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Environmental Culture and Gendered Consumer Perceptions of Sustainable Beverage Packaging in Indonesia

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Abstract: This cultural studies research addresses an environmental issue by examining the role of environmental culture on shaping gendered consumer perceptions regarding sustainable beverage packaging in Indonesia SMEs. This study specifically investigates whether gender has influence on four dimensions of consumer perceptions, including beverage packaging in Indonesian SMEs, particularly four dimensions - Environmental Impact (EI), Price and Willingness to Buy (PRICE), Access, Impact and Future (AIF), as well as Perceived Quality (QUAL). This study draws from Environmental Culture Theory and the Value-Belief-Norm framework to explain the gendered perspectives. There are 384 respondents with random sampling technique from Indonesian consumers as the sample of this research. The data is gathered via online questionnaire and independent sample t-test is used as the main data analysis technique. The finding shows that three of four dimensions are found to have significant differences based on gender. Female respondents are found to have higher willingness to pay for sustainable packaging (PRICE), greater optimism and perception toward access, impact and future (AIF), as well as stronger association for perceived quality and sustainable packaging (QUAL). However, no significant difference is found regarding EI which shows that both male and female respondents have strong awareness regarding environmental benefits of sustainable packaging. Overall, the finding supports the Gendered Environmental Culture perspective where social norms, beliefs, and roles are shaping stronger women's pro-environmental behavior and perceptions.

Key words: Gendered environmental culture, sustainability and SMEs, sustainable beverage packaging, consumer perception

Abstrak: Penelitian studi budaya ini bertujuan untuk mengkaji bagaimana gender memainkan peran penting dalam membentuk budaya lingkungan yang berkaitan dengan persepsi konsumen terhadap kemasan minuman berkelanjutan pada UMKM di Indonesia, khususnya pada empat dimensi utama, yaitu Dampak Lingkungan (Environmental Impact / EI), Harga dan Kesiapan Membeli (Price and Willingness to Buy / PRICE), Akses, Dampak, dan Masa Depan (Access, Impact and Future / AIF), serta Kualitas yang Dirasakan (Perceived Quality / QUAL). Penelitian ini menggunakan Environmental Culture Theory dan kerangka Value-Belief-Norm untuk menjelaskan perspektif berbasis

gender dalam konteks budaya lingkungan. Sebanyak 384 responden dipilih menggunakan teknik pengambilan sampel acak (random sampling) dari konsumen di Indonesia. Data dikumpulkan melalui kuesioner daring, dan teknik analisis utama yang digunakan adalah uji t sampel independen (independent sample t-test). Hasil penelitian menunjukkan bahwa tiga dari empat dimensi memiliki perbedaan signifikan berdasarkan gender. Responden perempuan menunjukkan kesediaan membayar yang lebih tinggi terhadap kemasan berkelanjutan (PRICE), memiliki optimisme dan persepsi yang lebih positif terhadap akses, dampak, dan masa depan kemasan berkelanjutan (AIF), serta asosiasi yang lebih kuat antara kualitas produk dan kemasan berkelanjutan (QUAL). Namun, tidak ditemukan perbedaan signifikan pada dimensi Dampak Lingkungan (EI), yang menunjukkan bahwa baik laki-laki maupun perempuan memiliki kesadaran tinggi terhadap manfaat lingkungan dari kemasan berkelanjutan. Secara keseluruhan, hasil penelitian ini mendukung perspektif Gendered Environmental Culture, di mana norma sosial, kepercayaan, dan peran gender berperan dalam membentuk perilaku dan persepsi pro-lingkungan yang lebih kuat pada perempuan.

Kata kunci: Budaya Lingkungan Berdasarkan Gender, Keberlanjutan dan UMKM, Kemasan Minuman Berkelanjutan, Persepsi Konsumen.

INTRODUCTION

This cultural study research examines how environmental norms, values and genders shape consumer perception regarding sustainable beverage packaging in Indonesia. This perspective views that packaging is not only technological solutions but also as a cultural practice which reflects the relationship between environmental values and norms with the perception of consumers, which in turn, results to the actual behavior of the buyers for beverage industry. With the advancement of technology, this opens opportunity for packaging to be seen as a mean of communicating environmental value and cultural aspects to consumers. This is driven by increasing awareness of issues in climate change and pollution. Packaging is considered as an industrial sector that has a big contribution to pollution, particularly plastic waste from beverage packaging. Most packaging materials used in the beverage industry are plastic due to cost and time efficiency used to manufacture them (Kumar et al., 2019). The plastic waste generated by this industry reportedly reached 142,6 million tons per year (Our World in Data, 2023). This has raised the issue of sustainable packaging, which is seen as one of solutions for minimizing the harmful impact of packaging toward the environment (Ibrahim et al., 2022). For Indonesia, small and medium enterprises (SMEs) are considered a major economic driver that needs to have a sustainable business development strategy where sustainable packaging is considered as both an opportunity and a challenge due to growing market and evolving regulations (Prabowo & Soekardi, 2023, p. 530).

In order to adopt sustainable packaging in the business world, consumer perception plays an important role because they would be the one that decides whether to buy a product with sustainable packaging or not. Consumer perceptions influence purchase decisions and shape how consumers interpret the eco-friendliness, functionality, and design of packaging. Tanzares et al. (2024) conducted a study in Indonesia and found that environmental awareness, consumer behavior, and consumer attitudes have a direct impact on purchase decisions on sustainable packaging in Indonesia. Lianita and Asmarantaka (2024) find that environmental concern plays an important role in influencing purchase decisions of sustainable packaging for younger consumers, such as Gen Z consumers. This shows that consumer perception toward sustainable

packaging is a complex issue and this must be understood thoroughly to ensure adoption of sustainable packaging can be done optimally.

