Bridging The Green Gap: Mediators And Moderators Of Public Awareness Campaigns On Sustainable Purchasing Behaviour In Oman

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Abstract— This research examines how public awareness campaigns and information dissemination shape sustainable consumer behaviour in Oman. The study identifies key predictors, mediators, and moderators influencing behavioural outcomes by exploring how consumers' awareness levels, perceived environmental responsibility, and behavioural intentions mediate relationships between campaign exposure and actual sustainable purchasing practices. The research employed quantitative survey methodology in Oman using Structural Equation Modelling (SEM). The study evaluated direct and indirect effects of awareness initiatives on consumption behaviour. Moderating factors included socio-demographic variables and access to sustainable alternatives. Key predictors encompassed frequency and clarity of sustainability messaging. Mediators included environmental concern, perceived consumer effectiveness, and social norms that bridge gaps between awareness and action. Data collection involved 226 residents of Oman through convenience sampling. Results showed that affective and behavioural awareness significantly influenced sustainable consumer behaviour through perceived consumer effectiveness. Cognitive awareness demonstrated limited mediating effects. Environmental concern showed a minimal direct impact on behaviour. The findings provide actionable insights for policymakers, marketers, and sustainability advocates. The research suggests designing targeted interventions that enhance perceived individual efficacy rather than focusing solely on raising awareness.

Keywords— environmental concern, environmental sustainability, perceived consumer effectiveness, public awareness campaigns, sustainable consumer behaviour, social norms

I. INTRODUCTION

Consumer behaviour has undergone unprecedented transformation towards environmental consciousness, fundamentally altering marketplace dynamics and purchasing priorities. Empirical evidence indicates substantial changes in consumer willingness to support sustainable products. Consumers demonstrate readiness to pay approximately 9.7% premium for sustainably produced goods [1]. These findings reflect fundamental changes in purchasing priorities transcending traditional economic barriers and appear consistent globally. It is documented [2] that 71% of consumers now regard sustainability considerations as equally important as conventional purchasing factors. This suggests a permanent paradigm shift rather than temporary market fluctuation.

Environmental awareness has grown significantly due to direct climate experiences. Research shows that 64% of people globally report increased environmental concerns. Most participants linked this heightened awareness to extreme weather events they experienced in the past two years [3]. This heightened environmental consciousness

generates measurable impacts on consumer decision-making processes. It was documented [4] that 28% of consumers attribute their sustainable purchasing initiation to awareness campaigns implemented by brands and retailers.

Within the Gulf Cooperation Council region, Oman has emerged as a progressive leader in environmental sustainability initiatives. The country demonstrates significant commitment to green transformation aligned with global objectives. Oman Vision 2040 prioritises balanced ecosystems to protect the environment and ensure sustainability of natural resources. The Sultanate aspires to transform into a diversified economy by 2040 [5]. The country's environmental policy framework reflects comprehensive planning. The Sultanate commenced in 2004 the establishment of a national network for monitoring air pollution across industrial areas [6].

Recent government-backed initiatives include the National Renewable Energy Initiative [7]. This features solar panel installation in residential homes within the Muscat Governorate [8]. In the waste management sector, Oman currently generates 1.2 kg of waste per capita per day. The country aims to reduce this to less than 1 kg per capita per day based on Vision 2040 sustainable development goals. This indicates ambitious targets necessitating significant behavioural changes among consumers [9].
Despite substantial progress in environmental policy implementation and growing international emphasis on sustainable consumption, a significant research gap persists. This involves understanding the specific mechanisms through which public awareness campaigns translate into actual sustainable purchasing behaviour within the Omani context. While extensive research has been conducted in Western contexts, limited empirical investigation has examined the key predictors, mediators, and moderators that influence awareness campaign effectiveness in driving sustainable consumption within the Gulf region. The existing literature predominantly focuses on direct relationships between environmental awareness and purchasing intentions. It does not adequately examine the complex mediating pathways involving environmental concern, perceived consumer effectiveness, and social norms that bridge the gap between campaign exposure and actual behaviour.

This research gap represents a critical limitation for policymakers and practitioners seeking to implement effective sustainability interventions. As Oman continues its transition toward Vision 2040's sustainability objectives, understanding the mechanisms that translate awareness into action becomes essential for achieving national environmental targets. The absence of culturally adapted frameworks for understanding campaign effectiveness in the Middle Eastern context limits the ability to design targeted interventions. These should account for unique social, cultural, and economic factors influencing consumer behaviour in this region.

This research aims to develop a validated framework using Structural Equation Modelling (SEM). The framework delineates the pathways through which awareness campaigns effectively drive sustainable consumption within the Omani context. The study's five core objectives encompass: (1) identifying key predictors and moderating factors that influence sustainable consumer behaviour; (2) examining how consumers' exposure to public awareness campaigns relates to their sustainable purchasing practices within the proposed SEM framework; (3) assessing direct and indirect effects of sustainability awareness initiatives on consumption behaviour; (4) investigating the mediating roles of environmental concern, perceived consumer effectiveness, and social norms; and (5)

deriving actionable insights for policymakers, marketers, and sustainability advocates regarding effective campaign design.

II. LITERATURE REVIEW

Sustainable consumer behaviour research has evolved from early economic approaches to sophisticated psychological frameworks, with contemporary understanding recognising complex decision-making processes influenced by multiple internal and external factors [10], [11]. The theoretical foundation primarily draws from three psychological theories: the Theory of Planned Behaviour (TPB), the Norm Activation Model (NAM), and the Value-Belief-Norm (VBN) theory. The TPB demonstrates greater explanatory power in situations involving high behavioural costs or strong behaviour constraints. This renders it particularly relevant for sustainable consumption research in developing economies [12].

Recent empirical investigations have employed sophisticated methodological approaches to examine the relationship between awareness and sustainable purchasing behaviour. A comprehensive SEM-PLS analysis of sustainable purchasing determinants [13] engaged 744 respondents through web-based surveys (October–December 2023), examining how awareness exposure relates to actual purchasing practices. The findings revealed complex relationships between awareness and behaviour. These challenge conventional assumptions about linear cause-and-effect processes. Environmental awareness emerged as a significant mediator in the awareness-to-behaviour pathway. It accounted for 34% of variance in sustainable purchasing intentions ($\beta = 0.42$, $p < 0.001$). This demonstrates statistically significant relationships between awareness initiatives and consumption behaviour. The research identified important demographic moderating effects. Age ($\beta = 0.15$, $p < 0.01$) and education ($\beta = 0.22$, $p < 0.001$) strengthened awareness-behaviour relationships. However, price sensitivity demonstrated substantial negative effects ($\beta = -0.23$, $p < 0.001$). This highlights economic barriers to sustainable consumption. These findings indicate that effective awareness campaigns require multi-dimensional approaches targeting psychological, demographic, and economic factors rather than focusing exclusively on environmental education.

