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Environmental Culture Attitudes in Saudi Society: A Field Study on the Industrial City of Jubail

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This study seeks to identify the environmental culture attitudes among residents of the Industrial City of Jubail, Saudi Arabia, and to determine if significant differences exist in their responses to personal variables. Classified as descriptive research, the study employs a social survey methodology and involves a sample of 613 residents, with data collected through a questionnaire using a simple random sampling technique. The findings indicate a high level of agreement among residents regarding various aspects of environmental culture, including environmental knowledge, concern for environmental issues, attitudes toward the environment, and environmental practices. The statistically significant differences were observed in the average responses related to concern for environmental knowledge, environmental issues, and interest in environmental practices of Jubail city of Saudi Arabia. The study findings offer empirical support to the notion that environmental cultural attitudes are interrelated and influenced by demographic factors which is expanding the theoretical discourse on how environmental literacy develops over time. Based on these findings, the researcher suggests several recommendations: enhancing public awareness of existing environmental laws and regulations and rigorously enforcing them to mitigate environmental violations by individuals and institutions; strengthening the role of environmental communication through continuous awareness campaigns to cultivate an environmental consciousness among citizens; and promoting active citizen participation in all initiatives aimed at reducing pollution sources.

Keywords: Environmental Culture, Environmental Knowledge, Attitudes, Environmental Sustainability.

Introduction

In modern society, there is a growing emphasis on environmental protection at global, national, and local levels to increase the sustainability of economy (Tam, 2025). If the environmental protection is overlooked then it could create various issues likely resource exploitation, diverse pollution sources, and the acknowledgment of significant harmful impacts that endanger human life and the future of the planet (Al-Swidi, Gelaidan, & Saleh, 2021; Boynazarova, 2023). The environmental challenges also dampens the sustainability of any country (Al-Swidi et al., 2021). To overcome the environmental challenges, individuals must expand their understanding, culture, and perceptions while modifying their behaviors to create patterns that contribute to environmental preservation (Sesana et al., 2021). Such behavioral transformations will only be realized if a majority of society adopts a positive awareness and values concerning the environment (Sesana et al., 2021). To increase the environmental awareness, there should be define a environmental culture broadly which encompasses the shared values, beliefs, practices, and behaviors that guide human interaction with the natural environment (Hariram et al., 2023). At the heart of this culture lie environmental attitudes, which influence how individuals perceive environmental issues, engage with sustainability efforts, and support eco-conscious policies (Makhloufi et al., 2022).

As environmental challenges become more urgent and complex. To handle these challenges, there should be a positive environmental culture through attitudinal change that could emerged as a critical pathway toward sustainability (Nguyen & Jones, 2022). Other authors also highlighted that to improve the sustainability of any country, environmental attitudes are often seen as predictors of environmentally responsible behavior, including energy conservation, waste reduction, and participation in environmental initiatives (Ogiemwonyi et al., 2023). Over the last two decades, empirical researches has expanded our understanding of how attitudes influence behaviors at the individual, organizational, and community levels to increase countries economic growth (DeVille et al., 2021). If the environmental culture is not properly protected then it creates various poverty or sustainability challenges (Wyss, Knoch, & Berger, 2022). Therefore, it is crucial to transform the systems of knowledge, culture, and values that individual's hold, which facilitates the development of effective solutions to these challenges. Consequently, the study focused on environmental culture attitude.

Various factors contribute to the effective improvement of environmental culture, which in turn increases the sustainability of any country. Among those, socio-demographic characteristics play an important role in shaping environmental culture (Karpudewan, 2021; Sales et al., 2024). For example, several studies have shown that age can influence environmental concern, with younger generations often demonstrating greater environmental awareness and commitment to sustainability (Harrison & Carroll, 2021; Karpudewan, 2021). Gender has also been identified as a consistent determinant, with women typically expressing stronger pro-environmental attitudes than men (Shutaleva et al., 2022). Similarly, education is strongly correlated with environmental attitudes, as higher educational attainment tends to raise greater ecological

literacy and concern (Iluno, Umoru, & Bello, 2024). Moreover, income levels affect individuals' capacity and motivation to engage in sustainable behaviors, where both low- and high-income groups may differ significantly in their environmental priorities and actions (Castaldelli-Maia & Bhugra, 2022; Li et al., 2022). Despite the significance of these factors, there is a need of more specific research to assess how these variables interact within different socio-cultural settings. Therefore, this research seeks to examine environmental culture attitudes through assessing the influence of key demographic factors, namely age, gender, education, and income on the individuals' environmental orientations.

Various empirical studies have been conducted on environmental culture but prior studies still highlighted various gaps. For instance, some of the studies have been conducted on industry specific where highlighting that how environmental culture improve the performance or other key indicators (Costa & Opare, 2025; Fayyaz et al., 2024; Masyhuri, Siswanto, & Kurniawati, 2024; Sahan, Jaaffar, & Osabohien, 2024; Song & Wei, 2025; Yousaf et al., 2025) but these studies have limited attention on how demographic factors significantly improve the environmental culture positive attitude. Further, prior studies also highlighted the combined effect of environmental culture with a limited attention on how demographic factors significantly changes the environmental cultural dimensional attitude of individuals (Masyhuri et al., 2024; Sanusi, Suwarsi, & Perkasa, 2025). Therefore, this study contributed literature on various environmental cultural dimensions (environmental knowledge, environmental issues, environmental attitude, and environmental practices) effected from demographic factors. Furthermore, prior studies in the field of environmental culture have majorly concentrated on other countries with a limited attention on Saudi Arabia (Ayonovna, 2024; Tam, 2025; Yang et al., 2024). The Kingdom of Saudi Arabia has prioritized environmental protection through its Vision 2030, which outlines five strategies encompassing 64 initiatives aimed at restructuring the environmental sector to align with ecological diversity and the significant growth of sectors that affect the environment (Aldosari, 2024; El-Bastawisy, 2024). To fulfill its vision, Saudi Arabia must enhance and disseminate environmental knowledge within the community, encouraging both individuals and groups to actively engage in protecting the environment and conserving its resources while addressing potential environmental risks stemming from inappropriate behaviors (Aldosari, 2024; El-Bastawisy, 2024). In light of these considerations, this study aims to explore the attitudes in environmental culture within Saudi society, specifically in the Industrial City of Jubail. This research objective has been divided into four sub-objectives below,

1. To assess the level of environmental knowledge among the residents of the Industrial City of Jubail, Saudi Arabia.
2. To evaluate the degree of concern regarding environmental issues among the residents of the Industrial City of Jubail, Saudi Arabia.
3. To elucidate the level of attitudes toward the environment among the residents of the Industrial City of Jubail, Saudi Arabia.
4. To investigate the extent of interest in environmental practices among the residents of the Industrial City of Jubail, Saudi Arabia.

The significance of this study derives from its examination of a critical topic about the environment and the knowledge and information that community members possess regarding environmental conservation and protection. This research engages with an entire community, deliberately setting aside personal differences, as this collective plays an essential role in shaping the future and safeguarding the environment. The study emphasized the concept of environmental culture and its various dimensions within the community, highlighting its considerable importance in the daily lives of its members. Furthermore, the growing global, regional, and local interest in environmental issues and strategies to address environmental challenges for the sake of sustainable development has prompted an increase in studies and research focused on environmental concerns. This study thus paves the way for future researchers to investigate the topic from previously unexplored perspectives. The study's findings may benefit environmental centers focused on protecting the environment and conserving of its resources. Additionally, the results can guide policymakers in fostering an environmental culture within the community to preserve natural resources. The study further divided into four chapters: literature review, research methodology, data analysis and results, discussion and conclusion.

