The Influence of Biodegradable Packaging and Consumer Awareness on Product Sustainability at Ascend Coffee and Tea Company

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ABSTRACT

This study aims to analyze the influence of *biodegradable* packaging and consumer awareness on product sustainability at Ascend Coffee and Tea Company in Medan City. The background of the research is based on the increasing global and local attention to sustainability issues and the demand of the beverage industry to reduce dependence on single-use plastic packaging. The adoption of *biodegradable* packaging is seen as an important strategy in supporting an environmentally friendly brand image, while consumer awareness of sustainability issues is a key factor in encouraging more responsible purchasing behavior. This study uses a quantitative approach with a survey method through a questionnaire to Ascend Coffee and Tea Company consumers who have consumed the product in the last six months. The analysis was conducted to find out the extent to which *biodegradable packaging variables* and consumer awareness affect product sustainability, both partially and simultaneously. The results of this study are expected to make a theoretical contribution to the development of literature related to green marketing as well as practical implications for companies in implementing sustainable business strategies that are able to improve brand image, consumer loyalty, and long-term competitiveness.

Keywords: Brand Image, Green Marketing, Product Sustainability, Biodegradable Packaging, Consumer Awareness

INTRODUCTION

In the development of the times that increasingly prioritize the importance of sustainability, many companies are starting to incorporate eco-friendly practices into their company's operating plans as the general public is now increasingly aware of the importance of sustainability. The use *of biodegradable packaging,* which can decompose naturally without polluting the environment, is one of the real practices and steps without polluting the environment. Consumer attention to environmental and sustainability issues is also increasing day by day, so more and more consumers are considering sustainability aspects before buying a product. In 21st-century global business, sustainability has become a top strategic priority rather than a moral choice. Consumers and businesses around the world have been forced to take more responsible action on the environment due to the increase in plastic pollution, the climate crisis, and the destruction of ecosystems in recent decades. *The adoption of biodegradable packaging*, an alternative to packaging that can decompose naturally without leaving behind long-term pollutants, is one clear example of this commitment.
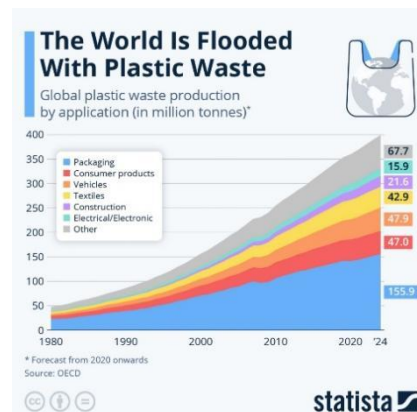
Figure 1. Chart: The World is Flooded With Plastic Waste
https://share.googlw/iMmxSHIdysQxdDg0l

According to the data shown in Figure 1, the packaging industry is responsible for most of the plastic waste collected worldwide. The food and beverage industry relies on the use of single-use plastics, so packaging is an important problem for the environment. Pollution continues to increase due to reliance on packaging that is not environmentally friendly, and this shows that the industry has not made a change to more responsible practices. The government in Indonesia itself targets a reduction in plastic waste by 70% by 2025, but industry players and the community must still participate. According to the Ministry of Environment and Forestry (MoEF), plastic accounts for 17% of national waste generation.

Ascend Coffee and Tea company as one of the local tea brands located in Medan City, North Sumatra that prioritizes quality and also social responsibility, has started using *biodegradable packaging* in its products. This initiative follows the trend of global consumers who are increasingly concerned about product sustainability. The extent to which consumers really understand, accept, and also be able to support these decisions still needs to be researched. Is the eco-friendly packaging just a green symbolism with no real meaning for customers or is it an important factor in retaining customers?

However, without awareness and active participation from consumers, eco-friendly packaging innovations will not have maximum results. When consumers become aware of environmental issues, they begin to act in a more responsible way. More than 60% of Generation Z and Millennial customers say they are more likely to buy goods from brands that care about the environment (GlobalWebIndex, 2022). However, there is still a gap between this awareness and real purchasing decisions, especially if the price of sustainable products is considered more expensive or information about sustainability is not well communicated.

The level of consumer literacy in Indonesia about product sustainability is still low. A survey conducted by the KataData Insight Center (2023) found that only about 35% of shoppers in Indonesia know and understand what the "eco-friendly" or "*biodegradable*" label means on product packaging. This means that there is still a lot of room to increase consumer education and awareness so that they are emotionally interested and take action in choosing the items they buy.

