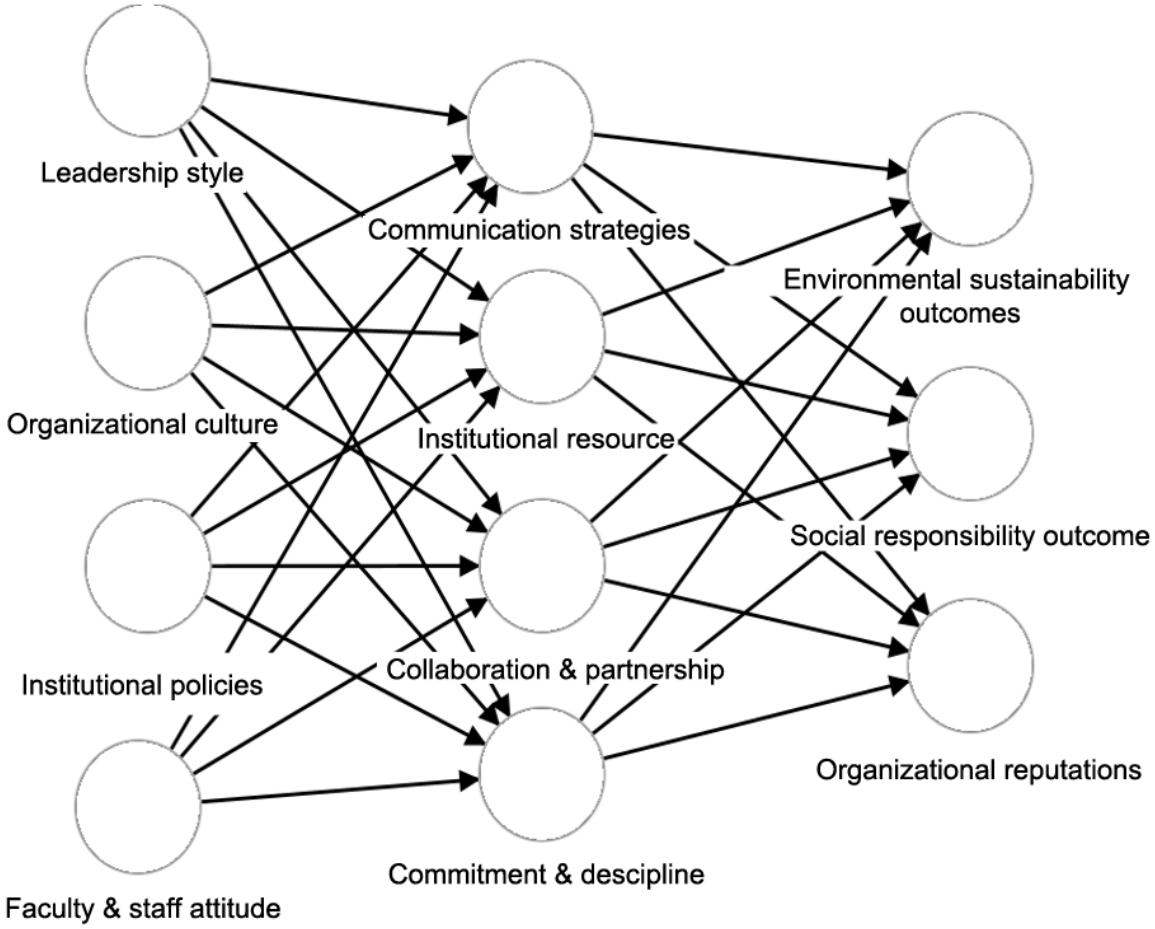

Figure 1. SEM model (Derived from literature review).

2.2.1. Leadership Style

One of the most influential factors that determines the success or failure of leadership in the long- run is the leader's style (Kafetzopoulos & Gotzamani, 2022; Riyadh, Nugraheni, & Ahmed, 2023) in AIs (Alomar, Mydin, & Alaklabi, 2022; Kasim, 2021). Several studies have established the relationship between transformational leadership and sustainable leadership practices in AIs (Alzoraiki et al., 2023). For example, Ortega, Freites, and Palomino (2017) demonstrated that leaders who exhibit transformational traits are more likely to foster practices that will last in the long- run AIs. Similarly, Militaru, Deselnicu, Ioanid, and Simion (2016) and Nduneseokwu and Harder (2023) identified a correlation between transformative leadership and sustainable development strategies in academic institutions. In contrast, sustainable leadership practices are harmed by transactional leadership activities like rewarding and penalizing employees based on their performance (Pickering, 2012). In a nutshell, there is consensus among academic researchers that transformational leadership is associated with long-term success in AIs. Hence, the following hypotheses are proposed based on the above study:

H_{1a}: Leadership style (LS) has a significant impact on environmental sustainability outcomes (ESO)

H_{1b}: Leadership style (LS) significantly impacts social responsibility outcomes (SRO).

H_{1c}: Leadership style (LS) significantly impacts organization reputation outcomes (ORO).

2.2.2. Organizational Culture

Organizational culture also affects sustainable AI practices (Abidi & Khan, 2018; AlShehhi, AlZaabi, Alnahhal, Sakhrieh, & Tabash, 2021; Assoratgoon & Kantabutra, 2023). AI with sustainable leadership practices favorably correlates with a sustainability-focused organizational culture which comprises attitudes, beliefs, and norms connected to environmental and social responsibility (Abdeldayem, Aldulaimi, & Alazzawi, 2021). A study by Nogueiro, Saraiva, and Jorge (2022) discovered that AIs with a culture that prioritizes environmental and social responsibility are likelier to adopt sustainable behaviors whereas culture plays a significant role in developing sustainability in an organization (Cabero-Almenara, Marín-Díaz, & Sampedro-Requena, 2018). Therefore, the following hypotheses are proposed from the above review:

H_{2a}: Organizational culture (OC) has a significant impact on environmental sustainability outcomes (ESO).