Cross-cultural investigations have provided valuable insights into the role of cultural factors in sustainable consumption behaviour [10]. Sampa et al. [14] examined psychological factors influencing organic food purchasing among 275 Japanese consumers, employing the Theory of Reasoned Action and Hirose's two-phase model within an SEM framework, and identifying environmental consciousness as a crucial mediator ($\beta = 0.35$, $p < 0.001$). Cultural factors including respect for nature ($\beta = 0.22$, $p < 0.01$) and social harmony significantly moderated consciousness-behaviour relationships. Age emerged as a significant predictor. Older consumers demonstrated stronger relationships ($\beta = 0.43$, $p < 0.001$) compared to younger consumers ($\beta = 0.21$, $p < 0.01$). These findings emphasise the importance of cultural adaptation in campaign design. This suggests that effective interventions should incorporate traditional cultural values rather than employing standardized approaches across different cultural contexts.

A comprehensive systematic literature review utilised the Theory-Context-Characteristics-Methodology (TCCM) approach. The review analysed 312 studies across 67 countries involving over 890,000 participants (1993-2023). This provided extensive variable identification across diverse contexts [15]. Environmental concern emerged as the strongest predictor. It was examined in 187 studies with statistically significant positive effects in 94% of cases ($r = 0.43$). Environmental knowledge demonstrated

effects in 78% of 156 studies but with smaller effect sizes (r = 0.28). Perceived consumer effectiveness showed significant effects in 89% of 134 studies (r = 0.39). This highlights key mediating variables in sustainable consumption behaviour. Important moderating factors included social norms, family influence, and institutional trust. The identification of institutional trust as a significant factor suggests that effective campaigns must address credibility concerns alongside environmental benefits. This requires coordinated approaches between awareness initiatives and trust-building measures for optimal outcomes.

Contemporary research has increasingly focused on integrated theoretical approaches to understand sustainable consumption behaviour [10]. Li et al. [16] applied a framework combining the knowledge-attitude-practice model and the theory of planned behaviour. Their study examined sustainable consumption amongst 876 Chinese youth. Results demonstrated SEM framework effectiveness. Green consumption intention ($\beta = 0.54$, $p < 0.001$) and perceived behavioural control ($\beta = 0.23$, $p < 0.01$) significantly affected behaviour. Mediating influences included attitudes towards eco-social benefits ($\beta = 0.31$, $p < 0.001$), green consumption attitudes ($\beta = 0.26$, $p < 0.001$), and subjective norms ($\beta = 0.19$, $p < 0.01$) positively affecting intentions. Environmental knowledge influenced behaviour through attitudes and intentions ($\beta = 0.17$, $p < 0.01$) rather than directly. This confirms important mediation pathways in youth environmental behaviour. These findings suggest that age-targeted campaigns require social influence strategies and barrier-addressing approaches for effective sustainable consumption promotion.

The role of media literacy in sustainable consumption has received increasing attention in recent research [10]. Chamchan et al. [17] investigated media literacy's influence on sustainable consumption amongst 432 Iranian consumers. The study identified novel predictors including media usage, accessibility, content generation, and critical understanding. The SEM framework application revealed that media literacy aspects accounted for 93% of variance in sustainable consumption awareness, 51% in intentions, and combined with awareness explained 87% of behaviour variance. Media literacy functions as an important mediating factor by enhancing consumers' ability to process environmental information effectively. These findings suggest incorporating media literacy education.

Social factors have been identified as crucial determinants of sustainable consumption behaviour [18]. Figueroa-Garcia et al. [18] investigated social factors determining sustainable consumption behaviour in Madrid. The study used Partial Least Squares-SEM (PLS-SEM) with 139 residents. The SEM approach demonstrated that three factors explained 43.4% of behaviour variance: environmental influences (family/friends and cultural traditions), education/information, and market conditions. Family influence demonstrated the strongest mediating effect ($\beta = 0.41$, $p < 0.001$). Cultural factors significantly influenced behaviour ($\beta = 0.35$, $p < 0.001$) through beliefs about appropriate consumption practices. These findings highlight the importance of family-based and community-level interventions. This suggests that effective campaigns should engage multiple social actors simultaneously rather than targeting individuals in isolation.

Theoretical framework analysis in sustainable consumption research has revealed the predominance of certain approaches while identifying gaps in theoretical application. Kumar et al. [10] conducted a systematic review of theories in sustainable consumption behaviour. The analysis covered 64 studies (2012-2022). TPB was most frequently employed (29 studies, 45%) with SEM applications showing consistent effectiveness and

statistically significant results (R^2 0.35-0.68 for intentions, 0.22-0.54 for behaviour). Extended TPB models including mediating factors like altruism and environmental concern showed improved explanatory power (R^2 improvements 0.08-0.22). These findings emphasise the need for integrated approaches combining multiple theoretical frameworks. This suggests that practitioners should address individual psychological factors, social influences, and contextual barriers simultaneously for optimal outcomes.

Multi-country analysis has provided insights into the cross-cultural consistency of sustainable consumption predictors. Kotyza et al. [12] examined pro-environmental intentions across six European countries using 2,702 university students. The SEM framework explained 51% of intentions variance. The analysis identified environmental concern (42% predictive power, $\beta = 0.48$) and perceived behavioural control (45% predictive power, $\beta = 0.44$) as strongest predictors. Social norms showed weaker mediating effects (6%, $\beta = 0.18$). No significant differences across countries were found. These findings support focusing campaign efforts on building environmental concern and perceived behavioural control rather than relying heavily on social pressure mechanisms.

This literature analysis reveals four critical research gaps that justify the current study's focus on sustainable consumer behaviour in Oman. First, while extensive research has been conducted in Western, European, and Asian contexts, there exists a notable absence of comprehensive studies examining sustainable consumer behaviour specifically within the Gulf Cooperation Council region. Unique cultural, economic, and social factors may influence awareness campaign effectiveness differently than in other regions. Second, although several studies have examined the relationship between environmental awareness and purchasing behaviour, limited research has specifically focused on understanding the mechanisms through which public awareness campaigns translate into actual behaviour change. Most studies treat awareness as a general construct rather than examining specific pathways from campaign exposure to behaviour modification. Third, while individual studies have examined various mediating factors such as environmental concern, perceived consumer effectiveness, and social norms, no comprehensive study has simultaneously investigated how these factors operate together within a single integrated framework. Fourth, the literature reveals insufficient attention to moderating factors such as socio-demographic variables, access to sustainable alternatives, economic constraints, and cultural values that may influence campaign effectiveness. Finally, there exists a need for more sophisticated SEM approaches that can simultaneously examine direct effects, indirect effects, mediation, and moderation within the same analytical framework.

Based on comprehensive literature review, this study proposes an integrated framework that addresses the identified research gaps. The framework accounts for the unique contextual factors relevant to the Omani market. The proposed framework synthesizes insights from established behavioural theories with empirical findings from recent consumer research. It incorporates the cultural and economic realities that shape decision-making processes in the Gulf region.

