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Evaluation of Food Quality Attributes Influencing Generation Z's Consumer Preferences for Packaged Beverages

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Abstract

The packaged beverage industry has experienced significant growth globally, driven by advancements in packaging technology, shifting consumption patterns, and increasing health and environmental regulations. This study investigates Generation Z's perception of packaged beverage quality by examining how intrinsic and extrinsic attributes influence their preferences using Caswell's framework. Data were collected via an online questionnaire completed by 300 purposively selected respondents. Descriptive statistics, crosstab analysis, and factor analysis were used to explore consumer behavior patterns. Results show that sensory qualities, certifications, and price are the most influential factors. Socio-demographic variables such as gender, income, education, and residence significantly affect attribute prioritization. Factor analysis revealed three key dimensions: intrinsic credence (including safety, nutrition, processing methods, and certifications), extrinsic (including advertising, producer reputation, and packaging), and intrinsic search (including sensory qualities, price, and perceived value). These findings provide practical insights for tailoring product development, marketing strategies, and health-oriented policies to meet Generation Z's expectations. The study offers a theoretical contribution to consumer behavior research by refining quality perception models through a multi-attribute lens.

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Introduction

The packaged beverage industry, encompassing products such as sweet tea, sweet coffee, soft drinks, and similar beverages, has experienced significant global growth in recent years. This growth has been driven by innovations in packaging technology, shifting consumption patterns, and increasingly stringent health and environmental regulations. Recent reports estimate that the market for packaged beverages will expand from approximately $157.73 billion in 2023 to $222.08 billion by 2030, representing a compound annual growth rate (CAGR) of 5.0% (Baranidharan *et al.*, 2024; Grand View Research, 2024; Smedescu *et al.*, 2024).

Parallel to this growth, consumers are placing increasing importance on product quality attributes, including labeling, health claims, certifications, pricing, and nutritional content. These evolving preferences are largely influenced by heightened health consciousness and demand for transparency in food and beverage products. As a result, public health policies have gained a central role in shaping market dynamics – particularly through efforts to regulate sugar content and promote healthier choices. To guide consumers toward healthier products, many countries have introduced front-of-pack (FOP) nutrition labeling systems. These initiatives have demonstrated strong impacts on purchasing behaviors, with consumers tending to prefer lower-sugar products (Cecchini & Warin, 2016; Hoenink *et al.*, 2021; Kelly & Jewell, 2019; Vandevijvere *et al.*, 2020).

Color-coded and warning-based nutritional labels have also proven effective in raising consumer awareness of the health risks associated with high-sugar beverages, thus fostering healthier consumption habits (Song *et al.*, 2021). Countries like Australia and New Zealand have implemented the Health Star Rating (HSR) system, which has guided nutrition-conscious consumers toward healthier food and beverage choices, while the United Kingdom's traffic light labelling provides clear visual indicators of a product's nutritional quality, facilitating informed decision-making (Kunz *et al.*, 2020; Söderlund *et al.*, 2020). These regulatory efforts not only empower consumers with essential nutritional information but also encourage manufacturers to reformulate their products to meet health standards, thereby enhancing the overall quality of packaged beverages available in the market (Cecchini & Warin, 2016; Crockett *et al.*, 2018).

Beyond labelling initiatives, fiscal policies such as taxation on sugary beverages have been widely adopted as a strategy to curb the consumption of unhealthy drinks. Some countries have demonstrated that such measures can effectively reduce the purchase of high-sugar beverages while simultaneously generating revenue for public health programs (Acton & Hammond, 2018; Colchero *et al.*, 2021; Mialon *et al.*, 2021; Taillie *et al.*,

2020). Moreover, in response to growing consumer concerns over food safety and quality, countries like China have implemented agri-food traceability systems, enhancing transparency within the food supply chain and reducing information asymmetries. These systems not only build consumer confidence in the quality attributes of packaged beverages but also address heightened demand for traceable and high-quality products (Liu *et al.*, 2023).

To better understand how consumers evaluate food product quality, Caswell's consumer perception model offers a foundational classification of quality information (Figure 1). Building on Steenkamp's quality perception framework (Steenkamp, 1990), this framework distinguishes when and how consumers can assess specific product characteristics – whether prior to purchase (search), during or after consumption (experience), or in cases where verification remains difficult even after use (credence) (Caswell, 2000; J. A. Rodriguez *et al.*, 2021). It illustrates how a consumer's expected quality emerges from multiple influences, including past experiences, education, perceived risks, and environmental factors. In the context of product innovations – particularly in the beverage sector – which further classifies quality attributes into intrinsic and extrinsic types (Figure 2). Intrinsic attributes, such as sensory characteristics, nutritional value, safety, and processing methods, reside in the product's physical composition and are

Figure 1 - Food quality framework (Caswell, 2000)