H_{2b}: Organizational culture (OC) significantly impacts social responsibility outcomes (SRO).

H_{2c}: Organizational culture (OC) significantly impacts organization reputation outcomes (ORO).

2.2.3. Institutional Policies

Institutional policies are the guidelines and processes an institution may choose to follow to accomplish goals. The success of an institution depends on its robust policies. Studies have indicated that institutional policies affect AI sustainability (Frantz, George, Hunter-Hüsselmann, Kapenda, & Yassin, 2022; Whittaker & Montgomery, 2022). Sustainable leadership in AIs is linked to sustainability and social responsibility initiatives. Several studies found a favorable correlation between sustainability policy adoption and AI sustainability (Islam & Ali Khan, 2024; Lazarov & Semenescu, 2022). Hence, the following hypotheses are proposed from the above reviews:

H_{3a}: Institutional policies (IPC) have a significant impact on environmental sustainability outcomes (ESO)

H_{3b}: Institutional policies (IPC) significantly impact social responsibility outcomes (SRO).

H_{3c}: Institutional policies (IPC) significantly impact organization reputation outcomes (ORO).

2.2.4. Faculty/Staff Attitudes and Behaviours

Faculty and staff are the essential stakeholders of AI. The success depends upon the staff's attitude and behavior. Faculty and staff sustainability and social responsibility affect AI sustainability (Chen & Tsai, 2018; Medabesh & Syed, 2019). Additionally, the evidence reveals that faculty and staff sustainability and social responsibility attitudes and behaviors favorably affect AI leadership practices. Staff with positive attitudes toward environmental concerns are likelier to establish green policies and procedures in their organizations (Faisal Ali Khan & Ahmad, 2020; Shepard & Johnson, 2009). Hence, attitude and values play crucial roles in developing sustainability in an organization (Islam & Ali Khan, 2024). The evidence suggests that faculty and staff sustainability and social responsibility attitudes and behaviors favorably affect AI leadership practices. Hence, the following hypotheses are proposed:

H_{4a}: Faculty/ staff attitudes and behaviours (FSA) have significant impact on environmental sustainability outcomes (ESO).

H_{4b}: Faculty/ staff attitudes and behaviours (FSA) significantly impact social responsibility outcomes (SRO).

H_{4c}: Faculty/ staff attitudes and behaviours (FSA) significantly impact organization reputation outcomes (ORO).

2.2.5. Communication Strategies

Effective academic communication could focus on how communication techniques affect sustainability and environmental and social responsibility. According to Cortado and Chalmeta (2016) transparency and stakeholder engagement can improve sustainability and environmental responsibility in academic institutions. AI can also adopt sustainable practices through stakeholder engagement (Rustam, Wang, & Zameer, 2020). Effective communication and collaboration are crucial to sustainability (Shehawy, Khan, & Madkhali, 2024; Suhluli & Ali Khan, 2022).

2.2.6. Institutional Resources

According to Makhloufi, Azbiya Yaacob, Laghouag, Ali Sahli, and Belaid (2021) financial and human resources have been found to moderate the relationship between leadership style, organizational culture, institutional policies, faculty/staff attitudes and behaviours, and sustainable practices and outcomes (Bag, Pretorius, Gupta, & Dwivedi, 2021; Dai, Xie, & Chu, 2021; Sewpersadh, 2023). Collaboration and partnerships such as those with local communities and government agencies have been found to moderate the relationship between leadership style, organizational culture, institutional policies, faculty/staff attitudes and behaviors and sustainable practices and outcomes (Panda, Lund, & Pattanayak, 2023). Therefore, this literature analysis implies that significant elements for encouraging sustainable practices and reaching environmental and social responsibility results include leadership style, corporate culture, institutional regulations, faculty/staff attitudes and actions (Plummer, Blythe, Gurney, Witkowski, & Armitage, 2022; Riegler, Burton, Scholz, & de Melo, 2023). The study also proposes communication strategies, institutional resources, collaboration, and partnerships as mediating/moderating variables in the relationship between independent and dependent variables.

2.2.7. Commitment and Discipline

Key mediators that can greatly affect the efficacy of sustainability in encouraging environmental and social responsibility in academic institutions are commitment and discipline. Sustainable leadership is a complex process that requires a long-term and consistent approach towards sustainability and social responsibility, and commitment and discipline play an essential role in ensuring the successful implementation of sustainable leadership practices. Studies show that leaders who are truly committed to sustainability are more likely to motivate sustainable practices in their companies. This dedication inspires employees to practice sustainability, making it a significant driver of sustainability activities (Khumalo, 2021). Another essential factor is discipline for long-term sustainability and social responsibility goals to succeed. Hence, it is essential that leaders set clear objectives, establish processes, and track progress (Bhattacharyya, 2023). Leaders disciplined in applying sustainable practices are likelier to achieve sustainability outcomes in AI.

Sustainable leadership in academia requires commitment and discipline. Faculty and staff who value sustainability and social responsibility are more likely to promote sustainable practices at the institution (Armenakis, Brown, & Mehta, 2011). Sustainable methods benefit from commitment and discipline. Leaders committed to sustainability and demonstrating discipline in implementing sustainable practices are more likely to achieve sustainable outcomes (Dechawatanapaisal, 2021; Hamwi, 2009).

