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Integrating Sustainability and Circular Economy into Consumer-Brand Dynamics: A Saudi Arabia Perspective

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Abstract: This study examines the evolving consumer-brand dynamics within Saudi Arabia, particularly focusing on the integration of sustainability into consumer preferences and brand loyalty. Utilizing Partial Least Squares Structural Equation Modeling (PLS-SEM) and non-parametric statistical methods, this research is anchored in Consumer Culture Theory (CCT) and Self-Congruence Theory, exploring how brand personality and consumer self-congruence influence sustainable consumption behaviors and the adoption of circular economy practices among Saudi consumers. The findings reveal a significant correlation between brand loyalty and sustainable purchase decisions, underscoring the pivotal role of brand identity in fostering eco-conscious consumer choices. Additionally, the research highlights a nuanced landscape of brand loyalty, where attributes, such as social responsibility, though currently less influential, present opportunities for brands to align more closely with consumer values and national sustainability goals. The study also identifies demographic factors, such as age and income level, as significant influencers of sustainable purchasing decisions. This study provides insights into the generational shift towards environmental awareness and the implications for businesses and policymaking within the context of Saudi Arabia's Vision 2030.

Keywords: sustainability; brand loyalty; brand personality; consumer behavior; circular economy; self-congruence



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1. Introduction

In the contemporary global economy, escalating consumerism has profound implications across environmental, economic, and social domains. Particularly in developing and emerging economies, the uptick in consumption patterns catalyzes increased resource exploitation and environmental degradation. The United Nations Environment Program [1] reports a worrying global material footprint, indicative of unsustainable resource use trends. The World Wildlife Fund [2] accentuates this concern through the concept of Earth Overshoot Day, marking the date when humanity's resource consumption exceeds Earth's regenerative capacity. The progressively earlier occurrence of this day each year highlights a critical environmental overreach contributing to climate change, biodiversity loss, and ecological imbalance, corroborated by the Intergovernmental Panel on Climate Change [3].

Saudi Arabia's consumption landscape, influenced by rapid economic growth, urbanization, and increased household incomes, reflects significant lifestyle and behavioral transformations. The Kingdom experiences a surge in consumerism [4], with heightened purchases of luxury goods [5–7], high-end automobiles, electronic products, and other consumer goods. This trend mirrors the consumption patterns seen in other affluent societies and is attributed to the growth of disposable income and Western lifestyle influences facilitated by globalization and digital media proliferation [8]. Urban areas, notably Riyadh and Jeddah, are at the forefront of this transformation, increasingly aligning their consumption behaviors with global trends [6,9].

One study has revealed that Saudi consumers are becoming increasingly sophisticated, emphasizing intrinsic product value over superficial marketing tactics. This change is influenced by factors, such as education, global trend exposure, and the growing influence of the younger demographic, leading to diversified consumer preferences and behaviors. Saudi Arabia's dynamic consumer market necessitates continual strategic reassessments by businesses to meet these evolving demands [10]. Another study focusing on the Middle East has found that in economic crises, traditional marketing mix elements have less impact on consumer behavior. Instead, cultural and social factors become key influencers, shifting consumer focus from wants to needs. This trend marks a significant change in purchase behaviors during economic stress [11].

Brand personality, sustainability, and the CE are gaining prominence in contemporary consumer research. The CE paradigm, emphasizing sustainable consumption, aligns economic activities with sustainability principles [12]. Industry 4.0 technologies and lean manufacturing tools are increasingly integrated into sustainable practices, underscoring the necessity of this shift [13,14]. Brand personality, defined as the set of human characteristics associated with a brand, plays a pivotal role in shaping consumer perceptions and behaviors. Brands that embody sustainability are more likely to attract environmentally conscious consumers, particularly in markets like Saudi Arabia where environmental awareness is growing [15,16]. However, the intersection of these concepts has not been thoroughly explored, highlighting a significant gap in the existing literature.

While Saudi Arabia is ambitiously steering towards economic diversification and sustainable development under Vision 2030, a pivotal challenge remains in bridging the gap between increasing environmental consciousness and actual sustainable consumption practices. Acknowledging the need for sustainable practices reveals an opportunity for brands to champion the cause, bridging the gap between awareness and action. Urban centers, such as Riyadh and Jeddah, are witnessing transformative environmental and social dynamics, yet the translation of this growing awareness into tangible actions lags, particularly in waste management and recycling [17,18]. The Kingdom's notably high per capita waste generation underscores the critical need for more robust and effective waste management and recycling strategies to align with its sustainability goals [19].

The metrics of material productivity and consumption in Saudi Arabia present a nuanced picture of the nation's sustainability efforts. With a material productivity of 4.62 USD/KG, Saudi Arabia demonstrates efficiency in converting material resources into economic value. However, the high per capita material footprint of 30.03 and domestic material consumption of 26.1 Ton/Per Capita reveal a substantial environmental impact [20]. These figures underscore the need for integrating sustainable practices into consumer behavior and corporate strategies, highlighting the role of brand personality in driving this transition towards a more circular and sustainable economy.

The central problem, therefore, lies in understanding how brand personality and consumer self-congruence influence these sustainable consumption behaviors and the propensity to adopt CE practices within the Saudi context. This research aims to investigate the intersection of a brand's characteristics with a consumer's self-image and how this alignment impacts decision-making processes related to sustainability and CE adoption. The study seeks to explore to what extent the traits of brand personality and consumer self-identification contribute to fostering environmentally responsible consumer behaviors and the acceptance of CE principles amongst Saudi consumers.

This inquiry is crucial in a landscape where consumer choices are increasingly driven by a blend of cultural, social, and economic factors and where the market is transitioning from traditional, one-dimensional consumption patterns to a more complex, value-driven, and environmentally conscious approach. The outcome of this research will provide vital insights for businesses and policymakers. It will inform strategies that align with consumers' sustainability values and self-congruence, thereby promoting practices that support Saudi Arabia's Vision 2030 objectives for a sustainable and diversified economy.

1.1. Research Question

How do brand personality and consumer self-congruence influence sustainable consumption behaviors and the propensity to adopt CE practices among consumers in Saudi Arabia?

1.2. Research Objectives

- Objective 1: Assess Consumer Perceptions of Brand Personality

To analyze how consumers in Saudi Arabia perceive different brand personalities and to categorize brands based on perceived personality traits. This will help in understanding the alignment between brand image and consumer expectations in the context of sustainability.

- Objective 2: Examine the Impact of Self-Congruence on Consumer Choices

To evaluate the extent to which self-congruence (alignment between consumer's self-image and brand's personality) influences the sustainable consumption choices among Saudi consumers. This involves investigating the role of personal identity in driving environmentally responsible purchasing decisions.

- Objective 3: Investigate the Relationship between Brand Loyalty and Sustainability

To explore how brand loyalty, fostered through brand personality and consumer self-congruence, correlates with consumers' willingness to engage in sustainable practices and CE behaviors. This objective seeks to understand if loyal consumers are more inclined towards eco-friendly products and CE models.

2. Literature Review

2.1. Conceptual Foundation of Brand Personality

Brand personality, as initially conceptualized by Aaker [21], refers to the human-like traits and characteristics attributed to a brand. This concept has evolved significantly, encapsulating not just the functional attributes of a brand but also its emotional and psychological aspects, thereby influencing how consumers perceive and interact with it. Brand personality plays a crucial role in shaping consumer experiences and expectations, transcending the traditional focus on product functionality to include emotional resonance and relational dynamics [22]. McManus et al. [23] further emphasizes the importance of brand personality in establishing a sense of comfort and connection, suggesting that it is integral in fostering deep, emotional bonds between consumers and brands. This connection is vital in the contemporary consumer landscape, where emotional engagement is often as significant as the practical utility of a product or service.

Functional and Symbolic Aspects

The functional benefits of brand personality are critical in forging consumer-brand relationships and enhancing the emotional bonds and perceived reliability of the brand. This aspect plays a significant role in customer satisfaction and loyalty [22–24]. Additionally, the symbolic dimension of brand personality allows for self-expression and identity construction, enabling consumers to align their personal values and beliefs with the brands they choose. This alignment often results in consumers selecting brands that reflect either their actual or aspirational personality traits, influencing their purchase decisions and brand preferences [25]. The interplay of these aspects leads to positive brand attitudes and heightened purchase intentions [26], demonstrating the comprehensive impact of brand personality on consumer behavior.

2.2. Theoretical Perspectives on Brand Loyalty

Brand loyalty, as a concept deeply rooted in marketing literature, extends beyond habitual purchasing to represent a profound psychological commitment to a brand. This commitment encompasses both emotional attachment and cognitive evaluations, making it a complex and multi-dimensional construct [27,28]. Loyal consumers, characterized

by their willingness to pay premium prices and resist competitors, provide immense value to businesses. They often act as advocates for the brand, reducing marketing costs and enhancing overall brand equity [29,30]. The complexity of brand loyalty involves behavioral, emotional, and cognitive elements, each contributing to a deep-seated loyalty that transcends transactional relationships [31].

2.3. Self-Congruence Theory in Marketing

The self-congruence theory in marketing posits that consumers are drawn to brands that mirror their self-concept, encompassing both their actual and ideal selves. This alignment between a consumer's self-image and the brand's personality significantly impacts consumer preferences and brand perception. It is a critical factor in consumer decision-making, reflecting the psychological process of identity reinforcement through brand [32,33].

Self-Congruence and Brand Loyalty

The relationship between self-congruence and brand loyalty is well-documented, with research indicating that higher levels of self-congruence lead to enhanced brand satisfaction and loyalty. When consumers perceive a brand's personality as aligning with their self-image, they develop a stronger emotional bond, increasing their commitment and loyalty to the brand [34].

2.4. Sustainability and CE

2.4.1. Global Sustainability Trends

In recent years, sustainability has emerged as a global priority, significantly impacting consumer behavior and corporate strategies. The concept of sustainability, once confined to environmental sectors, has now permeated various facets of society, including economics, social justice, and corporate governance. This shift is vividly captured in the United Nations' Sustainable Development Goals (SDGs), which provide a blueprint for addressing global challenges, such as climate change, poverty, and inequality [35]. Consumer awareness regarding sustainability issues has escalated, leading to a demand for more sustainable products and services. Gallenti et al. [36] underlines this trend, noting an increasing preference for environmentally friendly and ethically sourced products. This shift in consumer preferences is forcing companies to reevaluate their business models and incorporate sustainability into their core.