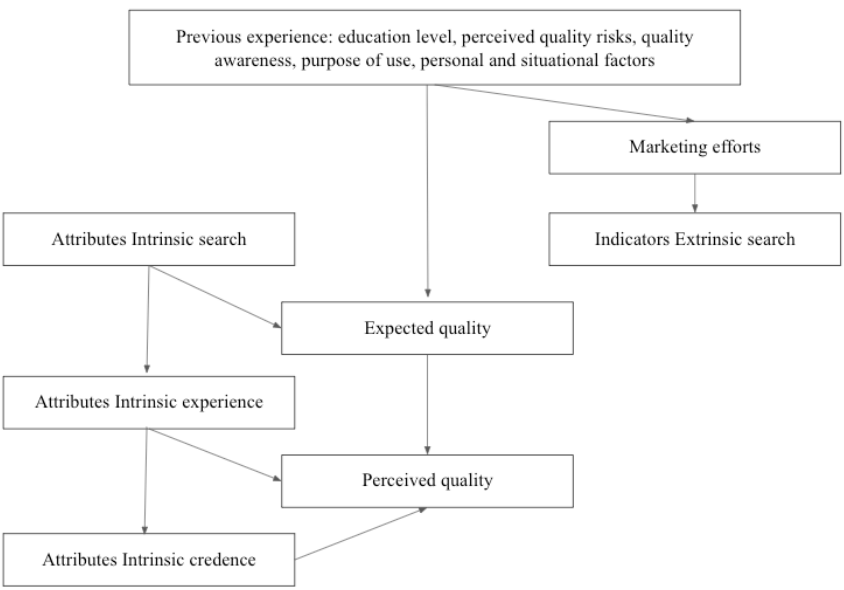
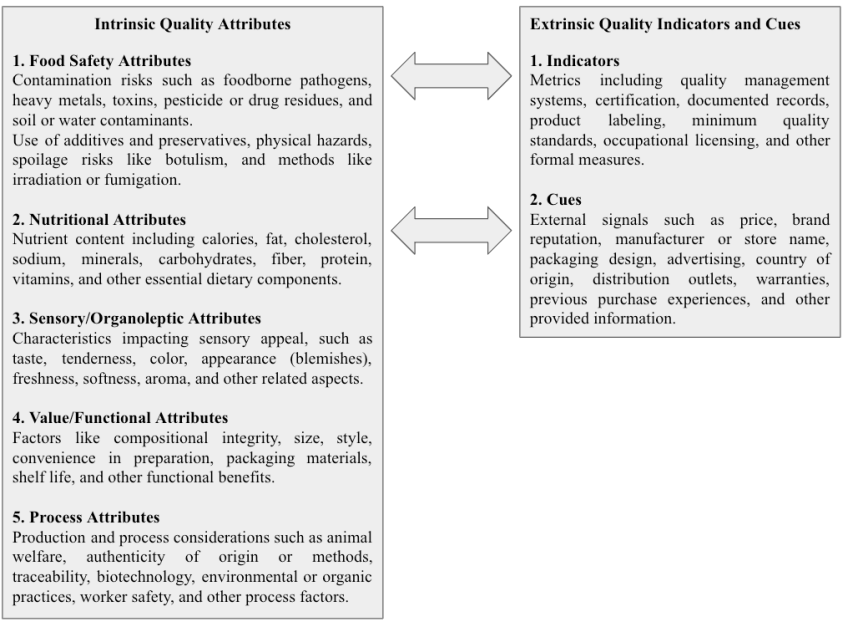


Figure 2 - Food intrinsic attributes and extrinsic indicators and cues (Caswell & Mojduszka, 1996)



filtered through consumers' informational environments. By contrast, extrinsic attributes – including packaging, cultural relevance, labelling, and market accessibility – reflect elements shaped by marketing strategies (Caswell & Mojduszka, 1996).

Taken together, these intrinsic and extrinsic considerations shape both consumer perception and ultimate decision-making, providing a comprehensive lens through which producers can better understand and meet evolving market demands. Studies based on experimental methods – such as Vickrey second-price auctions – further highlight how labelling (e.g., GMO/non-GMO or low pesticide content), nutritional information, and clear packaging can notably shift consumer judgments of healthfulness and willingness to pay (A. G. Rodriguez *et al.*, 2023; J. A. Rodriguez *et al.*, 2021). In other words, clear communication of product attributes is central to harmonizing what consumers expect and what they ultimately experience, thereby enhancing both trust and acceptance in new food and beverage innovations.

Although prior studies have examined the impact of these attributes on general consumer behaviour, there remains a lack of focused research

on Generation Z – a digitally native, health-aware, and socially conscious demographic born between 1997 and 2012. This generation has emerged as an influential consumer segment within the packaged beverage industry. This demographic exhibits distinct consumption patterns, characterized by a strong preference for products that are healthy, eco-friendly, and locally sourced. Generation Z consumers are particularly drawn to brands that demonstrate a commitment to sustainability, often influenced by social media platforms where they discover, engage with, and evaluate new products and trends (Djafarova & Foots, 2022; Tan & Trang, 2023). Their purchasing decisions are further shaped by a demand for convenience and experiential consumption, favouring products that provide immediate satisfaction and align with their dynamic, fast-paced lifestyles (Chen *et al.*, 2024). Additionally, urgency-driven marketing strategies, such as the "Buy Now, Think Later" concept, have been shown to increase impulsive purchasing tendencies among Gen Z consumers. These insights highlight the impact of marketing tactics on the consumption behaviors of younger demographic (Chairunnisah *et al.*, 2024).

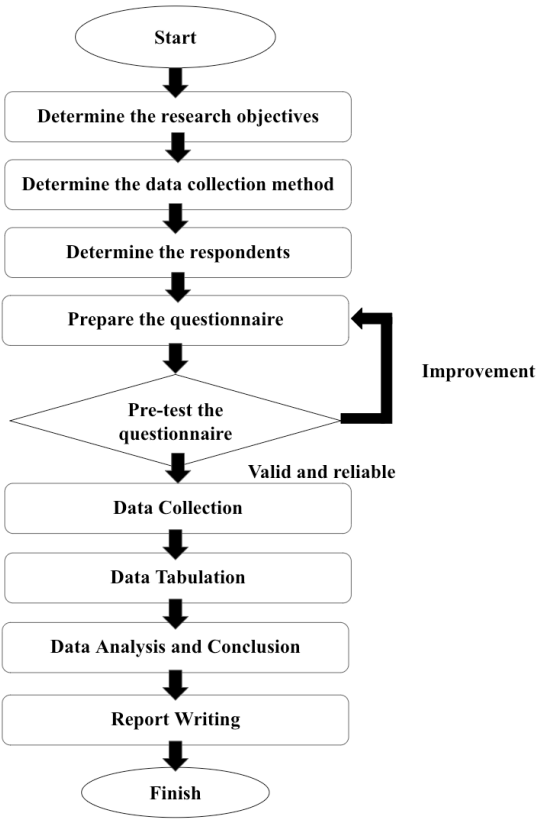
This study aims to fill that gap by examining the quality attributes that influence Generation Z's preferences for packaged beverages, such as sweet tea, sweet coffee, and soft drinks, commonly available in supermarkets. By integrating Caswell's frameworks with Gen Z's unique consumer behaviours, the study provides valuable insights for producers and policymakers seeking to align product strategies and regulations with market expectations.