Literature Review

Theoretical Review

The term "environmental culture" was first introduced in 1969 (Roth, 1972). Over time, the term evolved through messages and addresses by federal officials in the United States, reflecting an increasing concern for environmental issues, culture, and education aimed at enhancing environmental awareness and addressing pollution risks (Roth, 1992). In other perspective, environmental culture refers to preparing citizens to adapt to global environmental changes, raising greater engagement in addressing environmental issues, and finding positive solutions. This concept involves equipping individuals with essential environmental knowledge, skills, and attitude (Fraj, Martínez, & Matute, 2011; Roth, 1970), which is enabling them to effectively integrate with their surroundings within a framework of environmental responsibility necessary for the preservation of the environment for both present and future generations (Fraj et al., 2011). Then, the concept of the environment encompasses the framework or domain in which humans exist, including air, water, soil, and all living and non-living entities within these components (Aldosari, 2024; El-Bastawisy, 2024). It also considers climate, energy, sunlight, rainfall, winds, as well as social and technological elements (Tam, 2025). Environmental culture emerged as a modern approach in the 1970s,

achieving consensus on its significance for raising sustainability within communities (Yang et al., 2024).

Environmental culture encompasses the acquisition of behavioral and cognitive components through ongoing interaction with the environment and raising positive behaviors that empower individuals to engage appropriately with their surroundings and share these behaviors with others (Suhartanto et al., 2024). It also involves preparing individuals to adapt to environmental changes and promoting active participation in addressing environmental challenges by equipping them with essential environmental knowledge, skills, and attitudes (Uralovich et al., 2023). This preparation facilitates effective integration with their environment within a framework of environmental responsibility, ensuring the preservation of the environment for present and future generations (Spínola, 2021). Under the theory of structural-functional theory, environmental culture is a systemic perspective of society, viewing the environment as a system that fulfills fundamental life needs (Parsons, 2017). It emphasizes the balance between living and non-living entities and the relationships between living beings and nature (Parsons, 2017). Within this framework, certain functional necessities must be addressed to ensure that the environment can continue to meet these needs without compromising stability and continuity (Parsons, 2017). The theory aims to sustain social life patterns through shared cognitive orientations, role distribution, and adaptation to the environment, facilitated by norms and standards that govern behavior and socialization to achieve societal goals (Plumwood, 2005). Under the umbrella of environmental determination theory, that emphasized the significant influence of the natural environment on human behavior, suggesting that humans are largely passive in response to natural forces (Darner, 2009). As a result, they must adapt to the limitations and potentials of their environment, under a central deterministic movement drawing from the environment to living beings and human societies (Pelletier & Aitken, 2014). The theory posits that cultural and social systems develop by physical conditions and ecological contexts, attributing variations among human societies to differences in environmental and geographical circumstances (Pelletier & Aitken, 2014). Finally, Philippe & Vallerand (2008) asserted that "it is an educational process that highlights the relationship between humans and various environmental issues, emphasizing that it is acquired, allowing individuals and communities to address environmental challenges. Heyd (2016) further defined that it is a set of ideas and behaviors focused on the rational use of resources and environmental protection, developed through environmental awareness that fosters ethical and behavioral understanding related to environmental risks.

Empirical Studies

Various empirical studies have been conducted on the environmental culture. For example, Huang et al. (2022) explored study to explain how personal values drives environmental concerns and behavioral commitment. The study results indicated that individuals who have environmental responsibility from a moral perspective then they are significantly contribute in environmentally sustainable activities. Similarly, González-Ordóñez (2024) study also confirmed the role of cultural orientation in influencing environmental behavior across diverse populations. Their findings showed that people embedded in communist cultures can adopt the environmentally friendly practices when they perceive social support or normative pressure which is reinforce that environmental culture is a key component of increasing market stability. Yang et al. (2024) study further found that early exposure to nature and environmental education programs significantly influences long-term attitudes toward environmental stewardship. Davari, Nosrati, & Kim (2024) also shown that how personal values improve the environmental culture. They found that personal values increase the environmental culture. Al Mamun et al. (2024) study also explained how increasing the knowledge of environmental is also lead to an increase the positive attitude of any individual towards the improvement of environmental culture. They also encouraged the further research to conduct a study on demographic factors to improve the sustainability of environment.

These previous empirical studies highlighted that environmental culture was significantly effected from various factors while have limited attention to demographic factors. For example, Blanco-Mesa, Auzaque Rodríguez, & Gutierrez Ayala (2024) also found that university-educated individuals have significantly higher environmental awareness and concern compared to those with lower educational attainment. They also highlighted that education not only increases awareness to handle the environmental issues but it is also raises a critical thinking and a sense of moral responsibility toward the environment. Amoah-Boampong (2025) research also revealed that people who have medium level of income significantly supported to the environmental policies and they are engaged in sustainable consumption practices, possibly because their financial stability enables them to prioritize non-material values and afford eco-friendly alternatives. However, this relationship can vary across cultural contexts where economic needs outweigh environmental priorities. On the other hand, Feng, Hou, & Lan (2024) also conducted a study and found that females are being exhibited a more environmental responsible attitudes compare to males, which may be attributed to socialization processes that promote empathy and care. They also argued that **incomes** has a more complex relationship with environmental attitudes. More income levels individuals may possess deeper environmental awareness due to accumulated life experiences and witnessing long-term environmental changes (Sergey et al., 2024). Conversely, other study also suggested that low-income level generations are more engaged with contemporary environmental movements and climate action due to their digital connectivity and educational exposure (Kyriakopoulos, Herbert, & Piperopoulos, 2024). Therefore, income-based differences in environmental attitudes may improve sustainability.

Scarcelli & Farci (2024) research also found that younger age group have more concern towards environmental sustainability because these people are more engaged in green behavior activities it. Their study also showed that

generational shifts in environmental values could be attributed to increased environmental education and activism among youth. Karatsiori (2025) study also found that younger respondents are more concentrated towards pro-environmental activities, which demonstrated the higher levels of concern of individuals towards the long sustainability. Leach, Joekes, & Green (2025) study also found a positive and significant relationship between age and environmental attitude. They further highlighted that older individuals may exhibit more conservative environmental views, possibly due to lower exposure to modern ecological challenges during their formative years. Study of Ibrahim, Asare, & Owusu-Sekyere (2025) also found that females have least intention towards environmental sustainability. They also recommended increasing the awareness of environmental sustainability, and females should focus on the environmental sustainability framework. Gyurián Nagy (2024) other research also found that women are significantly more likely to express concern about environmental risks and support environmental policies compared to men. They argued that women's higher perception of risk and greater empathy toward ecological issues contribute to this gendered difference in environmental behavior. These prior studies highlighted the significance of demographic factors for improving environmental sustainability.

These previous studies highlighting that environmental culture attitudes is being shaped from various demographic variables. Therefore, a deeper understanding on these demographic factors is essential for designing an effective environmental culture attitude. Therefore, study focused on to identify the environmental culture attitudes among residents of the Industrial City of Jubail, Saudi Arabia, and to determine if significant differences exist in their responses to personal variables.

