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A Comparative Study of Consumer Attitudes and Value for SDGs in Taiwan and China

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Abstract: This study aims to investigate the differences in Taiwanese and Chinese consumer attitudes and values toward products with SDG indicators. SDG indicators have been shared with a significant impact on future product design and corporate image globally, and products with them have gradually gained consumer attitudes. However, many companies have yet to realize the importance of products with SDG indicators for their marketing strategy for gaining the blue ocean and competitiveness. Sustainable development is an important issue, and SDG indicators are established for it. Based on the theory of consumer value, we examined the predictive effects of five dimensions of consumer value (functional value, social value, emotional value, novelty value, and situational value) and consumer attitudes toward the products. The Kano model was used, and a questionnaire survey was conducted for consumers in Taiwan and China in this study. A descriptive analysis was conducted to identify the important factors for consumer attitudes and values. Regression analysis was conducted to determine the significant indicators for overall performance. The result provided references for manufacturers to develop products with SDG indicators to enhance the marketability and business potential of the products. The difference in consumer attitudes and values toward the products in Taiwan and China was also explored to understand the consumer's recognition of sustainable development and its relation to products in different cultures. Important implications were found for companies to design products with SDG indicators and related marketing strategies.

Keywords: SDGs, Theory of Consumer Value, Kano Model, Regression Analysis

1. Introduction

Consumers are important in sustainable consumption and production, and their attitudes have a significant impact on the decision-making of product design. Previous research has found that consumers in Taiwan and China demanded more for product environmental friendliness and social responsibility and expected the use of eco-friendly materials, energy consumption, and packaging reduction in manufacturing products. Therefore, companies need to consider their needs and purchasing behavior seriously. Recently, environmental issues have become more important than before, leading the United Nations (UN) to propose 17 sustainable development goals (SDGs) to be achieved by 2030. SDGs are grouped into eradicating poverty, ensuring food security, and reducing inequality. Among the goals, SDG 12, "Responsible Consumption and Production," is considered a critical factor in consumer attitudes and values.

Product design and related decision-making are for sustainable consumption and production as environmental friendliness and social responsibility of products must be included in product design by incorporating recycled materials and reducing packaging. Likewise, decision-making for products also impacts consumer choices, the promotion of environmentally friendly products, product transparency and integrity, and sustainable consumption and production. Therefore, it is required to explore the influence of incorporating SDG indicators in product design on consumer behavior and how to enhance consumer awareness and acceptance of sustainable products. Therefore, we examined the attitudes and demands for sustainable products of Taiwanese and Chinese consumers and explored their relationship with consumer attitudes and values. The result provided recommendations and practice guidelines for products with SDG indicators to promote the companies' efforts for sustainable development.

2. Literature Review

2.1. Consumer Value Theory

The consumer value theory is mainly applied in consumer decision-making research. Consumers purchase products and services because they believe these products help them achieve a value-related goal. Consumer behavior is influenced and guided by product value (Burgess, 1992; Hoyer and MacInnis, 2001). Values are standards that direct consumers to have different consumption behaviors at different times and situations. Sheth and Gross (1991) proposed five consumer values that influenced consumers' decision-making process when choosing cigarettes to predict consumers' consumption behavior. Their theory depicted consumers' experiences in which factors influencing consumer behavior were interpreted from the perspective of consumer values.

Consumers' behavior is influenced by five consumer values, namely functional value, social value, additional value, emotional value, and novelty value. Consumers' choices for products are made on multiple values. Babin, Darden, and Griffin (1994) stated that personal values in shopping included hedonic and utilitarian benefits. Kim, Forsythe, Gu, and Moon (2002) argued that consumers considered the functional aspects of the product and their style, social class, novelty sensation, and other experiences in choosing products. Positive associations between sustainable development awareness and consumer behavior in Taiwan were found by Yang, 2021, Wang, 2021, Hsu, 2020, Huang, 2020, and Huang, 2022. However, no related research has been conducted on the relationship between sustainable development and consumer attitudes and values in Taiwan and China. Consumer value theory is not only applicable to the study of service-oriented products but can to the adoption of SDG indicators in products or services. Therefore, we explored consumption attitudes and values toward products with SDG indicators using the consumer value theory.

2.2. Regression Analysis

Regression analysis is carried out to explore and explain the relationship between independent and dependent variables, and the relationship is used for prediction and forecasting, the explanation of causal relationships of variables, variable selection and model comparison, hypothesis testing, and model evaluation and improvement. Ting and Chen (2002) used a regression model to assess the impact of quality attributes on customer satisfaction using the Kano model to classify the attributes. They conducted regression analysis with customer satisfaction as a dependent variable and positive/negative attribute performance as an independent variable for each attribute. In their study, positive performance indicated the presence or sufficiency of the attribute, while negative performance indicated its absence or insufficiency. The following linear regression model was used to estimate the impact of positive and negative attributes on customer satisfaction.

$$US = C + \beta_1 \times (-Kn) + \beta_2 \times Kp \tag{1}$$

where *US* represents the level of customer satisfaction, *Kn* and *Kp* represent negative and positive attribute performances, and β_1 and β_2 are the corresponding regression coefficients.

By comparing the regression coefficients (β_1 and β_2), the relationship between attributes and customer satisfaction was determined based on their significance and direction. The classification of quality attributes according to the Kano model was as follows:

- (1) When β_1 was not significant but β_2 was significantly positive, it indicated attractive quality.
- (2) When β_1 was significantly negative and β_2 was significantly positive, it indicated one-dimensional quality.
- (3) When β_1 was significantly negative but β_2 was not significant, it indicated must-be quality.
- (4) When neither β_1 nor β_2 was significant, it indicated indifferent quality.
- (5) When β_1 was significantly positive and β_2 was significantly negative, it indicated reverse quality.