This phenomenon becomes particularly relevant when associated with changes in post-pandemic shopping behavior, where consumers are more selective, prioritize added value, and pay more attention to the social and environmental impact of a product. This opportunity can be used by brands like Ascend Coffee and Tea Company to differentiate themselves in a competitive market.

Therefore, at Ascend Coffee and Tea Company the selection of *biodegradable packaging* should be seen as a strategy to make its products different from others, as well as a test of the customer's readiness to appreciate and support sustainability. In addition, this study will investigate whether consumer awareness has a significant

influence on the perception of product sustainability, and how this relationship affects the value of products in the eyes of the market. The selection of *biodegradable* packaging is also a step to build a positive brand image in the eyes of consumers. A strong brand image can increase customer trust and be an important factor in building long-term loyalty. More than that, this strategy can also be a means to expand market segments, especially among young people who have high concern for environmental issues. Thus, this initiative is relevant not only in terms of sustainability, but also provides added value in business competition.

LITERATURE REVIEW

Product Sustainability

According to Firnaa (2025), the element of sustainability in products, especially those conveyed through packaging, can encourage consumers to prefer products that are considered to have environmental value. In this study, it is interpreted as the ability of a product to survive in the market for a long period of time by applying *biodegradable packaging* that supports environmental aspects without neglecting economic and social aspects, and is also supported by awareness from consumers in choosing sustainable products.

According to Prabawani & Sudharto (2022), product sustainability indicators include environmental certification or sustainable management, *proper* labels, and influences on social and ecological aspects. Environmental certification functions to ensure that products meet environmentally friendly standards, while proper labels are government instruments that assess the performance of a company's environmental management. In addition, the sustainability of the product is also reflected in its contribution to improving social aspects, such as community welfare, and ecological aspects, namely environmental sustainability. These indicators show that product sustainability must pay attention to the balance between *profit*, *planet*, and *people (triple bottom line).*

The concept *of green products* not only emphasizes the environmentally friendly aspect, but is also related to efforts to create sustainable products both in terms of materials, processes, and packaging. In the context of this research, *green products* can be paralleled with product sustainability, especially related to the use of *biodegradable* packaging that supports the reduction of plastic waste while increasing the company's positive image in the eyes of consumers. Thus, these findings strengthen the argument that product sustainability is one of the important factors that can influence purchasing decisions (Welice Angga & Dedy Lazuardi, 2024).

Based on the above expert opinions, product sustainability can be concluded as a multifaceted concept that integrates environmental, economic, and social balance. It emphasizes long-term product survival through eco-friendly innovation, responsible resource use, and consumer support for sustainable practices.

According to Prabawani & Sudharto (2022), the indicators of product sustainability include:

1. Environmental Certification and Labeling (compliance with eco-standards)
2. Contribution to Social and Ecological Welfare
3. Use od Sustainable Materials and Production Processes
4. Economic Continuity and Market Longevity of the Product

Biodegradable Packaging

According to Moshood (2022), *biodegradable* plastics are plastics that meet official biodegradability standards, which are capable of biodegradability by microorganisms under certain conditions and times set by international standards institutions. According to Siciliano et al., (2024), a *biodegradable* product is one that can be degraded through natural processes driven by microorganisms such as fungi and bacteria. This mechanism occurs automatically without human assistance and does not pollute the surrounding

environment. *Biodegradable* plastic is a type of bioplastic that is made from biopolymer and has biodegradable characteristics. This biopolymer can be obtained from agricultural products (Purwandari et al., 2019). According to Khodijah and Tobing (2023), *biodegradable plastic* is a biopolymer that is easily biodegradable and made from food plant waste; however, some products do not meet the SNI 7818:2014 standard, and the comfort of the product is greatly influenced by the starch content and concentration of additives such as *plasticizers* and *fillers*. It can be concluded that *biodegradable* packaging is a packaging innovation that uses environmentally friendly basic materials, such as bioplastics or natural fibers, which can decompose naturally over a certain period of time with the help of microorganisms, so as not to cause long-term pollution to the environment. The main goal of this *biodegradable* packaging is to reduce the negative impact of packaging waste on the environment by accelerating the degradation process and returning to the natural cycle, without causing harmful residues. Green *product research* has a significant influence on consumer purchasing decisions.