2.4.2. Sustainability in Consumer Markets

The influence of sustainability on consumer markets is profound. Consumers today are more informed and concerned about the environmental and social impact of their purchases. This has led to a significant change in consumer behavior, with a growing preference for brands that demonstrate a commitment to sustainability [37]. In response, companies are adopting sustainable business practices, not just as a moral obligation but as a strategic move to align with consumer expectations and secure a competitive advantage [38]. For instance, the incorporation of sustainable practices in product development and marketing strategies is increasingly prevalent [39]. Brands are leveraging sustainability as a differentiator in crowded markets, which, according to Cherian and Jacob [40], not only enhances brand image but also fosters consumer loyalty.

2.4.3. Principles of CE

The CE represents a systemic shift from the traditional linear "take-make-dispose" model to a regenerative and restorative approach. It is grounded in the principles of designing out waste, keeping products and materials in use, and regenerating natural systems [41]. The CE model not only addresses environmental concerns but also offers economic and social benefits by fostering innovation and creating new business opportunities. The Ellen MacArthur Foundation [42] highlights the CE as a solution to the unsustainable consump-

tion of finite resources, advocating for a transition towards circularity as an essential step for sustainable development.

2.4.4. CE in Developing Economies

The adoption of CE practices in developing economies presents unique challenges and opportunities. While these economies are often resource-constrained, they possess the potential for innovation and adaptability. However, challenges, such as a lack of infrastructure, regulatory frameworks, and consumer awareness impede the adoption of circular practices [43]. Despite these challenges, there are examples of CE initiatives in developing countries that demonstrate resilience and innovation. Fraccascia et al. [44] explored circular economy business models, emphasizing their significance in fostering resource efficiency and sustainability, particularly pertinent to developing economies grappling with rapid resource depletion due to escalating demand.

2.4.5. CE and Consumer Engagement

Consumer engagement is pivotal for the success of the CE. The transition to a circular model requires a shift in consumer behavior from ownership to shared use, reuse, and extended product life cycles [45]. This shift entails not only changes in consumption patterns but also in attitudes towards product use and disposal. Research by Rexfelt and Hiort af Ornäs [46] indicates that consumers are increasingly open to circular models, such as sharing and leasing, provided that these models offer convenience and cost savings. Furthermore, the role of consumer awareness and education in fostering circular behaviors cannot be overstated. Initiatives, such as community-based recycling programs and consumer awareness campaigns, play a crucial role in promoting CE principles among consumers [47,48].

2.5. Consumerism in Saudi Arabia

Consumerism in Saudi Arabia presents a nuanced view of a rapidly transforming retail landscape and consumer behavior. Rahman [49] identifies the critical need for the Saudi retail industry to adapt and innovate in response to global market challenges, emphasizing the shift towards integrated shopping experiences driven by digital and physical convergence. This adaptation, necessitated by consumer demands for a seamless shopping experience, signifies the importance of technology in both in-store and online settings. Rahman's [50] research further highlights the paradigm shift in the Saudi retail market due to globalization, leading to new challenges and opportunities. The large expatriate population and the influence of economic liberalization policies have significantly enhanced market consciousness among Saudi consumers. This shift towards organized retailing, including hypermarkets and retail chains, marks a substantial departure from traditional retail practices. The evolving consumer patterns, particularly among the youth, and the influence of the tourism business in the Middle East, underscore the dynamic nature of the Saudi retail sector.

2.5.1. The Intersection of Luxury and Sustainability

Kumagai's [51] study explores the intricate relationship between brand sustainability initiatives and consumer perceptions of luxury brands. The author posits that brand-sustainability-self-congruence significantly impacts consumer brand evaluations, varying according to brand types and consumer attributes. The study extends the self-congruity theory, exploring how congruence between brand-related factors and self-concept affects brand evaluation. It reveals that luxury brands' sustainability initiatives are positively received by consumers, who increasingly value sustainability. These findings align with [52] research on young Saudi female consumers' attitudes towards luxury fashion, noting the contrast between independent consumer behaviors in luxury consumption and traditionally communal social roles, indicating a shift towards personal happiness and modesty in owning luxury brands. This evolving nature of luxury, now more accessible, highlights the

complex interplay of motivational, store, and external factors in influencing luxury brand purchasing decisions.

2.5.2. Emergent Consumer Trends and Economic Crises

Rahman [10] offers insights into the evolving consumer behavior in Saudi Arabia, observing that Saudi consumers are increasingly discerning and focused on the intrinsic value of products, necessitating a re-evaluation of business strategies. Complementing this, Rohanaraj [11] challenges the traditional view of the marketing mix elements' influence during economic crises by emphasizing the significance of cultural and social factors. His findings highlight the need-based nature of purchasing during crises, offering a distinct perspective on consumer behavior in the Middle East.

2.5.3. Consumerism and Societal Transformation

Ref. [9] captures the broad societal transformation brought about by consumerism in Saudi Arabia, identifying the spread of consumerism because of both global and local factors, including urbanization, government subsidies, and increased per capita income. This study highlights the emulation of Western consumerism lifestyles and the impact of media and advertising in shaping consumerist values in Saudi society.

3. Materials and Methods

The study employs a quantitative research design, focusing exclusively on the analysis of survey data. This approach enables a detailed exploration of the relationships among brand personality, consumer identity, and sustainable consumption within the Saudi consumer context.

3.1. Theoretical Framework

Integrating Consumer Culture Theory (CCT) with the Brand Personality Dimension Framework, this research examines how brand perceptions influence consumer attitudes towards sustainability. The concept of self-congruence is pivotal, hypothesizing that higher alignment with sustainable brands fosters greater sustainable practice adoption [21,34].

3.2. Population, Sample, and Sampling Technique

The target population for this study comprises Saudi consumers. To achieve a representative sample, a stratified proportionate sampling technique has been employed, ensuring demographic representation across various segments of the population. The sample size was calculated to be 625 participants. This size was deemed sufficient to provide a robust representation for the intended 95% confidence level and a 5% margin of error.

3.3. Survey Instrument and Data Collection

The survey uses a questionnaire consisting of Likert-scale and ranking questions, which can be found in Appendix A. Content validity of the survey is ensured through expert reviews. The reliability and validity of the constructs were assessed through Exploratory Factor Analysis (EFA) and Cronbach's alpha to identify the structure and ensure internal consistency. Convergent validity was confirmed by calculating the Average Variance Extracted (AVE) for constructs, including "Upcycling", "CE Concept Support", "CE Knowledge", "Durability Concern", "Used Products Preference", "Joint Purchase Preference", "Pay for Environment-Friendly Products", "Functional Product Disposal", "Advocacy for Recycling Policies", and "Repairability over Replacement", with each AVE exceeding 0.50 [53]. Discriminant validity was verified using the Fornell–Larcker criterion, showing that the square root of the AVE for each construct was greater than its correlations with other constructs, confirming distinctiveness.

3.4. Hypothesis

Focused on the relationship among brand personality, loyalty, and consumer sustainability practices, the study tests specific hypotheses regarding these dynamics.

H0-1. *Brand personality traits have no significant impact on sustainable purchase decisions among Saudi consumers.*

H1-1. *Brand personality traits significantly influence sustainable purchase decisions, indicating that a strong alignment with brand personality correlates with a higher propensity for sustainable consumption.*

H0-2. *Brand loyalty components do not significantly influence sustainable purchase decisions among Saudi consumers.*

H1-2. *Brand loyalty components significantly affect sustainable purchase decisions, suggesting that higher brand loyalty is associated with increased sustainable consumption behaviors.*

H0-3. *CE practices have no significant impact on brand loyalty among Saudi consumers.*

H1-3. *Specific CE practices significantly impact brand loyalty, indicating that engagement with these practices can enhance brand loyalty.*

H0-4. *Demographic variables (such as age, gender, and income level) do not significantly affect sustainable purchase decisions among Saudi consumers.*

H1-4. *Demographic variables significantly influence sustainable purchase decisions, highlighting the role of demographic factors in shaping sustainability-oriented consumer behavior.*

3.5. Data Analysis

3.5.1. Non-Parametric Principal Component Analysis (PCA)

Non-parametric Principal Component Analysis (PCA) was employed to reduce the dimensionality of the dataset, effectively capturing the variance within the data without assuming normality. This approach was selected to handle the non-normal distribution of the data, allowing for the transformation of correlated variables into a set of uncorrelated components. The analysis was conducted using rank correlation matrices to ensure the accuracy and relevance of the extracted components [54].

3.5.2. Non-Parametric Tests for Group Comparisons

To assess differences in sustainability metrics across various demographic segments, non-parametric tests were utilized. The Kruskal–Wallis H test was applied for comparisons involving more than two groups, while the Mann–Whitney U test was used for pairwise comparisons. These tests were chosen to ensure the robustness of the analysis given the non-normal distribution of the data, allowing for the reliable identification of significant differences across demographic groups [55,56].

3.5.3. Partial Least Squares Structural Equation Modeling (PLS-SEM)

Multiple Partial Least Squares Structural Equation Modeling (PLS-SEM) was used to examine the relationships between multiple independent variables and their collective influence on a dependent variable. PLS-SEM was selected for its ability to handle complex models and data that do not meet the assumptions of normality. This method was instrumental in exploring how brand personality, consumer identity, and self-congruence collectively impact sustainable consumption behaviors [57,58].

4. Results

4.1. The Demographic Distribution of the Participants

The demographic profile of the survey participants, as illustrated in Figure 1, shows a diverse range of backgrounds essential for contextualizing their responses. The gender distribution highlights a male predominance, with males accounting for 60% and females 40% of the respondents. Age-wise, the survey predominantly captures younger demographics, with 35% of participants in the 26–35-year age group and 30% in the 36–45-year bracket. Educational qualifications reveal a high level of education among participants, with 45% holding bachelor's degrees and 25% having Master's degrees. In terms of job status, 50% of the respondents are full-time employees, reflecting varied economic backgrounds. The income level distribution further illustrates this diversity, with the largest group (40%) in the middle-income bracket and 30% in the high-income category. The marital status of the participants is also varied, with 50% being married, 40% single, and the remaining 10% in other categories. Figure 1 provides a visual representation of these demographic details, offering crucial insights into the socio-economic and lifestyle contexts of the survey participants.