Environmental culture theory explains how shared worldviews and institutional arrangements provide a way of perceiving and acting on environmental risks. This theory is based on the cultural theory of risk by Douglas and Wildavsky (Tansey & Rayner, 2020, p.53). Environmental culture theory could provide a framework on why consumers adopt or reject sustainable packaging. Environmental culture is not only an aggregate of individual beliefs regarding environmental issues, but it is a collective values and norms that shape perception on how and what sustainable packaging would mean for the society. Moreover, it is argued that culture is gendered which means that norms, responsibilities and values related to sustainability issues may be interpreted differently across genders through socialization, household roles and society norms. This in turn would result in a difference of behavioral repertoires and subjectivities on adopting the sustainable packaging. Some empirical research shows strong support on how gender differences could result in different interpretations on sustainability issues and environmental concerns. Nagy (2025) finds that women are more aware of environmental concerns than men as well as more willingness to change their behavior for reducing environmental impact. Wut et al. (2021) also find that women's perception toward sustainability are greatly affected by lifestyle and social norms, while men's perception is affected by their attitude toward policy. Nichols and Holt (2023) also support these findings where women have more concern toward sustainability compared to men. Furthermore, younger respondents are also showing more awareness toward sustainability issues compared to older generations. These empirical researches shows that women are often reported to show higher levels of environmental concerns, but the magnitude of these differences may be mediated by cultural context and factors, such as social roles, age and empathy (Wut et al., 2021; Nichols & Holt, 2023; Leong et al., 2024).

However, the issue of how gendered environmental culture shapes the consumer perception of sustainable packaging has been paid less attention in the research world. A gendered environmental culture can provide insights regarding how gender influenced by social roles and norms may condition their understanding and perception regarding sustainability and environmental issues. In the context of packaging, this may influence how credibility of sustainable packaging is perceived, product attributes that are noticed and relative importance of sustainability issues compared to other factors, such as price premium. Although there is little research that focuses on gender impact in the context of sustainable packaging, there is some empirical research that found support regarding the impact of gender toward perception on sustainability issues. Lidon et al. (2018) find that gender plays an important role in modulating the impact of extrinsic cues of products' packaging where women are found to be more sensitive on design cues compared to men. Hess and Melnyk (2016) also support the findings where they found that gender cues have an impact on brand perception and purchase behavior. Dewi and Syauki (2023) conducted research with Indonesian women sample where they found that Indonesian women are more interested in environmental concerns, although their study does not focus on packaging issue but this shows the support for gendered environmental culture where it can be used to provide insights on improving adoption of sustainable packaging in Indonesia.

Given these gaps, this research aims to examine how gender plays an important role in shaping environmental culture related to consumer perceptions of sustainable beverage packaging in Indonesian SMEs. Specifically, this research analyses the differences between male and female consumers on four different dimensions of consumer perceptions regarding

sustainable beverage packaging, which include environmental impact, price and willingness to buy, access, impact and potential future of sustainable packaging, as well as quality of sustainable beverage packaging for Indonesian SMEs. By doing so, this study has contributions for both literature and practical uses. In theory, this study integrates gendered environmental culture issues into the sustainable packaging literature and enriches the complex nature of consumer perception regarding sustainable packaging. This finding can also be used in practical ways, particularly by SMEs that can use gender-specific strategies on their packaging to improve adoption of sustainable packaging. In addition, the study of gendered cultural patterns could be used by policymakers and NGOs that seek for sustainable packaging intervention and establish relevant strategies and tactics, such as gendered tactics of recycling campaigns that are targeted through women's community groups may be seen as more effective compared to gender-neutral tactics.

LITERATURE REVIEW

A. Sustainable Packaging and Consumer Perception toward Sustainable Packaging

Sustainable packaging refers to packaging that utilizes eco-friendly material in their production activities and aims to be a solution for global sustainable development (Kozik, 2020, p.4). Sustainable packaging's main objective is to reduce waste generation by utilizing various practices that eliminate unnecessary materials, utilizing environmental-friendly materials or recyclable materials, maximize energy efficiency during its production process, and optimize life cycle assessment for the environmental impact of overall products (Ding et al., 2023, p. 6963). Sustainable packaging has increased popularity due to rising environmental concerns and changing of consumer preferences.

In beverage sectors, packaging is seen as one of largest contributors for plastic waste which makes it influential as a sustainability initiative (Magnier & Cri , 2015, p. 350). Specifically in Indonesia, packaging in the beverage sector shows high consumption of bottled drinks which results in significant plastic waste. It was reported that there are approximately 6.8 million tons of plastic waste every year and only 10% ends up in recycling centers (Plastic Waste Facts in Indonesia, 2021). This has resulted in the stakeholder pressure for businesses to adopt more environmentally-friendly solutions in their activities. However, SMEs have a mandate to incorporate sustainability issues while having challenges in the form of resource and financial constraints (Lo & Sugiarto, 2021, p.1159). Therefore, understanding consumer perception is pivotal because without push from consumers, SMEs would not give priority to incorporating sustainability and delaying adoption of sustainable packaging due to their financial constraints.