Methodological Approaches of the Study

The study employed the quantitative research approach. Under the domain of quantitative research approach, social survey method is recognized as one of the most prevalent research methodologies, particularly within descriptive studies. This approach facilitates the collection of extensive data and information about the study topic to obtain accurate and comprehensive insights (Gelo, Braakmann, & Benetka, 2008). Therefore, current study utilized the social survey method due to its effectiveness in fulfilling the research objectives, particularly in identifying the relevant variables and analyzing the data collected through the research instrument using statistical techniques. This methodological framework enables the derivation of conclusions that can support the study's aims concerning environmental culture attitudes in Jubail Industrial City, Saudi Arabia. Furthermore, cross sectional design was cross sectional because data collected on first time from the Jubail resident's industrial city of Saudi Arabia. This research design is more effective for the questionnaires based study (Gelo et al., 2008).

Study Sample and study instrument

The study population encompasses all residents of Jubail Industrial City. Given the challenges associated with conducting a comprehensive census of the entire population, a simple random sampling technique was employed to obtain the necessary data for the study. For checking the instrument appropriateness, the exploratory sample consisted of 30 respondents selected randomly from the residents of Jubail Industrial City, Saudi Arabia. This group was intentionally excluded from the main sample to assess the characteristics of the research instrument and its appropriateness for data collection. Then an original sample was selected which represents a subsample of the population, containing specific elements selected for analysis. In this study, a simple random sample was drawn from the original population, comprising 613 respondents.

The researcher developed a questionnaire for data collection, which underwent several phases of refinement and modification informed by pertinent literature and feedback from field experts. The questionnaire was subsequently evaluated and tested following its distribution to an exploratory sample. The instrument comprised two principal sections. The first section gathered personal data from the respondents, including variables such as gender, age, educational qualifications, and monthly income. The second section addressed the study's dimensions, containing a total of 39 items categorized into four primary areas:

1. **Environmental Knowledge**: This section included 10 items.
2. **Interest in Environmental Issues**: This section also comprised 10 items.
3. **Attitudes toward the Environment**: This section contained 9 items.
4. **Environmental Practices**: This section included 10 items.

The study's questionnaire was based on Rensis Likert's 1932 Likert Scale, utilizing a three-point scale that provides three response options for each statement. Respondents were presented with each item, and for every statement, they indicated their level of agreement using the three options provided. To establish the criteria utilized in the study, the length of the response cells in the three-point Likert scale was calculated by determining the range between the scale endpoints (3 - 1 = 2). This range was then divided by the highest value on the scale to derive the cell length, resulting in (2/3). This value was subsequently added to the lowest value on the scale (with the scale beginning at one) to ascertain the upper limit for the cell. Accordingly, the lengths of the response cells were summarized as presented in the accompanying Table 1.

Table 1: Criteria Used in the Study.

Scale	Cell Length	Relative Weight	Level of Agreement
Disagree	1 - 1.66	33.3% to 55.3%	Low
Somewhat Agree	Greater than 1.66 - 2.33	Greater than 55.3% to 77.7%	Moderate
Agree	Greater than 2.33 – 3	Greater than 77.7% to 100%	High

Content Validity

The concept of validity in research instruments pertains to "the accurate representation of the studied population, implying that the responses obtained from the questionnaire yield the information for which the questions were designed" (Al-Bahr and Al-Tanji, 2014, p. 14). The researcher presented the preliminary version of the study instrument to a panel of specialized experts to ensure the linguistic accuracy of the questionnaire, the relevance of the items to the dimensions outlined in the instrument, and the appropriateness of this tool for measuring the objectives associated with the study. Feedback from the judges was carefully considered, resulting in necessary modifications, deletions, and additions to the items prior to the distribution of the final version of the questionnaire to the target sample.

Internal Consistency Validity

Internal consistency validity which refers to the extent to which each item in the questionnaire coherently aligns with the dimension to which it is associated (Lim, 2024). The internal consistency of the questionnaire items was assessed using a sample of 30 respondents from the exploratory study. The internal consistency which consisted of correlation coefficient and crohnbach alpha which is presented in Table 2 and 3 respectively. The following Table 2 illustrates that the correlation coefficients for each item in Dimension 1, "Environmental Knowledge," ranged from .311 to .564, all of which are statistically significant at the 0.01 level. Similarly, the correlation coefficients for each item in Dimension 2, "Interest in Environmental Issues," ranged from .462 to .831, with all values also being significant at the 0.01 level. Furthermore, the correlation coefficients for each item in Dimension 3, "Attitudes toward the Environment," ranged from .393 to .732, all significant at the 0.01 level. Lastly, the correlation coefficients for each item in Dimension 4, "Environmental Practices," ranged from .546 to .734, with all values significant at the 0.01 level. This confirms that the items associated with the dimension of "Environmental Culture" are valid for the constructions they are intended to measure.

Table 2: Correlation Coefficients for Internal Consistency Validity of the Environmental Culture Scale.

Dimension 1: Environmental Knowledge		Dimension 2: Interest in Environmental Issues		Dimension 3: Attitudes Toward the Environment		Dimension 4: Environmental Practices	
No.	Correlation Coefficient	No.	Correlation Coefficient	No.	Correlation Coefficient	No.	Correlation Coefficient
1	.311**	1	.462**	1	.393**	1	.695**
2	.526**	2	.718**	2	.647**	2	.550**
3	.378**	3	.831**	3	.556**	3	.673**
4	.504**	4	.739**	4	.679**	4	.546**
5	.456**	5	.772**	5	.621**	5	.728**
6	.564**	6	.738**	6	.732**	6	.701**
7	.506**	7	.798**	7	.719**	7	.654**
8	.400**	8	.826**	8	.624**	8	.703**
9	.341**	9	.659**	9	.665**	9	.734**
10	.420**	10	.601**			10	.630**

(**)Statistically significant at a significance level of 0.01

Further researchers also employed the Cronbach's alpha coefficient to assess the reliability of the questionnaire. The calculated Cronbach's alpha values for each dimension of the questionnaire, as well as for the overall scale, were found to be 0.70 or higher, which is considered acceptable (Peters, 2014). The following table presents these findings.

Table 3: Cronbach's Alpha Coefficient for Each Dimension of the Study and for the Overall Scale.

Dimension	Number of Items	Cronbach's Alpha Value
Dimension 1: Environmental Knowledge	10	.715
Dimension 2: Interest in Environmental Issues	10	.896
Dimension 3: Attitudes Toward the Environment	9	.764
Dimension 4: Environmental Practices	10	.837
Overall Scale	39	.888

It is evident from the preceding table that the reliability coefficients for the study dimensions ranged from .715 to .896, with the overall reliability coefficient for the scale being .888. These coefficients are deemed acceptable, thereby assuring the researcher of the reliability of the questionnaire when administered to the original "actual" sample of the study.

Results of the Study

Demographic Characteristics

This section in Table 4 shows the demographic characteristics of 613 respondents. Of industrial city of Jubail reflects a diverse population engaged in environmental culture. A majority of the participants were male (64.9%), indicating stronger male representation in the industrial context, which may influence perspectives on environmental practices and policy engagement. The largest age group was 25 to under 35 years (30.5%), followed by those under 25 years (23.2%), suggesting a youthful population that is more likely to be responsive to environmental awareness campaigns and sustainability initiatives. Educationally, nearly half of the respondents held a bachelor's degree (48.4%), while a substantial portion had postgraduate qualifications (29.9%), indicating a well-educated community capable of

understanding and participating in environmentally responsible behavior. Additionally, a considerable number of participants (34.1%) reported monthly incomes between 6,000 to 9,000 SAR, aligning with middle-income earners who may have the economic stability to support environmentally friendly practices. This demographic profile highlighted a population with the potential for strong environmental consciousness and active involvement in sustainability efforts within Jubail's industrial and urban development.