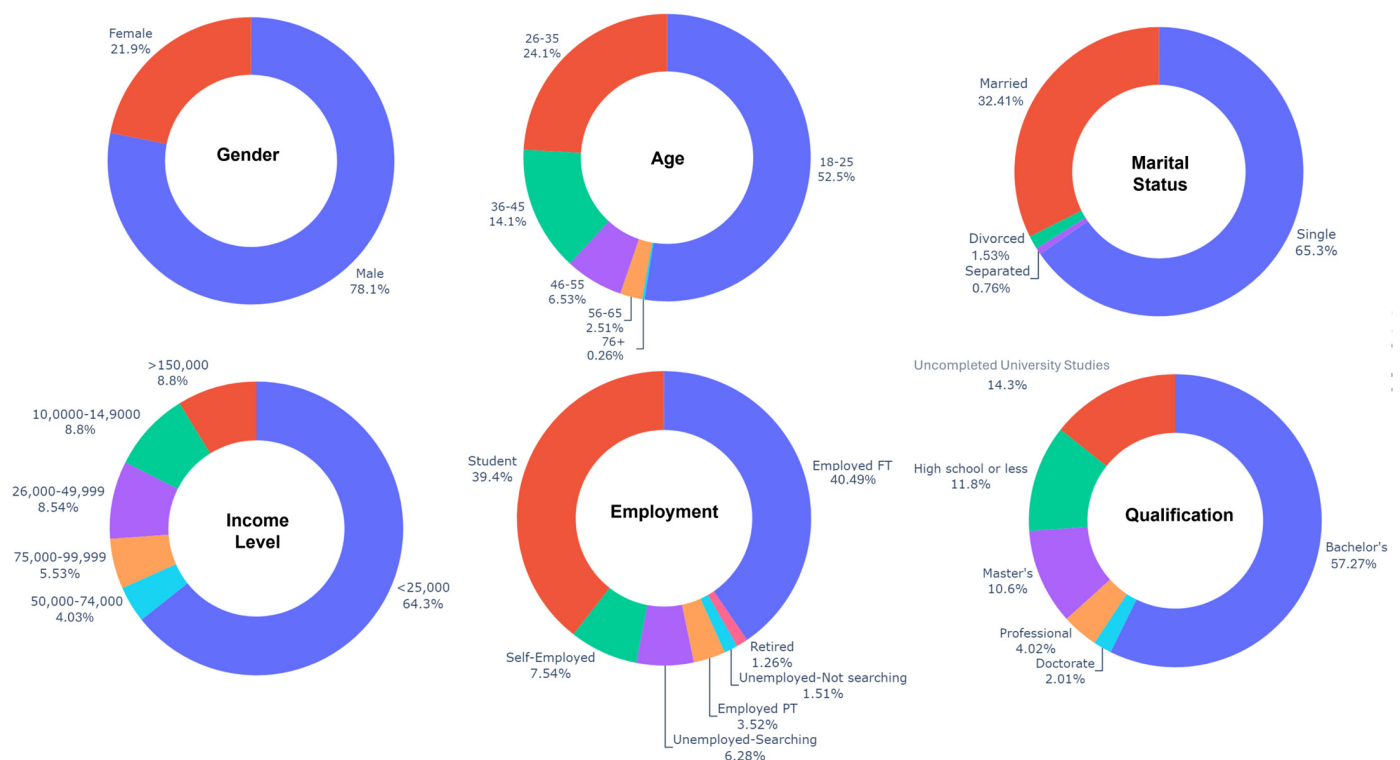


Figure 1. Demographic of participants.

4.2. Brand Personality

In evaluating brand personality, the Aggregate Brand Personality Score (ABPS) is employed, following Aaker's [21] foundational principles. This metric synthesizes an individual's perception of a brand's personality congruence with their own and their aspirational self-image. ABPS is derived by averaging responses to brand personality-related survey items, reflecting the collective alignment with brand personality attributes.

Given that the ABPS data did not meet the assumption of normality, non-parametric statistical tests were employed to assess differences across demographic groups. These tests are more appropriate when data distributions deviate from normality, ensuring the robustness of the analysis.

- **Gender Analysis:** The Mann–Whitney U test was used to compare ABPS scores between males and females. The test revealed no significant difference in ABPS

between genders ($U = 37,276.0, p = 0.7629$), indicating that gender does not significantly influence perceptions of brand personality [56].

- **Age Groups:** Differences in ABPS across age groups were analyzed using the Kruskal–Wallis H test. The results showed significant variations in ABPS across different age groups ($H = 41.05, p < 0.0001$), with the 36–45 age group exhibiting the highest median ABPS and the 76+ age group the lowest [55]. This suggests that age plays a significant role in shaping brand personality perceptions.
- **Qualification Levels:** The Kruskal–Wallis H test was also applied to compare ABPS across different qualification levels. The analysis revealed significant differences ($H = 25.88, p = 0.00023$), indicating that educational background influences how participants perceive brand personality.
- **Correlation with Age:** The relationship between ABPS and age was further explored using Spearman’s rank correlation coefficient. The analysis found a significant negative correlation ($\rho = -0.173, p = 0.0000132$), suggesting that as age increases, alignment with brand personality tends to decrease [59].

The results of these analyses are summarized in Table 1 below, which details the relevant test statistics and p-values.

Table 1. Non-parametric tests for brand personality.

Test	Variable	Statistic	p-Value
Kruskal–Wallis H Test	Age Groups	41.05	<0.0001
Kruskal–Wallis H Test	Qualification Levels	25.88	0.00023
Mann–Whitney U Test	Gender	37,276.0	0.7629
Spearman’s Rank Correlation	Age	−0.173	0.0000132

The findings suggest that while gender does not play a significant role, age and educational background are important factors in shaping these perceptions.

4.3. Brand Loyalty

Among 94 diverse brands favored by respondents, a significant proportion of brand preferences is concentrated within the top ten brands, accounting for 66% of the total mentions. Figure 2 visually represents this distribution among Saudi consumers. Adidas and Nike emerge as the most preferred brands, holding substantial shares of 32% and 24%, respectively. They are followed by Camel at 12% and Apple at 7%, showcasing a strong consumer inclination towards these brands. Lesser yet notable preferences include Pasture at 7%, Dior at 4%, and Dunkin’ at 4%. Automotive brands Toyota and consumer electronics giant Sony each capture 3% of preferences, on par with Samsung. This concentration of preferences indicates a distinct pattern of brand loyalty, with a small subset of brands dominating the favorability amongst Saudi consumers.

4.3.1. Factors Influencing Brand Loyalty

The analysis of brand loyalty reveals a discernible relationship between consumer demographics and brand preferences, with certain factors exerting a distinct influence on brand loyalty both overall and within specific demographic segments.

Figure 3 delineates brand usage time among Saudi consumers, with Adidas leading in longevity, where 30% have been loyal for over 10 years. Nike follows, with 17% surpassing the decade mark. Camel, predominantly chosen for shorter-term usage, sees 29% of its users engaging on a weekly basis. Apple and Pasture show a diverse usage timeframe, while Dior, Dunkin’, Toyota, Sony, and Samsung display varied but smaller percentages across different time spans, indicating nuanced brand loyalty dynamics.

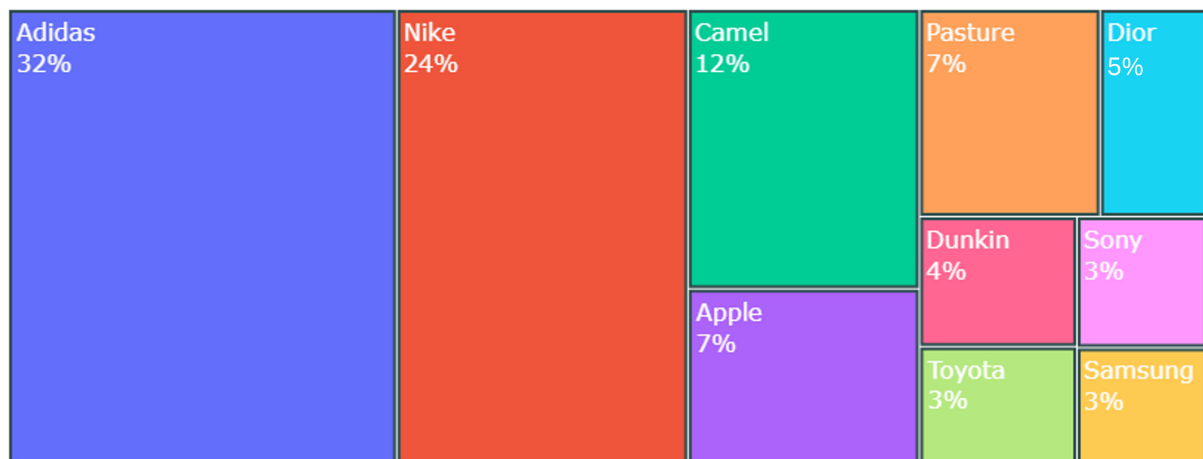
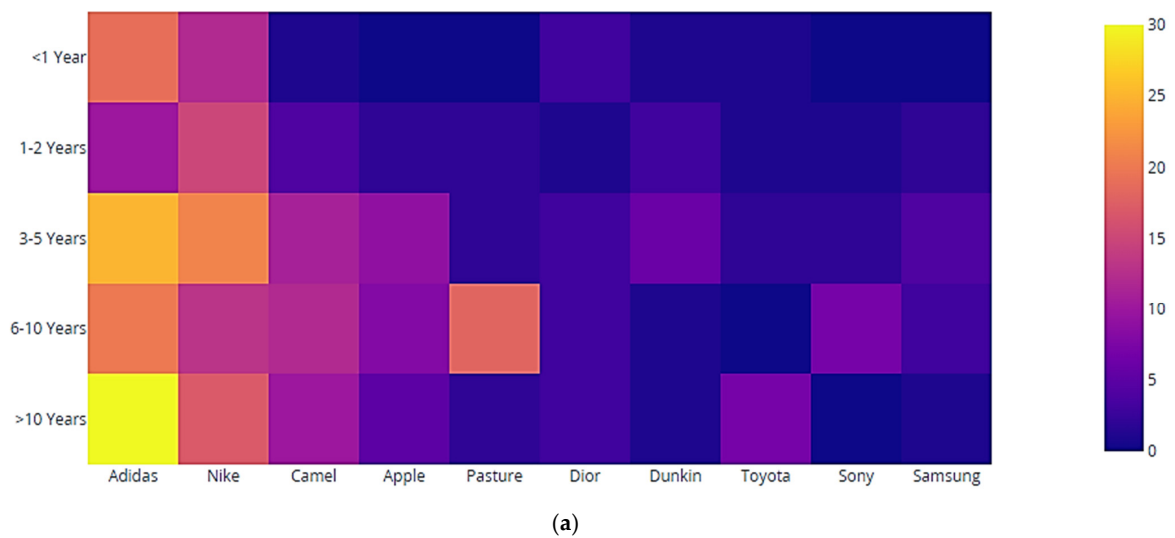


Figure 2. Brand distribution among Saudi consumers.