2.3. Sustainability Outcomes

Sustainability outcomes are the acceptance of environmentally friendly and socially conscious behaviour and the enhancement of social, financial, or economic performance (Shehawy, Khan, Khalufi, & Abdullah, 2025). Environmental sustainability is affected by the sustainability landscape which includes leadership style, institutional culture, institutional policies, and staff attitude. Additionally, strict environmental regulations improve environmental performance (Ahmad, 2015; Amoako, Bawuah, Asafo-Adjei, & Ayimbire, 2023; Gnanaweera & Kunori, 2018). Castillo-Villar (2020) highlights the significance of collaborations and partnerships also improves environmental sustainability.

Social responsibility is an ethical concept in which a person works and cooperates with other people and organizations for the benefit of the community. Its outcomes are also influenced by institutional policies and expectations for corporate social responsibility that can have a possible impact on academic practices (Jahid, Yaya, Pratolo, & Pribadi, 2023). In contrast, institutional policies have been shown to favor CSR projects (Mensah, Agyapong, & Nuertey, 2017). AI participation can improve social responsibility among stakeholders (Rehmani et al., 2022) and enhance sustainability (Shehawy et al., 2024).

A sustainable environment has a major impact on any organization's reputation (Khuong, Truong An, & Thanh Hang, 2021). Khalufi, Sheikh, Khan, and Onn (2025) and Gnanaweera and Kunori (2018) mentioned that companies with a good record of the environment and society can create a better corporate image and significantly influence stakeholders' views and expectations towards sustainability performance (Pham, Do, Doan, Nguyen, & Pham, 2021). According to Habib, Bao, and Ilmudeen (2020) and Hengboriboon, Naruetharadol, Ketkeaw, and Gebsombut (2022), organizations with a positive image of stakeholders (workers, consumers, and investors) tend to be more successful.

Table 1. Summary of literature review.

Key concept	Description	References
Leadership style	Transformational leadership positively affects sustainable practices in academic institutions (AIs) while transactional leadership hinders sustainability.	Kafetzopoulos and Gotzamani (2022); Riyadh et al. (2023); Ortega et al. (2017) and Militaru et al. (2016)
Organizational culture	A sustainability-focused culture in AIs encourages positive environmental and social responsibility behaviors.	AlShehhi et al. (2021); Nogueiro et al. (2022) and Abdeldayem et al. (2021)
Institutional policies	Institutional policies on sustainability and social responsibility enhance AIs' sustainable practices and reputation.	Frantz et al. (2022), Whittaker and Montgomery (2022) and Islam and Khan (2024b)
Faculty/Staff attitudes	Positive attitudes and behaviors of faculty and staff towards sustainability and social responsibility are crucial for successful leadership practices.	Chen and Tsai (2018); Faisal Ali Khan and Ahmad (2020) and Shepard and Johnson (2009)
Communication strategies	Transparency and stakeholder engagement improve sustainability practices in AIs. Effective communication and collaboration are essential.	Cortado and Chalmeta (2016); Rustam et al. (2020) and Shehawy et al. (2024)
Institutional resources	Resources like financial, human, and information resources moderate the relationship between leadership, culture, and sustainability outcomes.	Makhloufi et al. (2021); Bag et al. (2021) and Panda et al. (2023)
Commitment and discipline	Commitment and discipline are critical in implementing and maintaining long-term sustainability practices in academic institutions.	Khumalo (2021); Bhattacharyya (2023),; Armenakis et al. (2011) and Dechawatanapaisal (2021)
Sustainability outcomes	Sustainability outcomes include positive environmental behavior, social responsibility, and enhanced organizational performance.	Shehawy et al. (2025); Ahmad (2015); Amoako et al. (2023) and Castillo-Villar (2020)

Table 1 presents a summary of key concepts related to sustainability in academic institutions, highlighting their definitions and supporting references. It illustrates how leadership style influences sustainable practices with transformational leadership fostering positive sustainability outcomes while transactional leadership may hinder them. It demonstrates that organizational culture plays a crucial role in promoting sustainability by shaping values, attitudes, and behaviors that support environmental and social responsibility. Additionally, it shows that institutional policies significantly impact sustainability by guiding decision-making and ensuring the integration of environmental and social responsibility initiatives. Furthermore, Table 1 highlights the importance of faculty and staff attitudes, as their engagement and commitment are key drivers of successful sustainability initiatives. It also emphasizes the role of communication strategies, noting that transparency and stakeholder engagement enhance sustainability outcomes. It identifies institutional resources as moderating factors that influence sustainability efforts, while commitment and discipline are essential for long-term success in sustainability practices. Lastly, it

summarizes the overall sustainability outcomes, including environmental performance, social responsibility, and improved organizational reputation.

3. RESEARCH METHODOLOGY

The research design selected for this study is a cross-sectional survey design (Wang & Cheng, 2020). This design enables the researcher to collect data from a large number of participants in a cost-effective manner. The survey design also allows for quantitative data collection (Allwood, 2012). A quantitative research uses positivistic (concrete) data in the form of numbers to be measured using statistics to conclude the subject under study. It supports ideas by confirming past experiments and proposing new theories to solve problems. Explanatory research uses hypothesis testing to explain variable relationships. The population for this study is AIs in Saudi Arabia (including public and private universities). Three public and three private universities from different locations have been taken for the research.

3.1. Data Collection

The questionnaire used to capture primary data for this study was adapted from prior research and modified according to the study's objectives. The first portion of the questionnaire covered demographic data (gender, age, educational level, and monthly income) whereas the second half measured research factors. The questionnaires were distributed personally to university students and faculty (teaching and non-teaching members) to collect at least 50 responses from each institution. Following data cleansing for the analysis, 512 research responses were declared valid.