1. Materials and Methods

1.1. *Study design and context*

This study used a quantitative, cross-sectional survey design which sample selection was conducted October 2024. The respondents were Generation Z in Indonesia, defined as individuals born between 1997 and 2012, who represent about 26.4% of the national population, or roughly 71.5 million people (BPS-Statistics Indonesia, 2021). Indonesian Generation Z was selected due to its growing youth demographic, rapid digitalization, and expanding packaged beverage market (IDN Research Institute, 2024), making it a relevant setting to examine consumer behaviour among young adults. The complete research stages are illustrated in Figure 3.

Figure 3 - Flowchart of the stages of consumer preferences survey research



1.2. *Questionnaire development*

The questionnaire was developed to measure consumer preferences toward quality attributes in packaged beverage products, guided by Caswell's classification of food quality (Caswell & Mojduszka, 1996). Caswell's original framework distinguishes between intrinsic and extrinsic product attributes. For this study, the framework was adapted specifically for packaged beverages to enhance its contextual relevance to the Indonesian Generation Z market. Intrinsic attributes were grouped into five subcategories: food safety, nutrition, sensory characteristics, value, and processing methods. Extrinsic attributes were categorized into corporate-related and informational dimensions, which include elements such as branding, producer reputation, labeling, and certifications.

The instrument itself was divided into two main sections: the first focused on respondent identity, collecting demographic information such as name,

gender, education level, and income; the second section examined consumer motivations and preferences related to a wide range of quality dimensions in packaged beverages. To capture the multidimensional nature of consumer perception, the questionnaire combined various question types – open-ended, closed-ended, semi-closed, and Likert scale items – to allow respondents to express both structured preferences and more personalized opinions. Quality attributes were rated using a 5-point Likert scale ranging from "very unimportant" to "very important," while semi-open questions enabled respondents to provide custom answers beyond the listed options.

1.3. *Pilot testing (pre-test) and instrument validation*

Before launching the full survey, a pilot test was conducted involving 33 participants from the target population – Indonesian Generation Z with prior experience consuming packaged beverages such as sweet tea, sweet coffee, soft drinks, and similar supermarket products. The pilot aimed to evaluate the clarity, structure, response time, and overall comprehensibility of the questionnaire. Based on the feedback received, several Likert-scale items were revised due to perceived redundancy, and unclear terms such as "process attributes" and "certifications" were reworded using simpler and more familiar language. The form's layout was also optimized for mobile compatibility to enhance user experience, and the average completion time of 9-12 minutes was deemed acceptable by participants. A detailed breakdown of the questionnaire content, along with adjustments made based on the pilot feedback, is provided in Table 1.

To ensure the instrument accurately assessed consumer preferences for quality attributes in packaged beverages, the questionnaire was tested for validity using Spearman's rank correlation coefficient (Equation 1) and for reliability using Cronbach's alpha (Equation 2).

$$r_s = 1 - \frac{6\Sigma {b_\mathrm{i}}^2}{n(n^2 - 1)} \quad (1) \qquad \alpha = \left(\frac{k}{k-1}\right)\left(\frac{1 - \Sigma {\sigma_\mathrm{i}}^2}{{\sigma_\mathrm{x}}^2}\right) \quad (2)$$

Where:

r_s: Spearman rank correlation coefficient

b_i^2: The squared difference between one ranking and another

n: The number of observations (respondents)

Where:

α: Cronbach's alpha coefficient (reliability coefficient)

k: The number of valid questions

$\Sigma\sigma_i^2$: The total variance of the valid question items

σ_x^2: The variance of the total score

Table 1 - List of questions in the questionnaire

Section	Code	Question	Type
Respondent Identity	A1	Name	Open-ended
	A2	Residence	Closed-ended
	A3	E-mail	Open-ended
	A4	Gender	Closed-ended
	A5	Education Level	Semi-open
	A6	Income Level	Closed-ended
Product Quality	B1	Main considerations for food product choice	Semi-open
	B2	Importance level of quality attributes	Closed-ended (Likert scale)
	B3	Food safety attributes	Closed-ended
	B4	Nutrition attributes	Closed-ended
	B5	Sensory attributes	Closed-ended
	B6	Value attributes	Closed-ended
	B7	Informational attributes	Closed-ended
	B8	Process attributes	Closed-ended (Likert scale)
	B9	Corporate management attributes	Closed-ended (Likert scale)

1.4. *Sampling and data collection procedure*

This study targeted individuals who actively use internet and e-mail services and had prior experience consuming packaged beverages, such as sweet tea, sweet coffee, soft drinks, and similar supermarket products. Participants were selected using a purposive sampling technique – a non-probability method where individuals are deliberately chosen based on specific inclusion criteria relevant to the research objectives (Usman & Akbar, 2008; Victoria Sepulveda, 2009). In this case, eligibility was based on respondents' experience with packaged beverage consumption, aligning with the study's focus on Generation Z consumer behavior.

To determine the required minimum sample size, Cochran's formula was applied (Cochran, 1991). Using a Z-score of 1.96 for a 95% confidence level, a population proportion of 0.264 (representing the proportion of Generation Z in Indonesia) (BPS-Statistics Indonesia, 2021), and a margin of error of 5% ($\alpha = 0.05$). The result indicated a minimum sample of approximately 299 respondents, as shown in Equation (3).

$$n = \frac{Z^2 \,.\, p(1-p)}{\alpha^2} = \frac{(1.96)^2 \,.\, 0.264\ (1 - 0.264)}{0.05^2} = 298.64 \approx 299 \text{ respondents} \quad (3)$$

The online questionnaire was developed and distributed using Google Forms, providing a convenient and accessible platform for digital data collection. To minimize sampling bias and self-selection bias – issues commonly associated with open online surveys (Andrade, 2020) – the survey link was not made publicly available. Instead, it was strategically disseminated through e-mail invitations to curated mailing lists and youth-focused digital communities relevant to Indonesian Generation Z. This controlled distribution method helped prevent uncontrolled responses and reduce the risk of sampling errors while also ensuring that participants met the study's eligibility criteria (Verster *et al.*, 2010). Moreover, this approach successfully captured a wide range of socio-demographic diversity, as reflected in Tables 2 and 3.

Table 2 - Representative socio-demographic characteristics of the sample (% of respondents, N = 300)

Socio-demographic Categories		**Sample**	**Population**
Gender	Woman	48.67	48.55
	Man	51.33	51.45

Note: Ratio in the population according to the latest census (BPS-Statistics Indonesia, 2021).