The framework posits that awareness campaigns influence sustainable purchasing through multiple mediating pathways. These include environmental concern, perceived consumer effectiveness, and social norms. These relationships appear moderated by socio-demographic variables, access to sustainable alternatives, and cultural values. This approach differs from existing models by simultaneously examining the complex interplay between campaign characteristics, psychological mediators, and contextual

moderators within a single analytical framework specifically adapted for the Middle Eastern context. The framework addresses identified gaps by providing a culturally sensitive model for understanding campaign effectiveness in driving sustainable consumer behaviour within emerging market contexts characterized by unique social, cultural, and economic considerations.

III. RESEARCH METHODOLOGY

A. The Hypothetical Model

The hypothetical model was developed based on the integration of governing behavioural theories such as TPB, NAM, and VBN, along with empirical insights from prior research findings on sustainable consumption, awareness campaigns, and consumer psychology in environmental contexts.

1) *Linkage between Cognitive Awareness ((CGA) and Environmental Concern (ENC)*

Cognitive awareness entails an individual's ability to recognize environmental problems, understand their causes and consequences, and grasp the scientific and societal implications of unsustainable behaviours [19]. Environmental knowledge, particularly problem awareness, appears to be a critical antecedent of pro-environmental concern and behaviour. However, it often needs to be paired with motivational factors to be impactful [19]. Supporting this, awareness of environmental degradation enhances psychological discomfort, which in turn raises environmental concern [20]. Researchers argue that individuals who comprehend the scope and severity of environmental problems are more likely to experience concern as a cognitive-emotional reaction to perceived threats [21]. Thus, to test this relationship empirically the following hypothesis is formulated:

H1: There is a positive and significant relationship between CGA and ENC

2) *Linkage between Cognitive Awareness (CGA) and Perceived Consumer Effectiveness (PCE)*

Consumers with higher cognitive awareness often believe their actions can impact the environment positively. Prior studies support this linkage [22], [19], [23], [21]. However, some dispute its strength without emotional reinforcement [24]. Thus, the following hypothesis is proposed:

H2: There is a positive and significant relationship between CGA and PCE.

3) *Linkage between Affective Awareness (AFA) and Environmental Concern (ENC)*

Affective awareness evokes emotional engagement, which enhances belief in one's environmental impact. Emotional cues strengthen consumer efficacy by fostering responsibility and urgency [25], [26], [27], [28]. Emotional resonance often motivates action more than facts observed by earlier researchers [29]. Thus, the following hypothesis is proposed:

H3: There is a positive and significant relationship between AFA and ENC.

4) Linkage between Affective Awareness (AFA) and Perceived Consumer Effectiveness (PCE)

Affective awareness, rooted in emotional sensitivity toward environmental issues, strongly evokes concern. Emotional appeals in campaigns increase environmental worry and empathy [25], [26], [28], [27]. Emotions thus intensify environmental concern beyond mere knowledge [30]. Thus, the following hypothesis is proposed:

H4: There is a positive and significant relationship between AFA and PCE.

5) ***Linkage between Behavioural Awareness (BHA) and Environmental Concern (ENC)***

Behavioural awareness reflects one's attentiveness to the environmental impact of daily habits. When individuals become conscious of their consumption patterns and their consequences, this often leads to heightened concern for environmental issues. Empirical evidence supports that experiential and action-based awareness cultivates deeper emotional and cognitive concern [31], [32], [26], [33]. Thus, the following hypothesis is proposed:

H5: There is a positive and significant relationship between BHA and ENC.

6) ***Linkage between Behavioural Awareness (BHA) and Perceived Consumer Effectiveness (PCE)***

Behavioural awareness involves recognizing the impact of one's everyday actions on the environment. This awareness often enhances perceived consumer effectiveness. Individuals begin to see the tangible outcomes of their behaviours. Studies suggest that individuals who consciously engage in eco-friendly habits are more likely to believe in the efficacy of their personal efforts [22], [34], [33], [26]. Thus, the following hypothesis is proposed:

H6: There is a positive and significant relationship between BHA and PCE.

7) ***Linkage between Environmental Concern (ENC) and Sustainable Consumer Behaviour (SCB)***

Environmental concern refers to the degree to which individuals are emotionally and cognitively invested in environmental protection. Concern often acts as a motivational driver for sustainable consumption. Prior studies suggest that higher environmental concern positively correlates with intentions and actions toward eco-friendly choices [35], [34], [25], [36]. Thus, the following hypothesis is proposed:

H7: There is a positive and significant relationship between ENC and SCB.

8) ***Linkage between Perceived Consumer Effectiveness (PCE) and Sustainable Consumer Behaviour (SCB)***

PCE captures the belief that individual consumer actions can contribute meaningfully to solving environmental issues. When consumers feel empowered, they are more likely to adopt sustainable Behaviours. Empirical evidence consistently affirms this link. Studies show PCE as a strong predictor of green purchasing and eco-conscious decisions [22], [34], [33], [35]. Thus, the following hypothesis is proposed:

H8: There is a positive and significant relationship between PCE and SCB.

9) ***Linkage between Cognitive Awareness (CGA) and Sustainable Consumer Behaviour (SCB)***

Cognitive awareness equips individuals with knowledge about environmental issues, their causes, and consequences. This awareness can motivate behaviour change by making the impacts of unsustainable practices more salient. While some studies suggest knowledge alone is insufficient [24], others confirm that well-informed consumers are more likely to engage in sustainable consumption [19], [23], [21], [22]. Thus, the following hypothesis is proposed:

H9: There is a positive and significant relationship between CGA and SCB.

10) ***Linkage between Affective Awareness (AFA) and Sustainable Consumer Behaviour (SCB)***

Affective awareness involves emotional responses to environmental issues. These include empathy, guilt, or pride. These emotions often act as strong motivators for sustainable actions. Emotional engagement has been shown to enhance personal relevance and drive behaviour more effectively than cognitive appeals alone [25], [26], [28], [27]. Thus, the following hypothesis is proposed:
H10: There is a positive and significant relationship between AFA and SCB.