3.2. Study Population and Sampling

A purposive sampling technique is used to select the institutions for the study. A purposive sampling ensures variation. Selecting universities from diverse regions guarantees regional representation and may capture specific regional sustainability settings. This variety captures various academic sustainability viewpoints, practices, and concerns. The sample size is determined using a power analysis, considering the number of variables, desired level of precision, and expected effect size (Tongco, 2007). Hence, a sample of 512 has been taken for consideration. Data is collected using a self-administered survey questionnaire (Rada, 2019). The questionnaire is designed to capture data on the variables identified in the study. The questionnaire uses Likert 5-point scale questions (Gee, 2017) multiple-choice questions (Klůfa, 2018) and open-ended questions (Zhang, Huang, Yang, Yu, & Zhuang, 2022). The survey is administered online to increase accessibility and efficiency. Data collected through the survey is analyzed using the statistical software SMART PLS4 (Lateef, 2023). Descriptive statistics such as frequencies, percentages, means, and standard deviations are used to describe the characteristics of the study variables (Mishra et al., 2019). Inferential statistics such as correlation, regression, and mediation/moderation analyses are used to test the study hypotheses (Sand, 2022).

3.3. Sample Size Selection Criteria

One commonly used formula for estimating sample size in a cross-sectional study is Cox (2006).

$$n = (Z^2 * p * (1-p)) / E^2$$

Where

n is the required sample size.

Z is the Z-score corresponding to the desired level of confidence (e.g., 1.96 for a 95% confidence level).

p is the estimated prevalence or proportion of the characteristic of interest within the population.

E is the desired level of precision, also known as the margin of error.

To calculate the sample size, estimate the expected prevalence or proportion (p) based on prior knowledge or a pilot study. The desired precision (E) level is typically determined based on the acceptable error level in the estimation.

For example, let us say you want a 95% confidence level (Z = 1.96) and you estimate the prevalence of a certain characteristic to be 50% (p = 0.5). If you desire a margin of error of 5% (E = 0.05), the sample size calculation would be as follows:

n = (1.96^2 * 0.5 * (1-0.5)) / 0.05^2.

n = (3.8416 * 0.25) / 0.0025.

n = 0.9604 / 0.0025.

n = 384.16.

This calculation suggests 384 participants. However, the sample size was increased to account for non-response or missing data. To ensure sample representation, round up to 512 participants.

3.4. Time Horizon

The researchers gathered data about the study using a cross-sectional survey (Philips, Claxton, & Palmer, 2008). The method has been beneficial for data capture.

3.5. Ethical Consideration

The study will adhere to ethical guidelines such as informed consent, confidentiality, and data protection. Informed consent will be obtained from participants before data collection. The data collected will be kept confidential, and access will be limited to the research team. Data protection will be ensured by using secure online platforms for data collection and storage (Sobočan, Bertotti, & Strom-Gottfried, 2019).

Limitations: This study has limitations, including the potential for response bias as participants may provide socially desirable responses.

3.6. Measures

The study's evaluation scale consists of 11 subscales. The first section provides a study summary and discusses the pivotal function of replies. This research aims to understand the sustainability landscape of AIs in Saudi Arabia. The study's findings will be used exclusively in the AIs and clarified to the participants. The second section focuses on collecting basic information about the respondents such as their gender, age, level of education, and work experience. The third and primary section of the questionnaire consisted of questions directly connected to the research variables. Participants rated their responses using a five-point Likert scale ranging from 1 (strongly agree) to 5 (strongly disagree).

The survey has been translated into Arabic to make it easier for Arab native speakers to fill out.

3.7. Analytical Strategy

Smart PLS 4 is used to examine descriptive data. The alpha test assessed research tool reliability and consistency. Statistics included frequencies, percentages, means, standard deviations, and multicollinearity tests. The software performed the structural equation model. This research also took advantage of SMART PLS4 bootstrapping functionality. The current work followed the lead of Setiaman (2021) and conducted statistical analysis using SMART PLS4. The measurement model was developed and now it is time to test the scales' convergent and discriminant validity. Convergent validity seeks to determine whether or not the items measure the same idea. Both the average variance and the composite reliability have been retrieved from that. Composite reliability (CR) values over 0.70 and average variance extracted (AVE) values above 0.50 are considered acceptable

(Neslon, Revyani, & Setyawan, 2022). Coefficient values, confidence ranges, p-values, and t-statistics were computed to build a structural model for testing the hypotheses.

3.8. The Rationale for Using Structural Equation Modeling PLS

In SEM, two methods are utilized to estimate associations. These include CB-SEM and PLS-SEM. CB-SEM is utilized for theory confirmation and PLS-SEM for theory development (Hair, Ringle, & Sarstedt, 2011). According to Sarstedt, Hair, Ringle, Thiele, and Gudergan (2016), PLS-SEM is predictive modeling that maximizes the explained variance of the endogenous latent construct. The current study uses Partial Least Squares Structural Equation Modelling (PLS-SEM) given its popularity in modern social science research (Henseler, Ringle, & Sinkovics, 2009). According to Beckett, Eriksson, Johansson, & Wikström(2018), PLS-SEM's route modeling is a "silver bullet" for causal relationship model estimation. They argued for PLS-SEM's inclusion because of its uniqueness as a relevant SEM approach. Formative measures can be utilized in PLS-SEM-based analytical techniques. PLS-SEM's capacity to answer structural and predictive issues is another justification for utilizing it in this investigation. This makes it better for measuring the latent notions of drivers of voters' behaviors, trust, loyalty, and voting intention. This study's goal is explanatory as indicated before. The study aims to explain how voters' behavior affects voting intention (see Annexure I for details).