Table 3 - Further socio-demographic characteristics of the sample (N = 300)

Socio-demographic Categories		**Sample (N)**	**Percentage (%)**
Type of Residence	Rural	143	47.67
	Urban	157	52.33
Education	Other education (primary, secondary, etc)	44	14.67
	Higher education	256	85.33
Level of income	Low (< IDR2.500.000/month)	84	28.00
	Average (IDR2.500.000-5.000.000/ month)	205	68.33
	High (>IDR 5.000.000/month)	11	3.67

1.5. *Data analysis*

The data were analyzed using descriptive and inferential statistics. Descriptive analysis summarized demographic profiles and multiple-choice responses using tables and graphs, while crosstab analysis explored associations between socio-demographic factors and preferences for quality attributes. To identify underlying dimensions of perceived quality, factor analysis was used to reduce multiple observed variables into a few latent factors.

As factor analysis requires interval-scale data, ordinal responses from Likert scales were first transformed using the Method of Successive Intervals (MSI) – a psychometric approach that converts ordinal data into interval values by applying z-score transformations based on cumulative response probabilities (Asdar & Badrullah, 2016). Factor analysis proceeded in two stages: a feasibility test using the Measure of Sampling Adequacy (MSA), excluding variables with MSA < 0.5, followed by factor extraction. All analyses were performed using IBM SPSS Statistics 25.

2. Results and Discussion

2.1. *Questionnaire validity and reliability*

The validity of the questionnaire was evaluated using the Spearman rank correlation on 19 variables. A variable was deemed valid if the calculated rs value exceeded the rs table value at a 5% significance level. For n = 33 and df = 31, the rs table value was 0.344. Reliability was evaluated using Cronbach's alpha, with a value greater than 0.70 considered the minimum acceptable threshold for scale reliability, while values exceeding 0.80 are regarded as ideal (Yu *et al.*, 2022). The results, as shown in Tables 4 and 5, confirm that all items in the questionnaire are both valid and reliable.

Table 4 - rs calculated values for each test variable

No	Test Variable	Rs Value	No	Test Variable	Rs Value
1	Safety	0.375*	11	Origin	0.803*
2	Nutrition	0.463*	12	Biotechnology	0.800*
3	Sensory	0.403*	13	Organic	0.711*
4	Value	0.446*	14	Handling	0.868*
5	Process	0.479*	15	BPOM	0.629*

No	Test Variable	Rs Value	No	Test Variable	Rs Value
6	Certification	0.436*	16	Halal	0.435*
7	Packaging	0.510*	17	HACCP	0.856*
8	Price	0.379*	18	GMP	0.808*
9	Producer	0.494*	19	Reputation	0.430*
10	Promotion	0.559*			

* Correlation is significant at the 0.05 level (2-tailed).

Table 5 - Reliability test results using Cronbach's alpha

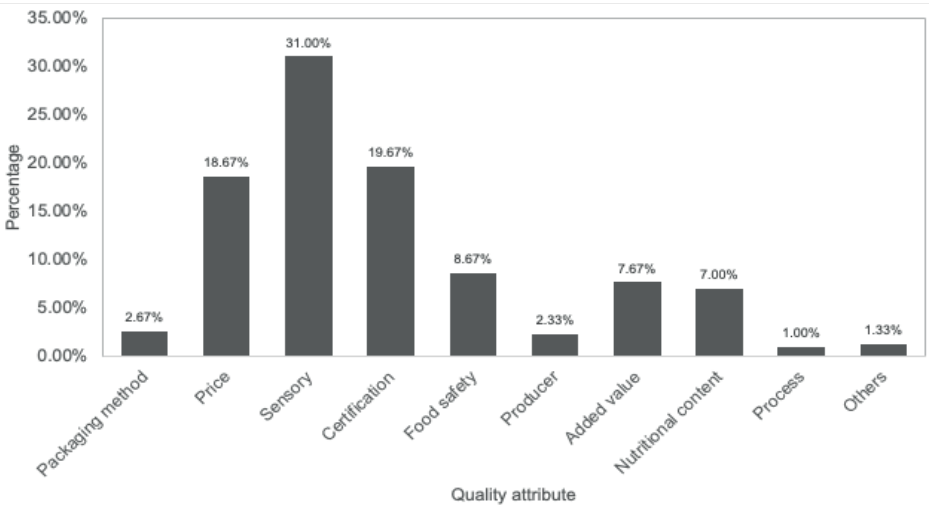
Cronbach's alpha	N of items
0.813	19

2.2. *Key Quality Attributes in Packaged Beverage*

Key quality attributes in packaged beverages are the critical factors that shape consumer preferences and influence their purchasing decisions. These attributes encompass sensory aspects like taste, aroma, and texture, as well as certifications (e.g., Halal or quality assurance), price, food safety, nutritional value, packaging, producer reputation, added benefits, and production methods. According to Figure 4, sensory attributes are the most influential, accounting for 31.00% of consumer preferences, followed by certifications (19.67%) and price (18.67%). The sensory properties of beverages, including taste and aroma, significantly impact consumer acceptance and preference. Research indicates that consumers are highly sensitive to these attributes, which can dictate their choices in a competitive market (Liu *et al.*, 2021). Additionally, the packaging design plays a crucial role in enhancing the sensory experience. For instance, studies employing Kansei engineering demonstrate that attractive packaging can evoke positive emotional responses, thereby influencing consumer perceptions and decisions (Chang *et al.*, 2018; Pratiwi *et al.*, 2023).

Furthermore, the visual appeal of packaging, including color and design, can also affect consumer behavior, as it serves as a critical cue for quality assessment (Lindh *et al.*, 2016). Certifications such as Halal and quality assurance labels are increasingly important to consumers, particularly in diverse markets where dietary restrictions and health considerations are paramount. These certifications not only assure consumers of the product's compliance with specific standards but also enhance trust in the brand

Figure 4 - The key of Gen Z consumer considerations percentage for quality attributes in packaged beverage



(Dlamini *et al.*, 2024). Price remains a significant factor, as consumers often weigh the perceived value against their willingness to pay, which can be influenced by the packaging and branding strategies employed by producers (Poelman *et al.*, 2016). Moreover, the nutritional value of beverages is becoming a focal point for health-conscious consumers. Studies have shown that consumers are increasingly aware of the sugar content and overall health implications of their beverage choices, leading to a demand for products that align with healthier dietary practices (Wen *et al.*, 2021). This trend is evident in the growing popularity of functional beverages that offer added health benefits, which cater to the evolving preferences of consumers seeking both convenience and nutritional value (Corbo *et al.*, 2014).