11) ***Linkage between Behavioural Awareness (BHA) and Sustainable Consumer Behaviour (SCB)***

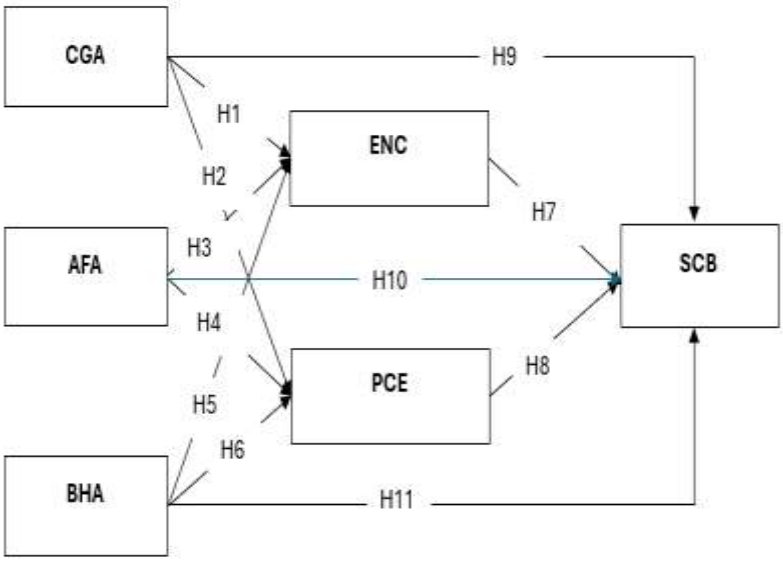
Behavioural awareness reflects consumers' recognition of how their everyday choices impact the environment. Individuals who are habitually conscious of their consumption behaviours are more likely to adopt sustainable alternatives. Studies confirm that behaviourally grounded awareness has a direct influence on eco-friendly actions. This appears especially true when reinforced by past practices and perceived control [31], [32], [26], [33]. Thus, the following hypothesis is proposed:
H11: There is a positive and significant relationship between BHA and SCB.

12) ***Mediating roles of Environmental Concern (ENC) and Perceived Consumer Effectiveness (PCE)***

ENC and PCE serve as key mediators in the pathway from awareness to sustainable Behaviour. ENC reflects emotional and cognitive investment in environmental well-being. PCE denotes the belief that individual actions can make a meaningful environmental impact. Prior studies suggest that ENC can motivate action when coupled with personal relevance [25], [26]. However, its mediating strength varies contextually [35]. In contrast, PCE consistently emerges as a robust mediator across sustainability frameworks. It enables the translation of awareness into action [22], [34], [33]. Hence, testing both mediators provides valuable insight into how psychological mechanisms influence sustainable consumer behaviour.

The hypothetical Model is shown in Figure 1.

Figure 1: The Hypothetical Model



Legend: CGA = Cognitive Awareness; AFA = Affective Awareness; BHA = Behavioural awareness; ENC = Environmental concern; PCE = Perceived Consumer Effectiveness; SCB = Sustainable Consumer Behaviour.

The measurement tool employed in this study is adapted from established standard scales relevant to the research dimensions. The items were slightly revised to align with the specific context of this study. To ensure the instrument's reliability and validity, Confirmatory Factor Analysis (CFA) was conducted. Table 1 presents the dimensions, their definitions, sources of the scales and authors, along with the specific items selected.

TABLE 1: DIMENSION, MEANING, SCALES AND CONTRIBUTING AUTHORS, AND ITEMS CHOSEN

Dimension	Meaning	Scales and Authors	Items chosen
Cognitive Awareness (CGA)	Awareness of how consumer behaviour and choices affect environmental sustainability.	Adapted from Bamberg & Möser [2007], Van der Linden [2017]	**13)** I am aware of how consumer behaviour affects the environment. **14)** I know how to identify eco-friendly or sustainable products while shopping. **15)** I understand the role of sustainability in preserving natural resources. **16)** I am familiar with government or NGO campaigns promoting sustainable consumption. **17)** I am knowledgeable about the environmental footprint of the products I use.
Affective Awareness (AFA)	Emotional and moral responses toward environmental issues and responsibility.	Adapted from Schultz [2000], Hartmann & Apaolaza-Ibáñez [2012]	**18)** I feel a personal responsibility to reduce my environmental impact. **19)** I am concerned about climate change and its consequences for future generations. **20)** I care about whether the products I buy are produced sustainably. **21)** I feel guilty when I purchase products that are harmful to the environment. **22)** I am emotionally affected by news related to environmental degradation.

Behavioural Awareness (BHA)	Awareness of actions and habits that support or hinder sustainability.	Adapted from Kollmuss & Agyeman [2002], Ajzen [1991]	**23)** I know how to reduce my carbon footprint through my consumption habits. **24)** I am aware of everyday actions I can take to support sustainability. **25)** I consciously check if a product is recyclable, usable, or biodegradable. **26)** I recognize when my actions are not aligned with sustainable practices. **27)** I am aware of sustainable alternatives to the products I usually buy.
Environmental Concern (ENC)	Concern and sense of urgency about environmental issues and consequences.	Adapted from Ogiemwonyi & Tahir Jan [2025], Dangelico & Vocalelli [2017]	**28)** I am concerned about the negative consequences of environmental problems. **29)** Environmental protection is one of my top priorities. **30)** I feel a strong sense of responsibility to protect the environment. **31)** I believe environmental problems are among the most serious issues today. **32)** I often think about how my actions affect the environment.
Perceived Consumer Effectiveness (PCE)	Belief that one's own consumption behaviour can positively impact the environment.	Adapted from Ellen et al. [1991], Hanss & Böhm [2012]	**33)** I believe my individual actions can contribute to environmental protection. **34)** My purchasing decisions can make a positive difference for the environment. **35)** I feel empowered to choose products that are better for the planet. **36)** Even small sustainable choices by individuals can lead to big changes. **37)** I believe I can influence environmental outcomes through my consumption behaviour.

Sustainable Consumer Behaviour (SCB)	Actual purchasing behaviour that favours environmentally friendly and sustainable products.	Adapted from Vermeir & Verbeke [2008], Geiger et al. [2018]	**38)** I actively seek out environmentally friendly products when shopping. **39)** I avoid buying products that have a negative impact on the environment. **40)** I prefer products with recyclable or biodegradable packaging. **41)** I am willing to pay more for products that are sustainably produced. **42)** I reduce consumption of products that contribute to environmental problems.