Consumer perceptions of sustainable packaging have several dimensions that need to be understood as they are shaped by both cognitive and affective dimensions. The first dimension is the Environment Impact (EI) of sustainable packaging. It refers to the perceived benefits of sustainable packaging toward the environment where it was considered as one of top keywords associated with sustainable packaging (Morashti et al., 2022, p.4921). Perceived environmental benefits of sustainable packaging is found to increase positive attitudes and willingness to purchase for consumers (Feber et al., 2023a; Afif et al., 2022). Consumers view that purchasing products with sustainable packaging are perceived as a way to have active participation in reducing harmful environmental impact, but there is also knowledge gap where consumers mostly view visible packaging attributes as a way to associate with overall environmental benefits,

despite lacking comprehensive understanding of overall life-cycle impacts (Norton et al., 2022). Most consumers rely on heuristic cues such as the use of materials that are environmentally-friendly, but failing to account for energy consumption and efficiency associated with production activities (Herrmann et al., 2022, p.106219). Understanding about consumer perception regarding environmental impact is crucial for businesses, particularly for SMEs as knowledge about this perception can help on how well sustainable packaging is viewed by consumers. With this knowledge, it would help businesses to prioritize resource allocation and create better communication with consumers.

The second dimension is price premium and willingness to buy sustainable packaging (PRICE). Price is considered as a critical determinant that influences consumers' willingness to buy sustainable packaging. Consumers' willingness to pay for premium price of products with sustainable packaging tends to be modest and it is often limited to below 10 percent more where most consumers are willing to pay up to 7% more as price premium (Feber et al., 2023b). There is also a persistent gap between actual behavior and willingness to pay where price is determinant of the actual behavior where higher price premium would make consumers revert to conventional options because of the high price differences (Herrmann, 2022). Willingness to pay is also related to the knowledge and awareness of environmental issues for consumers as well as other cultural issues. For developing markets, Carvalho et al. (2022) find that consumers are willing to pay for up to 5% premium price. While developed markets, such as the US market, would see higher price premiums where 7% of consumers are willing to pay for above 10% of price premium and only 8% of consumers are not willing to pay for price premium (Feber et al., 2023b). This shows that culture and societal values might also play an important role in determining the price and willingness to buy for sustainable packaging.

The third dimension is consumer's perception toward Access, Impact, and Future of SMEs Sustainable Packaging (AIF). SMEs face resources and financial constraints as their main barriers for adopting sustainable packaging solutions. Combined with lack of technical expertise and supply chain constraints, this makes SMEs have to pay more production cost for adopting sustainable packaging due to limited economies of scale compared to big companies, which in turn, make them unable to adopt the sustainable packaging (Daramola et al., 2025, p.89). With growing environmental awareness from stakeholders, particularly consumers, this also results in encouragement for SMEs to adopt sustainable packaging, which could lead to more affordable and accessible materials for sustainable packaging in the future. Assessment of consumer perception toward access, impact and future of sustainable packaging would be seen as important for determining the confidence of consumers toward the sustainable packaging's future adoption in the context of SMEs. The adoption of sustainable packaging can also be seen as an opportunity for companies where it is perceived as a branding strategy to position the brand better in the consumer's mind, particularly for consumers that have high environmental awareness (Maianto et al., 2024).

The fourth dimension is perceived quality of sustainable packaging (QUAL). Consumer perception of perceived quality plays an important role because packaging not only functions as a protection for the product but also acts as a signal of quality and safety (Magnier & Crié, 2015). Sustainable packaging can have an impact toward perceived quality in consumers' minds and this could influence their willingness to buy the product as well as association of products' quality in consumers' mind. Consumers also find that sustainable materials used in the product would be associated with higher quality of products (Magnier et al., 2016). However, other researchers also found that sustainable packaging may not be one and sole determinant for perceived quality,

as other factors may also influence perceived quality of products (Cammarelle et al., 2019). Understanding about consumer perception regarding how sustainable packaging shapes perceived quality of products would be important to help SMEs on building relevant strategies to optimize and utilize sustainable packaging for their benefits.

B. Environmental Culture Theory and Gendered Perspective

Environmental culture theory is built based on Douglas and Wildavsky's (1982) cultural theory of risk where its main notion is that shared worldviews, beliefs, norms and institutional arrangements provide a way of perceiving and acting on environmental risks and appropriate responses are socially patterned (Tansey & Rayner, 2020, p.53). Complementary modern psychological models, such as the Value-Belief-Norm (VBN) framework also support this notion where it highlights how underlying human values to environmental beliefs would drive pro-environmental behaviors (Batool et al., 2024, p.694). These frameworks help in understanding how environmental behaviors are not just a product of rational outcomes but also mediated by culturally constituted values and norms in the society. In the context of sustainable packaging, this means consumers' perception toward sustainable packaging cannot be understood separately from the cultural context where they are embedded as the cultural values and norms would determine how consumers perceive sustainable packaging. From a contemporary cultural studies perspective, it is argued to understand a culture not only as a pattern of behavior but also as a system of values, beliefs, and norms that shapes social practices and perceptions. This perspective emphasizes that environmental practices are influenced by broader cultural narratives rather than being isolated individual choice. Recent research also supports this argument by suggesting that cultural meanings are situated within local social contexts making it important to interpret environmental behavior through specific cultural systems (Permanadeli, 2024). This makes evaluation of consumer perception toward sustainable beverage packaging reflects not only environmental considerations but also culturally constructed meanings which are related to environmental behavior and social identity.