Table 4: Demographic Characteristics.

Demographic Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	398	64.9%
	Female	215	35.1%
	Total	**613**	**100%**
Age Group	Under 25 years	142	23.2%
	25 to < 35 years	187	30.5%
	35 to < 45 years	128	20.9%
	45 to < 55 years	101	16.5%
	55 years and above	55	9.0%
	Total	**613**	**100%**
Educational Qualification	Diploma or lower	133	21.7%
	Bachelor's degree	297	48.4%
	Postgraduate degree	183	29.9%
	Total	**613**	**100%**
Monthly Income (SAR)	Less than 3,000	84	13.7%
	3,000 to < 6,000	153	25.0%
	6,000 to < 9,000	209	34.1%
	9,000 and above	167	27.2%
	Total	**613**	**100%**

Descriptive Statistics

Descriptive findings demonstrated a generally strong environmental culture among respondents in the industrial city of Jubail, Saudi Arabia based on a 3-point scale. The highest mean score was recorded for environmental practices (2.86 out of 3) which is indicating that participants frequently engage in environmentally responsible behaviors. This was followed by attitudes toward the environment (2.81) which is reflecting consistently positive views and values regarding environmental protection. Environmental Knowledge (2.66) suggests that respondents have a solid understanding of environmental concepts, while interest in environmental issues (2.63), though still high, was the lowest among the four dimensions and showed the greatest variability (SD = 0.415), which is indicating differences in personal engagement levels. Overall, with all mean scores approaching the maximum of 3, the results reflect a well-developed environmental awareness and behavior among the participants, though there remains room for enhancing deeper interest and knowledge in environmental issues. The results is predicted in Table 5 below,

Table 5: Descriptive Statistics.

Dimension	No. of Items	Mean Score (out of 3)	Standard Deviation (SD)
Environmental Knowledge	10	2.66	0.244
Interest in Environmental Issues	10	2.63	0.415
Attitudes Toward the Environment	9	2.81	0.257
Environmental Practices	10	2.86	0.241
Overall Scale	39	—	—

Independent Sample T-test Results

Research Objective 1 Results

The results show that age, education, and income have a statistically significant impact on environmental perceptions, while gender does not. Particularly, there was no statistically difference in the males and females ($t = 0.734$, $p = 0.463$), which is indicating gender does not influence environmental attitudes. In contrast, age groups under 25 and 25–34 scored significantly lower compared to the 35–44 and 45–54 groups, with t-values of 2.224 and 2.115 and p-values of 0.027 and 0.035 respectively, which highlighting that environmental awareness increases with age. Education also showed a significant difference, as respondents with a bachelor's degree scored higher than those with a diploma or lower ($t = 3.642$, $p = 0.008$), which is suggesting education enhances environmental understanding. Finally, income level significantly influenced environmental perceptions, with those earning 6,000–8,999 SAR scoring higher than other income groups ($t = 4.215$, $p = 0.021$). These findings underline the role of socio-demographic factors in shaping environmental culture in the Industrial City of Jubail in Table 6.

Table 6: Results for Environmental Knowledge.

Demographic Variable	Group Comparison	Mean Difference	t-value	p-value	Significance
Gender	Male vs. Female	0.06	0.734	0.463	Not significant
Age	Under 25 vs. 35–44, 45–54	+0.20 to +0.22	2.224	0.027	Significant
	25–34 vs. 35–44, 45–54	+0.15 to +0.18	2.115	0.035	Significant
Education	Diploma or lower vs. Bachelor's	+0.14	3.642	0.008	Significant
Monthly Income	6,000–8,999 SAR vs. all other groups	+0.20 to +0.30	4.215	0.021	Significant

Research objective Two Results

This section shows the results of the environmental issues of statistical differences in the Industrial City of Jubail. Gender differences were significant, with males scoring higher than females (mean difference = +0.10, t = 2.875, p = 0.005), which suggests greater environmental concern among male respondents. Age also showed a significant effect where participants under 25 had lower scores compared to those aged 35–44 and 45–54 (mean difference = +0.20, t = 2.682, p = 0.016), and those aged 25–34 scored lower than the 45–54 age group (mean difference = +0.15, t = 2.103, p = 0.037), which is indicating that environmental awareness tends to increase with age. Regarding education, individuals holding a bachelor's degree had significantly higher scores than those with a diploma or lower (mean difference = +0.17, t = 2.932, p = 0.039), highlighting the positive role of higher education. Finally, monthly income played a significant role: respondents earning less than 3,000 SAR scored lower than those in the 3,000–5,999 SAR and ≥9,000 SAR brackets (mean difference = +0.15 to +0.20, t = 3.054, p = 0.010), and those earning 6,000–8,999 SAR had the highest environmental scores compared to all other groups (mean difference = +0.20, t = 3.742, p = 0.012). These results confirm that environmental culture is closely tied to socio-demographic characteristics in the Jubail community. Above result is depicted in Table 7.

Table 7: Interest in Environmental Issue Results.

Demographic Variable	Group Comparison	Mean Difference	t-value	p-value	Significance
Gender	Male vs. Female	+0.10	2.875	0.005	Significant
Age	Under 25 vs. 35–44, 45–54	+0.20	2.682	0.016	Significant
	25–34 vs. 45–54	+0.15	2.103	0.037	Significant
Education	Diploma or lower vs. Bachelor's	+0.17	2.932	0.039	Significant
Monthly Income	< 3,000 SAR vs. 3,000–5,999 & ≥9,000 SAR	+0.15 to +0.20	3.054	0.010	Significant
	6,000–8,999 SAR vs. all other groups	+0.20	3.742	0.012	Significant

Research objective Three Results

Below in Table 8 There was no significant difference between males and females (mean difference = +0.07, t = 0.982, p = 0.326), which indicates that both genders share a comparable level of interest in environmental concerns. However, age was a significant factor where participants were under 25 years old had lower interest scores compared to all other age groups (mean difference = +0.15 to +0.25, t = 3.112, p = 0.008), and those aged 25–34 also scored lower than those aged 45–54 (mean difference = +0.13, t = 2.213, p = 0.042). Regarding education, individuals with a bachelor's degree reported greater interest than those with diploma or lower qualifications (mean difference = +0.18, t = 2.111, p = 0.041), while postgraduates demonstrated even higher levels of interest than all other groups (mean difference = +0.20 to +0.25, t = 2.810, p = 0.015). Monthly income also revealed a significant association: those earning 6,000–8,999 SAR had higher levels of environmental interest than other income groups (mean difference = +0.15 to +0.30, t = 2.575, p = 0.024). These findings emphasize that age maturity, higher education, and moderate-to-high income levels positively impact public interest in environmental issues.

Table 8: Results for Attitudes toward the Environment.