B. The Sampling Design

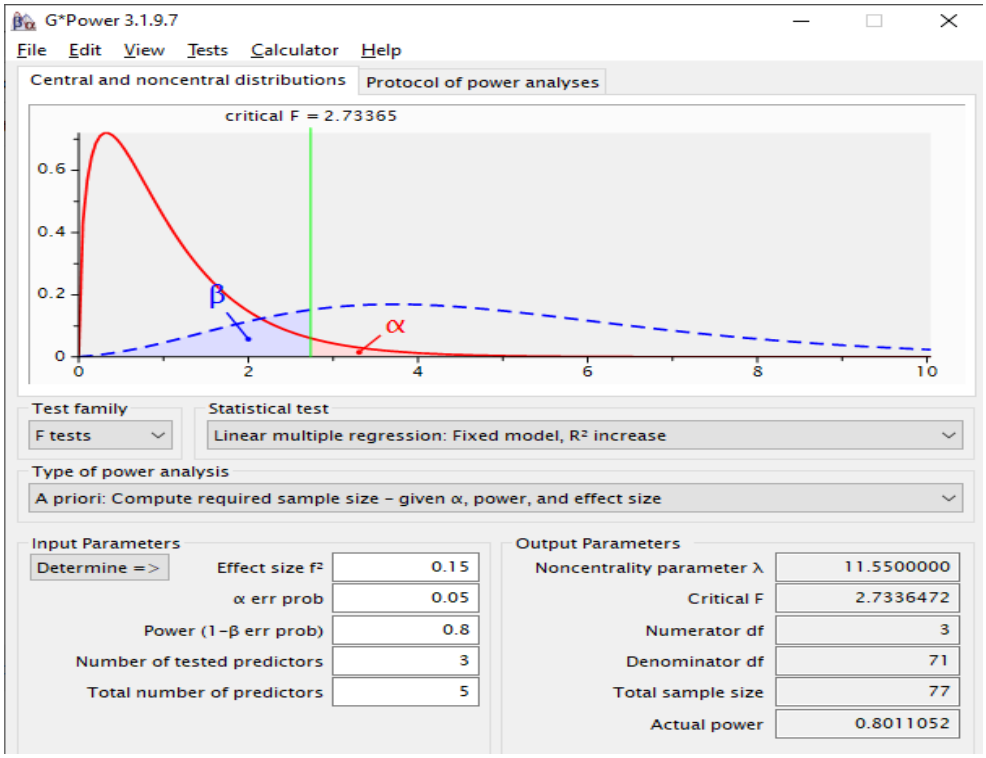
This research employed convenience sampling for accessibility and expediency. The approach aligns with the research's objectives and the available resources [10]. The target population comprises residents of Oman across diverse demographics, ensuring contextually specific understanding.

The sample size of 226 respondents used in this research strikes a balance between practical considerations and the need for an adequately representative dataset for hypothesis testing. Participants ranged in age from young adults (above 20 years) to senior citizens (above 60 years), representing diverse life stages and perspectives on sustainability and providing insights into the sustainable consumption behaviour within the Omani context.

The recruitment of participants was carried out through various channels. These included community networks, online platforms, and institutional contacts established through higher education institutions, government organizations, and private sector connections. Individuals were contacted through mail and calls. The research team provided them with information about the research's purpose and procedures. Participation was entirely voluntary. This voluntary approach fostered genuine responses.

While 200 appears adequate sample from the SEM point of view [37], another option was to use about 10 observations per estimated parameter [38]. Another thumb rule used in SEM for sample size estimation is ten times the number of indicators. This amounts to 6×3×10 = 180. Sample size adequacy is tested by G*Power estimation in SEM as it is mainly based on the effect size. For the effect size (f^2) = 0.15 (medium effect), α error probability = 0.05, power = (1-β error probability) = 0.8, number of predictors = 5, the actual Power for the sample was found to be 0.801 (Figure 2). This suggests that the study is adequately powered to detect medium-sized effects.

Figure 2: G*Power Estimate for sample size justification



In line with ethical research practices, participation in the survey was entirely voluntary. Respondents were clearly informed that they could withdraw at any point if they found the process inconvenient or uncomfortable. As the study posed minimal risk and involved no sensitive personal data, formal ethical clearance was not deemed necessary. Additionally, it was explicitly stated at the beginning of the questionnaire that the data would be used solely for academic research purposes. The sampling design, therefore, provided a robust and contextually appropriate foundation for quantitatively investigating the influence of public awareness campaigns on sustainable consumer behaviour within the Omani context.

IV. RESULTS AND ANALYSIS

The results and analysis are presented in two parts: descriptive statistics and inferential statistics, as outlined below:

C. Descriptive Statistics

This section includes the demographic characteristics of the sample and the measurement model of the SEM.

43) The Demographic Characteristics of the Sample

The demographic characteristics reveal a diverse sample representing a cross-section of Oman residents across gender, age, education, and income. Out of the total participants, 69.5% were male and 30.5% were female, indicating a male-dominated sample. The age distribution shows significant diversity across stages of life. The largest group (34.1%) was between 40 to 50 years, followed by 27.4% in the 20–30 age group, and 23.0% in the 30–40 age range. Notably, the sample included older participants, with 9.7% between 50–60 years and 5.8% above 60 years. This provided perspectives across generational cohorts regarding sustainable consumption behaviour. Educational qualifications varied significantly, with the majority holding a bachelor's degree (42.5%), followed by master's

degree holders (23%) and diploma holders (17.7%). Only a small portion reported having a Ph.D. (7.5%) or being uneducated (0.9%). The income distribution showed that nearly 30% of respondents earned less than 500 Omani Rial (OMR) per month, while 28.3% earned between 1,000 and 1,999 OMR. Additionally, 22.1% earned between 500 and 999 OMR, and 19.9% reported an income above 1,500 OMR. This demographic profile offers a balanced foundation for understanding variations in sustainable purchasing behaviour across different social segments in Oman. The details are provided in Table 2.

TABLE 2 DEMOGRAPHIC CHARACTERISTICS

Characteristics	Number	Percentage
Gender		
Male	157	69.5
Female	69	30.5
Age		
Above 20 up to 30 years	62	27.4
Above 30 up to 40 years	52	23.0
Above 40 up to 50 years	77	34.1
Above 50 up to 60 years	22	9.7
Above 60 years	13	5.8
Educational qualification		
Ph.D.	17	7.5
Master's degree	52	23
Bachelor's degree	96	42.5
Diploma	40	17.7
Higher Secondary School	8	3.5
Secondary School	11	4.9
Uneducated	2	0.9
Income/month in OMR		
Less than 500	67	29.6
More than 500 up to 999	50	22.1
More than 1,000 up to 1,999	64	28.3
Above 1,500	45	19.9

D. The Measurement Model

Table 3 presents the results of the measurement model assessing the reliability and validity of the constructs used in the study. All constructs demonstrate strong internal consistency. Cronbach's alpha values range from 0.87 to 0.93 (Table 3, cutoff of 0.7) [39]. Similarly, Rho_A and composite reliability (CR) values for all constructs are above 0.85. This indicates high construct reliability (curoff of 0.6) [40]. The factor loadings for individual items are all above 0.86. This confirms indicator reliability [38]. Additionally, the Average Variance Extracted (AVE) for each construct is above 0.70. This signifies satisfactory convergent validity [41]. These results collectively confirm that the constructs: AFA, BHA, CGA, ENC, PCE, and SCB are reliable and valid for further structural model analysis.

The R-square values of 0.650, 0.619, and 0.784 (Figure 3) for endogenous variables ENC, PCE, and SCB respectively indicate that 61.9% to 78.4% of the variance is explained by the predictors. This confirms that the model fit is adequate to predict the relationships between the variables (cutoff 10%) [42].