Culture is a complex concept that can be experienced differently across social groups because it is not monolithic, specifically for different genders in the same social groups. A gendered environmental culture perspective merges the idea of environmental culture theory and gender structure theory where the main notion is that cultural values and norms are gendered because social expectation, roles and symbolic meaning may be experienced differently based on the gender, which could result to subjectivity preference for actual behaviors (Risman, 2018, p.25). Gender is identified as a determinant for explaining environmental concerns and behavior as several empirical evidences have shown support. Explanations about this gap from gendered perspective include females are found to have more care-oriented roles, higher empathy toward environmental risks, and greater responsibility for household and waste issues (Dhenge et al., 2022; Shahid et al., 2025). While ecofeminist scholars connect gendered perspective toward environmental behaviors as a cultural metaphor which influences how women are positioned as more responsible and capable of environmental actions (Sturgeon, 2016, p.5). This cultural interpretation is also relevant in Indonesia, where women more positioned in a primary role related to household purchasing decisions and food preparation. These social practices provide women with more exposure to sustainability-related decisions, such as packaging selection and waste disposal. Recent Indonesian research also argues that women's engagement in environmental issues should be understood as a culturally embedded practice shaped by social responsibility and participation. In turn, this leads to argument where women's stronger

environmental perceptions may reflect culturally constructed identities and social expectations rather than individual preferences (Pakasi et al., 2024).

Although empirical evidence has shown a gender gap in the environmental concerns and behaviors where women often report higher concerns toward environmental issues and more willing to take proactive environmental behaviors compared to men, this gap is not uniform and it depends on the certain issues and behaviors of the research. Women are shown to have more sensitivity toward stewardship motives as they are more socialized toward care and responsibility cares (Bormann et al., 2021). Wut et al. (2021) find that women's perception toward sustainability are greatly affected by lifestyle and social norms, while men's perception is affected by their attitude toward policy. Meanwhile, Nagy (2025) finds that women are more aware of environmental concerns than men as well as more willingness to change their behavior for reducing environmental impact. Women also have greater involvement in household provisioning where they take active involvement in waste management which results in perceived efficacy and knowledge toward environmental issues (Arya & Shukla, 2025). Kennedy and Kmec (2018) found a gender gap in household-level pro-environmental behavior where women have more frequent engagement compared to men. This is because of the society's norms and values where normative influence can amplify collective norms on the pro-environmental behavior. Pothitou et al. (2016) find that gender is linked with pro-environmental behavior, specifically household energy saving. However, they also emphasized that this behavior is influenced by environmental values and knowledge of the women, where gender may not be the only determinant for difference of pro-environmental behavior.

In the context of packaging, Auliandri et al. (2024) find that women have a higher level of intention to purchase toward green packaging compared to men, specifically caused by attitude, willingness to pay, and subjective norms. This shows that women have subjective norms that are caused by the society's culture as supported by gendered environmental culture perspectives on how women have more concern toward environmental issues. However, Zahari and Esa (2023) find that gender differences regarding adoption of sustainable packaging can only explain negative emotions associated with environmental issues, while other determinants, such as environmental concern, positive emotions and cognitive benefits are not showing significant differences among genders. This shows that understanding about gendered perspective is still showing mixed results where other factors may also play an important role in the context of packaging.

Therefore, this research contributes to the research gap by integrating gendered environmental culture perspective toward sustainable packaging would provide richer insight regarding how cultural norms and values interact with gender roles to shape different perceptions toward sustainable packaging. For Indonesian SMEs, this perspective is important because it can provide relevant strategies that can optimize the adoption of sustainable packaging which resonate with women's environmental values that are effective for the target market. Furthermore, this insight can also be used to develop relevant policies and marketing campaigns that consider cultural-gender dynamics to improve adoption of sustainable packaging in the future. Based on the literature review, the hypotheses of this study are as follows:

H₁ = There is a significant difference of consumer perception toward environment impact of sustainable packaging for Indonesian SME's beverage industry based on gender.

H₂ = There is a significant difference of consumer perception regarding price and willingness to buy beverages with sustainable packaging for Indonesian SME's beverage industry based on gender.

H₃ = There is a significant difference of consumer perception regarding access, impact and potential future of sustainable packaging for Indonesian SME's beverage industry based on gender.

H₄ = There is a significant difference of consumer perception regarding perceived quality and sustainable packaging for Indonesian SME's beverage industry based on gender.

RESEARCH METHODS

A. Type of Research

This research adopts a quantitative research approach using quantitative data collected through a questionnaire. The data collected is a primary data which contains both nominal and interval data, where Gender is a nominal data which is binary-coded where "1" is male and "2" is female. The interval data is measured with Five-Point Likert Scale that records the consumer perception toward sustainable packaging. The data analysis for this study is via the use of independent samples t-test. This statistical test is a relevant method for data analysis since the objective of this research is to compare the mean scores of two independent groups on dependent variables (Saunders et al., 2019). In this study, the two groups are male and female consumers, while dependent variables are the four dimensions of consumer perceptions toward sustainable packaging which are Environment Impact (EI) of sustainable packaging, price premium and willingness to buy sustainable packaging (PRICE), consumer's perception toward Access, Impact, and Future of SMEs Sustainable Packaging (AIF), as well as perceived quality and sustainable packaging (QUAL).