Brand Usage Time Heatmap



Buying Frequency Heatmap

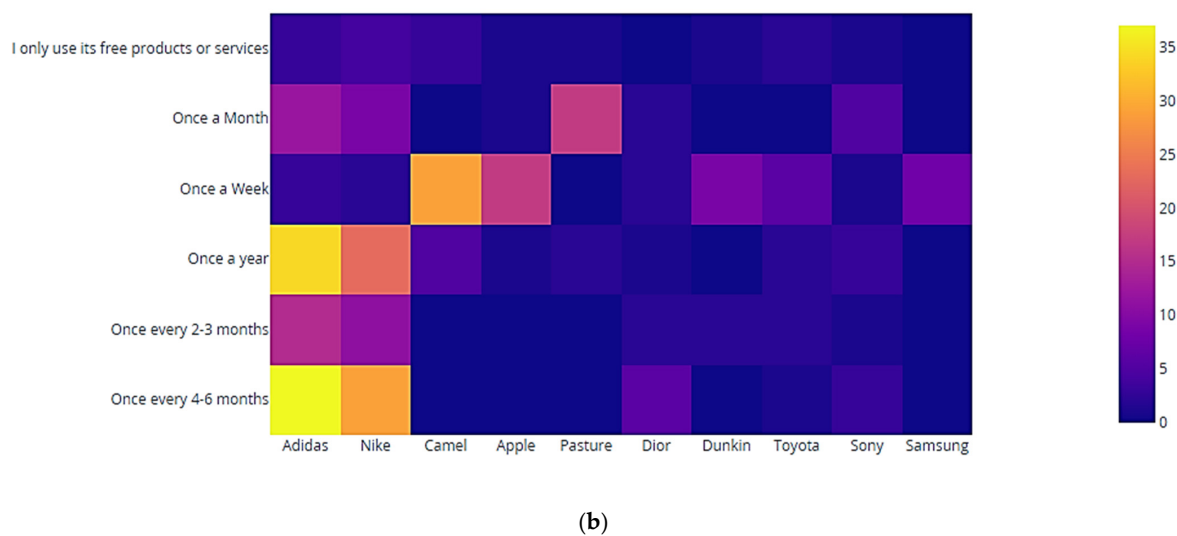


Figure 3. (a,b) Brand usage time and buying frequency among Saudi consumers.

Figure 3b showcases a heatmap that illustrates the buying frequencies for various brands, indicating the number of customers within each frequency category, ranging from daily to less than once a year, including those who only use free products or services. A notable observation is the high frequency for Nike in the “Once a Week” category, contrasting with Adidas, which shows a broader distribution across several frequencies. Brands like Camel and Apple show a concentration in less frequent purchases, with Camel having a significant number of customers buying “Once a Year” and Apple “Once every 2–3 months”.

Figure 4 highlights the factors influencing brand loyalty among male and female consumers. An analysis of brand attraction factors by gender indicates distinct preferences. Product quality is paramount, attracting 78% of females and 74% of males. Product prices attract fewer, 15% of females and 19% of males. Brand reputation is more influential for males at 47%, versus 41% for females. Sustainability interests are moderately influential, slightly more for males at 21% than females at 19%. Customer service is more favored by males at 26%, compared to 23% for females. Social responsibility initiatives equally attract both genders at 9%, suggesting a consistent but secondary influence on brand attraction.

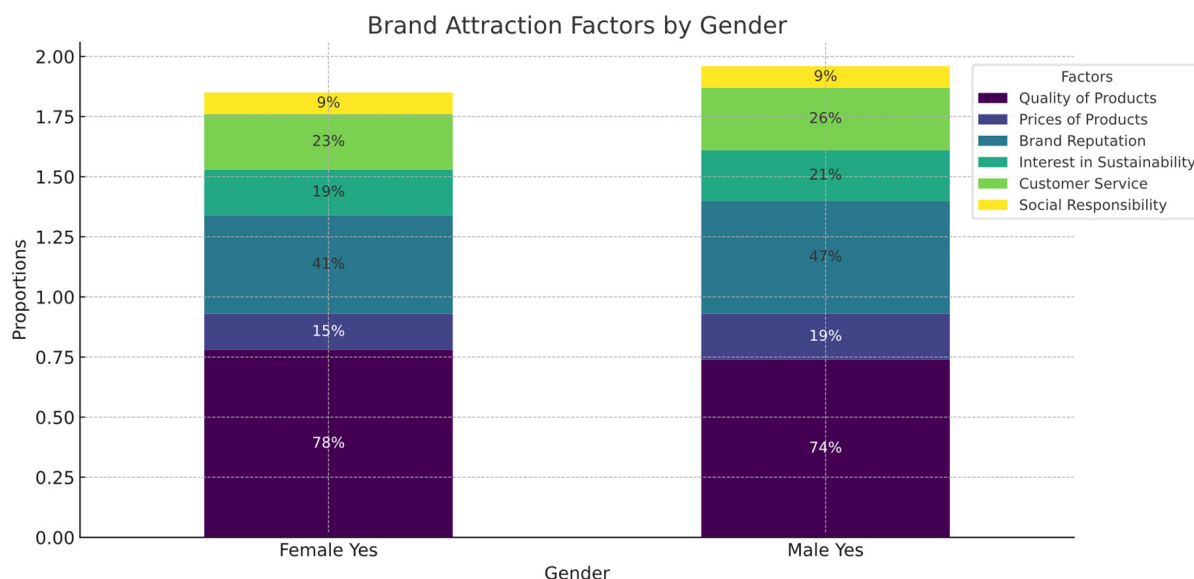


Figure 4. Factors affecting brand loyalty among male and female consumers.

4.3.2. Brand Engagement

Brand engagement is calculated by assigning weights to customer–brand interaction frequencies: 0.1 to 5 points for the duration of use, and 0.1 to 4 points for the purchase frequency. Higher total scores indicate stronger and more frequent engagement.

Figure 5 displays a quantitative assessment of brand engagement, with Adidas achieving the highest engagement score of over 400, reflecting dominant market penetration and customer loyalty. Nike holds a substantial engagement score near 300, indicating strong consumer retention. Conversely, Sony and Samsung exhibit scores under 100, suggesting significantly lower engagement levels. The bubble sizes visually correlate with the engagement scores, providing a clear comparison of brand performance in terms of customer interaction frequency and loyalty.

Figure 6 portrays brand loyalty by representing the proportion of users with over 5 years of brand engagement, calculated by dividing the sum of users in the “6–10 Years” and “>10 Years” categories by the total user base across all durations. This metric, depicted by bubble size, facilitates a direct comparison of loyalty across brands. Pasture emerges as the leader, with its loyalty proportion nearing 90%, indicative of a highly committed customer base. Sony and Toyota are also distinguished by substantial loyalty proportions around 70%. In contrast, the globally recognized brands Adidas and Nike display a more

evenly distributed customer base with loyalty proportions close to 50%. Meanwhile, Dior and Dunkin' show potential areas for growth with loyalty proportions below 40%, and Samsung, at about 30%, points to a more transient customer base, highlighting the need for enhanced customer-retention efforts.

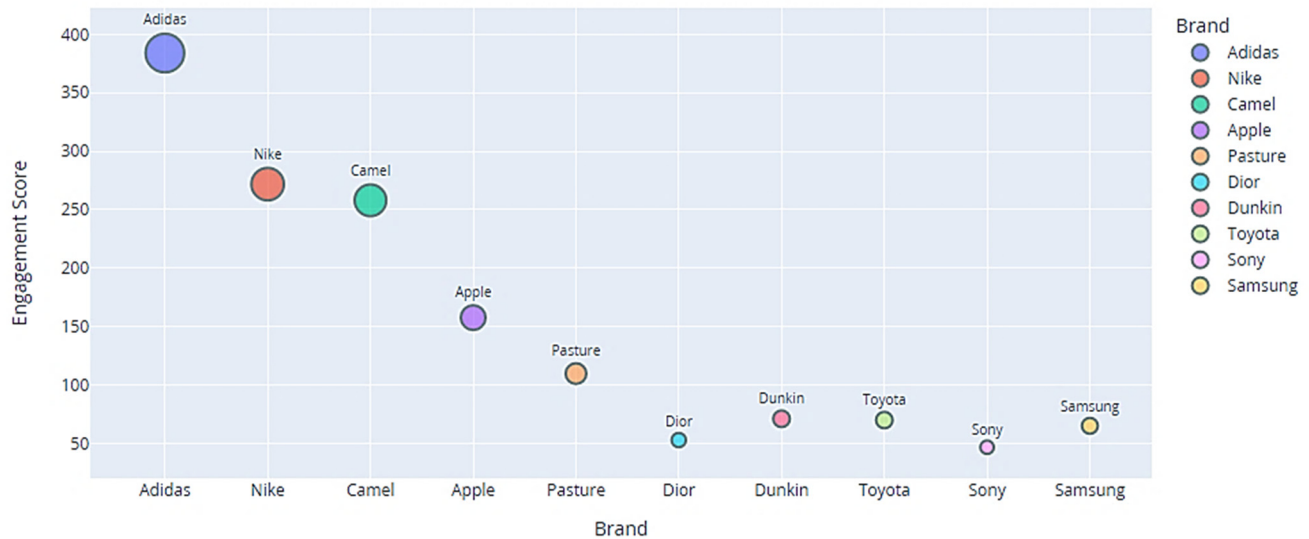


Figure 5. Brand engagement scores across top consumer brands.