Table 3 Reliability and Validity

Construct	Items	Factor loadings	Cronbach's alpha	Rho_a	Composite reliability	Average variance extracted (AVE)
AFA	AFA2	0.89	0.87	0.88	0.92	0.80
	AFA3	0.91				
	AFA5	0.88				
BHA	BHA1	0.91	0.92	0.93	0.95	0.87
	BHA2	0.93				
	BHA3	0.95				
CGA	CGA3	0.91	0.90	0.90	0.94	0.83
	CGA4	0.93				
	CGA5	0.89				
ENC	ENC2	0.87	0.88	0.88	0.93	0.81
	ENC4	0.93				
	ENC5	0.90				
PCE	PCE1	0.86	0.87	0.87	0.92	0.79
	PCE4	0.92				
	PCE5	0.88				
SCB	SCB1	0.94	0.93	0.93	0.96	0.88
	SCB2	0.94				
	SCB3	0.94				

Legend:
CGA = Cognitive Awareness; AFA = Affective Awareness; BHA = Behavioural Awareness; ENC = Environmental concern; PCE = Perceived Consumer Effectiveness; SCB = Sustainable Consumer Behaviour

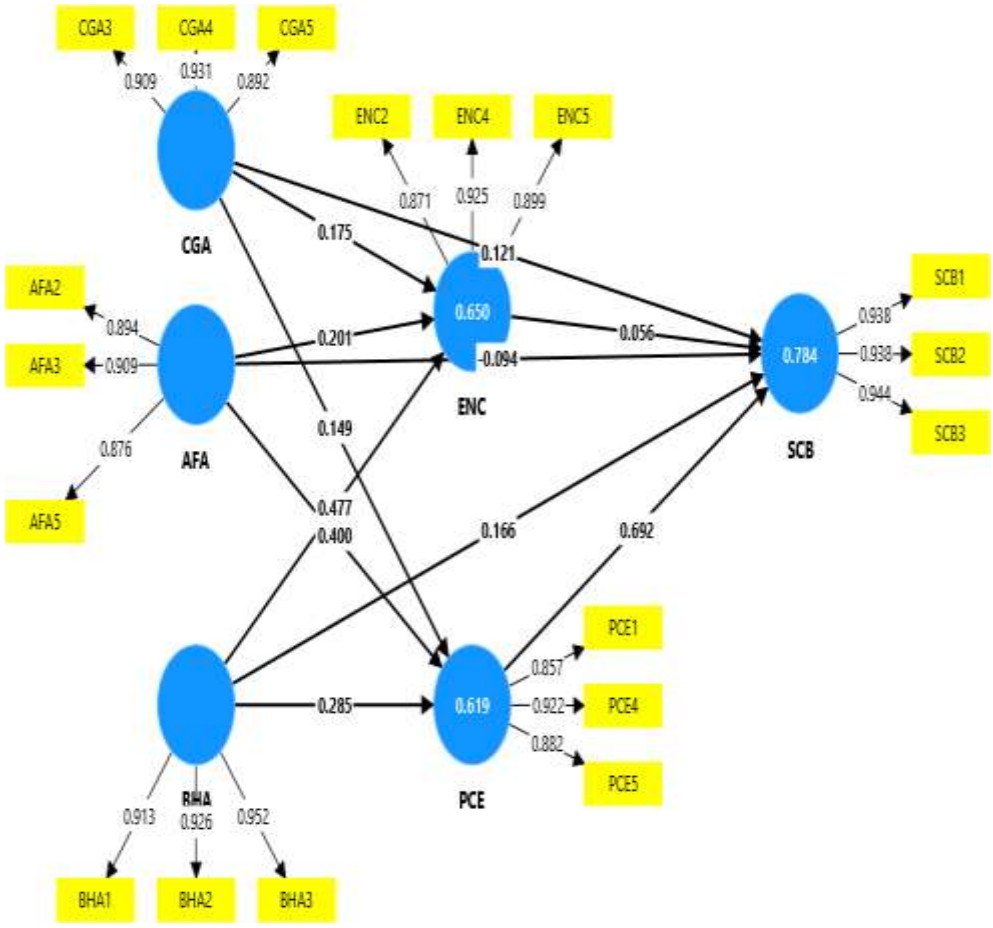
Table 4 presents the inter-item correlation matrix. It shows strong positive associations among all latent constructs. The diagonal values represent the square roots of the AVE. All exceed 0.85, thereby confirming discriminant validity. High correlations are observed between BHA and CGA (0.90), and between AFA and PCE (0.87). This reflects close relationships among components of awareness and consumer perception. SCB exhibits moderate to strong correlations with all other constructs. The correlations are particularly strong with PCE (0.86) and BHA (0.80). This emphasizes the influence of perceived effectiveness and behavioural awareness on sustainable purchasing Behaviour. Therefore, the matrix supports both the conceptual distinctiveness and the interrelated nature of AFA, BHA, CGA, ENC, PCE, and SCB within the proposed framework.

TABLE 4 THE INTER-ITEM CORRELATIONS

	AFA	BHA	CGA	ENC	PCE	SCB
AFA	0.89					

BHA	0.84	0.93				
CGA	0.81	0.90	0.91			
ENC	0.84	0.87	0.82	0.90		
PCE	0.87	0.83	0.80	0.83	0.89	
SCB	0.78	0.80	0.78	0.78	0.86	0.94

Figure 3: The Path Model



E. The Structural Model

Table 5 presents the results of hypothesis testing. It reveals the structural relationships between the key constructs. AFA shows a significant positive effect on ENC (β = 0.201, t = 2.254, p = 0.024) and PCE (β = 0.400, t = 3.453, p = 0.001). This supports the corresponding hypotheses. However, its direct effect on SCB is not significant (β = 0.195, t = 1.642, p = 0.101). This indicates an unsupported hypothesis.

BHA significantly influences ENC (β = 0.477, t = 4.825, p = 0.000), PCE (β = 0.285, t = 2.978, p = 0.003), and SCB (β = 0.390, t = 3.733, p = 0.000). This confirms the strong role of behavioural awareness in shaping both perception and sustainable behaviour.

CGA, on the other hand, has a significant direct impact only on SCB (β = 0.234, t = 2.303, p = 0.021). Its effects on ENC (β = 0.175, t = 1.831, p = 0.067) and PCE (β = 0.149, t = 1.522, p = 0.128) are statistically insignificant.

Among the mediators, ENC does not have a significant direct effect on SCB (β = 0.056, t = 0.850, p = 0.395). This suggests its limited influence in the final behavioural outcome. In contrast, PCE emerges as a strong predictor of SCB (β = 0.692, t = 6.648, p = 0.000). This confirms its central mediating role in the model. These findings collectively highlight that while awareness dimensions (AFA, BHA, CGA) vary in their direct effects, PCE plays a crucial mediating role in driving SCB.