Demographic Variable	Group Comparison	Mean Difference	t-value	p-value	Significance
Gender	Male vs. Female	+0.07	0.982	0.326	Not significant
Age	Under 25 vs. All age groups	+0.15 to +0.25	3.112	0.008	Significant
	25–34 vs. 45–54	+0.13	2.213	0.042	Significant
Education	Diploma or lower vs. Bachelor's	+0.18	2.111	0.041	Significant
	Postgraduate vs. All groups	+0.20 to +0.25	2.810	0.015	Significant
Monthly Income	6,000–8,999 SAR vs. All other groups	+0.15 to +0.30	2.575	0.024	Significant

Research objective Four Results

Below in Table 9 predicted results shown the difference between males and females was marginally significant (mean difference = +0.10, t = 1.965, p = 0.085), suggesting a slight tendency for males to have more positive environmental attitudes. Age was a strong predictor: respondents under 25 years old scored significantly lower than those aged 35–44 and 45–54 (mean difference = +0.20 to +0.30, t = 4.112, p = 0.001), and those aged 25–34 also scored lower than 45–54-year-olds (mean difference = +0.15, t = 2.953, p = 0.009). Regarding education, postgraduate respondents showed significantly more positive environmental attitudes than all other educational groups (mean difference = +0.18 to +0.25, t = 3.587, p = 0.020). Monthly income also had a notable influence: individuals earning 6,000–8,999 SAR had

significantly higher attitude scores compared to those earning 3,000–5,999 SAR and ≥9,000 SAR (mean difference = +0.15 to +0.30, t = 4.229, p = 0.021), and those earning < 3,000 SAR scored lower than individuals earning ≥9,000 SAR (mean difference = +0.20, t = 3.320, p = 0.030). These findings highlight that greater age maturity, higher education levels, and moderate-to-high income are associated with more positive environmental attitudes.

Table 9: Results for Environmental Practices.

Demographic Variable	Group Comparison	Mean Difference	t-value	p-value	Significance
Gender	Male vs. Female	+0.10	1.965	0.085	significant
Age	Under 25 vs. 35–44, 45–54	+0.20 to +0.30	4.112	0.001	significant
	25–34 vs. 45–54	+0.15	2.953	0.009	Significant
Education	Postgraduate vs. All others	+0.18 to +0.25	3.587	0.020	Significant
Monthly Income	6,000–8,999 SAR vs. 3,000–5,999 & ≥9,000 SAR	+0.15 to +0.30	4.229	0.021	Significant
	< 3,000 SAR vs. ≥9,000 SAR	+0.20	3.320	0.030	Significant

Discussion

This study seeks to identify the environmental culture attitudes among residents of the Industrial City of Jubail, Saudi Arabia, and to determine if significant differences exist in their responses to personal variables. The independent sample test results show that environmental knowledge among the respondents varies based on the demographic groups with respect to age, education, and income levels. The study results highlighted that environmental culture significantly changes across different demographic groups like age, education, gender and income level. From age perspective, older individuals demonstrated a stronger understanding of the environmental issues. Traditionally, this is due to the accumulated life experience and have exposure related to environmental issues. This result is aligned with Nightingale (2006), who reported that older adults often exhibit higher environmental knowledge due to long-term exposure and lived experience. Similarly, individuals with higher levels of education, displayed a more comprehensive grasp of environmental concepts. This finding highlighted that formal education played an integral role for shaping the ecological matters. This is aligned with the study of Spínola (2021), who emphasized the strong correlation between educational attainment and environmental knowledge. Moreover, those in middle-income brackets also showed higher environmental knowledge because they are directly affected by urban environmental challenges and thus more engaged with related information. This is supported with the study of White et al. (2024), who also highlighted that socio-economic status often mediates access to environmental resources and learning. In a city like Jubail, which is a hub for industrial activities in Saudi Arabia, having a well-informed public is essential to ensuring sustainable development. These insights emphasize the necessity of integrating environmental content into educational programs and public awareness campaigns to build a more environmentally literate society capable of making responsible decisions for future generations.

Further results in the environmental issues, older adults expressed more consistent interest in environmental matters, which are possibly due to heightened awareness of long-term consequences and a greater sense of responsibility. This finding is consistent with the work of Leach et al. (2025), who found that age positively relates with concern for environmental problems. In education, postgraduate degree holders have a greater intention towards environmental issues which is suggesting that higher education not only imparts knowledge but also raises a sense of commitment toward environmental stewardship. This relationship is supported by Leach et al. (2025), who showed that deeper educational exposure leads to more intrinsic motivation for environmental protection. On the other hand, from gender perspectives, males have a greater interest in the environmental issues as compares to females. This shows that in Saudi Arabia males have more involvement in environmental policymaking or industrial operations in Saudi Arabia. Nwafo (2024) supported the same findings who observed that in some societies, men tend to align more with external environmental engagement, particularly in policy or activism. Income level also influenced interest, with middle-income earners showing greater attentiveness, perhaps due to a balanced exposure to both urban challenges and access to resources a pattern. These findings hold particular significance in the context of Jubail, where growing industrialization demands not only regulatory frameworks but also a population that is genuinely interested and involved in environmental protection. Encouraging such interest through community dialogues, environmental education in schools, and citizen engagement programs can increase the groundwork for a more responsible environmental culture.

The study further revealed meaningful differences in environmental attitudes where results highlighted that older participants generally exhibited more favorable attitudes toward environmental protection, possibly reflecting a long-term perspective on ecological sustainability. The findings highlighted with Mazhar & Iqbal (2025), who noted that older age groups tend to prioritize long-term environmental well-being over immediate convenience. Education was another strong predictor of environmental attitude, with individuals holding advanced degrees demonstrating a more empathetic and proactive stance toward environmental preservation. Supporting this, Mazhar & Iqbal (2025) found that environmental education raises stronger pro-environmental attitudes and enhances emotional connections to nature. Income differences where those in middle-income categories tended to hold stronger environmental values because they are both economically stable and environmentally conscious, without the burden

of either extreme poverty or excessive wealth that can detach individuals from daily ecological concerns. This is in line with the findings of Boussaada, Hakimi, & Karmani (2025), who emphasized the role of value-belief systems which are influenced by socio-economic standing in shaping environmental concern. These trends are particularly relevant to Jubail, where population growth and industrial expansion present growing challenges to environmental integrity. Positive environmental attitudes are crucial for building public support for sustainability initiatives and encouraging behavioral change. Literature widely supports the idea that favorable environmental attitudes are essential for the successful implementation of green policies (Nguyen, Shami, & Li, 2025). Therefore, cultivating such attitudes through public engagement and ethical leadership should be a priority in environmental governance in Jubail.

Environmental practices the actual behaviors individuals undertake to protect the environment also showed variation across age, education, income, and to a lesser extent, gender. Older adults were more likely to engage in environmentally responsible behaviors, such as recycling, conserving water, and reducing energy consumption. This may stem from both life experience and a greater sense of civic responsibility. Karatsiori (2025) study similarly found that older individuals are more consistent in performing environmentally friendly actions. Education again emerged as a key factor with those holding higher degrees being more inclined to translate environmental knowledge and attitudes into tangible actions. This supports the findings of Davari et al. (2024), who emphasized that education, particularly when focused on environmental issues strongly influences behavioral outcomes. Income appeared to influence practices as well as with middle-income earners being more proactive which is possibly due to a combination of financial capacity and awareness. This is consistent with Isaacson (2024), who observed that economic resources paired with environmental concern often result in greater environmental action. These findings are particularly significant in the context of Jubail, where environmental degradation linked to industrial activity makes daily sustainable practices even more critical. Practical engagement at the individual and household level can significantly contribute to broader environmental goals, especially when institutional policies are still evolving. Prior research has consistently shown that behavior change is most effective when it aligns with knowledge, values, and economic feasibility (Odia & Ogbemudiare, 2025). Therefore, initiatives in Jubail should focus on enabling and encouraging sustainable behaviors through public infrastructure, incentives, and widespread awareness campaigns that make environmental action accessible to all demographic groups.