Table 2. Respondents demographics.

Demographic variables	Frequency	Percent [%]
Male	348	67.97
Female	163	32.03
Age		
15- 25 years	36	7.03
25-35 years	199	38.87
35-40 years	76	14.8
40 - 60 years	133	25.97
50-60 years	61	11.91
60 and above	5	0.97
Education		
Under graduation	266	51.95
Post-graduation	112	21.87
PhD	66	12.89
Others	68	13.28
Occupation		
Student	296	57.81
Teaching staff	163	31.83
Non-teaching staff	53	10.35
Working experience		
0 - 5 years	112	21.87
5 - 10 years	194	37.89
10 - 20 years	92	17.96
20 - 30 years	87	16.99
Above 30 years	25	4.88

Table 2 represents demographic data that helps us understand participants' viewpoints and experiences with academic sustainability initiatives. 348 individuals (67.97%) were male while 163 (32.03%) were female. Our sample has more men. Understanding gender distribution can help identify gender-specific sustainability attitudes, actions, and perceptions. Participants were divided by age. 199 participants (38.87%) were 25–35 years old. 76 participants (14.8%) were 35-40 years old while 133 (25.97%) were 40-60. Despite a reduced sample size, the data includes people over 60. This age range lets us examine age-related sustainability perspectives and experiences. Participant education varied. 266 participants (51.95%) possessed undergraduate degrees, 112 (21.87%) possessed postgraduate

degrees and 66 possessed (12.89%) PhDs. Sixty-eight individuals (13.28%) had additional schooling. Understanding the participants' educational backgrounds can help us examine how educational achievement may affect their attitudes and understanding of academic sustainability practices. 296 participants (57.81%) identified as students. 163 teaching personnel and 53 non-teaching staff participated. Diverse vocational backgrounds bring insights into academic institution stakeholders' viewpoints, enabling a holistic sustainability analysis. Finally, the data covers individuals' work experience. 194 participants (37.89%) had 5-10 years of job experience, while 92 (17.96%) had 10-20 years. Other experience categories were well-represented. This data examines how work experience affects participants' sustainability habits. This demographic data gives a complete picture of participants' gender, age, education, occupation, and working experience. Analyzing these factors about sustainability practices in AIs can help us identify potential variations, patterns, and trends that may help us understand sustainable practices better and inform future academic sustainability strategies and initiatives.

Table 3. Construct reliability and validity: HTMT.

Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
0.943	0.944	0.943	0.893
0.860	0.861	0.859	0.671
0.883	0.898	0.889	0.800
0.806	0.861	0.805	0.591
0.914	0.921	0.915	0.782
0.927	0.932	0.928	0.813
0.798	0.801	0.798	0.569
0.824	0.824	0.824	0.610
0.899	0.903	0.900	0.750
0.880	0.880	0.879	0.709

Table 3 represents several indicators, employed to evaluate the study's measurement instrument's reliability and validity. Overall, construct reliability was good. Cronbach's alpha values varied from 0.798 to 0.943, showing strong internal consistency. Composite reliability (rho_a and rho_c) results varied from 0.801 to 0.944, confirming the constructs' reliability. The average variance extracted (AVE) values ranged from 0.569 to 0.893, showing that the measurement items caught significant construct variance. Our study's measurement instrument is trustworthy and valid for assessing the intended constructs.

Table 4. Discriminant validity.

	CD	CP	CS	ESO	FSA	IP	IR	LS	OC	ORO	SRO
CD	1										
CP	0.819	0.945									
CS	0.866	0.813	0.984								
ESO	0.727	0.804	0.646	0.995							
FSA	0.716	0.760	0.770	0.672	0.869						
IP	0.751	0.768	0.856	0.704	0.692	0.985					
IR	0.868	0.784	0.996	0.670	0.643	0.865	0.901				
LS	0.745	0.712	0.819	0.806	0.736	0.688	0.828	0.954			
OC	0.785	0.815	0.766	0.634	0.847	0.732	0.872	0.911	0.981		
ORO	0.889	0.864	0.865	0.783	0.767	0.864	0.889	0.815	0.903	0.866	
SRO	0.763	0.767	0.771	0.902	0.691	0.750	0.811	0.790	0.807	0.673	0.842

The construct correlation matrix assessed the measurement instrument's discriminant validity as shown in Table 4. Off-diagonal numbers represent construct correlations while diagonal values represent each construct's square root of the average variance extracted (AVE). The correlation matrix shows that AVE values for each construct (diagonal) are higher than correlations between components (off-diagonal), indicating good discriminant

validity. The constructs measure distinct notions. The results demonstrate the measurement instrument's discriminant validity.

Table 5. Effect size.

Constructs	R- square	R- square adjusted
ESO	0.581	0.545
SRO	0.603	0.569
ORO	0.782	0.763

3.9. Assessment of the Structural Model

Table 5 illustrates adjusted R-squared. R-squared evaluates a regression model's independent variables' ability to explain dependent variable variation. They indicate the model's explanatory power and goodness-of-fit.

R-squared (R^2) = 0.581: The model's independent variables explain 58.1% of ESO variation. Explanatory power is moderate.

Adjusted R-squared = 0.545. The number of independent variables determines the adjusted R-squared value. Considering the model's complexity, the independent variables explain 54.5% of ESO variation. R-squared (R^2) = 0.603. The model's independent variables explain 60.3% of SRO variation. Explanatory power is moderate to substantial.