B. Research Subjects

This research has a population of all Indonesian beverage consumers that buy from SMEs products. As estimated by Statista (2025) there are around 27.3 million consumers in 2025, which make the population is very huge. Therefore, to ensure that the research is feasible in terms of resources and times, a sample must be taken. This research employs probabilistic sampling, particularly simple random sampling where samples are taken randomly from part of population. This research uses Cochran's formula for determining sample sizes as this is relevant formula with very large or infinite number of population (Nanjundeswaraswamy & Divakar, 2021, p.28):

$$n_0 = \frac{Z^2 * p * q}{e^2}$$

This research uses a 5% margin of error and a 95% confidence level. which results to the Z Score of 1.96. The portion (p) is 0.5 which is commonly used as conversative portion in social research and q = (1-p) = 0.5. With this assumption, the number of sample (n₀) for this research is 384 respondents. This number of samples are considered as sufficient to ensure good representation of population, which is Indonesian beverage consumers.

C. Research Procedure

Data for this study is gathered via a questionnaire. The questionnaire has two sections where the first section asks about the demographic profile of respondents and the second section measures the consumer perception toward sustainable beverage packaging using a five-point Likert scale. The EI dimension has five questions that are used to measure the consumers perception toward environmental impact of sustainable beverage packaging which are modified and adapted from Mahmoud et al. (2022). The PRICE dimension has three questions adapted from Mahmoud et al. (2022) to measure the extent to which consumers are willing to pay price premium for purchasing sustainable packaging. The AIF dimension has seven questions which are adapted and modified from Quac et al. (2025) and Putz-Egger et al. (2025). For QUAL dimension, there are six questions adapted from Atta-Delgado et al. (2024) and Bai (2024).

The questionnaire is distributed via Google form. The data is tested for validity and reliability test to ensure that this research uses valid and reliable data. For validity test, the Pearson Product-moment correlation is conducted where item that has greater critical r -value is considered as valid (Hair et al., 2019). For this research, the critical r -value is 0.10 based on 384 respondents and Alpha of 5%. For reliability test, Cronbach's Alpha with a cut-off point of 0.7 is used (Hair et al., 2019).

For achieving the research objectives, this research uses independent-sample t -test. This is considered as relevant data analysis technique because this study aims to compare and test whether there is significant difference of consumer perception toward sustainable packaging between two independent groups (males and females). Male group is coded as "1" and female group is coded as "2". Before conducting the t -test, Levene's Test for assumption of homogeneity of variances is conducted. If Levene's Test shows variances are equal ($p \geq 0.05$) the standard t -test results (equal variances assumed) are used.

On the other hand, if Levene's Test shows variances are unequal ($p < 0.05$), the adjusted t -test results (equal variances not assumed) are used. (Pollock & Edwards, 2025, p.375). For this research, significance level (α) of 0.05 is used as threshold for hypothesis testing. If the sig. t is less than 0.05, the null hypothesis is rejected, and the stated hypotheses ($H_1 - H_4$) are accepted. This means there is significant difference of consumer perception toward sustainable packaging for corresponding dimension between male and female groups. Conversely, if the sig. t is greater than 0.05, the null hypothesis cannot be rejected which indicates gender does not significantly affect the difference of consumer perception toward sustainable packaging in the context of Indonesian SME's beverage industry.

RESULTS AND DISCUSSIONS

A. Validity and Reliability Test Results

The results of validity and reliability is discussed prior to the hypothesis testing. For table 1, it is shown the R -value of each item in the questionnaire. The critical R -value is 0.01 where all of R -value for the indicators show that they are above the critical R -value. The lowest R -value is 0.356 (PRICE-3) which is still above the critical R -value. It can be said that all indicators for the questionnaire used in this research are valid.

Table 1:
Validity Test with Pearson Product Moment

Dimension	Items	R-value	Analysis
EI	EI-1	0.509	Valid
	EI-2	0.516	Valid
	EI-3	0.622	Valid
	EI-4	0.592	Valid
	EI-5	0.474	Valid
PRICE	PRICE-1	0.668	Valid
	PRICE-2	0.728	Valid
	PRICE-3	0.356	Valid
AIF	AIF-1	0.602	Valid
	AIF-2	0.664	Valid
	AIF-3	0.651	Valid
	AIF-4	0.718	Valid
	AIF-5	0.709	Valid
	AIF-6	0.478	Valid
	AIF-7	0.603	Valid
QUAL	QUAL-1	0.608	Valid
	QUAL-2	0.489	Valid
	QUAL-3	0.467	Valid
	QUAL-4	0.717	Valid
	QUAL-5	0.620	Valid
	QUAL-6	0.712	Valid

Table 2 shows the result of reliability analysis with Cronbach's Alpha. The cut-off point is 0.7 where it can be seen that all dimensions have Cronbach's Alpha above 0.7. The lowest Cronbach's Alpha is PRICE with 0.741 but it is still above 0.7. From the test, it can be said that all indicators used in this research are valid and reliable to measure the intended constructs.

Table 2:
Reliability Test with Cronbach's Alpha

Dimension	Cronbach Alpha	Analysis
EI	0.768	Reliable
PRICE	0.741	Reliable
AIF	0.860	Reliable
QUAL	0.829	Reliable

B. Respondents Profile

Figure 1 shows the distribution of respondents in this research. From 384 respondents, there are 200 male respondents (52%) and 184 female respondents (48%). This shows that there is balanced distribution for respondents in this research which could be used to minimize gender bias for the research results. This could make the research to address the research objective optimally.