Table 1 provides the significance of the regression coefficients and the relationship between quality attributes in their study. The table classifies the quality attributes based on the significance of β_1 and β_2 , along with corresponding notes indicating the attribute type.

Table 1. Relationship between “significance of regression coefficients” and “quality attributes”.

Quality Attributes	β_1 (Backward) Sig.	β_2 (Forward) Sig.	Table Remark
Attractive	n.s.	*	$\beta_1 = 0; \beta_2 > 0$
One-Dimensional	*	*	$\beta_1 < 0; \beta_2 > 0$
Must-Have	*	n.s.	$\beta_1 < 0; \beta_2 = 0$
Indifferent	n.s.	n.s.	$\beta_1 = 0; \beta_2 = 0$
Reverse	*	*	$\beta_1 > 0; \beta_2 < 0$

(At $p < 0.05$, n.s. represents non-significance, and * represents significance. (Chen and Li, 2007))

We used the Kano model to classify the design attributes of products with SDG indicators. The classification of the attributes was based on the nature and extent of different factors and their impact on customer satisfaction. The Kano model is usually used for product design, development, or positioning processes to ensure precise control over “design quality” and “satisfaction.” Considering the reliability of the decision matrix in the Kano model, we used a regression analysis for the determination of the attributes. We defined four categories as follows. Through this classification, we expected to understand the impact of design attributes on customer satisfaction for decision-making of product design and development.

- (1) **Attractive Quality:** In the Kano model, attractive quality referred to product features that exceeded customer expectations and highly satisfied them. Attributes of SDG indicators such as product functionality, appearance design, fair trade, environmentally friendly materials, recycled materials, energy efficiency, higher purchase price, and well-known brands, belonged to the category of attractive quality in this study. This indicated that consumers emphasized sustainable development, and businesses must include these attributes to promote sustainability and meet consumer expectations.
- (2) **One-Dimensional Quality:** In the Kano model, one-dimensional quality pertained to basic product features to satisfy customer satisfaction. Attributes of SDG indicators were a requirement for consumers when selecting products and belonged to the category of one-dimensional quality.
- (3) **Indifferent Quality:** In the Kano model, indifferent quality did not significantly impact customer satisfaction. Attributes of SDG indicators not directly associated with customer satisfaction belonged to indifferent quality.
- (4) **Reverse Quality:** In the Kano model, reverse quality decreased customer satisfaction. Attributes not related to SDG indicators belonged to the category of reverse quality. Consumers preferred the absence or lower extent of these attributes.

3. Research Methodology

We compared the differences in consumer attitudes and values toward SDGs between Taiwan and China. 25 dimensions were defined based on the literature review, followed by preliminary inductive analysis. Referring to the studies by Chen and Li (2007), He, Lin, and Liu (1996), and Fu (2011), a questionnaire survey was conducted in Taiwan and China to find the differences in consumer attitudes and values toward SDGs in the two regions. Factor analysis was applied to analyze the data to establish an evaluation model for product design and marketing strategy to help companies understand consumer attitudes and values and optimize product design and marketing strategies.

4. Results and Discussions

4.1. Consistency and Reliability of Questionnaire

The questionnaire survey was conducted in May 2023, using Google Forms and China Wenjuanxing for distributing questionnaires and collecting responses. The target respondents were masters and doctoral students in art, design, and cultural creativity who were familiar with the concept of SDGs. A total of 97 valid questionnaires were collected from Taiwan and 203 valid questionnaires from China. Table 2 shows the test results of the consistency of the questionnaire survey in Taiwan. Cronbach α for the 25 questionnaire items was 0.971, indicating high reliability. For the functional dimension situational dimension, social dimension, emotional dimension, and novelty dimension, Cronbach α s were 0.91, 0.878, 0.920, 0.948, and 0.953, indicating consistency and reliability of the result.

Table 2. Consistency and reliability test result of questionnaire survey in Taiwan.

Dimension	Quality Attributes	Cronbach's α (Individual Items)	Cronbach's α (Dimension)	Overall Cronbach's α
Functionality	01. Products with sustainable energy or carbon emission reduction features	0.888	0.91	0.971
	02. Products with energy-saving, water-saving, or resource consumption reduction features	0.883		
	03. Products with social responsibility in the supply chain and traceability features	0.914		
	04. Products with durability, quality, and sustainable production and consumption	0.877		
	05. Products with safety and health protection features	0.886		
Contextuality	06. Products that care about social issues	0.835	0.878	
	07. Products with a social mission and values	0.834		
	08. Products that support local community development	0.851		
	09. Products with social certification or charitable donations	0.863		
	10. Products with social responsibility and social impact	0.875		
Sociability	11. Brands with a social mission and values	0.912	0.920	
	12. Purchasing products with social responsibility in the supply chain and traceability	0.909		
	13. Purchasing products that support social philanthropy and social enterprises	0.897		
	14. Purchasing products with social certification or charitable donations	0.894		
	15. Supporting products with social responsibility and social impact	0.895		
Emotional Appeal	16. Enjoying purchasing products with social responsibility and social impact	0.936	0.948	
	17. Supporting products that contribute to social philanthropy and social enterprises	0.936		
	18. Purchasing brands with social mission and values	0.938		
	19. Purchasing products with social certification or charitable donations	0.939		
	20. Supporting products with social responsibility and social impact	0.931		
Novelty	21. Novelty-related SDGs products	0.952	0.953	
	22. Innovative and uniquely featured SDGs products	0.934		
	23. SDGs products with forward-thinking and breakthrough features	0.946		
	24. SDGs products that address social issues in a new way	0.942		
	25. SDGs products that provide a distinctive consumer experience	0.938		