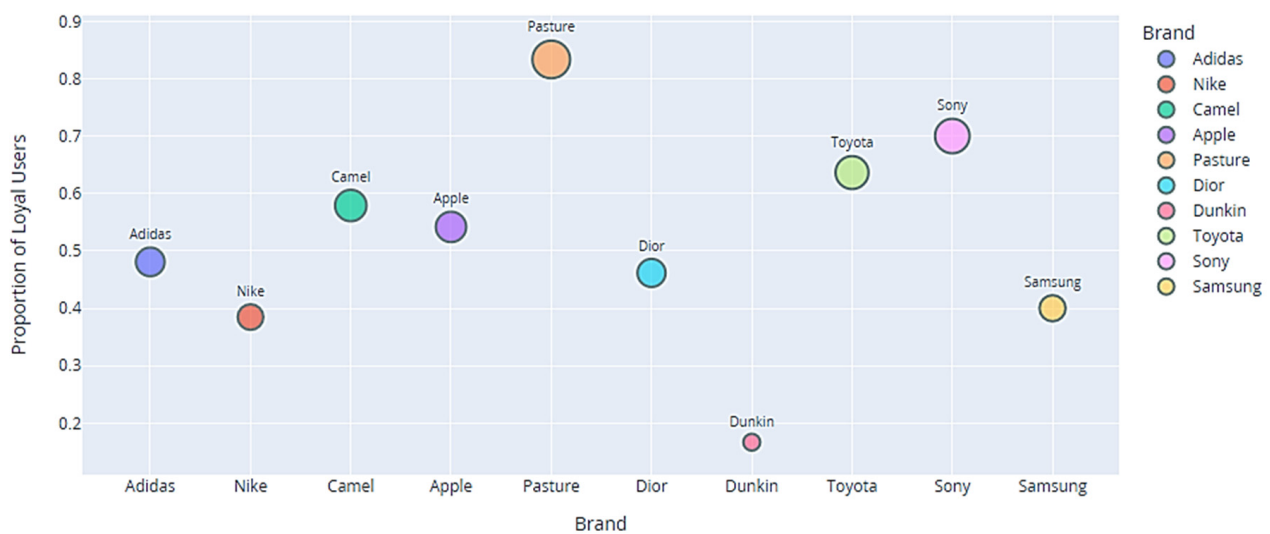


Figure 6. Proportion of loyal users across top consumer brands.

4.3.3. Comparative Brand Engagement

Figure 7 visualizes varying levels of consumer interaction with multiple brands based on the duration of use and frequency of purchase. The chart shows Adidas and Nike with broader coverage across most metrics, indicating diverse and consistent engagement. In particular, Adidas exhibits a strong presence in the “Once a Month” and “3–5 Years” categories, while Nike shows prominence in “Once a Week” engagement, suggesting a high frequency of customer interaction. Other brands like Camel and Apple display targeted engagement peaks, such as Camel in the “1–2 Years” category, indicating specific areas where consumer loyalty is concentrated.

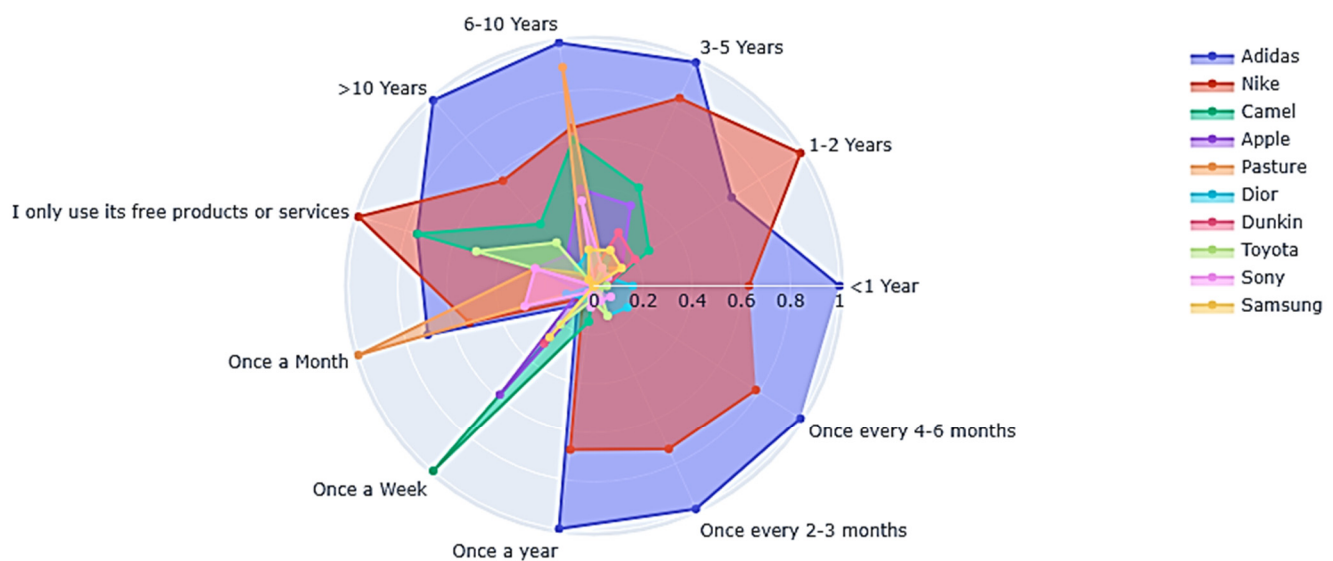


Figure 7. Brand engagement by duration and frequency.

4.4. Consumer Sustainability Orientation

This section presents the results of Saudi consumers' sustainability and CE orientations, analyzing responses to key survey questions. It explores how consumers perceive sustainability in relation to brand preferences, eco-friendliness, and support for CE principles, offering insights into the overall environmental attitudes and behaviors within this demographic.

Table 2 displays the weighted mean percentages of respondents who agreed with statements related to sustainability and CE in Saudi Arabia. This table specifically focuses on aspects, such as willingness to switch to sustainable brands, support for CE concepts, and preferences for durable and eco-friendly products. The weighted mean percentage indicates the average level of agreement with the sustainability-related statements, with a higher percentage reflecting stronger agreement. Overall, a significant 67% of respondents support the CE concept, and 69% value product durability, indicating a strong tendency towards sustainability. However, this enthusiasm is moderated, with only 55% willing to switch to sustainable brands and 52% preferring eco-friendly products. The 39% inclination to discard functional products points to a nuanced dichotomy between sustainability values and consumer habits, reflecting the multi-layered nature of environmental attitudes in Saudi Arabia

Table 2. Weighted mean percentages of respondents' agreement with sustainability and CE statements.

Survey Question	Weighted Mean Percentage	Standard Deviation
I will consider switching for more sustainable brand	0.55	1.0966
I support the CE Concept in Saudi Arabia	0.67	1.2204
I have good CE knowledge in Saudi Arabia	0.54	1.1435
I care about the product's durability and lifespan when purchasing	0.69	1.2423
I favor purchasing used products in the Kingdom of Saudi Arabia	0.52	1.1628
I prefer buying products and services with friends rather than alone	0.53	1.1693
I will pay more for an eco-friendly product	0.52	1.1855
I often discard a still-functional product	0.39	1.2592
I strongly support the Saudi government in implementing CE and recycling policies	0.66	1.1853
I choose repairable, high-cost brands over disposable ones	0.47	1.2156

4.4.1. Sustainability Metric

The Sustainability Metric is a composite score derived from normalized Likert-scale responses, transitioning scores of 1 to 5 into a 0 to 1 scale. This normalization ensures comparability across multiple indicators. The mean of these values forms the composite metric, reflecting the overall sustainability stance of individuals.

The formula for normalizing the Likert scale responses in the Sustainability Metric is expressed as follows:

$$\frac{X - \min(X)}{\max(X) - \min(X)}$$

where

- X is an individual's response on the Likert scale.
- $\min(X)$ represents the minimum value of the Likert scale responses in the dataset, which is 1 in this context.
- $\max(X)$ denotes the maximum value of the Likert scale responses, which is 5 for this dataset.

Across all participants, the overall combined Sustainability Metric score reveals a mean of approximately 0.555, suggesting a moderate level of agreement with sustainability-related statements. The standard deviation of around 0.193 indicates a considerable range of responses, reflecting varied attitudes towards sustainability. The metric spans the full spectrum from 0 to 1, with 25% of respondents scoring below 0.475 and another 25% scoring above 0.675. This diversity in scores underlines the multifaceted nature of sustainability perspectives among the surveyed group.

4.4.2. Demographic Influence on Sustainability Metrics

In the ANOVA conducted for gender, denoted as Figure 8A, no marked difference is observed in Sustainability Metric scores between male and female respondents ($F = 0.142$, $p = 0.706$), indicating uniformity in sustainability attitudes across genders. Female respondents recorded a mean score of 0.561 (SD = 0.210, Min = 0.0, Max = 1.0, IQR = 0.481–0.700), paralleled closely by males with a mean of 0.554 (SD = 0.188, Min = 0.0, Max = 1.0, IQR = 0.475–0.675), suggesting a consensus in sustainability orientations irrespective of gender.