Based on the various definitions above, biodegradable packaging refers to packaging materials that are designed to naturally decompose through biological processes, minimizing pollution and supporting sustainability. This concept not only involves innovation in materials but also in design efficiency and waste reduction throughout the product's lifecycle.

Indicators of *biodegradable packaging* according to Sarlin (2023), namely:
1. Environmental footprint reduction & product lifecycle optimization: the goal of eco-friendly packaging is to reduce the environmental footprint and optimize the product lifecycle.
2. Design innovation & material use efficiency: the importance of packaging designed to minimize the use of materials, use recycled materials or waste, and improve energy and resource efficiency in production.
3. Use of recycled or waste materials: eco-friendly packaging also involves the use of recycled or waste materials as raw materials and is also part of efficiency and sustainability.

Consumer Awareness
According to Ritonga (2021), consumer awareness means that consumers know the product or service and its characteristics. Individuals understand about their rights as consumers. The right to information, the right to choose, and the right to safety. According to Tjan & Tobing (2024), consumer awareness is the level of understanding and attention consumers have towards sustainability and green initiatives taken by a brand, such as the use of refill spaces, as well as how it affects their purchasing decisions. It can be concluded that consumer awareness is how consumers understand, pay attention to, and respond to the products used, including their impact on the environment. Consumer awareness includes not only an understanding of product features, but also considerations about morals, health, and sustainability. Customer awareness is expected to encourage them to make choices in choosing more environmentally friendly packaging.

Based on experts' views above, consumer awareness can be concluded as a concept involving cognitive, affective, and behavioral components. High levels of awareness encourage consumers to actively support sustainable brands and choose environmentally friendly products.

According to Mentari et al., (2025), the indicators of consumer awareness are as follows:
1. Knowledge: consumers know information related to the product, including its impact.
2. Understanding: consumers understand the importance of environmentally friendly products and their benefits.
3. Attitude: consumers have views/opinions (positive or negative) related to environmental and product issues.

4. Behavior: Consumers show real actions, for example choosing environmentally friendly products over ordinary products.

Frame of Mind

According to Hardani (2020:321), a frame of thought is a model or picture in the form of a concept in which it explains the relationship between one variable and another. From this research, the frame of thought can be described as follows:
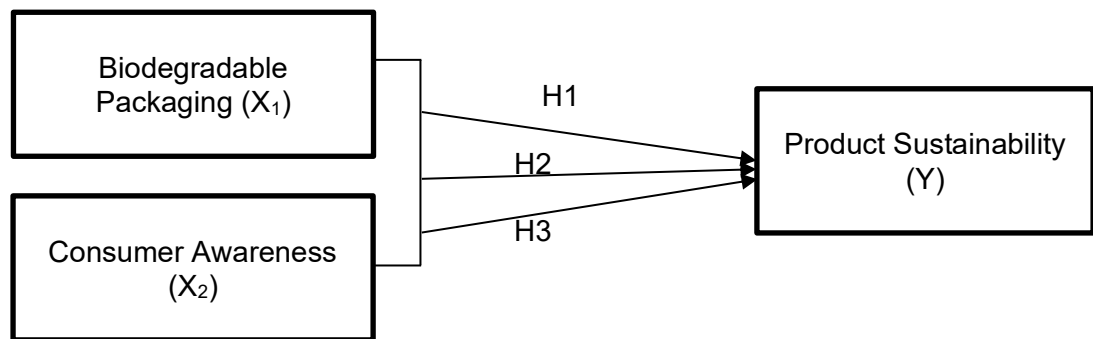
Figure 2. Frame of Mind

The hypothesis, according to Sugiyono (2019:99), is a temporary answer to the formulation of the research problem and is based on empirical facts obtained through data collection.

Based on the relationship between variables in the framework of thought, the following research hypotheses are made:

H1 : There is an effect of *Biodegradable* Packaging on Product Sustainability at Ascend Coffee and Tea Company.

H2 : There is an influence of Consumer Awareness on Product Sustainability at Ascend Coffee and Tea Company.