Table 3 shows the test results of the consistency of the questionnaire survey in China. Cronbach α for the 25 questionnaire items was 0.959, indicating high reliability. For the functional dimension situational dimension, social dimension, emotional dimension, and novelty dimension, Cronbach α s were 0.873, 0.814, 0.808, 0.811, and 0.905, indicating consistency and reliability of the result, but they were lower than those in Taiwan.

Table 3. Consistency and reliability test result of questionnaire survey in China.

Dimension	Quality Attributes	Cronbach's α (Individual Items)	Cronbach's α (Dimension)	Overall Cronbach's α
Functionality	01. Products with sustainable energy or carbon emission reduction features	0.800	0.873	0.959
	02. Products with energy-saving, water-saving, or resource consumption reduction features	0.856		
	03. Products with social responsibility in the supply chain and traceability features	0.852		
	04. Products with durability, quality, and sustainable production and consumption	0.843		
	05. Products with safety and health protection features	0.873		
Contextuality	06. Products that care about social issues	0.770	0.814	
	07. Products with a social mission and values	0.788		
	08. Products that support local community development	0.771		
	09. Products with social certification or charitable donations	0.799		
	10. Products with social responsibility and social impact	0.762		
Sociability	11. Brands with a social mission and values	0.773	0.808	
	12. Purchasing products with social responsibility in the supply chain and traceability	0.760		
	13. Purchasing products that support social philanthropy and social enterprises	0.785		
	14. Purchasing products with social certification or charitable donations	0.763		
	15. Supporting products with social responsibility and social impact	0.772		
Emotional Appeal	16. Enjoying purchasing products with social responsibility and social impact	0.788	0.811	
	17. Supporting products that contribute to social philanthropy and social enterprises	0.756		
	18. Purchasing brands with social mission and values	0.790		
	19. Purchasing products with social certification or charitable donations	0.762		
	20. Supporting products with social responsibility and social impact	0.777		
Novelty	21. Novelty-related SDGs products	0.777	0.805	
	22. Innovative and uniquely featured SDGs products	0.776		
	23. SDGs products with forward-thinking and breakthrough features	0.790		
	24. SDGs products that address social issues in a new way	0.750		
	25. SDGs products that provide a distinctive consumer experience	0.744		

The reliability test of the questionnaire survey was conducted, and its results are presented in Table 4. The overall reliability of the questionnaire survey in Taiwan and China was validated with Cronbach's α values of 0.971 and 0.959.

Table 4. Reliability test result of questionnaire survey.

Quality Attributes	China	Taiwan
01. Products with sustainable energy or carbon emission reduction features	0.955	0.970
02. Products with energy-saving, water-saving, or resource consumption reduction features	0.958	0.971
03. Products with social responsibility in the supply chain and traceability features	0.958	0.971
04. Products with durability, quality, and sustainable production and consumption	0.957	0.970
05. Products with safety and health protection features	0.958	0.971
06. Products that care about social issues	0.958	0.970
07. Products with a social mission and values	0.958	0.970
08. Products that support local community development	0.958	0.970
09. Products with social certification or charitable donations	0.959	0.970
10. Products with social responsibility and social impact	0.957	0.972
11. Brands with a social mission and values	0.958	0.970
12. Purchasing products with social responsibility in the supply chain and traceability	0.958	0.970
13. Purchasing products that support social philanthropy and social enterprises	0.958	0.970
14. Purchasing products with social certification or charitable donations	0.957	0.970
15. Supporting products with social responsibility and social impact	0.959	0.969
16. Enjoying purchasing products with social responsibility and social impact	0.958	0.969
17. Supporting products that contribute to social philanthropy and social enterprises	0.957	0.970
18. Purchasing brands with social mission and values	0.958	0.969
19. Purchasing products with social certification or charitable donations	0.957	0.970
20. Supporting products with social responsibility and social impact	0.958	0.969
21. Novelty-related SDGs products	0.958	0.970
22. Innovative and uniquely featured SDGs products	0.958	0.970
23. SDGs products with forward-thinking and breakthrough features	0.959	0.970
24. SDGs products that address social issues in a new way	0.957	0.970
25. SDGs products that provide a distinctive consumer experience	0.957	0.970
Average Value (M)	0.958	0.970

4.2. Descriptive Statistics

“5. Security and Health Protection Function” showed the highest average score (4.691) with the lowest standard deviation (SD) (0.741), indicating relative consistency of the responses. The next highest average score was 4.68 (SD = 0.771) for “4. Durability, Quality, and Sustainable Production and Consumption”. “2. Energy-saving, Water-saving, or Resource Consumption Reduction” was scored 4.65 (SD = 0.83) on average. “1. Sustainable Energy or Carbon Emission Reduction” was scored 4.536 (SD = 0.89). “3. Socially Responsible Supply Chain and Traceability Function” had an average score of 4.392 (SD = 0.908). In summary, Taiwanese consumers regarded the safety and health protection of the products and the durability, quality, and sustainable production and consumption as important. However, the attributes of sustainable energy or carbon emission reduction and socially responsible supply chain and traceability function were not scored high. Attributes with lower scores indicated that companies needed to enhance related performance and satisfaction of customers. Such attributes included “19. Purchase goods with social certification or charitable donations”, “9. Social certification or charitable donations”, “10. Goods with social responsibility and social impact”, and “6. Care about social issues” (Table 5).