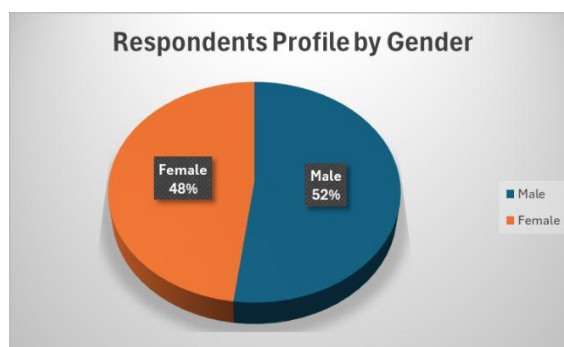


Figure 1:
Respondents Profile by Gender

C. Hypothesis Testing

For hypothesis testing, table 3 shows the p-value as the result of independent sample t-test.

Table 3:
Independent Sample t-test Results

Dimension		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	Sig. t	Mean Difference
EI	Equal variances assumed	4.033	0.045	-1.621	0.106	-0.482
	Equal variances not assumed			-1.634	0.103	-0.482
PRICE	Equal variances assumed	2.380	0.124	-2.591	0.010*	-0.679
	Equal variances not assumed			-2.604	0.010	-0.679
AIF	Equal variances assumed	10.808	0.001	-2.062	0.040	-1.044
	Equal variances not assumed			-2.078	0.038*	-1.044
QUAL	Equal variances assumed	3.421	0.065	-2.445	0.015*	-0.992
	Equal variances not assumed			-2.465	0.014	-0.992

For the first hypothesis, Levene's test shows that the sig. F is 0.045 which is below 0.05, so equal variances not assumed are used. The sig. t is 0.103 which is above 0.05. This means H_1 is rejected which means that there is no significant difference of consumer perception toward environmental impact of sustainable packaging for Indonesian SME's beverage industry based on gender. This shows that both male and female respondents have shown to acknowledge the environmental benefits of sustainable packaging which aligns with global trends of increasing environmental awareness due to stakeholder pressure and media narratives (Feber et al., 2023a; Norton et al., 2022). However, detailed tests for each indicator show that there are two questions that can be seen as having significant differences. This is shown in table 4, where to simplify the table, sig. t shown in the table is based on the result of Levene's test.

Table 4:
Independent Sample t-test Results for Environmental Impact Dimension

Indicators	Group	Mean	SD	t-test		
				t	Sig. t	Mean Difference
	Male	4.070	0.911	-2.581	0.010*	-0.217

EL-1 = I believe that sustainable packaging is important for beverages produced by SMEs.	Female	4.282	0.675			
EL-2 = I believe that sustainable packaging significantly contributes to efforts to reduce plastic waste.	Male	4.520	0.808	-0.587	0.557	-0.045
	Female	4.565	0.690			
EL-3 = I believe that by using sustainable packaging, beverages produced by SMEs help reduce environmental impact.	Male	4.245	0.793	0.696	0.487	-0.054
	Female	4.299	0.719			
EL-4 = I think that beverages with sustainable packaging produced by SMEs have a better impact on the environment compared to conventional packaging.	Male	4.250	0.843	0.264	0.792	0.022
	Female	4.228	0.763			
EL-5 = I believe that the environmental benefits of sustainable packaging outweigh the additional costs for SMEs in producing beverages.	Male	4.020	0.982	-2.071	0.039*	-0.192
	Female	4.212	0.819			

Table 4 shows that there are two indicators that have sig. t below 0.05 which are EI-1 (sig. t = 0.010) and EI-5 (sig. t = 0.039). While other indicators show no significant difference between male and female groups. The mean score for both indicators also show that the female group has a higher mean score compared to male group, which shows that female respondents have higher perception regarding the importance of sustainable beverage packaging (EI-1) as well as the environmental benefits that would outweigh additional costs for sustainable beverage packaging (EI-5). This partial significant difference shows that female respondents are shown to have stronger moral and affective aspects of sustainability, although the overall awareness regarding environmental benefits are widespread among both genders. This finding supports the argument of Dhenge et al. (2022) as well as Bormann et al. (2021) that female groups have stronger empathy and moral concern regarding environmental risks due to socialized care-oriented roles. But it must be noted that overall environmental awareness regarding benefits of sustainable packaging is similar for both genders which shows that societies have been aware about the positive environmental impact of sustainable packaging.

For the second hypothesis, the sig. t is 0.010 where equal variances are assumed due to sig. F from Levene's test is higher than 0.05 (sig. F = 0.124). This means there is a significant difference of consumer perception regarding price and willingness to buy beverages with sustainable packaging for Indonesian SME's beverage industry based on gender. This result supports the gendered environmental culture perspective where they are more willing to change their behavior for environmental concern (Nagy, 2025) as well as showing stronger pro-

environmental motivations (Wut et al., 2021). Specifically, table 5 shows detailed test for each question for this dimension:

Table 5:
Independent Sample t-test Results for Price and Willingness to Pay Dimension

Indicators	Group	Mean	SD	t-test		
				t	Sig. t	Mean Difference
PRICE-1 = I am willing to tolerate up to a 20% price increase for sustainable packaging in SME beverages.	Male	2.440	1.101	-2.172	0.030*	-0.245
	Female	2.685	1.106			
PRICE-2 = I am willing to tolerate up to a 10% price increase for sustainable packaging in SME beverages.	Male	2.845	1.195	-2.144	0.033*	-0.258
	Female	3.103	1.162			
PRICE-3 = I am willing to tolerate up to a 5% price increase for sustainable packaging in SME beverages.	Male	3.965	0.989	-2.026	0.044*	-0.176
	Female	4.141	0.703			

Table 5 shows that all three indicators have sig. t below 0.05 which means that there is significant difference of perception for price and willingness between male and female groups for all three indicators. The mean score of male respondents is lower compared to female respondents for all indicators where it means that female respondents are more willing to pay price increase for adopting sustainable beverage packaging compared to male respondents. This supports stronger motives and incentives for women to be more involved and willing to take behavioral change for environmental issues (Bormann et al., 2021; Wut et al., 2021; Nagy, 2025). Furthermore, these results also show the dynamics of gendered environmental culture where consumption behavior of female groups is shaped by societal expectation where they are more associated with environmental stewardship and care (Sturgeon, 2016). This finding is also important for SMEs where marketing strategies that emphasize on environmental issues might be more effective aimed at female consumers compared to male consumers.