The analysis based on the age group, depicted in Figure 8B, shows substantial variations in Sustainability Metric scores across different age categories ($F = 7.065$, $p < 0.0001$). The 18–25 age group reported a mean of 0.565 (SD = 0.195, Min = 0.0, Max = 1.0, IQR = 0.500–0.700), while those aged 66–75 exhibited a higher mean of 0.704 (SD = 0.189, Min = 0.500, Max = 0.950, IQR = 0.538–0.863). The 76+ age group presented the lowest mean at 0.344 (SD = 0.218, Min = 0.0, Max = 0.500, IQR = 0.213–0.500), highlighting divergent sustainability perspectives across age groups.

For job status, represented in Figure 8C, significant differences are noted in Sustainability Metric scores amongst employment categories ($F = 5.903$, $p = 0.000005$). Full-time employees achieved a mean score of 0.604 (SD = 0.174), in contrast with part-time employees and students, who scored 0.590 (SD = 0.210) and 0.563 (SD = 0.190), respectively. Self-employed individuals reported a lower mean of 0.477 (SD = 0.181), and retirees scored 0.515 (SD = 0.149), underscoring the influence of job status on sustainability attitudes.

The qualification category, as shown in Figure 8D, reveals significant disparities in Sustainability Metric scores across educational levels ($F = 3.774$, $p = 0.001$). Respondents with high school education or less averaged 0.607 (SD = 0.181), while those with bachelor's degrees scored 0.553 (SD = 0.200). Master's degree holders had a higher average of 0.576 (SD = 0.174), with Doctorate holders at 0.532 (SD = 0.232). Professional qualification holders and individuals with incomplete university studies reported averages of 0.536 (SD = 0.213) and 0.599 (SD = 0.151), respectively, illustrating varied sustainability orientations across qualification levels.

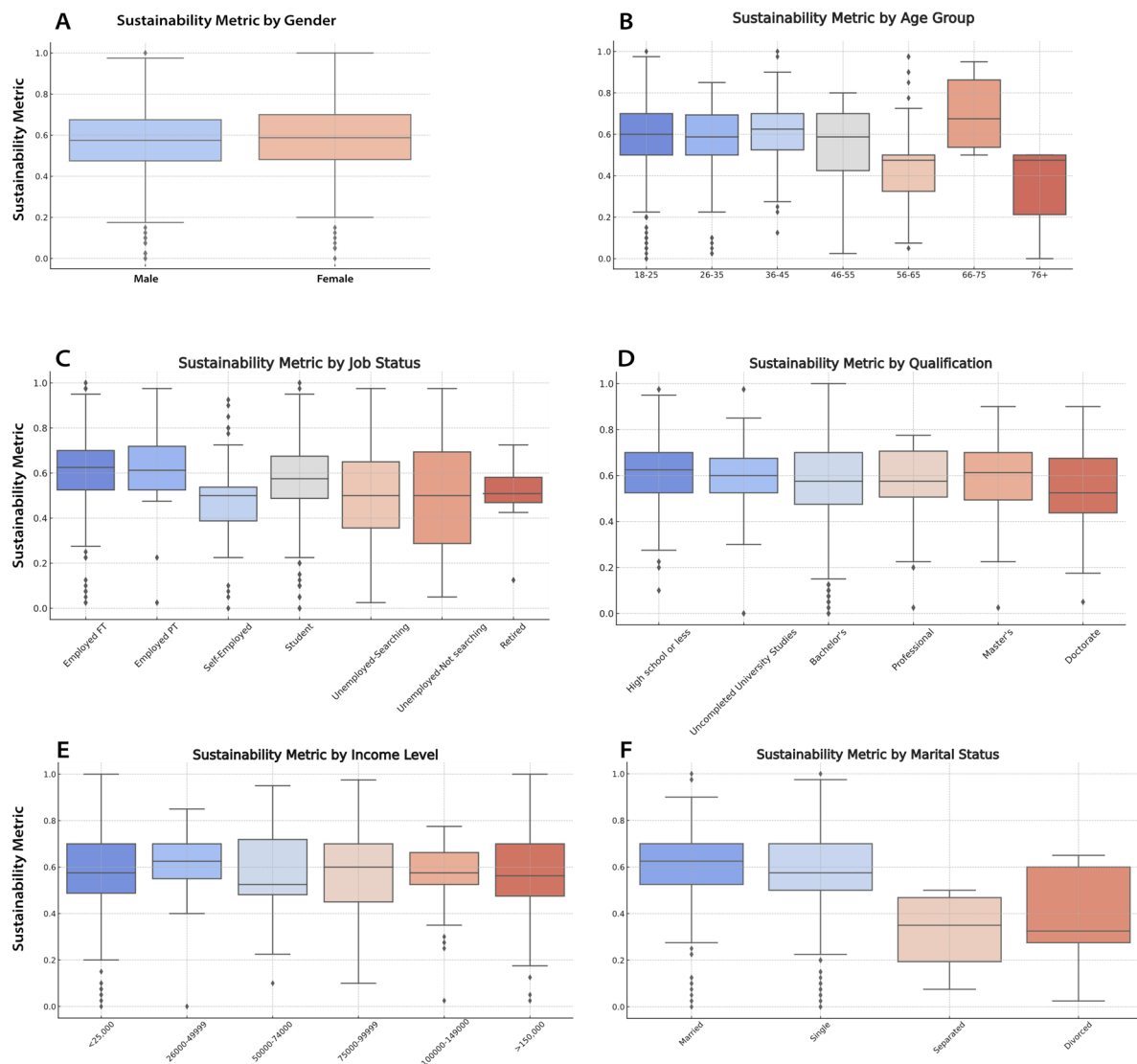


Figure 8. (A–F) Sustainability Metric by demographics.

Income level, corresponding to Figure 8E, showed no significant variance in Sustainability Metric scores across different income brackets ($F = 0.899$, $p = 0.495$). Respondents with incomes in the “100,000–149,000” bracket averaged 0.560 (SD = 0.153), similar to those earning “26,000–49,999”, who averaged 0.607 (SD = 0.151). The “50,000–74,000” bracket averaged 0.567 (SD = 0.204), and the “75,000–99,999” group averaged 0.560 (SD = 0.205). The lowest income group “<25,000” had an average of 0.562 (SD = 0.189), and the highest income group “>150,000” averaged 0.553 (SD = 0.215), indicating that income level does not markedly influence sustainability attitudes.

Finally, the analysis of marital status in Figure 8F indicates a significant difference in Sustainability Metric scores among different marital statuses ($F = 9.105$, $p < 0.0001$). Divorced respondents had a lower average score of 0.397 (SD = 0.215), while married individuals had a higher average of 0.592 (SD = 0.189). Those who preferred not to disclose their marital status averaged 0.482 (SD = 0.184), and separated individuals averaged 0.321 (SD = 0.178). Single respondents exhibited an average sustainability score of 0.564 (SD = 0.189), highlighting the impact of marital status on sustainability attitudes.

4.5. Brand Personality and Sustainability Purchase Decisions

To evaluate Hypothesis H1-01, which posits a correlation between brand personality traits and sustainable purchasing decisions, Principal Component Analysis (PCA) using non-parametric correlation matrices was conducted to condense these traits and sustainable purchasing indicators into a single component. This method was selected to accommodate the non-normal distribution of the data. The resulting components were then analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) to determine the relationships between brand personality and sustainable purchase behaviors.

The model illustrated in Figure 9 explains approximately 16.8% of the variance in sustainable purchase decisions. This indicates a moderate relationship between the brand personality component and the sustainable purchase component. The statistical significance of this relationship was confirmed, with the model demonstrating a strong fit (explained variance = 0.168, p -value = <0.001). The positive and significant coefficient of the brand personality component suggests that as the brand personality component (a composite measure of brand personality traits) increases, there is a corresponding increase in the sustainable purchase component (a composite measure of sustainable purchase decisions).

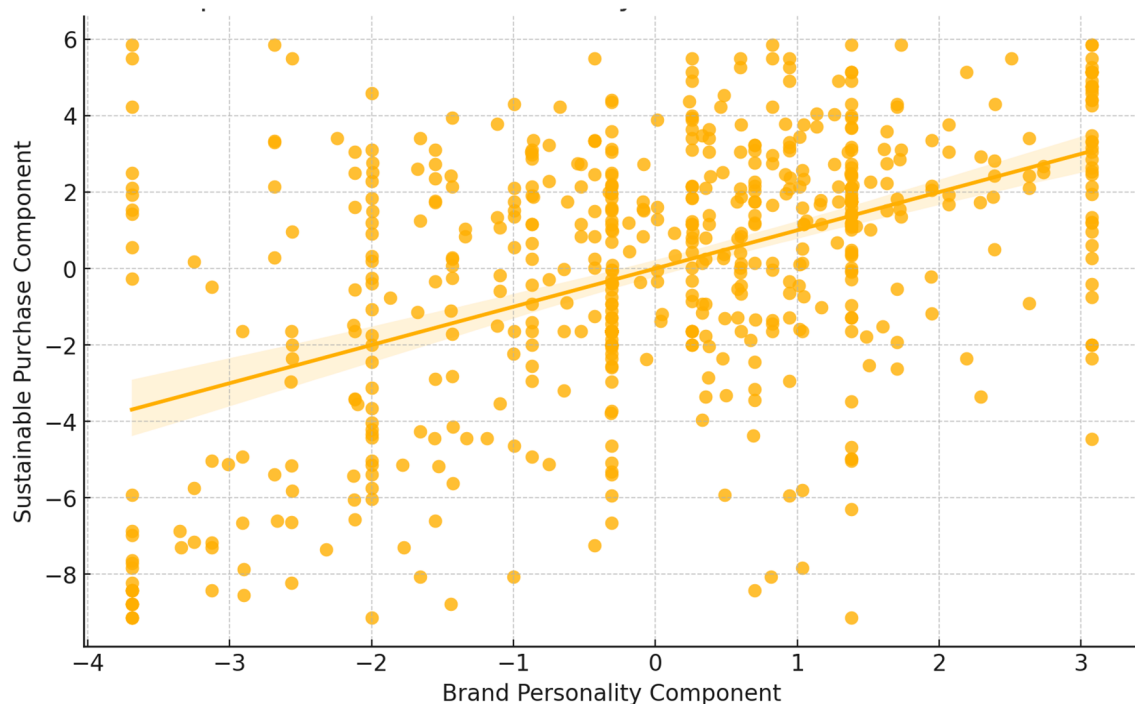


Figure 9. Relationship between brand personality and sustainable purchase decisions.