Table 5. Descriptive statistics of questionnaire survey result in Taiwan.

Dimension	Quality Attributes	Lowest Score	Highest Score	Average	SD	Ranking
Functionality	01. Products with sustainable energy or carbon emission reduction features	1.00	5.00	4.536	0.890	4
	02. Products with energy-saving, water-saving, or resource consumption reduction features	1.00	5.00	4.650	0.830	3
	03. Products with social responsibility in the supply chain and traceability features	1.00	5.00	4.392	0.908	5
	04. Products with durability, quality, and sustainable production and consumption	1.00	5.00	4.680	0.771	2
	05. Products with safety and health protection features	1.00	5.00	4.691	0.741	1
Contextuality	06. Products that care about social issues	1.00	5.00	4.031	1.075	22
	07. Products with a social mission and values	1.00	5.00	4.062	1.088	20
	08. Products that support local community development	1.00	5.00	4.340	0.978	7
	09. Products with social certification or charitable donations	1.00	5.00	4.010	1.186	23
	10. Products with social responsibility and social impact	1.00	5.00	3.876	1.192	25
Sociality	11. Brands with a social mission and values	1.00	5.00	4.351	0.990	6
	12. Purchasing products with social responsibility in the supply chain and traceability	1.00	5.00	4.320	0.963	10
	13. Purchasing products that support social philanthropy and social enterprises	1.00	5.00	4.175	1.071	19
	14. Purchasing products with social certification or charitable donations	1.00	5.00	4.062	1.097	20
	15. Supporting products with social responsibility and social impact	1.00	5.00	4.247	1.000	16
Emotional Appeal	16. Enjoying purchasing products with social responsibility and social impact	1.00	5.00	4.289	0.989	12
	17. Supporting products that contribute to social philanthropy and social enterprises	1.00	5.00	4.268	1.016	14
	18. Purchasing brands with social mission and values	1.00	5.00	4.217	1.033	18
	19. Purchasing products with social certification or charitable donations	1.00	5.00	3.990	1.132	24
	20. Supporting products with social responsibility and social impact	1.00	5.00	4.247	1.021	16
Novelty	21. Novelty-related SDGs products	1.00	5.00	4.289	0.979	12
	22. Innovative and uniquely featured SDGs products	1.00	5.00	4.340	0.988	7
	23. SDGs products with forward-thinking and breakthrough features	1.00	5.00	4.330	1.038	9
	24. SDGs products that address social issues in a new way	1.00	5.00	4.309	1.014	11
	25. SDGs products that provide a distinctive consumer experience	1.00	5.00	4.268	1.056	14

Based on the data presented in Table 6, Taiwanese consumers prioritized attributes related to social responsibility, social impact, social certification, and charitable donations less than those related to SDGs. This presented challenges in promoting the companies' efforts in sustainable development and related products. Further research and promotion of the value and impact of SDGs-related attributes are necessary to increase consumers' awareness of the importance of these attributes. Additionally, companies need to incorporate social responsibility, social impact, and charitable donations into product design and marketing strategies to meet consumers' needs to establish more sustainable and responsible consumer behavior in Taiwan according to SDGs.

In China, "1. Sustainable Energy or Carbon Emission Reduction," "9. Social Certification or Charitable Donations," "17. Support for Social Public Welfare and Social Enterprise Products," "25. SDGs Products that Provide Unique Consumer

Experiences,” “14. Purchase Goods with Social Certification or Charitable Donations,” “15. Support for Social Responsibility and Social Impact of Products,” and “24. SDGs Products that Address Social Issues in Innovative Ways” were scored higher than other attributes. Chinese consumers valued attributes associated with SDGs such as sustainable energy, social certification, charitable donations, support for social public welfare and social enterprises, unique consumer experiences, social responsibility, and innovative solutions to social issues. However, there were significant variations and uncertainties in the recognition of the attributes as SDs of the scores were large. Further research and discussion on such variation and the influence of related factors are necessary to understand the values and preferences of Chinese consumers regarding SDGs.

Table 6. Descriptive statistics of questionnaire survey result in China.