The third hypothesis tests the perception regarding access, impact and potential future of sustainable packaging. The equal variances not assumed are used because sig. F from Levene's test is below 0.05 (sig. F = 0.001). The sig. t is 0.038 which is below 0.05. It means the third hypothesis is accepted and there is a significant difference of consumer perception regarding access, impact and potential future of sustainable packaging for Indonesian SMEs beverage industry based on gender. With negative mean difference, this shows that female respondents are showing higher perception toward better access, impact and potential future of sustainable packaging.

The result aligns with the argument that female's environmental perceptions are related to socialized roles in household management and environmental-related engagement (Kennedy & Kmec, 2018; Arya & Shukla, 2025). Table 6 shows the detailed test result for each indicator in this dimension.

Table 6:
Independent Sample t-test Results for Access, Impact and Potential Future of Sustainable Packaging Dimension

Indicators	Group	Mean	SD	t-test		
				t	Sig. t	Mean Difference
AIF-1 = I feel that SMEs need to prioritize the use of sustainable packaging for their beverage products.	Male	3.930	0.943	-1.917	0.056	-0.168
	Female	4.098	0.769			
AIF-2 = I believe that SMEs have access to sustainable packaging options for their beverages.	Male	4.015	0.974	-1.024	0.307	-0.094
	Female	4.109	0.802			
AIF-3 = I think it is easy for SMEs to find affordable sustainable packaging for their beverages.	Male	3.525	1.112	-1.340	0.181	-0.149
	Female	3.674	1.062			
AIF-4 = Sustainable packaging influences my decision to purchase beverages from SMEs.	Male	3.575	1.162	-2.681	0.008*	-0.300
	Female	3.875	1.029			
AIF-5 = The use of sustainable packaging in beverages is a major factor in my purchasing decision, especially for SMEs.	Male	3.425	1.217	-1.549	0.122	-0.184
	Female	3.609	1.096			
AIF-6 = I hope more SMEs adopt sustainable packaging for their beverages in the future.	Male	4.260	0.738	-0.244	0.807	-0.017
	Female	4.278	0.640			
AIF-7 = I believe that in the coming years, sustainable packaging will become a standard practice for SMEs in the beverage industry.	Male	4.090	0.875	-1.552	0.122	-0.133
	Female	4.223	0.796			

It is found that only AIF-4 has shown significant difference with sig. t of 0.008. The mean score of female respondents (3.875) is higher compared to male respondents (3.575) which shows support of previous finding that sustainable packaging influences purchasing decisions stronger on female groups compared to male groups. It means that female respondents are more willing to purchase sustainable packaging compared to male groups, particularly caused by attitudes and subjective norms (Auliandri et al., 2024). In other words, subjective norms and attitudes of female respondents are playing a stronger role in purchasing decisions toward sustainable packaging compared to male respondents. From a cultural standpoint, this may show that female respondents may perceive sustainable packaging as a moral and social necessity as one of solutions for environmental issues.

For the last hypothesis, the sig. t is 0.015 which is below 0.05. This is from assuming equal variances because the sig. F for Levene's test is 0.065 which is higher than 0.05. This means

hypothesis four is accepted where there is a significant difference of consumer perception regarding perceived quality and sustainable packaging for Indonesian SME's beverage industry based on gender. With negative mean difference, it means female respondents have stronger association of perceived quality with sustainable packaging compared to male respondents. This supports previous researchers about gendered environmental culture where society's norms and values can amplify perception of pro-environmental issues for women (Kennedy & Kmec, 2018; Pothitou et al., 2016). This also supports the finding of Magnier et al. (2016) where sustainable packaging is associated with product excellence and quality. Test for each indicator is shown in table 7.

Table 7:
Independent Sample t-test Results for Perceived Quality and Sustainable Packaging
Dimension

Indicators	Group	Mean	SD	t-test		
				t	Sig. t	Mean Difference
QUAL-1 = Sustainable packaging enhances the brand reputation of beverages produced by SMEs.	Male	4.155	0.827	-1.769	0.078	-0.138
	Female	4.294	0.694			
QUAL-2 = I think sustainable packaging in beverages produced by SMEs helps reduce waste and pollution.	Male	4.280	0.852	-0.437	0.663	-0.035
	Female	4.315	0.716			
QUAL-3 = Sustainable packaging makes me feel that SMEs are taking responsibility for environmental preservation.	Male	4.275	0.789	-0.949	0.343	-0.073
	Female	4.348	0.708			
QUAL-4 = I feel the quality of beverages produced by SMEs improves when sustainable packaging is used.	Male	3.810	1.162	-1.979	0.049*	-0.212
	Female	4.022	0.929			
QUAL-5 = I believe SMEs are more likely to innovate with sustainable packaging than large beverage companies.	Male	3.745	1.116	-2.244	0.025*	-0.233
	Female	3.978	0.917			
QUAL-6 = I believe beverages from SMEs with innovative sustainable packaging have higher quality.	Male	3.830	1.032	-3.008	0.003*	-0.300
	Female	4.130	0.914			