Table 6 highlights that certification, safety, price, nutritional content, and sensory attributes are the most important factors in consumer preferences for packaged beverages. Certification builds trust, safety addresses health concerns, and sensory appeal enhances satisfaction. Price is also significant, emphasizing affordability, while attributes like value and packaging methods hold moderate importance. Nutrition plays a vital role in food acceptance because it directly impacts both consumer perception and decision-making (Kasza *et al.*, 2023). Producer reputation and advertising are least influential. These insights highlight the need for producers to

prioritize certification, safety, sensory appeal, and pricing to meet consumer expectations effectively.

Table 6 - Importance levels of quality attributes

Attributes	**Importance Levels (%)**					
	VI	**I**	**FI**	**LI**	**VLI**	**Total**
Safety	**69.00**	25.33	4.67	0.67	0.33	100
Nutritional content	**39.33**	37.67	17.33	4.67	1.00	100
Sensory	**52.67**	36.00	10.67	0.67	0.00	100
Value	28.33	**45.67**	22.00	3.00	1.00	100
Process	31.67	**35.00**	21.67	9.67	1.33	100
Certification	**74.33**	18.33	6.00	1.33	0.00	100
Packaging method	35.00	**38.00**	23.33	2.67	1.00	100
Price	**55.67**	26.67	13.67	3.67	0.33	100
Producer	24.33	**33.00**	32.00	8.33	2.33	100
Advertising	16.67	29.00	**35.33**	12.00	7.00	100

Note: VI = Very Important; I = Important; FI = Fairly Important; LI = Less Important; VLI = Very Less Important.

Table 7 indicates that consumer preferences span five core areas – sensory attributes, food safety, nutrition, specific added value, and product quality information. Within the sensory domain, taste and texture emerge as top drivers of acceptance; meanwhile, chemical safety and vitamins/minerals rank highest under food safety and nutrition. In terms of added value, consumers prioritize nutritional completeness and size/volume, while product quality information focuses heavily on price and packaging labels. These findings underscore the importance of offering appealing sensory experiences, ensuring safety through transparent labelling, and providing robust nutritional details. Moreover, if packaging cues create expectations that are not met upon consumption, consumer enthusiasm may decline (Gunaratne *et al.*, 2019). As a result, producers must ensure that packaging design and communication consistently reflect the product's genuine characteristics – particularly taste and healthfulness – to fulfil consumer expectations and strengthen purchase intent.

Table 7 - Percentage of selection for sub attributes of sensory, food safety, nutrition, specific added value, and product quality information attribute

Attributes	Sub-Attributes	Total (%)
Sensory	Aroma	8.67
	Appearance and freshness	3.67
	Taste and texture	69.00
	Color	18.66
	Total	100.00
Food safety	Biological safety	29.67
	Chemical safety	68.67
	Physical safety	1.66
	Total	100.00
Nutrition	Calories (carbohydrates)	30.00
	Protein	9.00
	Fats and cholesterol	23.67
	Vitamins and other minerals	37.33
	Total	100.00
Specific added value (expected from product)	Packaging materials and design	21.67
	Product durability	8.00
	Nutritional completeness per package	36.33
	Ease of preparation	7.67
	Size and volume	26.33
	Total	100.00
Product quality information (signals of product quality)	Advertising and other promotions	7.33
	Packaging label	28.00
	Brand name	18.00
	Manufacturer's name	6.00
	Store name (where product is purchased)	1.67
	Price	30.00
	Product reputation	9.00
	Total	100.00

Table 8 underscores the growing significance of process and management sub-attributes in guiding consumer preferences. Consumers place considerable emphasis on origin and organic labels, underscoring a

widespread desire for traceability and eco-friendly production methods. Meanwhile, Halal and BPOM (Indonesia's national food and drug authority) certifications stand out for their strong effect on consumer trust and perceived safety, while HACCP and GMP, though moderately important, reflect the ongoing relevance of standardized quality and safety protocols. Company reputation ranks lower in comparison, suggesting that formal, well-recognized certifications carry greater weight than less-structured assurance signals. These findings highlight the need for producers to invest in robust certification frameworks and transparent operations. By focusing on credible certifications, clear labelling, and sustainable practices, producers can bolster consumer confidence and strengthen their competitive edge (Brukało *et al.*, 2024).

Table 8 - Importance levels of quality attributes

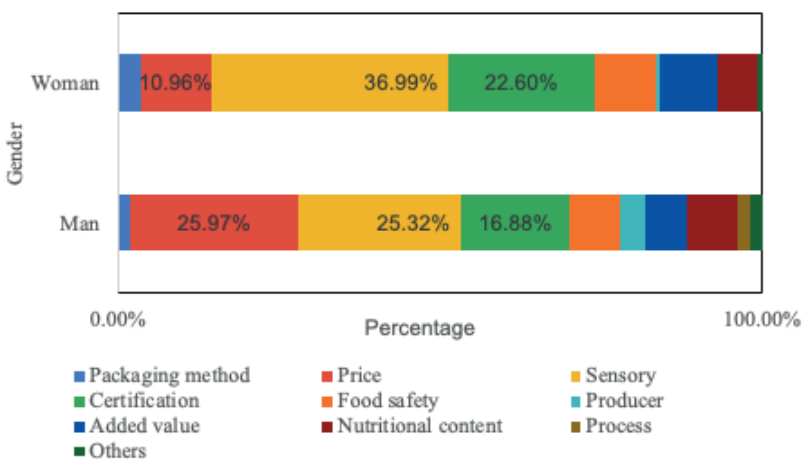
Attributes	**Sub-Attributes**	**Importance Levels**					
		VI	**I**	**FI**	**LI**	**VLI**	**Total**
Process	Origin (%)	**52.33**	33.00	11.67	2.67	0.33	100
	Biotechnology aspect (%)	**34.00**	39.00	22.33	3.67	1.00	100
	Organic product (%)	**50.00**	33.33	14.67	1.67	0.33	100
	Handling (%)	**43.33**	32.67	17.33	5.67	1.00	100
Management	BPOM certification (%)	**73.67**	21.00	4.33	0.67	0.33	100
	Halal certification (%)	**83.33**	11.00	3.67	1.33	0.67	100
	HACCP (%)	**50.67**	35.33	11.33	2.34	0.33	100
	GMP (%)	**51.00**	33.00	12.00	3.33	0.67	100
	Company reputation (%)	32.00	**41.00**	21.00	5.33	0.67	100

Note: VI = Very Important; I = Important; FI = Fairly Important; LI = Less Important; VLI = Very Less Important.