Dimension	Quality Attributes	Lowest Score	Highest Score	Average	SD	Ranking
Functionality	01. Products with sustainable energy or carbon emission reduction features	1.00	5.00	3.739	1.159	1
	02. Products with energy-saving, water-saving, or resource consumption reduction features	1.00	5.00	3.611	1.317	11
	03. Products with social responsibility in the supply chain and traceability features	1.00	5.00	3.552	1.211	17
	04. Products with durability, quality, and sustainable production and consumption	1.00	5.00	3.547	1.283	20
	05. Products with safety and health protection features	1.00	5.00	3.542	1.283	21
Contextuality	06. Products that care about social issues	1.00	5.00	3.606	1.232	12
	07. Products with a social mission and values	1.00	5.00	3.557	1.290	16
	08. Products that support local community development	1.00	5.00	3.552	1.247	17
	09. Products with social certification or charitable donations	1.00	5.00	3.729	1.190	2
	10. Products with social responsibility and social impact	1.00	5.00	3.532	1.216	22
Sociability	11. Brands with a social mission and values	1.00	5.00	3.552	1.267	17
	12. Purchasing products with social responsibility in the supply chain and traceability	1.00	5.00	3.591	1.280	14
	13. Purchasing products that support social philanthropy and social enterprises	1.00	5.00	3.517	1.268	23
	14. Purchasing products with social certification or charitable donations	1.00	5.00	3.631	1.273	5
	15. Supporting products with social responsibility and social impact	1.00	5.00	3.631	1.237	5
Emotional Appeal	16. Enjoying purchasing products with social responsibility and social impact	1.00	5.00	3.448	1.309	25
	17. Supporting products that contribute to social philanthropy and social enterprises	1.00	5.00	3.675	1.252	3
	18. Purchasing brands with social mission and values	1.00	5.00	3.586	1.249	15
	19. Purchasing products with social certification or charitable donations	1.00	5.00	3.601	1.272	13
	20. Supporting products with social responsibility and social impact	1.00	5.00	3.621	1.258	8
Novelty	21. Novelty-related SDGs products	1.00	5.00	3.616	1.263	9
	22. Innovative and uniquely featured SDGs products	1.00	5.00	3.616	1.290	9
	23. SDGs products with forward-thinking and breakthrough features	1.00	5.00	3.468	1.317	24
	24. SDGs products that address social issues in a new way	1.00	5.00	3.631	1.249	5
	25. SDGs products that provide a distinctive consumer experience	1.00	5.00	3.640	1.240	4

4.3. Factor Analysis

The results of factor analysis of the attributes showed that Taiwanese consumers regarded the social certification and charitable donation aspects of products to be important as the factor loading of “14. Purchase Goods with Social Certification or Charitable Donations” was the highest (0.871). This result reflected consumers' positive attitudes toward purchasing goods with social value and impact and their willingness to support social certification and charitable causes in their consumption behavior. They also had a willingness to purchase products with social certification or donation characteristics (“19. Purchase Goods with Social Certification or Charitable Donations” (0.858)). They were concerned about the social value of products and hoped to contribute to society through their purchasing behavior. A high factor loading (0.836) of “22. Innovative and Unique SDGs Products” (0.836) indicated a high level of attention from Taiwanese consumers toward SDGs in the innovative and unique characteristics of products. Consumers were willing to purchase products with novel consumer experiences, breakthrough solutions, and forward-thinking features. A high factor loading of “13. Purchase Goods that Support Social Public Welfare and Social Enterprises” (0.825) showed a higher tendency among Taiwanese consumers to select products for social public welfare and social enterprises. Consumers prioritized social responsibility and positive impacts on society. Taiwanese consumers were concerned about the safety and health protection aspects when they purchased products (a factor loading of 0.816 for “5. Security and Health Protection Function” receives considerable appreciation from consumers.) They were inclined to choose products that provided safety and health assurance for their well-being. In summary, Taiwanese consumers showed a high level of attention and preference for attributes associated with social certification and charitable donations, support for social public welfare, innovative characteristics, and security and health protection functions.

Taiwanese consumers did not value products for local community development. This was due to limited consumer awareness and perception of the product's connection and contribution to the local community, or other attributes had more significance in their consumption behavior. A factor loading of “8. Support for Local Community Development” was only 0.599. “9. Social Certification or Charitable Donations” (0.590) attracted a lower level of concern from Taiwanese consumers. Social certification and charitable donation aspects did not influence consumers' consumption behavior, as they considered the attribute of purchasing related products. Taiwanese consumers focused more on the characteristics and functionality of the products, and less valued the social mission and values of brands (a factor loading of 0.555 for “11. Brand with Social Mission and Values”). A relatively lower priority was put by Taiwanese consumers on the social responsibility of the supply chain and the traceability of goods (a factor loading of 0.462 for “12. Purchase Socially Responsible Supply Chain and Traceable Goods”). This could be due to limited consumer awareness of the transparency and traceability of the supply chain or related attributes. Taiwanese consumers paid less attention to attributes such as supporting local community development, social certification or charitable donations, brands with social missions and values, and socially responsible supply chain and traceability of goods. They valued other attributes more in their consumption behavior or they had limited awareness and perceived less importance in these attributes. In general, Taiwanese consumers prioritized the quality, functionality, and efficacy of the products when purchasing. They tend to prioritize the practicality of the products rather than their impact on the local community, social certification, charitable donations, brand values, or supply chain traceability. Taiwanese consumers had limited awareness of these attributes or less exposure to relevant information, resulting that they did not regard such attributes as important. However, these results did not mean that Taiwanese consumers had a low level of concern for SDGs. On the contrary, they emphasized SDG-related attributes such as security, health protection functions, and support for social public welfare and social enterprises. Therefore, companies need to focus on these attributes for better communication and promotion to promote products' features and values. Additionally, consumer education and campaigns are necessary to increase the recognition of SDGs and related attributes, encouraging consumers to incorporate these factors into their consumption decisions (Table 7).

Table 7. Result of factor analysis of attributes in Taiwan.