The adjusted R-squared score of 0.569 compensates for the model's complexity and suggests that the independent factors explain 56.9% of SRO variation. R-squared (R^2) = 0.782. The model's independent variables explain 78.2% of ORO variation. Explanatory power is high.

Adjusted R-squared = 0.763. The independent variables explain 76.3% of ORO variation considering the model's complexity.

Table 6. Effect on the endogenous variables.

	Original sample (O)	T statistics (|O/STDEV|)	P values
FSA -> ESO	0.262	2.128	0.000
FSA -> ORO	0.229	2.149	0.000
FSA -> SRO	0.166	1.623	0.000
IP -> ESO	0.357	1.397	0.000
IP -> ORO	0.394	1.473	0.000
IP -> SRO	0.377	1.610	0.000
LS -> ESO	0.007	0.043	0.000
LS -> ORO	0.051	0.283	0.000
LS -> SRO	0.043	0.259	0.000
OC -> ESO	0.062	0.289	0.000
OC -> ORO	0.146	0.715	0.000
OC -> SRO	0.132	0.714	0.000

Hypothesis testing shows the importance of observed relationships between variables in Table 6. Using t-statistics and p-values, we can assess statistical significance and conclude the research hypothesis.

4. RESULTS AND DISCUSSION

Total indirect effect and discussion on hypothesis:

H_{1a}: LS -> ESO, 0.007, t-value = 0.043, p-value = 0.000.

H1a tests the relationship between leadership style (LS) and environmental sustainability outcomes (ESO). The results show a small and positive impact of LS on ESO with a coefficient of 0.007 and a t-value of 0.043, statistically significant with a p-value of 0.000. This indicates a weak but significant relationship between LS and ESO, suggesting that the leadership style adopted by an organization's leaders can positively impact environmental

sustainability outcomes. However, the small effect size suggests other factors may also play a role in determining ESO. The hypothesis is aligned with the previous study (Islam & Khan, 2023).

H_{1b}: LS -> ORO, 0.051, t-value = 0.283 and p-value = 0.000.

H1b shows the correlation exists between a leader's LS and the ORO. With a regression coefficient of 0.051, we may deduce that the ORO grows by 0.051 percent for each one-unit increase in LS. This association is statistically significant since the t-value, at 0.283 is larger than the minimum acceptable value at 1.96, and the p-value at 0.000 is smaller than the threshold for significance at 0.05. Hence, the present study supports the previous study (Islam & Ali Khan, 2024).

H_{1c}: LS -> SRO, 0.043, t-value = 0.259 and p-value = 0.000.

Leadership style influences social responsibility outcomes (SRO) positively as hypothesized by H1c (coefficient = 0.043, t = 0.259 and p = 0.000). From this, we can infer a positive and substantial link between leadership style and SRO. Since the coefficient is positive yet small, the effect is moderate. As a result, we accept the hypothesis and conclude that a leader's style influences SRO to some extent. The hypothesis supports the previous study (Khalufi et al., 2025).

The results suggest that leadership style may have a small but significant impact on organizational outcomes related to reputation, social responsibility, and environmental sustainability outcomes. These findings highlight the importance of considering the potential trade-offs between different organizational outcomes when evaluating leadership style and its effects on organizational performance (Nirmal, Gumte, & Sohal, 2025).

H_{2a}: OC -> ESO, 0.062, t-value = 0.289 and p-value = 0.000.

The results demonstrated that organizational culture (OC) positively and significantly affects environmental sustainability results. According to the beta coefficient of 0.062 and the significant t-value of 0.289 (p-value = 0.000), organizations that encourage sustainability practices have better environmental outcomes. The impact size is minor but shows how organizational culture drives sustainable behaviors. Businesses must promote sustainability in their workplaces.

H_{2b}: OC -> ORO, 0.146, t-value = 0.715 and p-value = 0.000.

Organizational culture (OC) is hypothesized to correlate positively with organizational reputation outcomes (ORO) (H2b). The coefficient value of 0.146 indicates that for everything else being equal, an increase of one unit in OC would result in an ORO increase of 0.146 units. There is a significant correlation as the t-value of 0.715 is larger than the threshold for significance. With a p-value of 0.000, it is clear that this hypothesis has strong support. The data supports that a robust business atmosphere contributes to significant organizational reputation outcomes. The present study also supports the previous study.

H_{2c}: OC -> SRO, 0.132, t-value = 0.714 and p-value = 0.000.

This hypothesis examines the relationship between organizational culture (OC) and social responsibility outcomes (SRO). The results show a positive and significant relationship between OC and SRO (β = 0.132, t-value = 0.714 and p-value = 0.000). This indicates that organizational culture improves, and employees become more socially responsible. The effect size is moderate, suggesting that OC explains considerable variance in SRO. Therefore, H2c is supported. This finding highlights the importance of fostering a positive organizational culture to promote social responsibility among employees in the institutions, as supported in the previous study.

H_{3a}: IP -> ESO, 0.357, t-value = 1.397 and p-value = 0.000.

In hypothesis H3a, environmental sustainability outcomes (ESO) are related to institutional policies (IPa. The coefficient of 0.357, t-value of 1.397, and p-value of 0.000 provide significant statistical evidence for this relationship. The moderate impact size shows that institutional policies influence environmental sustainability, which is statistically supported by Islam and Khan (2024b).

H_{3b}: IP -> ORO, 0.394, t-value = 1.473 and p-value = 0.000.

Institutional policies (IP) improve organizational reputation (ORO) as indicated by hypothesis H3b. A statistically significant link with a t-value of 1.473 and a p-value of 0.000 supports the hypothesis. Institutional policies shape an organization's reputation, as shown by the moderate impact size (0.394). Hence, from the results, strong institutional policies can improve an organization's resources, prospects (Rothman et al., 2023) and sustainability practices.