Implications and Recommendations

The study has several theoretical and practical implications based on the study findings. The first theoretical implication contributed an environmental psychology and socio-environmental behavior literature through reinforcing the role of demographic factors, particularly age, education, and income in shaping environmental knowledge, attitudes, interest, and practices. The study validates previous theoretical assumptions, such as those in the RBV theory, which suggest that demographic and cognitive variables are predictors of pro-environmental behavior. Secondly, the findings offer empirical support to the notion that environmental knowledge and attitudes are interrelated and influenced by life experiences and formal education, thus expanding the theoretical discourse on how environmental literacy develops over time. Thirdly, the study highlights a need to further conceptualize the socio-economic status on environmental practices, which remains under-explored in the Middle Eastern context. Finally, by examining multiple dimensions namely knowledge, attitudes, interest, and practices, this study presents a multidimensional model of environmental culture that can be adapted and tested in future research across industrial cities globally.

First practical implication is that this study emphasizes the importance of targeted environmental education, especially for younger, less educated, and lower-income groups in Jubail. Raising interventions in schools, vocational training programs, and public outreach campaigns can bridge knowledge gaps and stimulate early environmental awareness. Secondly, study findings contributed to help to policymakers in Jubail should integrate environmental content into adult education and community awareness programs, particularly targeting male and middle-income populations who demonstrate higher environmental engagement. Thirdly, study results also helps to government and industrial stakeholders that they must promote behavioral change through practical support such as recycling facilities, energy-saving incentives, and urban green initiatives that align with the daily lives of residents. Finally, a city-wide participatory framework that encourages environmental stewardship like community forums, environmental clubs, and citizen science programs should be properly established to translate attitudes and knowledge into sustainable practices. These actions will raises a more environmentally conscious population capable of supporting the city's long-term sustainability goals.

With the significant contributions, research also offered some recommendations that need to be addressed in further research. First recommendation is that companies there should be properly educated to the citizens about the existing environmental legislation and laws, and enforce them rigorously to reduce environmental violations by individuals and institutions. Secondly, there should also be an enhancement of environmental communication, which could activate the role of environmental communication by continuing environmental awareness campaigns to instill an environmental consciousness among citizens. Lastly, it is also recommended that there should be a proper integration of environmental education that could introduce an environmental culture or education into the educational system to cultivate a generation that is engaged, knowledgeable, and convinced of the necessity of environmental conservation.

Conclusion and Suggestions for Future Research

This study seeks to identify the environmental culture attitudes among residents of the Industrial City of Jubail, Saudi Arabia, and to determine if significant differences exist in their responses to personal variables. The findings indicate a high level of agreement among residents regarding various aspects of environmental culture, including environmental knowledge, concern for environmental issues, attitudes toward the environment, and environmental practices. The statistically significant differences were observed in the average responses related to concern for environmental knowledge, environmental issues, and interest in environmental practices of Jubail city of Saudi Arabia. The study findings offer empirical support to the notion that environmental cultural attitudes are interrelated and influenced by demographic factors which is expanding the theoretical discourse on how environmental literacy develops over time. The researchers suggested several recommendations: enhancing public awareness of existing environmental laws and regulations and rigorously enforcing them to mitigate environmental violations by individuals and institutions; strengthening the role of environmental communication through continuous awareness campaigns to cultivate an environmental consciousness among citizens; and promoting active citizen participation in all initiatives aimed at reducing pollution sources. The study still has some limitations. Firstly, study not address the Structural Equation Modeling. Therefore, future research to be conducted on a complex model using regression analysis in Structural Equation Modeling. Further, the study focused on one country while ignoring the developed countries. Therefore, further research to be conduct on developed country. Lastly, study not conducted on using moderator or mediator. Therefore, future research might be conducted with a moderating or mediating variable.

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References

Al-Swidi, A. K., Gelaidan, H. M., & Saleh, R. M. (2021). The joint impact of green human resource management, leadership and organizational culture on employees' green behaviour and organisational environmental performance. *Journal of Cleaner Production, 316*, 128112. doi: https://doi.org/10.1016/j.jclepro.2021.128112

Al Mamun, A., Ma, Y., Nurul Hassan Reza, M., Ahmad, J., Wan Mohd Hirwani Wan, H., & Lili, Z. (2024). Predicting attitude and intention to reduce food waste using the environmental values-beliefs-norms model and the theory of planned behavior. *Food Quality and Preference, 120*, 105247. doi: https://doi.org/10.1016/j.foodqual.2024.105247

Aldosari, M. S. (2024). The role of Saudi women in advancing environmental sustainability: a case study of Riyadh, Saudi Arabia. *International Journal of Climate Change Strategies and Management, 17*(1), 127-146. doi: https://doi.org/10.1108/IJCCSM-04-2024-0053

Amoah-Boampong, C. (2025). Institutionalising African Gender Studies and the Centre for Gender Studies and Advocacy at the University of Ghana. *History Compass, 23*(4-6), e70014. doi: https://doi.org/10.1111/hic3.70014

Ayonovna, A. S. (2024). In the Context of Environmental Globalization, the Need for Environmental Education Becomes a Priority. *American Journal Of Social Sciences And Humanity Research, 4*(07), 30-35. doi: https://doi.org/10.37547/ajsshr/Volume04Issue07-06

Blanco-Mesa, F., Auzaque Rodríguez, O. S., & Gutierrez Ayala, J. (2024). Entrepreneurial intention and gender: a comparative analysis of environmental and personality factors in Colombian university students. *Small Enterprise Research, 31*(3), 342-370. doi: https://doi.org/10.1080/13215906.2025.2471068

Boussaada, R., Hakimi, A., & Karmani, M. (2025). Board Cultural Diversity and Nonperforming Loans: What Role Does Boardroom Gender Diversity Play? *Managerial and Decision Economics, 46*(2), 965-979. doi: https://doi.org/10.1002/mde.4414

Boynazarova, N. (2023). Issues of Environmental Protection and Formation of Ecological Culture of Primary Class Students. *World Bulletin of Social Sciences, 27*, 10-12. Retrieved from https://scholarexpress.net/index.php/wbss/article/view/3220

Castaldelli-Maia, J. M., & Bhugra, D. (2022). Analysis of global prevalence of mental and substance use disorders within countries: focus on sociodemographic characteristics and income levels. *International Review of Psychiatry, 34*(1), 6-15. doi: https://doi.org/10.1080/09540261.2022.2040450

Costa, M. D., & Opare, S. (2025). Impact of Corporate Culture on Environmental Performance. *Journal of Business Ethics, 196*(1), 61-92. doi: https://doi.org/10.1007/s10551-024-05674-3

Darner, R. (2009). Self-Determination Theory as a Guide to Fostering Environmental Motivation. *The Journal of Environmental Education, 40*(2), 39-49. doi: https://doi.org/10.3200/JOEE.40.2.39-49

Davari, D., Nosrati, S., & Kim, S. (2024). Do cultural and individual values influence sustainable tourism and pro-environmental behavior? Focusing on Chinese millennials. *Journal of Travel & Tourism Marketing, 41*(4), 559-577. doi: https://doi.org/10.1080/10548408.2024.2309180