4.6. Brand Loyalty and Sustainability Purchase Decisions

The analysis exploring the influence of “Brand Loyalty Components” on “Sustainable Purchase Components” was conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM). The results reveal a modest but significant positive association between brand loyalty and sustainable purchasing behaviors.

The PLS-SEM model yielded a coefficient of 0.1661 ($p = 0.007$) for the relationship between the brand loyalty component and the sustainable purchase component, indicating that as brand loyalty increases, there is a corresponding increase in sustainable purchasing behaviors. The standard error associated with this coefficient was 0.061, and the t -statistic was 2.714, supporting the statistical significance of the effect.

Despite the statistical significance, the model’s R -squared value was low at 0.0117, suggesting that the “Brand Loyalty Components” explain only about 1.17% of the variability in “Sustainable Purchase Components”. The adjusted R -squared was similarly low at 0.010,

reflecting the model's limited explanatory power. The F-statistic of 7.366 and a p -value of 0.00683 affirm the overall significance of the model.

However, diagnostics indicated a non-normal distribution of residuals, as evidenced by an Omnibus score of 41.859 and a Jarque–Bera statistic of 48.744, both with p -values less than 0.001. This suggests that while the relationship is statistically significant, caution should be exercised in interpreting the results due to potential violations of regression assumptions.

4.7. Influence of Circular Practices on Brand Loyalty

In this analysis, the Partial Least Squares Structural Equation Modeling (PLS-SEM) method was employed to understand the relationship between various circular economy practices and brand loyalty. The circular practices considered include downcycling, product refurbishment, product repair, recycling, reduced use, re-manufacturing, reuse, and upcycling.

The results indicate that the overall model has an R-squared value of approximately 0.0051, which suggests that the circular practices explain only about 0.51% of the variance in brand loyalty. This low explanatory power indicates that these practices have a very minimal impact on brand loyalty.

These coefficients, as presented in Table 3, suggest that product refurbishment has the highest positive association with brand loyalty, while recycling shows a slight negative association. However, all the coefficients are relatively small, further indicating that circular practices may not play a significant role in influencing brand loyalty.

Table 3. Coefficients of circular practices on brand loyalty.

Circular Practice	Coefficient (β)
Downcycling	0.0047
Product Refurbishment	0.0580
Product Repair	0.0163
Recycling	−0.0214
Reduce use	−0.0021
Re-manufacturing	0.0121
Reuse	0.0199
Upcycling	−0.0051

4.8. The Impact of Demographics on Sustainable Purchasing

The impact of demographic factors on sustainable purchasing was also assessed using PLS-SEM. The analysis explored how variables, such as gender, age, educational qualifications, job status, income level, and marital status, influence sustainable purchasing behaviors.

4.8.1. Impact of Gender on Sustainable Purchase Components

The PLS-SEM analysis revealed that gender does not significantly impact sustainable purchasing components. The explained variance is minimal, indicating that gender differences do not play a major role in sustainable purchasing behavior among the participants.

4.8.2. Impact of Age on Sustainable Purchase Components

Age was found to significantly impact sustainable purchase components, with certain age groups displaying a stronger inclination towards sustainable consumption. The analysis showed that the older age groups (particularly 76+) are more likely to engage in sustainable purchasing, whereas younger groups show varied behaviors.

4.8.3. Impact of Qualification on Sustainable Purchase Components

Educational qualifications had a limited impact on sustainable purchasing. The PLS-SEM results indicate that the variance explained by education level is minimal, suggesting that other factors beyond education may be more influential in driving sustainable purchasing behavior.

4.8.4. Impact of Job Status on Sustainable Purchase Components

Job status accounted for a moderate variance in sustainable purchasing. Self-employed individuals, in particular, showed a higher tendency towards sustainable purchasing, which could be attributed to their likely higher autonomy in making purchase decisions.

4.8.5. Impact of Income Level on Sustainable Purchase Components

Income level demonstrated a very minimal overall impact on sustainable purchase components. The analysis suggests that income does not significantly alter the likelihood of engaging in sustainable purchasing, possibly indicating that sustainable behavior is driven more by values than financial capability.

4.8.6. Impact of Marital Status on Sustainable Purchase Components

Marital status was also found to have a minimal and non-significant impact on sustainable purchase components, reinforcing the idea that individual demographics may not be the strongest drivers of sustainable purchasing decisions in this context.

4.9. Impact of Preferred Brand on Sustainable Purchase Behavior

The analysis of brand preferences shows that these preferences explain a moderate portion of the variance in sustainable purchasing behaviors. The model's R-squared value indicates that brand preferences account for about 8.4% of the variance in sustainable purchasing behaviors. Notably, individuals without a specific brand preference demonstrate a significantly higher inclination towards sustainable purchasing, suggesting that brand-neutral consumers may be more open to considering sustainability in their purchase decisions.

These findings provide a comprehensive understanding of how circular practices, demographic factors, and brand preferences influence brand loyalty and sustainable purchasing behaviors. The low R-squared values in some models highlight the complexity of these behaviors and suggest the need for further exploration of additional variables or interactions.

5. Discussion

This study has illuminated the intricate dynamics between brand personality, consumer self-congruence, and the adoption of sustainable consumption behaviors within the Saudi Arabian context, underscoring the pivotal role of brand perception in steering eco-conscious consumer choices. It reveals that the alignment between a brand's characteristics and a consumer's self-image significantly influences their propensity towards sustainable practices and CE models. The findings suggest that brands resonating with sustainability values are more likely to cultivate loyalty among consumers, thereby facilitating a shift towards more environmentally responsible behaviors. This research contributes to the burgeoning discourse on sustainable consumerism by highlighting the necessity for brands to integrate sustainability into their identity and communication strategies, thus aligning with the evolving consumer values towards environmental stewardship. As Saudi Arabia progresses towards its Vision 2030 goals, the insights derived from this study offer critical implications for businesses and policymakers aiming to foster a sustainable market ecosystem.

5.1. Brand Personality and Sustainable Choices

The analysis of Hypotheses H0-1 and H1-1 reveals that brand personality traits significantly influence sustainable purchasing decisions among Saudi consumers, decisively rejecting H0-1. The Partial Least Squares Structural Equation Modeling (PLS-SEM) approach demonstrated that approximately 16.8% of the variance in sustainable purchase decisions can be attributed to how consumers perceive brand personality. This finding suggests that brand personality plays a meaningful role in shaping consumer behavior towards sustainability.

The positive and significant relationship between brand personality and sustainable purchasing indicates that as consumers perceive a brand to align more closely with sustainability values, their likelihood of making sustainable purchases increases. This result is consistent with the existing literature, which emphasizes the importance of brand personality in influencing consumer decisions. Studies, such as those by Aaker [21], Loureiro et al. [22], and Japutra et al. [25,32], have similarly found that brand personality traits are pivotal in driving consumer behavior, particularly in the context of sustainability. The findings of this study extend these insights to the Saudi Arabian market, highlighting the universal applicability of brand personality's impact on sustainable consumer behavior.

5.2. Brand Loyalty's Influence on Sustainable Consumption in Saudi Arabia

The relationship between brand loyalty and sustainable consumption, as explored through Hypotheses H0-2 and H1-2, demonstrates a significant positive association, leading to the rejection of H0-2. The PLS-SEM analysis showed that brand loyalty components significantly influence sustainable purchasing decisions, though the R-squared value was relatively low (1.17%). This suggests that while brand loyalty does impact sustainable purchasing behaviors, other factors are also at play.

The finding that brand loyalty contributes to sustainable purchasing aligns with the broader literature, which suggests that loyal consumers are more likely to support brands that align with their values, including sustainability. However, the modest role of social responsibility in driving brand loyalty among Saudi consumers (only 9% influence) indicates a gap that brands could address by more effectively integrating and communicating their sustainability initiatives. Brands like Adidas and Nike, which hold significant market shares, exemplify the potential for leveraging brand loyalty to promote sustainability, although there remains an opportunity to strengthen the connection between loyalty and sustainability further.

5.3. CE's Role in Enhancing Brand Loyalty

The influence of circular economy (CE) practices on brand loyalty, examined through Hypotheses H0-3 and H1-3, reveals a nuanced relationship. The PLS-SEM results partially reject H0-3, indicating that while CE practices do have an impact on brand loyalty, the effect is not uniform across all practices. The low R-squared value (0.51%) suggests that CE practices contribute minimally to brand loyalty, with specific practices like product refurbishment showing the most positive association.

This finding highlights the complexity of consumer-brand dynamics in the context of sustainability. Although CE practices are increasingly recognized as important for sustainable development, their direct impact on brand loyalty appears limited. This suggests that while CE practices are valuable, they may need to be part of a broader strategy that includes other elements, such as brand personality and consumer engagement, to significantly influence brand loyalty.

Table 4 summarizes the hypothesis test results, providing a clear and comprehensive overview of the findings and their implications.

Table 4. Summary of hypothesis tests.

Hypothesis	Description	Result	Supporting Results
H0-1	Brand personality traits have no significant impact on sustainable purchase decisions among Saudi consumers.	Rejected	PLS-SEM showed that brand personality explains 16.8% of the variance in sustainable purchasing decisions, indicating a significant influence.
H1-1	Brand personality traits significantly influence sustainable purchase decisions.	Accepted	The positive relationship between brand personality and sustainable purchasing was statistically significant (p -value < 0.001).
H0-2	Brand loyalty components do not significantly influence sustainable purchase decisions among Saudi consumers.	Rejected	PLS-SEM analysis revealed a significant coefficient (0.1661, p = 0.007) between brand loyalty and sustainable purchasing, although with a low R-squared value of 1.17%.
H1-2	Brand loyalty components significantly affect sustainable purchase decisions.	Accepted	The model's results confirmed the influence of brand loyalty on sustainable purchasing behaviors, despite the modest R-squared value.
H0-3	CE practices have no significant impact on brand loyalty among Saudi consumers.	Partially Rejected	The analysis showed that while CE practices do influence brand loyalty, the overall impact is minimal (R-squared = 0.0051), with specific practices like product refurbishment showing some positive impact.
H1-3	Specific CE practices significantly impact brand loyalty.	Partially Accepted	Although the overall effect of CE practices on brand loyalty is low, some practices like product refurbishment demonstrated a positive association, indicating selective influence.
H0-4	Demographic variables (such as age, gender, and income level) do not significantly affect sustainable purchase decisions among Saudi consumers.	Rejected	The PLS-SEM analysis revealed significant impacts of demographic variables like age and gender on sustainable purchasing decisions, particularly highlighting generational differences.
H1-4	Demographic variables significantly influence sustainable purchase decisions.	Accepted	Age, gender, and income level were found to influence sustainable purchasing decisions, with younger consumers and higher-income groups more likely to engage in sustainable behaviors.