TABLE 5 THE T-STATISTIC

	Original sample (O)	**Sample mean (M)**	**Standard deviation (STDEV)**	**T statistics (|O/STDEV|)**	**P values**	**Hypothesis**
AFA -> ENC	0.201	0.201	0.089	2.254	0.024	Supported
AFA -> PCE	0.400	0.397	0.116	3.453	0.001	Supported
AFA -> SCB	0.195	0.193	0.119	1.642	0.101	Unsupported
BHA -> ENC	0.477	0.475	0.099	4.825	0.000	Supported
BHA -> PCE	0.285	0.286	0.096	2.978	0.003	Supported
BHA -> SCB	0.390	0.390	0.104	3.733	0.000	Supported
CGA -> ENC	0.175	0.178	0.095	1.831	0.067	Unsupported
CGA -> PCE	0.149	0.153	0.098	1.522	0.128	Unsupported
CGA -> SCB	0.234	0.236	0.102	2.303	0.021	Supported
ENC -> SCB	0.056	0.056	0.066	0.850	0.395	Unsupported
PCE -> SCB	0.692	0.691	0.104	6.648	0.000	Supported

Figure 4: The Structural Model

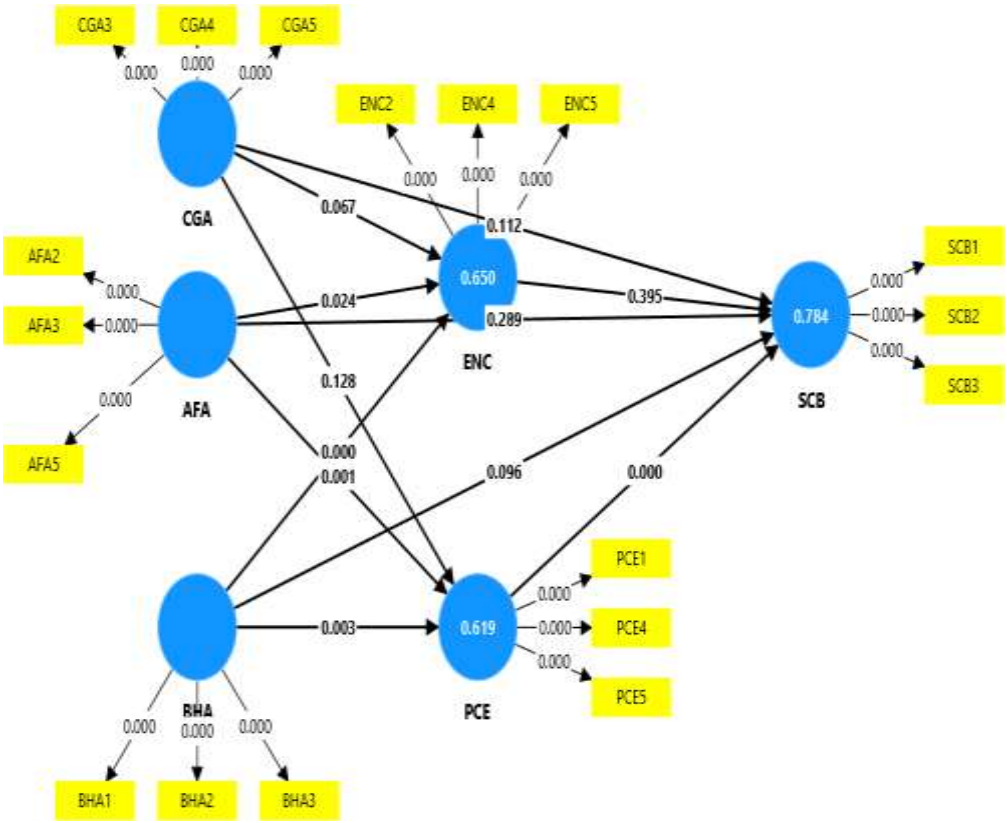


Table 6 illustrates the mediating relationships between awareness constructs (AFA, BHA, CGA) and SCB. These are channeled through the mediators ENC and PCE. The mediation analysis confirms that AFA has a significant indirect effect on SCB (β = 0.288, t = 3.956, p = 0.000). This indicates a strong mediating pathway. Similarly, BHA also exerts a significant mediated influence on SCB (β = 0.224, t = 2.654, p = 0.008). This supports the hypothesis that the effect of BHA on sustainable behaviour is meaningfully transmitted through mediating variables.

In contrast, the indirect pathway from CGA to SCB does not reach statistical significance (β = 0.113, t = 1.505, p = 0.132). This suggests that CGA alone does not influence SCB through mediation by ENC or PCE. These findings underscore the stronger mediating impact of emotional and behavioural awareness (AFA and BHA) compared to cognitive awareness (CGA) in shaping sustainable consumer behaviour.

TABLE 6 MEDIATING RELATIONSHIPS

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics	P values	Hypothesis
AFA -> SCB	0.288	0.280	0.073	3.956	0.000	Supported

BHA -> SCB	0.224	0.226	0.084	2.654	0.008	Supported
CGA -> SCB	0.113	0.120	0.075	1.505	0.132	Unsupported

V. DISCUSSIONS

This research yielded three central findings that align with and diverge from prior studies: (1) varied effects of affective, behavioural, and cognitive awareness on SCB, (2) dominant mediating role of perceived consumer effectiveness (PCE), and (3) limited role of environmental concern (ENC) as mediator.

First, the direct and indirect influences of AFA and BHA on SCB emphasise the importance of emotional engagement and habitual cues in driving sustainable choices. AFA was found to significantly affect both ENC and PCE. BHA had a statistically significant influence on all three outcome variables, including SCB. These results are consistent with previous findings that emotional resonance and behaviourally oriented messages can more effectively translate into action than cognitive information alone [32], [26]. The strong influence of BHA on SCB aligns with the theory of planned behaviour [31]. Past behaviour and perceived control play key roles in shaping future intentions and actual behaviour.

Interestingly, CGA showed a significant direct relationship with SCB but failed to significantly influence either ENC or PCE. Its indirect effect on SCB was not significant. This diverges from some earlier research that placed emphasis on knowledge as a critical antecedent to sustainable action [24]. However, recent studies have increasingly acknowledged the knowledge–action gap. Increased cognitive awareness does not necessarily lead to behavioural change without emotional engagement or contextual support [23]. This finding supports the need for campaigns to go beyond informational content and incorporate emotionally compelling narratives and actionable guidance.

A pivotal finding of the study is the central mediating role of PCE in influencing SCB. PCE not only showed a strong direct effect on SCB but also mediated the relationship of AFA and BHA with SCB. This underscores the importance of empowering consumers with a belief that their individual actions make a difference. This concept appears deeply rooted in environmental psychology [22]. Similar conclusions have been drawn in recent studies indicating that perceived self-efficacy is a crucial determinant of pro-environmental behaviour [34], [33].

Contrary to expectations, ENC did not significantly mediate the relationship between awareness variables and SCB. While BHA and AFA significantly influenced the ENC, the pathway from ENC to SCB was statistically insignificant. This is partially in conflict with recent studies that have identified environmental concern as a direct antecedent of green purchasing [35]. However, this could be explained by the evolving dynamics of consumer behaviour in the Middle Eastern context. Concern alone may not be sufficient without supportive infrastructure, policy incentives, or access to green alternatives [43]. Moreover, the disconnect between concern and action might also reflect social desirability bias or a lack of behavioural cues and reinforcement mechanisms.