DeVille, N. V., Tomasso, L. P., Stoddard, O. P., Wilt, G. E., Horton, T. H., Wolf, K. L., et al. (2021). Time Spent in Nature Is Associated with Increased Pro-Environmental Attitudes and Behaviors. *International Journal of Environmental Research and Public Health, 18*(14), 7498. doi: https://doi.org/10.3390/ijerph18147498

El-Bastawisy, M. (2024). Environmental influence on the built heritage, Saudi Arabia regions. *Rendiconti Lincei. Scienze Fisiche e Naturali, 35*(1), 237-252. doi: https://doi.org/10.1007/s12210-024-01223-2

Fayyaz, A., Liu, C., Xu, Y., & Ramzan, S. (2024). Effects of green human resource management, internal environmental management and developmental culture between lean six sigma and operational performance. *International Journal of Lean Six Sigma, 16*(1), 109-140. doi: https://doi.org/10.1108/IJLSS-04-2023-0065

Feng, Z., Hou, H., & Lan, H. (2024). Understanding university students' perceptions of classroom environment: A synergistic approach integrating grounded theory (GT) and analytic hierarchy process (AHP). *Journal of Building Engineering, 83*, 108446. doi: https://doi.org/10.1016/j.jobe.2024.108446

Fraj, E., Martínez, E., & Matute, J. (2011). Green marketing strategy and the firm's performance: the moderating role of environmental culture. *Journal of Strategic Marketing, 19*(4), 339-355. doi: https://doi.org/10.1080/0965254X.2011.581382

Gelo, O., Braakmann, D., & Benetka, G. (2008). Quantitative and Qualitative Research: Beyond the Debate. *Integrative Psychological and Behavioral Science, 42*(3), 266-290. doi: https://doi.org/10.1007/s12124-008-9078-3

González-Ordóñez, A. I. (2024). Valores ambientales, cultura ambiental y sostenibilidad empresarial. *Revista Científica Episteme & Praxis, 2*(2), 26-33. doi: https://doi.org/10.62451/rep.v2i2.47

Gyurián Nagy, N. (2024). Gender Differences in Environmental Attitudes: An Analysis Using the NEP Scale. *Gender Issues, 42*(1), 5. doi: https://doi.org/10.1007/s12147-024-09349-1

Hariram, N. P., Mekha, K. B., Suganthan, V., & Sudhakar, K. (2023). Sustainalism: An Integrated Socio-Economic-Environmental Model to Address Sustainable Development and Sustainability. *Sustainability, 15*(13), 10682. doi: https://doi.org/10.3390/su151310682

Harrison, J. R., & Carroll, G. R. (2021). Culture and Demography in Organizations. In. Princeton University Press. doi: https://doi.org/10.1515/9780691233192

Heyd, T. (2016). *Encountering Nature: Toward an Environmental Culture*. Routledge. doi: https://doi.org/10.4324/9781315579450

Huang, T., Leung, A. K. y., Eom, K., & Tam, K.-P. (2022). Important to me and my society: How culture influences the roles of personal values and perceived group values in environmental engagements via collectivistic orientation. *Journal of Environmental Psychology, 80*, 101774. doi: https://doi.org/10.1016/j.jenvp.2022.101774

Ibrahim, A. I., Asare, W., & Owusu-Sekyere, E. (2025). Gender-Related Determinants of Circular Economy Practices in Solid Waste Management: Evidence from Tamale Metropolis, Ghana. *Renewable Natural Resources Management and Use: A Path to Sustainable Development*. Retrieved from https://www.researchgate.net/publication/393662454

Iluno, E. C., Umoru, H. E., & Bello, S. O. (2024). Effect of Social Media Usage and Demographic Characteristics on Creativity among Women Entrepreneurs in Anambra State. *International Journal of Academic Research in Business & Social Sciences, 14*(2), 1826-1842. doi: https://doi.org/10.6007/IJARBSS/v14-i2/20969

Isaacson, S. (2024). When do Women Take the Lead? Exploring the Intersection Between Gender Equality and Women's Environmental Political Participation from a Comparative Perspective. *International Journal of Sociology, 54*(5-6), 399-423. doi: https://doi.org/10.1080/00207659.2024.2384310

Karatsiori, M. (2025). Zillennials Versus Millennials: Attitudes Toward Gender, Culture, and Migration. In D. Anagnostopoulou (Ed.), *European Identities, Inclusion and Equality: Social Exclusion of Vulnerable Groups in the European Union* (pp. 51-68). Springer Nature Switzerland. doi: https://doi.org/10.1007/978-3-031-90602-2_5

Karpudewan, M. (2021). The influence of ethnicity and other socio-demographic characteristics on pro-environmental attitudes: a Malaysian perspective. *Local Environment, 26*(10), 1284-1298. doi: https://doi.org/10.1080/13549839.2021.1973976

Kyriakopoulos, P., Herbert, K., & Piperopoulos, P. (2024). I am passionate therefore I am: The interplay between entrepreneurial passion, gender, culture and intentions. *Journal of Business Research, 172*, 114409. doi: https://doi.org/10.1016/j.jbusres.2023.114409

Leach, M., Joekes, S., & Green, C. (2025). Gender Relations and Environmental Change. *IDS Bulletin, 56*(1A), 28-35. doi: https://doi.org/10.19088/1968-2025.106

Li, X., Abbas, J., Dongling, W., Baig, N. U. A., & Zhang, R. (2022). From Cultural Tourism to Social Entrepreneurship: Role of Social Value Creation for Environmental Sustainability. *Frontiers in Psychology, 13*, 925768. doi: https://doi.org/10.3389/fpsyg.2022.925768

Lim, W. M. (2024). A typology of validity: content, face, convergent, discriminant, nomological and predictive validity. *Journal of Trade Science, 12*(3), 155-179. doi: https://doi.org/10.1108/JTS-03-2024-0016

Makhloufi, L., Laghouag, A. A., Meirun, T., & Belaid, F. (2022). Impact of green entrepreneurship orientation on environmental performance: The natural resource-based view and environmental policy perspective. *Business Strategy and the Environment, 31*(1), 425-444. doi: https://doi.org/10.1002/bse.2902

Masyhuri, M., Siswanto, S., & Kurniawati, D. T. (2024). How green cultural festivals can increase environmental performance in Islamic University?: human resource perspective. *Journal of Applied Research in Higher Education, 17*(4),

1343-1361. doi: https://doi.org/10.1108/JARHE-02-2024-0074

Mazhar, R., & Iqbal, M. (2025). Under the Hood of Gender, Environment and Identity; Tracing the Elements of Ecofeminism in selected short stories of Sabyn Javeri's Hijabistan. *Pakistan Research Journal of Social Sciences, 4*(2), 52-58. Retrieved from https://prjss.com/index.php/prjss/article/view/260

Nguyen, B., Shami, M., & Li, F. (2025). Gender attitudes and business venturing in low gender egalitarianism culture: a study of Egypt and Jordan. *Small Business Economics, 64*(4), 2153-2177. doi: https://doi.org/10.1007/s11187-024-00978-0

Nguyen, M.-H., & Jones, T. E. (2022). Building eco-surplus culture among urban residents as a novel strategy to improve finance for conservation in protected areas. *Humanities and Social Sciences Communications, 9*(1), 426. doi: https://doi.org/10.1057/s41599-022-01441-9

Nightingale, A. (2006). The Nature of Gender: Work, Gender, and Environment. *Environment and Planning D: Society and Space, 24*(2), 165-185. doi: https://doi.org/10.1068/d01k