For this dimension, there are three indicators (QUAL-4, QUAL-5, and QUAL-6) that have sig. t below 0.05. All of the mean scores for female respondents are higher compared to male respondents. This shows that female respondents believe in the quality of beverages using sustainable packaging, which shows strong support of previous research that female respondents are showing higher emotion and concern for pro-environmental issues. These findings align with

the gendered environmental culture perspective where the pro-environmental behavior of female respondents is reinforced by cultural and social norms to promote responsibility and moral obligation toward environmental issues (Kennedy & Kmec, 2018; Pothitou et al., 2016). For SMEs, this shows that utilizing sustainability messages associated with quality can have stronger appeal for female consumers as they might have better brand trust and loyalty compared to male consumers. In short, three hypotheses of this study are accepted, indicating strong support for gendered environmental culture perspective regarding sustainable beverage packaging, specifically female groups are shown to have higher willingness and affection toward sustainable beverage packaging. From a cultural perspective, however, the rationale behind these findings can be attributed to the culturally constructed gender roles and social expectations of women in Indonesia. Their social role is more associated with household consumption and family well-being which make them to have more direct engagement with everyday environmental practices. These social roles have direct contribution on creating stronger environmental identities, which shapes greater environmental culture and put higher value on sustainable packaging as a cultural expression for responsible consumption for women. There is only one hypothesis that is rejected which shows that maybe male respondents are also having the perception that sustainable beverage packaging has a strong positive environmental impact for society.

CONCLUSION

In conclusion, this research has addressed research objectives regarding how gender plays an important role in shaping environmental culture related to consumer perceptions of sustainable beverage packaging in Indonesian SMEs, particularly through the lens of gendered environmental culture. The findings indicate that gender differences are rooted in culturally constructed values and social expectations which shape the different interpretation for environmental responsibility between men and women. In the Indonesian culture context, women's greater involvement in household consumption and caregiving is argued to contribute to stronger environmental identities and meanings, which resulting in greater support for sustainable beverage packaging. These findings reinforce the gendered environmental culture perspective that consumer perceptions toward sustainable packaging are culturally embedded and constructed with social value rather than being driven solely by individual preferences and choices toward product attributes. This study uses an independent sample t-test to test the consumer perception among four dimensions (Environmental Impact, Price and Willingness to Buy, Access, Impact, and Future as well as Perceived Quality and sustainable packaging). The result shows partial support for the proposed hypotheses, particularly three hypotheses are accepted. The significant differences are found for three dimensions (PRICE, AIF, and QUAL) while EI dimension shows no significant difference among female and male respondents. This indicates that gender plays a dominant role in shaping consumer perception toward sustainable beverage packaging, particularly related to economic evaluation (PRICE), expectations (AIF), and affective associations (QUAL). The non-significant difference of EI may be explained by the increasing awareness of the environment for both genders, where sustainability consciousness has shown to not be influenced by gender due to media narratives and awareness campaigns.

This result also aligns with gendered environmental culture perspective which suggests that gendered socialization and cultural norms are shaping the perception and behavior of individuals to respond on environmental issues, specifically women have stronger association and willingness to engage in pro-environmental behavior compared to men due to care-oriented

cultural roles and moral responsibility embedded in the society. This also supports the Cultural Theory of Risk from Douglas and Wildavsky (1982) where shared worldviews, beliefs, norms and institutional arrangements provide a way of perceiving and acting on environmental risks and appropriate responses are socially patterned. In this context, women's beliefs and norms are shaping their higher pro-environmental perceptions. This is also consistent with the Value-Belief-Norm (VBN) framework (Batool et al., 2024) where internalized care values and moral obligation influence sustainable consumption patterns and behavior of women.

Overall, this study has contributed toward literature by providing empirical support regarding gendered environmental culture perspectives within consumer behavior research regarding sustainable beverage packaging in Indonesia. It also shows the importance of cultural and gendered perspectives in the sustainability strategies among SMEs that face financial constraints but have depended on consumer demand for transformation toward sustainable operations. For Indonesian SMEs, there are several strategic implications that can be discussed. First, the SMEs should emphasize on the emotional and social dimensions of communication and marketing strategies that align with female consumers to encourage more adoption of sustainable packaging. Second, SMEs can create campaigns related to environmental care and family safety aimed for female consumers which connect sustainable packaging with moral responsibility. This would be appealing for female consumers that have care-oriented motives related to environmental issues. Third, male consumers are found to be aware about environmental benefits but are less motivated by normative and affective cues. This finding shows that SMEs should emphasis on rational and practical benefits of sustainable packaging to increase adoption for men consumers.

For future research, this study can be extended by integrating other demographic and cultural variables to explore more environmental culture perspectives that can influence consumer perception toward sustainable beverage packaging. These variables might include education level, income and regional background. Furthermore, longitudinal studies can also be applied to assess how gendered perceptions regarding sustainability issues evolve over time in Indonesia. Moreover, mixed-method approaches can be conducted to reveal psychological mechanisms that explain gendered environmental decision-making, such as empathy, social norms and beliefs. Lastly, comparative studies among different countries can be established to further test generalization for universality of gendered environmental culture perspective in relation to sustainable beverage packaging.

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