H3 : The Influence of *Biodegradable* Packaging and Consumer Awareness on Product Sustainability at Ascend Coffee and Tea Company

RESEARCH METHOD

This research was conducted at Ascend Coffee and Tea Company in Medan City using quantitative research methods. According to Sugiyono (2020:16), quantitative research methods are research methods based on the philosophy of positivism, used to examine certain populations or samples and collect data using research tools, analyzing quantitative or statistical data with the aim of testing predetermined hypotheses. The data of this study was collected by distributing questionnaires to respondents. This study examines the influence of independent variables, namely *Biodegradable* Packaging (X_1) and Consumer Awareness (X_2), both partially and simultaneously, on the dependent variable, namely Product Sustainability (Y).

Population is a combination of all elements in the form of events, things or people that have the same characteristics (Ferdinand 2014:171). Meanwhile, Sugiyono (2020:126) said that population is a general area consisting of objects or subjects that have certain quantities and characteristics that are determined by researchers to be studied and then conclusions are made. The population in this study is all visitors/customers of Ascend, both *on-site café* and *online*, who have consumed Ascend tea products in the last 6 months.

According to Sugiyono (2020:127), samples are part of the number and characteristics possessed by the population. The sample in this study was obtained from [opulation using *the purposive sampling* technique, which is a sample determination technique by

determining special characteristics in accordance with the research objectives of Sugiyono, 2020:133). The sample criteria used in this study were respondents who were at least 17 years old and had experience consuming the Ascend product. Haryono (2017:2014) said that the sample size in the PLS test was used for the strength of the analysis based on the portion of the model that has the largest number of predictors at least 30 to 100 cases suggested, based on this, the researcher used a sample of 100 respondents.

The measurement scale in this study uses *the Likert scale.* The *likert scale* is used to measure the attitudes, opinions, and perceptions of a person or group of people about a social object or phenomenon (Sugiyono, 2018:132). The questionnaire was distributed using *a Likert scale,* respondents were asked to choose five choices, Strongly Agree (SS) with a score of 5, Agree (S) with a score of 4, Neutral (N) with a score of 3, Disagree (TS) with a score of 2, and Strongly Disagree (STS) with a score of 1 (Sugiyono:2012).

RESULTS

1. Validity Test

The validity test was conducted to determine whether each item in the research instrument could accurately measure the intended variable. The results showed all items for the variables Biodegradable Packaging (X_1), Consumer Awareness (X_2), and Product Sustainability (Y) had corrected item. Total correlation values greater than the critical r-table value of 0.361. Spesifically, the validity coefficients for Biodegradable Packaging ranged from 0.567 to 0.844, for Consumer Awareness from 0.609 to 0.723, and for Product Sustainability from 0.618 to 0.869. Since all correlation values exceeded 0.361, it can be concluded that all questionnaire items were valid and appropriate to be used as research instruments.

2. Reliability Test

Table 1. Reliability Test

No.	Variabel	Cronbach's Alpha	Result
1	Biodegradable *Packaging* (X_1)	0,853	Reliabel
2	Consumer Awareness (X_2)	0,748	Reliabel
3	Product Sustainability (Y)	0,833	Reliabel

From the results of the table above, it can be seen that the data obtained from each variable has a Cronbach's Alpha value above 0.6 so that the entire statement of each variable

3. Normality Test
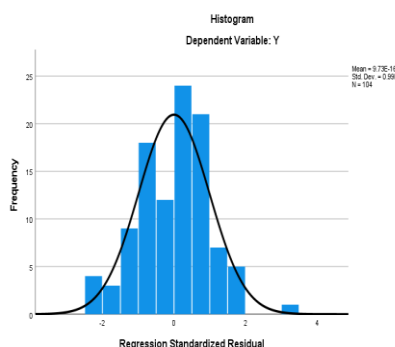
Figure 3. Histogram Graph
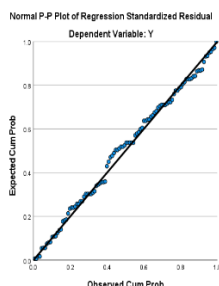
Figure 4. Normal P-P Plot
Source: SPSS Data Processing Results, 2025.

Based on the histogram graph, the distribution of the data appears to follow a normal pattern because it resembles a bell curve and does not show any noticeable deviations on either side. In addition, on the P-P Plot chart, the dots are scattered around the diagonal line and form a pattern that is almost parallel to the line. This indicates that the assumption of normality in the regression model has been met.

Table 2. Kolmogrov-Smirnov One-Sample Test Results

Unstandardized Residual	
N	104
Asymp.sig (2-tailed)	0,200

Source: SPSS Data Processing Results, 2025.