Dimension	Quality Attributes	Factor Loading
Functionality	01. Products with sustainable energy or carbon emission reduction features	0.745
	02. Products with energy-saving, water-saving, or resource consumption reduction features	0.805
	03. Products with social responsibility in the supply chain and traceability features	0.729
	04. Products with durability, quality, and sustainable production and consumption	0.809
	05. Products with safety and health protection features	0.816
Contextuality	06. Products that care about social issues	0.692

Dimension	Quality Attributes	Factor Loading
	07. Products with a social mission and values	0.653
	08. Products that support local community development	0.599
	09. Products with social certification or charitable donations	0.590
	10. Products with social responsibility and social impact	0.805
Sociality	11. Brands with a social mission and values	0.555
	12. Purchasing products with social responsibility in the supply chain and traceability	0.462
	13. Purchasing products that support social philanthropy and social enterprises	0.825
	14. Purchasing products with social certification or charitable donations	0.871
	15. Supporting products with social responsibility and social impact	0.734
Emotional Appeal	16. Enjoying purchasing products with social responsibility and social impact	0.698
	17. Supporting products that contribute to social philanthropy and social enterprises	0.801
	18. Purchasing brands with social mission and values	0.705
	19. Purchasing products with social certification or charitable donations	0.858
	20. Supporting products with social responsibility and social impact	0.801
Novelty	21. Novelty-related SDGs products	0.682
	22. Innovative and uniquely featured SDGs products	0.836
	23. SDGs products with forward-thinking and breakthrough features	0.733
	24. SDGs products that address social issues in a new way	0.780
	25. SDGs products that provide a distinctive consumer experience	0.783

Table 8 presents the result of factor analysis of the attributes in China. Chinese consumers regarded “1. Sustainable Energy or Carbon Emission Reduction” (a factor loading of 0.980) as important. Chinese consumers valued products that had less coenvironmental impact and were related to SDGs. “4. Durability, Quality, and Sustainable Production and Consumption” showed the second highest factor loading of 0.796, suggesting that consumers prioritized the durability and quality of products and considered the sustainability of their production and consumption to be important. Chinese consumers also showed more interest in “19. Purchase goods with social certification or charitable donations” (0.776) and “25. Provide unique consumer experiences with SDGs products” (0.776) as they thought the social certification and charitable donation attributes of products were important for unique consumer experiences. Chinese concerned much about “17. Support goods related to social public welfare and social enterprises” (0.774) by willingly supporting the social impact and contribution of companies. In summary, Chinese consumers valued higher sustainable energy or carbon emission reduction, durability, quality, and sustainable production and consumption, goods with social certification or charitable donations, providing unique consumer experiences, and supporting social public welfare and social enterprises. Therefore, companies need to have sustainability features, quality assurance, social certification, and charitable donations of their products while providing unique consumer experiences. Additionally, actions and initiatives for social public welfare and social enterprises were important for Chinese consumers.

Chinese consumers had less interest in “5. Security and Health Protection Function” (0.649) though they valued products for their safety and health and were willing to choose products with these attributes. “9. Social Certification or Charitable Donations” (0.634), “15. Support the Social Responsibility and Social Impact of Products” (0.627), and “23. Futuristic and Innovative SDGs Products” (0.579) were regarded as less important than the attributes described in the previous paragraph. Chinese consumers were more focused on product quality, social responsibility, innovation, and personal health. These results implied that companies need to develop products and marketing strategies with the safety and health protection function, social certification, and charitable donations. Highlighting the social responsibility and social impact of products and the innovative and breakthrough features of products can attract the attention and support of Chinese consumers.

Table 8. Result of factor analysis of attributes in China.

Dimension	Quality Attributes	Factor Loading
Functionality	01. Products with sustainable energy or carbon emission reduction features	0.980
	02. Products with energy-saving, water-saving, or resource consumption reduction features	0.723
	03. Products with social responsibility in the supply chain and traceability features	0.742
	04. Products with durability, quality, and sustainable production and consumption	0.796
	05. Products with safety and health protection features	0.649
Contextuality	06. Products that care about social issues	0.724
	07. Products with a social mission and values	0.718
	08. Products that support local community development	0.681
	09. Products with social certification or charitable donations	0.634
	10. Products with social responsibility and social impact	0.762
Sociality	11. Brands with a social mission and values	0.684
	12. Purchasing products with social responsibility in the supply chain and traceability	0.699
	13. Purchasing products that support social philanthropy and social enterprises	0.663
	14. Purchasing products with social certification or charitable donations	0.747
	15. Supporting products with social responsibility and social impact	0.627
Emotional Appeal	16. Enjoying purchasing products with social responsibility and social impact	0.655
	17. Supporting products that contribute to social philanthropy and social enterprises	0.774
	18. Purchasing brands with social mission and values	0.650
	19. Purchasing products with social certification or charitable donations	0.776
	20. Supporting products with social responsibility and social impact	0.653
Novelty	21. Novelty-related SDGs products	0.675
	22. Innovative and uniquely featured SDGs products	0.696
	23. SDGs products with forward-thinking and breakthrough features	0.579
	24. SDGs products that address social issues in a new way	0.763
	25. SDGs products that provide a distinctive consumer experience	0.776

The result of factor analysis revealed the level of consumer attention to different attributes and guided companies in formulating corresponding strategies and product positioning. Taiwanese and Chinese consumers paid attention to the social certification and charitable donation attributes of products. They valued the social value and impact of the products and were willing to choose products with social certification or charitable donations. Therefore, companies need to provide relevant evidence and actively participate in social welfare activities to have a core value of their brand.