2.3. *Crosstab Analysis of Economic and Socio-Demographic Factors in the Consideration of Quality Attributes*

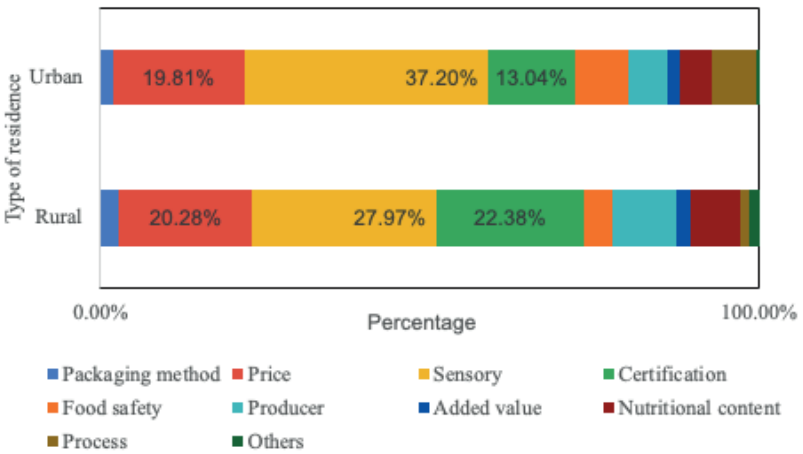
Further analysis focused on the top three prioritized attributes – sensory, certification, and price – through crosstab analysis to assess the role of socio-demographic factors in shaping packaged beverage preferences. As illustrated in Figure 5, sensory appeal was prioritized more by women (36.99%) than men (25.32%), consistent with studies showing that women are more attuned to sensory and emotional dimensions of consumption (Nagina *et al.*, 2024). Similarly, certification was more frequently cited by women (22.60%) than men (16.88%), indicating that female consumers may place greater emphasis on safety, transparency, and quality assurance when selecting beverages. Gender differences affect how health-related information impacts beverage acceptance. For instance, males and females may respond differently to health benefit claims, which can influence their willingness to try new beverages (Collins & Lalor, 2024; Thompson *et al.*, 2024). In contrast, price considerations were more prevalent among male respondents (25.97% vs. 10.96%), suggesting that men tend to prioritize economic value in purchase decisions. These findings reinforce existing evidence that gender not only influences how quality attributes are perceived but also reflects broader behavioral tendencies – where women are more attentive to certification and health signaling, while men focus more on functionality and affordability.

Figure 5 - Crosstab analysis of the relationship between gender and the selection of general attributes



Residence, income, and education levels significantly shape consumer preferences for packaged beverages. Figure 6 shows that urban consumers tend to prioritize sensory attributes (37.20%), followed by price (19.81%) and certification (13.04%), reflecting an emphasis on product appeal and perceived quality assurance. This trend aligns with findings from Chile and the U.S., where urban populations are more frequently exposed to policy interventions – such as food labelling regulations and sugar taxes – that shape their purchasing behaviour (Knox & Jones-Smith, 2025; Taillie *et al.*, 2020). In contrast, rural consumers exhibit a more evenly distributed preference, notably placing comparable emphasis on sensory (27.97%) and certification (22.38%). This may reflect a greater reliance on official endorsements and certifications as trusted indicators of product safety and quality (Isharyadi & Kristiningrum, 2021), especially in areas with limited access to brand diversity or lower exposure to advertising and in-store marketing. Thus, certification plays a compensatory role in helping rural consumers evaluate product credibility in the absence of other quality signals.

Figure 6 - Crosstab analysis of the relationship between residence and the selection of general attributes



Education level plays a key role in shaping consumer preferences for packaged beverage attributes. Consumers with higher education place greater emphasis on sensory attributes (33%), reflecting a focus on taste, aroma, and overall consumption experience. In contrast, those with lower education levels prioritize price (25%) and certification (20%), highlighting the importance

of affordability and trust in product safety and quality. These findings suggest that marketing and consumer education strategies should be tailored to different educational backgrounds to effectively influence purchasing decisions (Andreea & Paula, 2019).

Figure 7 - Crosstab analysis of the relationship between education and the selection of general attributes