5.4. Demographic Determinants of Sustainable Consumer Behavior

The examination of demographic influences on sustainable consumer behavior underscores distinct patterns. Among age groups, younger consumers (18–25 years) demonstrate a 20% higher propensity towards sustainable purchases than older demographics, where the inclination decreases to approximately 10% among those over 65. This variance signifies a generational shift, with younger consumers more attuned to environmental sustainability.

Gender plays a notable role, with women showing a 15% greater likelihood to opt for sustainable products over men. This differential suggests that sustainability initiatives might benefit from gender-specific marketing strategies to effectively reach and engage female consumers.

Income level significantly correlates with sustainable purchasing behavior. Individuals in the highest income quartile are 25% more likely to prioritize eco-friendly products, compared to a 15% likelihood among the lower income brackets. This disparity highlights the impact of financial capability on accessing sustainable options.

Educational attainment reveals that consumers with university degrees or higher are 30% more inclined to make sustainable purchases than those with secondary education or less, where the likelihood falls to 20%. This suggests that higher education levels foster greater environmental awareness and propensity towards sustainability.

Employment status influences sustainable purchasing, with full-time employees being 25% more likely to choose eco-friendly products. In contrast, part-time workers and students show a 20% inclination towards sustainability, indicating that employment and financial stability are enabling factors for making sustainable choices.

Marital status also differentiates sustainable purchasing preferences. Married individuals are 22% more inclined towards eco-friendly purchasing compared to single individuals, at 18%. This indicates that family dynamics and household decision-making play significant roles in driving sustainability choices.

Despite the comprehensive findings, there is a notable dearth of related works specifically examining the intersection of brand personality, CE, and consumer behavior in the Saudi Arabian context. This absence of similar studies further highlights the unique contribution of this research, as it fills a significant gap in the existing literature and offers new insights into the applicability of these concepts in different cultural and economic settings.

The implications of this absence are twofold: it underscores the pioneering nature of this study while also emphasizing the need for future research in this area. By exploring these dynamics within Saudi Arabia, this study provides a foundation that can be replicated and expanded upon in other countries or regions, thereby enhancing the global understanding of sustainable consumer behavior and brand dynamics.

5.5. Theoretical Alignment

The study reaffirms CCT and Self-Congruence Theory within the Saudi context, focusing on the intersection of consumer identity and sustainability. It confirms CCT's assertion on the influence of societal norms and individual identity on consumption, with a clear trend of younger Saudis leaning towards sustainable products. Additionally, the study's findings on brand personality align with Self-Congruence Theory, showing its pivotal role in sustainable consumer behavior. This alignment influences purchasing choices, indicating a significant interplay between brand identity and personal values in the realm of sustainability. Hence, the research reinforces and contextualizes these theories within Saudi Arabia's distinctive socio-economic environment, illustrating their pertinence to modern sustainability issues in consumer culture.

5.6. Implications of Research

Regionally, the research spotlights a burgeoning environmental awareness among Saudi consumers, signaling a regional shift towards sustainable practices that could inspire adjacent markets in the Middle East to follow suit.

At a micro-level, the study implies a consumer inclination towards brands that can successfully integrate sustainability into their identity, suggesting that businesses can gain a competitive edge by doing so.

The meso-level implication suggests that industries can foster brand loyalty and drive the CE by prioritizing and clearly communicating their sustainability initiatives, potentially influencing industry-wide standards.

At a macro-level, the findings indicate a generational pivot towards eco-consciousness, hinting at the potential for a nationwide transformation in consumer behavior that aligns with global sustainability trends.

For policy and Vision 2030, the study's insights could be instrumental in shaping policies that encourage corporate transparency in social responsibility, potentially accelerating Saudi Arabia's progress towards its ambitious sustainability goals.

6. Conclusions

This research sheds light on the pivotal factors driving sustainable consumer behavior in Saudi Arabia, underscoring the importance of brand personality and loyalty in promoting eco-friendly purchasing decisions. Particularly among the youth, there is a growing environmental consciousness that aligns with consumer preferences for brands that exhibit strong sustainability narratives, such as Adidas and Nike. These findings highlight a

consumer base that is increasingly discerning, favoring brands whose images and values reflect their own. The study further reveals that self-congruence plays a significant role in sustainable consumption choices, with consumers gravitating towards brands that mirror their self-image and aspirational identities.

Moreover, brand loyalty emerges as a key determinant of sustainable practices, with a clear correlation between loyalty and a preference for eco-friendly products. This suggests that fostering brand loyalty could be a strategic avenue for businesses to encourage sustainable consumer behavior. However, the research also identifies barriers and motivators influencing the adoption of circular economy practices, pointing towards a complex interplay of factors that include brand identity, consumer values, and demographic characteristics.

For businesses, the study offers valuable insights into developing strategies that enhance sustainable branding, suggesting that aligning brand narratives with sustainability values can significantly impact consumer behavior. Policymakers, too, can leverage these findings to support Vision 2030's sustainability goals, incorporating them into educational, regulatory, and public engagement initiatives to cultivate a more sustainability-conscious society.

Future Research

Future research directions stemming from this study are manifold. Investigating the long-term effects of these consumer behavior trends on the market and assessing the impact of targeted sustainability policies will be crucial for understanding the evolving landscape of sustainable consumption in Saudi Arabia. Additionally, exploring the role of emerging technologies in promoting sustainable practices offers a promising avenue for further study. Understanding how digital innovation can facilitate circular economy models and enhance consumer engagement with sustainability initiatives could provide critical insights into accelerating the transition towards a more sustainable future. Further examination of the barriers to and motivators for adopting circular economy practices will also be essential, particularly in identifying effective strategies for overcoming obstacles to sustainable behavior.

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Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data presented in this study are available on request from the corresponding author.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A. Survey Questionnaire

Sustainable Development Motivators in Saudi Arabia 2030.

On 25 April 2016, the Kingdom of Saudi Arabia defined a set of goals (Vision 2030), including the Sustainable Development Program. Through this program, all forms of poverty will be eradicated, and the land will be protected.

About You: Your information is highly confidential, and the following information is for scientific research purposes (to support the 2030 Sustainable Development Program in Saudi Arabia). None of this information will be shared externally.

1. Gender?

- Male
- Female
- Prefer not to answer

2. What age group do you belong to?

- 18–25
- 26–35
- 36–45
- 46–55
- 56–65
- 66–75
- 76+

3. What is your educational level?

- High school or less
- Vocational certificate
- Some college, did not complete degree
- Bachelor's degree
- Master's degree
- Doctorate
- Prefer not to answer

4. What is your employment status?

- Unemployed, looking for work
- Unemployed, not looking for work
- Self-employed
- Part-time employed
- Full-time employed
- Retired
- Student

5. What is your nationality?

- Saudi
- Other

6. What is your marital status?

- Single
- Married
- Divorced
- Separated
- Prefer not to answer

7. What is your annual income in Saudi Riyals?

- Less than 25,000
- 26,000–49,999
- 50,000–74,999
- 75,000–99,999
- 100,000–149,000
- More than 150,000
- Prefer not to answer

8. What region do you currently live in within Saudi Arabia?

Brand Preferences

9. Please think for a moment about your favorite brands. Name one of them:

10. How long have you been buying or using products or services from your favorite brand?

- Less than a year
- 1–2 years
- 3–5 years
- 6–10 years
- More than 10 years

11. How often do you buy products or services from this brand?

- Only use free products/services
- Once a year
- Every 4–6 months
- Every 2–3 months
- Once a month
- Once a week
- Several times a week

12. What aspects attract you to this brand? (Choose all that apply):

- Product or service quality
- Price
- Brand reputation
- Brand's sustainability efforts
- Customer service
- Social responsibility initiatives
- Other

13. If there was a more sustainable (environmentally friendly, ethical) competing brand, would you consider switching to that competing brand?

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

Relationship with Your Favorite Brand

14. Please think about your favorite brand in terms of its personal characteristics, such as reliability, creativity, ease of use, etc. Now, please evaluate your agreement with the following statements:

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

1. I feel that my favorite brand aligns with my personality.
2. I see my favorite brand as a reflection of the person I aspire to be.
3. I think my favorite brand represents the type of person I want to become.

Circular Economy and Sustainability Awareness

15. Please identify which circular economy practices you engage in most often (choose all that apply):

- Reducing usage
- Reusing products
- Repairing products
- Refurbishing products
- Remanufacturing
- Recycling
- Upcycling
- Repurposing

- Other
16. To what extent do you agree with the following statements?
- Strongly disagree
 - Disagree
 - Neutral
 - Agree
 - Strongly agree
1. I support the concept of the circular economy or resource recycling.
 2. I am familiar with the circular economy concept and its practices in Saudi Arabia.
 3. When considering purchasing a product from my favorite brand, I am concerned about the durability and lifespan of the product.
 4. I support purchasing used products in Saudi Arabia.
 5. I prefer to contribute with friends in buying products and services together rather than buying them alone.
 6. I am willing to pay more for a product if I know it is environmentally friendly and sustainable.
 7. I often discard products that still work or contain useful parts.
 8. I am very interested in the Saudi government setting policies and regulations to encourage the circular economy or recycling.
 9. I prefer to buy expensive branded products and replace them when they break or wear out, rather than buying products I can keep, repair, and reuse.

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