Another salient insight is the differential impact of awareness components on SCB. The findings reveal that BHA has the strongest total effect (direct and indirect) on SCB. This is

followed by AFA, whereas CGA contributes minimally to a mediated framework. This aligns with the finding that strong emotional involvement and routine behavioural habits were more predictive of pro-environmental purchasing than factual knowledge. It also echoes the growing consensus that awareness campaigns should focus more on emotional engagement, narrative storytelling, and behavioural nudges than on purely educational content [44].

The demographic diversity of residents of Oman provides additional insights into sustainable consumption behaviour patterns. The inclusion of participants across age groups (20-60+ years) reveals the complexity of environmental behaviour within Oman's diverse social fabric. This diversity strengthens the generalisability of findings across Oman's heterogeneous population and supports the development of inclusive sustainability campaigns that resonate with different demographic segments of society.

Finally, the Oman-specific data reveals that demographic variables such as education and income create differential access to sustainable alternatives. Structural barriers and socio-economic constraints have been shown to limit the efficacy of awareness efforts, even when attitudes are favourable [36].

Therefore, while this study validates much of the extant theory around mediators like PCE and the limited role of cognitive awareness, it also sheds light on context-specific nuances. These include the weaker role of environmental concern in translating awareness into behaviour in Oman. Future research could explore longitudinal designs or experimental interventions to examine causal dynamics and the long-term impact of emotionally rich campaigns.

VI. IMPLICATIONS OF THE STUDY

Implications of this research are largely in the form of suggestions to policymakers, marketers, and sustainability advocates to strengthen sustainable behaviour among residents of Oman across diverse demographic groups. From a policy perspective, the Ministry of Information and the Ministry of Environment and Climate Affairs (MECA) should collaborate to design sustainability campaigns that go beyond raising awareness. Instead, they should focus on enhancing PCE across different age groups and cultural backgrounds. This can be achieved by integrating storytelling methods that highlight real-life examples of how individual consumer actions from residents of Oman to contribute to environmental protection.

Campaigns should visually and narratively communicate the tangible outcomes of small but impactful sustainable behaviours. These might include reducing plastic usage, adopting eco-friendly transport, or supporting local green businesses. MECA may incorporate such content across television, radio, social media, and billboards. This can create a sense of agency among the public, thereby strengthening the belief that individual efforts matter.

Second, the Ministry of Commerce, Industry and Investment Promotion (MCIIP) should consider incentivising businesses and retailers to display sustainability labels. They should provide consumers with transparent information about the environmental footprint of their products. Such initiatives would directly reinforce behavioural and affective awareness by enabling consumers to act upon their values at the point of purchase. Offering tax benefits or public recognition to companies that actively promote sustainable products can create a positive feedback loop between businesses and environmentally aware consumers. In addition, consumer education programs in malls,

markets, and public events can make sustainability a practical and visible choice rather than a theoretical ideal.

Third, the findings suggest that cognitive awareness alone is insufficient to drive sustainable behaviour. Therefore, the Ministry of Education (MoE) along with the higher education institutions should consider integrating experiential sustainability learning into the school and university curriculum. Interactive projects such as waste segregation, campus clean-ups, eco-clubs, and community outreach can instil affective and behavioural awareness from an early age. These activities help students internalise environmental values and observe the consequences of their actions. This creates a foundation for lifelong sustainable habits. Moreover, the inclusion of sustainability topics in national examinations can further elevate their perceived importance among students and educators alike.

Lastly, the Ministry of Housing and Urban Planning (MHUP) and local municipal bodies should enhance structural support for sustainable consumer behaviour by increasing access to green alternatives. This includes expanding recycling facilities, developing public transport infrastructure, supporting farmer's markets, and promoting the use of renewable energy in households. Without such enabling environments, even the most well-designed awareness campaigns may fail to translate into action. Policymakers must ensure that sustainable options are not only available but also affordable and convenient, especially for middle- and lower-income groups. By aligning awareness efforts with systemic enablers, Oman can create a robust ecosystem that fosters long-term shifts toward environmentally responsible consumption.

VII. CONCLUSION

This study was undertaken in response to the growing environmental challenges prevalent in many Middle Eastern countries, including Oman. As regional economies continue to develop rapidly, there is an urgent need to align public behaviour with sustainability goals. While several global studies have explored the relationship between awareness and sustainable consumer behaviour, the Middle Eastern context remains under-researched. This is particularly true in understanding how public awareness campaigns influence individual behaviour in culturally specific settings. Given Oman's policy push toward environmental sustainability, this research contributes by uncovering behavioural drivers and psychological mechanisms that can bridge the green gap between awareness and action.

Employing a quantitative research design, data were collected through structured surveys and analysed using Structural Equation Modelling (SEM). The model examined the influence of three types of awareness: affective (AFA), behavioural (BHA), and cognitive (CGA) on SCB. Mediators such as ENC and PCE were also examined. The findings revealed that AFA and BHA had significant indirect effects on SCB via PCE. CGA had a direct but weaker impact. Notably, PCE emerged as the most powerful predictor of SCB. ENC showed limited influence. These results underscore the importance of emotional engagement and behavioural reinforcement over mere knowledge dissemination.

The practical implications of these findings are significant for policymakers and public agencies in Oman. Awareness campaigns should move beyond information dissemination to strategies that foster emotional engagement and perceived individual efficacy. Ministries responsible for environment, education, and commerce must adopt coordinated approaches that couple persuasive communication with supportive

infrastructure and incentives. This includes integrating sustainability into education, enabling access to green alternatives, and leveraging storytelling in media to promote behavioural change.

Despite its contributions, the study has some limitations. The research relied solely on self-reported survey data, which may be subject to social desirability bias. Moreover, the cross-sectional design limits causal inferences. While the sample provides valuable demographic diversity among residents of Oman, the convenience sampling approach may have introduced selection bias toward individuals with higher educational levels and greater institutional connections. The residents of Oman's representation of different nationality groups (Omani nationals versus expatriate residents) and occupational backgrounds could be better balanced in future studies. Additionally, rural populations and those with limited access to urban networks may be underrepresented, which could limit the generalisability of findings to all segments of Omani society.

Future studies could use longitudinal designs, or mixed method approaches to validate these findings over time and across different contexts. Future research can expand the model by including additional mediators such as social influence, cultural values, and policy trust. Furthermore, comparative studies between urban and rural populations or between GCC countries can provide deeper insights into contextual differences. Experimental designs that test the effectiveness of different types of awareness messages - emotional vs. informational - can also yield actionable recommendations for campaign strategies.

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CONFLICT OF INTEREST

The authors declare no conflict of interests.

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