Based on the results of the One-Sample Kolmogrov-Smirnov test, the significance of 0.200. This value is greater than the significance level of 0.05, So it can be concluded that the research data is distributed normally.

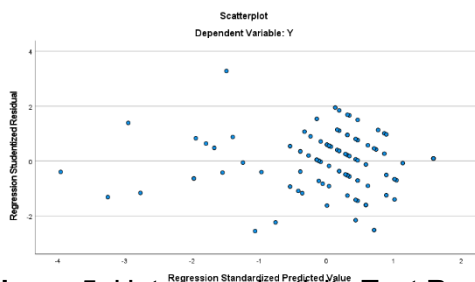4. Multicollinearity Test

Table 3. Multicollinearity Test Results

Coefficientsa			
		Collinearity Statistics	
Model		**Tolerance**	**BRIGHT**
1	Biodegradable Packaging (X_1)	0,608	1,644
2	Consumer Awareness (X_2)	0,608	1,644
a. Dependent Variable: Product Sustainability			

Source: SPSS Data Processing Results, 2025.

Based on the results of the multicollinearity test in table 4, the Tolerance and VIF values obtained were outside the limits set for multicollinearity when compared to the other independent variables: they reached 0.608 and 1.644, respectively.

5. Heterogenedasticity Test

Figure 5. Heteroscedasticity Test Results
Source: SPSS Data Processing Results, 2025.

As shown in Figure 4, there is no striking pattern at the above points below the number 0 along the Y axis. The results show that there is no problem of continuity of variance in the regression model, so this model can be declared feasible to predict product sustainability in response to *Biodegradable Packaging* (X_1), Consumer Awareness (X_2).

6. Multiple Linear Regression Analysis

Table 4. Multiple Linear Regression Analysis

Coefficientsa			
		Unstandardized Coefficients	
Model		**B**	**Std.Error**
1	(Constant)	3,225	1,540
	Biodegradable Packaging (X_1)	0,646	0,066
	Consumer Awareness (X_2)	0,257	0,068
a. Dependent Variable : Product Sustainability			

Source: SPSS Data Processing Results, 2025.

Table 4 presents information regarding the results of multiple linear regression analysis that results in the equation:
Product Sustainability = 3.225 + 0.646 *Biodegradable Packaging* + 0.257 Consumer Awareness + e
1. Constant of 3.225 means if Packaging *Biodegradable* (X_1) and Consumer Awareness (X_2) that is researched with a fixed value, then the Product Sustainability is 3.225.
2. 0.646 means that every one unit increase in the Biodegradable Packaging variable (X_1) will cause an increase of 0.646 units in Product Sustainability under the condition of Consumer Awareness (X_2) is considered to be of zero value.
3. 0.257 means that every one unit increase in the Consumer Awareness variable (X_2) will cause an increase of 0.257 units in Product Sustainability with the condition that the variable Biodegradable Packaging (X_1) is considered to be of zero value.

7. Partial Significance Test (t-test)

Table 5. Partial Significance Test (t-test)

Coefficientsa			
Type		**T**	**Sig.**
1	Biodegradable Packaging (X_1)	6.990	< 0.001
	Consumer Awareness (X_2)	3.770	< 0.001
a. Dependent Variable: Product Sustainability			

Source: SPSS Data Processing Results, 2025.

Table 6 provides the following information results:
1.   For the variable Biodegradable Packaging (X_1), t-value$_{count}$ by 6.990 at a significance level < 0.001. With a total of 104 respondents, the degree of freedom (df) was calculated as $n - k - 1 = 104 - 2 - 1 = 101$, with a value of t_{table} At the level of significance 5% is 1.983. Because t_{count} (6,990) > t_{table} (1.983), then it can be concluded that the variable of Biodegradable Packaging (X_1) has a positive and partially significant effect on Product Sustainability (Y).

2.   For the Consumer Awareness variable (X_2), t-value$_{count}$ of 3.770 with a significance level of < 0.001. With df = 101 and t_{table} = 1,983, then t_{count} (3,770) > t_{table} (1,983). This shows that the Consumer Awareness variable (X_2) also has a positive and partially significant effect on Product Sustainability (Y).