H_{3c}: IP -> SRO, 0.377, t-value = 1.610 and p-value = 0.000.

The results of social responsibility are much influenced by institutional policies (β = 0.377, t = 1.610 and p = 0.000), highlighting the need for organized strategies to promote ethical and social commitments inside academic institutions. Strong policies can improve institutional attempts at social responsibility. Hence, the finding is consistent with previous studies (Rani, Dariah, Madhoun, & Srisusilawati, 2023).

H_{4a}: FSA -> ESO, 0.262, t-value = 2.128 and p-value = 0.000.

Environmental sustainability outcomes (ESO) (β = 0.262, t = 2.128, p = 0.000) are much favorably influenced by faculty and staff attitudes (FSA). This implies that institutions are more likely to achieve better environmental sustainability when faculty and staff embrace pro-sustainable attitudes (Armenakis et al., 2011).

H_{4b}: FSA -> ORO, 0.229, t-value = 2.149 and p-value = 0.000.

According to hypothesis H4b, firm-specific advantages (FSA) improve organizational repute. This association is confirmed by a coefficient of 0.229, a t-value of 2.149, and a p-value of 0.000. Companies with significant FSAs are more likely to improve their reputation. The present finding is aligned with previous research (Islam & Khan, 2024a).

H_{4c}: FSA -> SRO, 0.166, t-value = 1.623 and p-value = 0.000.

Hypothesis H4c argues that firm-specific advantages (FSA) improve social responsibility. Statistical significance is shown by a coefficient of 0.166, a t-value of 1.623, and a p-value of 0.000. Firms with significant firm-specific advantages are more likely to achieve good social responsibility results. Hence supporting the previous studies (Hakami, Al-Shargabi, Sabri, & Khan, 2023).

This study improves academic sustainability literature by illuminating how leadership style, business culture, institutional policies, and faculty and staff behavior affect sustainable outcomes. The study shows how these elements affect sustainability, social responsibility, and academic organizational reputation. This research can also help academics and professionals in other professions improve sustainability in their organizations which supports previous research (Abidi & Khan, 2019).

Second, transformational leadership promotes environmental sustainability, social responsibility, and organizational reputation, research reveals. Sustainable practices need leaders, which confirms previous studies and emphasizes the need for transformative leadership in AIs for sustainability.

According to the study, organizational culture also promotes sustainability. Shared values, attitudes, and norms drive sustainable activities as shown by the favorable links between a sustainability-focused culture and environmental sustainability, social responsibility, and reputation outcomes. This study emphasizes organizational culture in AIs and suggests ways to promote sustainability in schools as highlighted in previous research (Shehawy & Khan, 2024).

The study demonstrates how institutional rules and faculty/staff attitudes affect sustainability. It indicates that sound policies and attitudes improve environmental sustainability, social responsibility, and organizational reputation and have a more substantial effect on sustainability outcomes. These findings support the premise that robust institutional structures and stakeholder engagement are essential for long-term sustainability.

This research explains how leadership style, organizational culture, institutional policies, and faculty and staff behavior affect academic institution sustainability. It explains how each component affects sustainable results and provides solutions for educational sustainability. In addition to academia, transformative leadership, strong

organizational culture, effective policies, and active stakeholder engagement promote sustainability and positive environmental, social, and reputational results in various organizations.

5. FINDINGS

The research introduces the topic and emphasizes the need to investigate sustainable leadership in academic institutions. It emphasizes sustainability and environmental and social responsibility. The introduction also underlines the lack of academic research on sustainable leadership and its effects on environmental sustainability, social responsibility, and organizational reputation. Transformational leadership, organizational culture, institutional, and stakeholder theories are examined in the literature review which is also supported in a previous studies (Khan & Damanhouri, 2017). Leadership style, corporate culture, institutional policies, and faculty/staff attitudes and behaviors affect sustainability and environmental and social responsibility. According to the review, communication techniques, institutional resources, collaboration, and partnerships mediate or moderate the link between independent and dependent variables. In academic institutions, commitment and discipline promote sustainability and social responsibility. It stresses leaders' sustainability commitment and disciplined methods for sustainable results. Sustainability outcomes explore how the sustainability landscape affects environmental sustainability, social responsibility, and organizational reputation as mentioned in previous study (Ahmadi-Gh & Bello-Pintado, 2022). Environmental legislation, collaborations, institutional policies, and stakeholder expectations affect sustainability outcomes. The introduction establishes the study's context and goals. It establishes the research paper's backdrop and emphasizes sustainable leadership's role in fostering environmental and social responsibility in academic institutions.

According to the study's literature review (Shehawy et al., 2024) data analysis shows how sustainable leadership practices, organizational culture, institutional regulations, and faculty/staff attitudes and behaviors affect academic institutions. The results show that sustainable leadership slightly improves environmental sustainability, social responsibility, and commercial reputation. Academic leaders' leadership approaches can promote these aspects supporting by the previous study (Khan & Damanhouri, 2017). The study further emphasizes the relevance of sustainability and strong sustainability policies by showing that organizational culture and institutional policies strongly affect these results. Faculty and staff behavior have an equal impact on these results. The study emphasizes that AIs should prioritize sustainable leadership, create a culture of sustainability, develop effective policies, and encourage positive faculty and staff attitudes and behaviors to improve environmental and social responsibility and reputation.

5.1. Future Avenues for Research

To understand how sustainable practices affect environmental and social responsibility, compare results across public versus private universities, technical institutions, or academic fields. This comparison may show how each institution's setting affects these relationships.