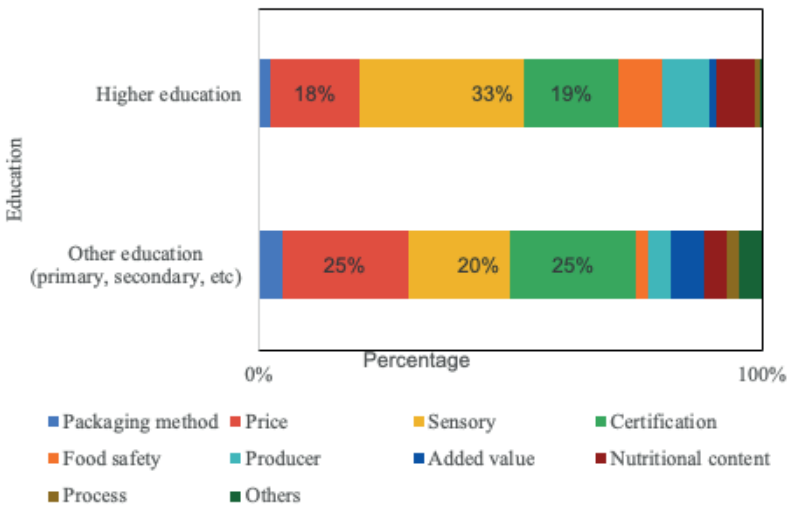
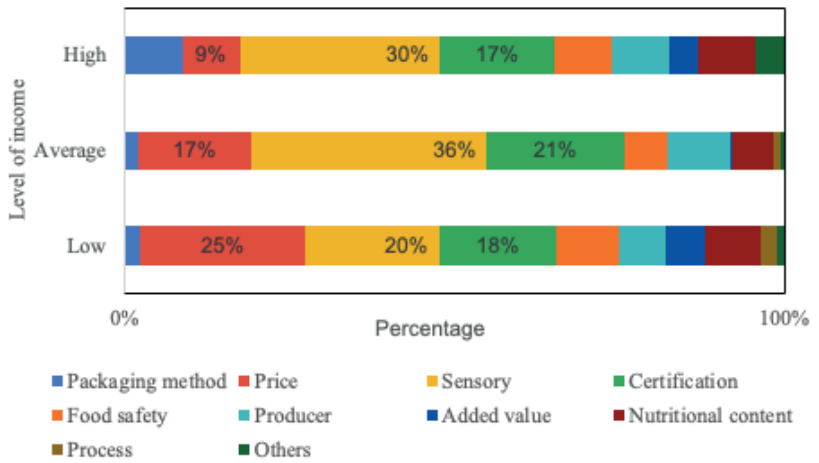


Figure 8 reveals notable differences in attribute prioritization across income levels. High-income consumers are primarily driven by sensory attributes (30%), followed by certification (17%), while price (9%) becomes the least influential. This implies a shift towards quality, safety, and premium perception as income increases. Average-income consumers prioritize sensory attributes (36%) the most, suggesting a desire for enjoyable consumption experiences. Certification (15%) and price (17%) are also relevant, indicating a balanced consideration between enjoyment, assurance, and value. Low-income consumers show the strongest preference for price (25%), indicating affordability as their primary concern. Sensory (20%) and certification (14%) follow, reflecting interest in taste and product assurance despite budget constraints. These findings align with prior research showing that lower-income households are more sensitive to price and tend to reduce consumption of taxed or premium beverages more than higher-income groups (Eyles *et al.*, 2024; Knox & Jones-Smith, 2025).

Figure 8 - Crosstab analysis of the relationship between income and the selection of general attributes



2.4. *Factor analysis of quality attributes*

Consumers have varying perceptions when evaluating quality attributes in packaged beverage products, particularly regarding the importance of general quality attributes. These differences may arise from external consumer factors such as economic and socio-demographic influences. The patterns formed from respondents' evaluations can be used to identify the position or role of each quality attribute. Additionally, these patterns can reveal relationships between quality attributes, leading to the formation of new groupings of quality attributes. The newly formed quality attribute groups can reflect perceptions of quality within specific consumer segments. Three new factors (groups) of quality attributes were identified through factor analysis. The grouping was based on the highest factor loadings among the three factors. Factor loadings indicate the role of each variable within a factor, where higher factor loadings signify a greater contribution of the variable to that factor (Sappaile *et al.*, 2023).

Based on Table 9, the factor analysis of quality attributes reveals that the first factor comprises safety, nutrition, process, and certification. While certification is an extrinsic attribute, its inclusion among intrinsic factors is justified by its role as an indicator of quality assurance, encompassing safety, nutrition, and processing in packaged beverages. This grouping is referred to as the **intrinsic credence factor (factor 1)**, characterized by attributes that are not directly observable but can be evaluated through certification. Recent

Table 9 - Results of factor analysis on quality attributes

Attributes	Factor Loadings		
	1	2	3
Safety	.756*	–0.055	0.099
Nutrition	.674*	0.177	0.000
Process	.659*	0.325	0.000
Certification	.654*	–0.018	0.19
Producer	–0.001	.818**	0.106
Advertising	0.099	.796**	0.16
Packaging method	0.373	.493**	0.248
Price	–0.008	0.012	.775***
Sensory	0.106	0.191	.706***
Value	0.241	0.350	.575***

Note: * Factor 1; ** Factor 2; *** Factor 3.

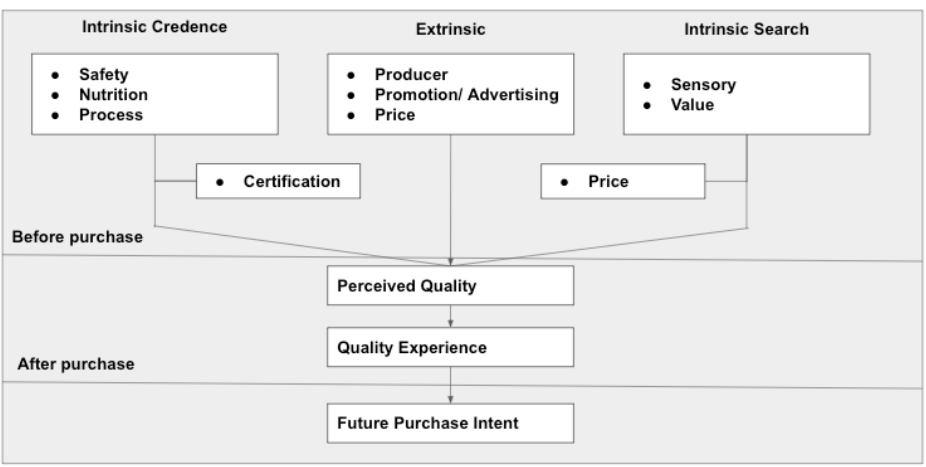
studies further emphasize the importance of intrinsic attributes in shaping consumer preferences. Credence attributes, such as food safety and eco-friendliness, have been shown to positively influence attitudes toward organic food (Huo *et al.*, 2023), while consumers exhibit heightened sensitivity to intrinsic qualities, particularly in organic or locally sourced products, driven by health and environmental sustainability motivations (Varaldo *et al.*, 2022). The significance of these attributes is also reflected in market behaviour, where the inherent uncertainty of credence goods often compels consumers to rely on suppliers' expertise, highlighting the importance of trust and perceived quality in purchasing decisions (Karunadasa *et al.*, 2023).