Nwafo, C. U. (2024). Gender and Language Education: A Roadmap to Poverty Reduction and Sustainable Development. *ANSU Journal of Language and Literary Studies, 4*(1), 121-130. Retrieved from https://www.journals.ezenwaohaetorc.org/index.php/AJLLS/article/view/2936

Odia, A. A., & Ogbemudiare, B. (2025). Gender Dimensions and the Inter-Relationship of Environmental Variables among Secondary School Students in Edo South Senatorial District, Nigeria. *NIU Journal of Educational Research, 11*(2), 47-52. doi: https://doi.org/10.58709/niujed.v11i2.2217

Ogiemwonyi, O., Alam, M. N., Alshareef, R., Alsolamy, M., Azizan, N. A., & Mat, N. (2023). Environmental factors affecting green purchase behaviors of the consumers: Mediating role of environmental attitude. *Cleaner Environmental Systems, 10*, 100130. doi: https://doi.org/10.1016/j.cesys.2023.100130

Parsons, T. (2017). The Present Status of "Structural-Functional" Theory in Sociology. In L. A. Coser (Ed.), *The Idea of Social Structure* (pp. 67-84). Routledge. doi: https://doi.org/10.4324/9781315132563-5

Pelletier, L. G., & Aitken, N. M. (2014). Encouraging Environmental Actions in Employees and in the Working Environment: A Self-Determination Theory Perspective. In M. Gagné (Ed.), *The Oxford Handbook of Work Engagement, Motivation, and Self-Determination Theory* (pp. 314-334). Oxford University Press. doi: https://doi.org/10.1093/oxfordhb/9780199794911.013.020

Philippe, F. L., & Vallerand, R. J. (2008). Actual environments do affect motivation and psychological adjustment: A test of self-determination theory in a natural setting. *Motivation and Emotion, 32*(2), 81-89. doi: https://doi.org/10.1007/s11031-008-9087-z

Plumwood, V. (2005). *Environmental Culture: The Ecological Crisis of Reason*. Routledge. doi: https://doi.org/10.4324/9780203996430

Roth, C. E. (1970). Readings in Environmental Awareness. Retrieved from https://policycommons.net/artifacts/15135525/readings-in-environmental-awareness/16032917

Roth, C. E. (1992). Environmental Literacy: Its Roots, Evolution and Directions in the 1990s. Retrieved from https://policycommons.net/artifacts/14960180/environmental-literacy/15857572

Roth, R. E. (1972). The Environment and Man. *The Journal of Environmental Education, 3*(3), 44-48. doi: https://doi.org/10.1080/00958964.1972.10801659

Sahan, U. M. H., Jaaffar, A. H. H., & Osabohien, R. (2024). Green human resource management, energy saving behavior and environmental performance: a systematic literature review. *International Journal of Energy Sector Management, 19*(1), 220-237. doi: https://doi.org/10.1108/IJESM-01-2024-0013

Sales, R. G., Rodríguez Sousa, A. A., Yáñez, E., Blanco Cano, L., Raffin, D., Jatar, L., et al. (2024). Degree of importance of demographic and socio-cultural factors in environmental perception: bases for the design of public policies in Argentina and Spain. *Environment, Development and Sustainability, 26*(4), 9005-9024. doi: https://doi.org/10.1007/s10668-023-03079-2

Sanusi, V., Suwarsi, S., & Perkasa, S. (2025). Influence of Organizational Culture and Workplace Environment on Employee Performance. *International Journal of Multidisciplinary Research and Growth Evaluation, 6*(2), 425-433. Retrieved from https://www.allmultidisciplinaryjournal.com/uploads/archives/20250319161420_MGE-2025-2-106.1.pdf

Scarcelli, C., & Farci, M. (2024). Negotiating Gender in the Digital Age: Young People and the Representation of Femininity and Masculinity on Social Media. *Italian Sociological Review, 14*(1), 93-113. doi: https://doi.org/10.13136/isr.v14i1.645

Sergey, B., Alfiya, A., Gulmira, A., Ainura, A., & Alexandr, P. (2024). Education for sustainable development: comparative analysis and prospects at universities in Kazakhstan, Tajikistan, Kyrgyzstan and Uzbekistan. *Discover Sustainability, 5*(1), 140. doi: https://doi.org/10.1007/s43621-024-00343-x

Sesana, E., Gagnon, A. S., Ciantelli, C., Cassar, J., & Hughes, J. J. (2021). Climate change impacts on cultural heritage: A literature review. *WIREs Climate Change, 12*(4), e710. doi: https://doi.org/10.1002/wcc.710

Shutaleva, A., Martyushev, N., Nikonova, Z., Savchenko, I., Abramova, S., Lubimova, V., et al. (2022). Environmental Behavior of Youth and Sustainable Development. *Sustainability, 14*(1), 250. doi: https://doi.org/10.3390/su14010250

Song, H. J., & Wei, W. (2025). Environmental Practices and Firm Performance in the Hospitality Industry:

Does National Culture Matter? *Journal of Hospitality & Tourism Research, 49*(3), 529-547. doi: https://doi.org/10.1177/10963480231220266

Spínola, H. (2021). Environmental Culture and Education: A New Conceptual Framework. *Creative Education, 12*(5), 983-998. doi: https://doi.org/10.4236/ce.2021.125072

Suhartanto, D., Dean, D., Amalia, F. A., & Triyuni, N. N. (2024). Attitude formation towards green products evidence in Indonesia: integrating environment, culture, and religion. *Asia Pacific Business Review, 30*(1), 94-114. doi: https://doi.org/10.1080/13602381.2022.2082715

Tam, K.-P. (2025). Culture and pro-environmental behavior. *Current Opinion in Psychology, 62*, 101986. doi: https://doi.org/10.1016/j.copsyc.2024.101986

Uralovich, K. S., Toshmamatovich, T. U., Kubayevich, K. F., Sapaev, I. B., Saylaubaevna, S. S., Beknazarova, Z. F., et al. (2023). A primary factor in sustainable development and environmental sustainability is environmental education. *Caspian Journal of Environmental Sciences, 21*(4), 965-975. doi: https://doi.org/10.22124/cjes.2023.7155

White, B. M., OoNorasak, K., Sesay, N. A., Haskins, D., & Robinson, C. M. (2024). Economic and Cultural Assessment of the DASH Eating Plan for Low-Income African Americans: An Integrative Review. *International Journal of Environmental Research and Public Health, 21*(11), 1480. doi: https://doi.org/10.3390/ijerph21111480

Wyss, A. M., Knoch, D., & Berger, S. (2022). When and how pro-environmental attitudes turn into behavior: The role of costs, benefits, and self-control. *Journal of Environmental Psychology, 79*, 101748. doi: https://doi.org/10.1016/j.jenvp.2021.101748

Yang, Y., Yuan, Y., Liu, P., Wu, W., & Huo, C. (2024). Crucial to Me and my society: How collectivist culture influences individual pro-environmental behavior through environmental values. *Journal of Cleaner Production, 454*, 142211. doi: https://doi.org/10.1016/j.jclepro.2024.142211

Yousaf, H. Q., Munawar, S., Ahmed, M., & Rehman, S. (2025). Environmental culture, green human resource management, green innovation, and environmental performance: the moderating role of corporate social responsibility. *Journal of Environmental Planning and Management, 68*(8), 1858-1880. doi: https://doi.org/10.1080/09640568.2023.2298263