8. Simultaneous Significance Test (F Test)

Table 6. Simultaneous Significance Test (F Test)

NEW ERA			
Type		**F**	**Sig.**
1	Regression	78.982	< 0.001b
	a. Dependent Variable: Product Sustainability		
	b. Predictors: (Constant), Biodegradable Packaging (X_1), Consumer Awareness (X_2)		

Source: SPSS Data Processing Results, 2025.

Table 7 shows that the value of $F_{is\ calculated}$ as 78.982 at a significance level of < 0.001. The F-value$_{of\ the\ table}$ with a 95% confisdence level (α = 0.05), df1 = 2 and df2 = 101 is 3.09. Because F_{counts} > F_{tables} (78.982 > 3.09) and significance values are smaller than 0.05. Therefore, it can be concluded that Biodegradable Packaging (X_1) and Consumer Awareness (X_2) simultaneously have a significant effect on Product Sustainability (Y).

9. Determination Coefficient Test (R^2)

Table 7. Coefficient of Determination Test (R^2)

Model Summary^b				
Type	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	0,781	0,610	0,602	1,366
	a. Dependent Variable: Product Sustainability			
	b. Predictors: (Constant), Biodegradable Packaging (X_1), Consumer Awareness (X_2)			

Source: SPSS Data Processing Results, 2025.

The R-Square value of 0.610 shows that this research model is able to explain the variability in the dependent variable (Y) of 61.0% through the contribution of independent variables (X_1 and X2). This means that Biodegradable Packaging (X_1) and Consumer Awareness (X_2) together exert an influence of 61.0% on Product Sustainability (Y), while the remaining 39.0% is explained by other factors outside of this research model.

DISCUSSION
The Effect of Biodegradable Packaging on Product Sustainability
The *variable of Biodegradable* Packaging (X_1) was tested to have a positive and partially significant influence on Product Sustainability (Y), as evidenced by a calculated t value of 6,990 which exceeded t$_{table}$ by 1,983. This shows that the use of Biodegradable Packaging at Ascend Coffee and Tea Company is able to encourage consumers to support environmentally friendly products, reduce single-use plastic waste, and improve sustainable brand image. These results are in line with research by Windrayahya et al. (2019) which showed that biodegradable molded pulp packaging made from the, starch, and PLA waste has good mechanical properties and skill, making it an environmentally friendly packaging alternative.

The Influence of Consumer Awareness on Product Sustainability
The Consumer Awareness variable (X_2) in this study was tested to have a positive and partially significant influence on product sustainability (Y), as evidenced by a calculated t value of 5.432 which is greater than the t$_{table}$ of 1.983. This means that the higher the level of consumer awareness of environmental issues, the greater their support for sustainability-oriented products. This result is strengthened by research by Nanda Nini

Anggalih (2022) which found that consumers with a high level of environmental awareness are more likely to choose environmentally friendly products over conventional products.

The Influence of Biodegradable Packaging and Consumer Awareness on Product Sustainability
Both Biodegradable Packaging (X_1) and Consumer Awareness (X_2) have a simultaneously, positively and statistically significant impact on Product Sustainability (Y) at Ascend Coffee and Tea Company. As shown by the value of F_{the} centimeter of 78.982 exceeds the $F_{of the table}$ by 3.09. Thus, the sustainability of tea products at Ascend Coffee and Tea Company is not only determined by the implementation of eco-friendly packaging, but also greatly influenced by consumer awareness to support more sustainable consumption practices.

CONCLUSION

The findings of this study show that both Biodegradable Packaging (X_1) and Consumer Awareness (X_2) have a positive and significant effect on Product Sustainability (Y) at Ascend Coffee and Tea Company. The results indicate that biodegradable packaging provides the strongest influence, followed by the consumer awareness, while both variables together explain 61% of the variation in product sustainability. This means that implementing biodegradable packaging is not only an environmental initiative but also a reflection of the company's long-term commitment to responsibility and innovation.

Based on these findings, Ascend Coffee and Tea Company is encouraged to enchance its sustainable packaging strategies by improving design efficiency and ensuring compliance with biodegradability standards. At the same time, the company should increase consumer education and engagement through green marketing campaigns, eco-labelling, and community-based sustainability programs. Collaboration with local suppliers and continuous evaluation of environmental impact are also recommended to strengthen the circular economy and maintain long-term brand trust. Future research may include other related variables, such as green marketing strategy, eco-friendly pricing, or brand image, to provide a broader understanding of the factors influencing product sustainability.

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