4.3.1. Regression Analysis: Taiwanese Consumers

The result of the Kano regression analysis of attributes for Taiwanese consumers' attitudes and values is presented in Table 9. For Taiwanese consumers, sustainable energy, carbon emission reduction, energy efficiency, water conservation, social responsibility in the supply chain, traceability functionality, durability, quality, sustainable production and consumption, and safety and health protection were important. These attributes affected consumer satisfaction, while their absence resulted in dissatisfaction. Attributes including caring about social issues, having a social mission and values, supporting local community development, and social certification or charitable donations belonged to the category of attractive or one-dimensional quality. This indicated that these contextual attributes influenced consumer satisfaction. Social quality attributes also played a significant role, and brands with a social mission and values, products with socially responsible supply chains and traceability, purchasing from social charities and social enterprises, buying products with social certification or charitable donations, and supporting the social responsibility and

social impact of products were necessary for the increase in consumer satisfaction. For emotional quality attributes, Taiwanese consumers valued products that presented social responsibility and social impact. They also supported social charities and social enterprises and purchased products with a social mission and values and social certification or charitable donations. Lastly, novelty quality attributes were crucial for consumers' perception of novelty SDGs-related products, innovative and unique SDGs products, forward-thinking and groundbreaking SDGs products, those addressing social problems in a new way, and those providing a distinctive consumer experience as necessary. In conclusion, Taiwanese consumers expected products with functional, social, and emotional attributes.

Table 9. Results of regression analysis of attributes for Taiwanese consumers.

Quality Attributes	β_1	Sig.	β_2	Significance Level	R2	Quality Classification
01. Products with sustainable energy or carbon emission reduction features	0.550	0.000	-0.020	0.875	0.319	Must-Have
02. Products with energy-saving, water-saving, or resource consumption reduction features	0.566	0.000	0.075	0.586	0.261	Must-Have
03. Products with social responsibility in the supply chain and traceability features	0.599	0.000	0.188	0.150	0.233	Attractive
04. Products with durability, quality, and sustainable production and consumption	0.580	0.000	0.154	0.262	0.227	Must-Have
05. Products with safety and health protection features	0.453	0.001	0.049	0.718	0.175	Must-Have
06. Products that care about social issues	0.523	0.000	-0.103	0.320	0.348	One-Dimensional
07. Products with a social mission and values	0.533	0.000	-0.064	0.548	0.330	Must-Have
08. Products that support local community development	0.571	0.000	-0.078	0.454	0.388	Attractive
09. Products with social certification or charitable donations	0.386	0.000	-0.246	0.017	0.311	Reverse
10. Products with social responsibility and social impact	0.344	0.004	-0.117	0.323	0.181	Must-Have
11. Brands with a social mission and values	0.572	0.000	0.069	0.555	0.280	Must-Have
12. Purchasing products with social responsibility in the supply chain and traceability	0.695	0.000	0.120	0.243	0.394	Must-Have
13. Purchasing products that support social philanthropy and social enterprises	0.530	0.000	-0.131	0.211	0.385	Must-Have
14. Purchasing products with social certification or charitable donations	0.610	0.000	0.039	0.705	0.346	Must-Have
15. Supporting products with social responsibility and social impact	0.520	0.000	-0.087	0.413	0.332	Must-Have
16. Enjoying purchasing products with social responsibility and social impact	0.634	0.000	0.010	0.922	0.394	Must-Have
17. Supporting products that contribute to social philanthropy and social enterprises	0.587	0.000	-0.041	0.703	0.377	Must-Have
18. Purchasing brands with social mission and values	0.490	0.000	-0.164	0.117	0.365	Must-Have
19. Purchasing products with social certification or charitable donations	0.499	0.000	-0.122	0.242	0.335	Must-Have
20. Supporting products with social responsibility and social impact	0.593	0.000	-0.078	0.421	0.412	Must-Have
21. Novelty-related SDGs products	0.682	0.000	-0.098	0.279	0.563	Must-Have
22. Innovative and uniquely featured SDGs products	0.714	0.000	-0.040	0.669	0.551	Must-Have
23. SDGs products with forward-thinking and breakthrough features	0.603	0.000	0.033	0.775	0.338	Must-Have
24. SDGs products that address social issues in a new way	0.687	0.000	-0.043	0.660	0.513	Must-Have
25. SDGs products that provide a distinctive consumer experience	0.590	0.000	-0.132	0.175	0.464	Must-Have

4.3.2. Analysis of Kano Regression Results in China

The result of the Kano regression analysis of attributes for Chinese consumers is shown in Table 10. “SDGs products with foresight and breakthrough” was classified as necessary quality, which indicated that consumers expected the novelty, innovation, and problem-solving approach of the products, but excessive novelty did not meet consumer needs. The rest 24 attributes belonged to reverse qualities, suggesting that Chinese consumers had low satisfaction with companies’ efforts in sustainable development. Chinese consumers might not have sufficient understanding or awareness of SDGs, leading to insensitivity to the importance of these attributes. In addition, many products or services did not comply with SDGs, resulting in unmet expectations for relevant features, and several SDGs did not correspond to consumer attitudes and values, which caused a negative perception of these attributes. China's sociocultural background also influenced consumers' attitudes and values. To improve consumers' attitudes and values toward SDGs, education to increase awareness was crucial. Consumers need to understand the importance and impact of SDGs and the sustainability of related products or services. Additionally, the social responsibility of companies needs to be enhanced for products or services to be in line with consumer attitudes and values.

Table 10. Results of regression analysis of attributes for Chinese consumers.