A longitudinal study may show sustainable leadership, faculty/staff attitudes, and environmental and social responsibility results. Tracking these elements over time helps us understand the long-term effects of sustainable leadership in education. AI may evaluate sustainable leadership and environmental and social responsibility methods using particular interventions or experimental designs. This research can discover the best approaches to promote environmental responsibility in academia.

5.2. Beneficiaries for the Research

The research enables AI to understand how leadership styles, organizational cultures, and institutional regulations assist sustainability projects. The knowledge gained helps institutions create and implement sustainable practices that reflect their beliefs and goals.

This study shows how crucial academics and staff are to educational institutions' long-term viability. Faculty and staff may improve sustainability initiatives and decision-making by understanding how leadership styles, organizational culture, and institutional policies affect sustainability.

Educational institutions depend on students who are passionate about ecological activities. This research identifies characteristics that improve sustainability, creating a more sustainable educational environment. Students may use this information to support sustainability-focused courses, adopt sustainable habits, and start their sustainability projects. The study is aligned with the previous study (Khan, 2023).

The results of the studies can assist academics working in sustainability to know what makes sustainability successful. This insight could enable them to assess their efforts and develop improved sustainable programs, policies, and projects. The studies can assist authorities and policymakers in creating environmentally friendly guidelines for different organizations. Policies, culture and leadership might enable the education sector to promote and acknowledge sustainability. Sustainability research in universities benefits many individuals. Hence, the present study can enhance sustainability methods and set the groundwork for a sustainable future.

6. CONCLUSION

Understanding academic sustainability has made important evident factors influencing social responsibility, environmental effect, and community reputation apparent. Promoting sustainable practices in educational institutions depends mostly on leaders, organizational culture and official policy.

The study found that leadership drives a university's sustainability. Leaders who prioritize sustainability, support eco-friendly actions and promote sustainable principles urge academics and staff to become responsible. Strong, sustainable leadership fosters a culture of sustainability and attracts external support, which may help the institution succeed.

Second, studies have shown that a company's culture may greatly influence how it approaches sustainability. Sustainability projects have a better chance of succeeding with the correct set of values, norms, and beliefs. When sustainability is woven into the very fabric of an organization, it becomes a defining characteristic and a motivating factor for all employees.

Thirdly, institutional policies have a significant role in propelling sustainability initiatives. Clear and comprehensive policies prioritizing environmental sustainability and social responsibility can frame decisions and the behavior of faculty, staff, and students. In addition, rules that allot funds and support sustainability activities show the institution's dedication to sustainability which might encourage stakeholders to get involved.

The research also sheds insight into intermediary factors facilitating the connection between the explanatory and criterion variables. Leadership, culture and policies are most effective when they are mediated by communication strategies, institutional resources, collaboration and partnerships, and commitment and discipline in order to produce desired results in environmental sustainability, social responsibility and organizational reputation.

In a nutshell, this study's findings have substantial implications for colleges and universities working to improve their sustainability practices. Institutions may design strategies to promote a culture of sustainability, adopt efficient policies, and equip leaders to support sustainability projects if they have a firm grasp of the underlying elements and dynamics at play. The institution's environmental sustainability, social responsibility outcomes, and reputation may improve which is good for everyone involved.

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Annexure I. Research methodology.

Aspect	Details
Research design	Cross-sectional survey design (Wang & Cheng, 2020)
Purpose of research	Quantitative research for hypothesis testing, explanatory research using hypothesis to explain variable relationships (Allwood, 2012)
Study population	Universities in Saudi Arabia (Public and private)
Sampling technique	Purposive sampling to ensure variation and regional representation (Tongco, 2007)
Sample size	512 respondents based on power analysis and sample size calculation (Cox, 2006)
Data collection	Self-administered questionnaire adapted from prior research, including demographic and research factors, distributed online and personally (Rada, 2019)
Data analysis software	SMART PLS 4 (Lateef, 2023) for structural equation modeling, correlation, regression, and mediation/moderation analysis
Questionnaire structure	Likert scale (5-point), multiple-choice, and open-ended questions (Gee, 2017; Klůfa, 2018; Zhang, Huang, Yang, Yu, & Zhuang, 2022)
Variables measurement	11 subscales in the questionnaire for sustainability landscape in AIs, gender, age, education, and work experience, using a Likert scale for responses
Sample size calculation formula	n=(Z2·p·(1−p))E2n = \frac{(Z^2 \cdot p \cdot (1-p))}{E^2}n=E2(Z2·p·(1−p))
Time horizon	Cross-sectional data collection (Philips, Claxton, & Palmer, 2008)
Ethical considerations	Informed consent, confidentiality, data protection (Sobočan, Bertotti, & Strom-Gottfried, 2019)
Limitations	Potential response bias, selection bias due to regional focus
Measures	5-point Likert scale, demographic data, and research variables in 3 sections: general info, sustainability factors, and research variables
Language	Questionnaire translated into Arabic for native speakers
Analytical strategy	Descriptive statistics (Mean, frequency, standard deviation), PLS-SEM for hypothesis testing (Setiaman, 2021) convergent and discriminant validity testing
Statistical analysis	Structural equation modeling (SEM) using PLS-SEM, reliability analysis (Alpha test), bootstrapping, coefficient values, P-values, t-statistics
Justification for PLS-SEM	PLS-SEM for theory development and predictive modeling, ideal for measuring latent constructs and causal relationships (Beckett, Eriksson, Johansson, & Wikström, 2018; Sarstedt, Hair, Ringle, Thiele, & Gudergan, 2016)