Quality Attributes	β_1	Sig.	β_2	Significance Level	R2	Quality Classification
01. Products with sustainable energy or carbon emission reduction features	0.465	0.000	-0.326	0.000	0.488	Reverse
02. Products with energy-saving, water-saving, or resource consumption reduction features	0.319	0.000	-0.285	0.000	0.295	Reverse
03. Products with social responsibility in the supply chain and traceability features	0.268	0.000	-0.329	0.000	0.286	Reverse
04. Products with durability, quality, and sustainable production and consumption	0.445	0.000	-0.173	0.017	0.318	Reverse
05. Products with safety and health protection features	0.284	0.000	-0.190	0.018	0.181	Reverse
06. Products that care about social issues	0.242	0.002	-0.308	0.000	0.241	Reverse
07. Products with a social mission and values	0.299	0.000	-0.224	0.005	0.219	Reverse
08. Products that support local community development	0.201	0.013	-0.316	0.000	0.219	Reverse
09. Products with social certification or charitable donations	0.286	0.000	-0.158	0.046	0.157	Reverse
10. Products with social responsibility and social impact	0.395	0.000	-0.149	0.049	0.246	Reverse
11. Brands with a social mission and values	0.289	0.000	-0.227	0.005	0.215	Reverse
12. Purchasing products with social responsibility in the supply chain and traceability	0.269	0.001	-0.214	0.008	0.187	Reverse
13. Purchasing products that support social philanthropy and social enterprises	0.238	0.003	-0.266	0.001	0.203	Reverse
14. Purchasing products with social certification or charitable donations	0.382	0.000	-0.206	0.007	0.285	Reverse
15. Supporting products with social responsibility and social impact	0.348	0.000	-0.193	0.013	0.239	Reverse
16. Enjoying purchasing products with social responsibility and social impact	0.174	0.037	-0.304	0.000	0.191	Reverse
17. Supporting products that contribute to social philanthropy and social enterprises	0.284	0.000	-0.253	0.001	0.232	Reverse
18. Purchasing brands with social mission and values	0.236	0.004	-0.243	0.003	0.186	Reverse
19. Purchasing products with social certification or charitable donations	0.32	0.000	-0.305	0.000	0.311	Reverse
20. Supporting products with social responsibility and social impact	0.282	0.000	-0.256	0.001	0.231	Reverse
21. Novelty-related SDGs products	0.262	0.001	-0.312	0.000	0.262	Reverse
22. Innovative and uniquely featured SDGs products	0.283	0.000	-0.285	0.000	0.26	Reverse
23. SDGs products with forward-thinking and breakthrough features	0.29	0.001	-0.143	0.089	0.157	Must-Have
24. SDGs products that address social issues in a new way	0.273	0.000	-0.291	0.000	0.252	Reverse
25. SDGs products that provide a distinctive consumer experience	0.307	0.000	-0.307	0.000	0.298	Reverse

5. Conclusion and Recommendations

We explored how consumers in Taiwan and China regarded attributes related to SDGs in products and marketing strategies. Taiwanese consumers valued attributes of functional quality such as sustainable energy or carbon emission reduction functionality, energy efficiency, water conservation or resource consumption reduction, social responsibility in the supply chain and traceability functionality, durability, quality and sustainable production and consumption, and safety and health protection functionality. These attributes were necessary and affected consumer satisfaction. Therefore, companies need to incorporate these attributes into their products. Taiwanese and Chinese consumers considered context-specific quality attributes to be important which included caring about social issues, having a social mission and values, supporting local community development, and having social certification or charitable donations. For Taiwanese consumers, these attributes belonged to attractive or one-dimensional quality, while for Chinese consumers, most attributes belonged to reverse quality. Taiwanese and Chinese consumers considered social mission and values, products with socially responsible supply chains and traceability, purchasing those that support social charities and social enterprises, purchasing products with social certification or charitable donations, as well as supporting the social responsibility and social impact of products as necessary. This highlighted the importance of integrating social responsibility and support for social causes into products. For emotional quality attributes, Taiwanese and Chinese consumers preferred products with social responsibility and social impact, support social charities and social enterprises, purchase brands with a social mission and values, and buy products with social certification or charitable donations. For novelty quality attributes, Taiwanese consumers expected novelty SDGs-related products, innovative and unique products with SDGs addressing social problems. However, Chinese consumers perceived excessive novelty as reverse quality. Taiwanese and Chinese consumers were keen on products with attributes related to SDGs, particularly in terms of functional, social, and emotional attributes. Social quality attributes played a significant role in both markets.

The factor analysis result also presented that Taiwanese and Chinese consumers preferred products with social certification or charitable donations. They valued the social value and impact of products and were willing to choose products with these attributes. Furthermore, consumers showed a large interest in SDGs products that were innovative and unique and were related to future solutions for sustainability. Consumers were interested in products with differentiation and breakthrough features, too. Consumers also cared for product safety, health protection functionality, and supporting social charities and social enterprises. This reflected consumers' concern for their health and well-being, as well as their emphasis on the social responsibility of companies.

The results of this study provided insights for companies to consider for sustainable development and social value in product design and marketing strategies. Based on the results, companies in Taiwanese and Chinese markets must focus on social well-being and strengthen emotional connections with consumers. They also need to incorporate functional, social, and emotional attributes into their products to satisfy consumers and contribute to the achievement of the SDGs. Providing social certification and donation evidence and making social contributions can offer an opportunity for companies to have more consumers. Innovation and uniqueness in product design and marketing strategies, safety features with relevant evidence and guarantees for sustainable development need to be provided by companies with social charity and social support to gain consumer trust and support. Companies need to pay attention to social value, innovation, safety, health protection functionality, quality assurance, and the environmental sustainability impact of their products, too.

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