The second factor includes attributes such as producer, advertisement, and packaging, which are categorized as **extrinsic factor (factor 2)** in packaged beverages. Among these, the producer attribute is particularly impactful due to its direct involvement in the production process, which ultimately shapes the quality of the product. Research indicates that sophisticated marketing techniques, including health claims and appealing packaging designs, can enhance consumer perceptions and preferences, thereby increasing the desirability of products, especially ultra-processed foods (Baker *et al.*, 2020). These marketing strategies are aimed at improving the immediate appeal of the product and establishing a brand identity that resonates with consumers, which is crucial in a competitive market (Mpuon *et al.*, 2023). The role of advertisement in promoting packaged beverages is substantial. Studies

have shown that advertisements significantly affect consumer behaviour, particularly among children and adolescents, who are often targeted through various media channels (Backholer *et al*., 2021; Powell *et al*., 2024). The effectiveness of these advertisements is amplified when they are strategically placed in environments frequented by the target demographic, such as schools and urban neighborhoods (Amevinya *et al*., 2022).

The third factor, known as the **intrinsic search factor (factor 3)**, encompasses price, sensory attributes, and perceived value. This factor integrates intrinsic qualities such as sensory appeal and value with the extrinsic attribute of price. Price often acts as a dependent variable, adjusting in response to the quality of sensory and value attributes. Research highlights that sensory attributes, including aroma and flavour, play a pivotal role in enhancing a product's perceived value and can justify higher pricing, demonstrating a strong correlation between sensory appeal and pricing strategies. For example, consumers frequently prioritize sensory qualities when making food choices, while price remains a critical factor influencing their decisions (Barahona *et al*., 2020; Souza *et al*., 2020). This relationship underscores the essential role of sensory attributes in shaping perceived value and determining pricing strategies. Moreover, the intrinsic search factor aligns with findings that consumers can anticipate the quality of intrinsic attributes before purchase and confirm their evaluation after consumption. Sensory attributes not only influence consumer preferences but also directly affect their willingness to pay, reinforcing the value of these qualities in driving purchasing decisions (Barahona *et al*., 2020).

Figure 9 - Diagram of the packaged beverage quality acceptance model



Based on Figure 9, the quality acceptance model for packaged beverages, consumers' perceptions of packaged beverage products are shaped by **a combination of intrinsic credence attributes, intrinsic search attributes, and extrinsic attributes**, which together influence the overall evaluation of product quality. Intrinsic attributes, such as taste and nutritional value, are directly linked to the fundamental properties of the product and serve as key indicators of its quality. These attributes inherently reflect the product's characteristics, making them critical in assessing its functionality and acceptability. On the other hand, extrinsic attributes – such as packaging design, branding, and labelling – act as supplementary factors that enhance the perceived quality of the product. Although they do not represent the product's inherent properties, these attributes provide additional quality cues that become especially important when intrinsic attributes are already optimized. For example, research highlights that clear and aesthetically designed packaging and labels not only improve perceptions of quality but also instil confidence and clarity regarding the product's attributes (Nimoh *et al*., 2024).

The interaction between intrinsic and extrinsic attributes plays a significant role in quality evaluation. While intrinsic attributes often serve as the primary criteria due to their direct influence on product functionality, extrinsic attributes provide complementary support by shaping pre-consumption quality perceptions, particularly in competitive markets where differentiation is key (Arenas de Moreno *et al*., 2020; Yang *et al*., 2021). While the model was developed in the context of packaged beverages, its conceptual framework may be extended to other fast-moving consumer goods (FMCG) categories such as snack foods, dairy products, and ready-to-eat meals. In these sectors, consumers also evaluate a combination of intrinsic and extrinsic attributes when making purchasing decisions. Similarly, different consumer demographics – such as older adults or caregivers shopping for children – may weigh these attributes differently, emphasizing factors like safety, labelling clarity, or ease of preparation. This highlights the potential adaptability and broader relevance of the proposed model. Post-purchase, consumers integrate these evaluations by comparing the product's actual quality with their expectations, a process that results in the formation of "experienced quality". These post-consumption reflections form a critical feedback loop that influences future purchase intentions, loyalty, and brand advocacy. If the experienced quality aligns with or exceeds expectations, consumers are more likely to repurchase and recommend the product (Ebrahim *et al*., 2024). On the other hand, unmet expectations may lead to negative word-of-mouth and diminished trust. Acknowledging this feedback mechanism reinforces the importance of delivering consistent product performance to build long-term consumer relationships.

This comprehensive evaluation enables consumers to develop a more holistic understanding of the product's overall quality and its ability to meet their expectations.

The findings of this study provide valuable insights for both producers and policymakers, guiding them in meeting consumer expectations and promoting healthier beverage choices. For producers, the results suggest a clear shift toward health-oriented products, particularly those with low sugar content and high nutritional value. As Generation Z consumers place significant importance on attributes such as food safety, nutritional content, and sensory appeal, producers should focus on reformulating packaged beverages to align with these preferences. This could involve reducing the use of artificial sweeteners, adding beneficial nutrients like vitamins and minerals, and incorporating functional ingredients such as probiotics or prebiotics. In addition to health considerations, the study emphasizes the significance of certifications, such as Halal or quality assurance labels, in building consumer trust. Producers should prioritize obtaining and prominently displaying these certifications to reassure consumers of product quality. Furthermore, sensory attributes like taste, aroma, and texture continue to play a crucial role in consumer preferences. Producers should invest in improving these sensory characteristics through better ingredient sourcing and innovation in processing methods. Price remains a critical factor as well, with consumers perceiving higher-priced beverages as higher quality, making it important for producers to strike the right balance between quality and affordability.

For policymakers, the study underscores the importance of regulatory measures such as front-of-pack nutrition labelling and fiscal policies like sugary beverage taxes. By implementing clear, easy-to-understand labelling systems, policymakers can help guide consumers towards healthier choices, particularly in the context of reducing sugar intake. Additionally, the study highlights the effectiveness of policies that promote transparency, such as agri-food traceability systems, which can further enhance consumer confidence in the safety and quality of packaged beverages. Policymakers should continue to support initiatives that encourage producers to reformulate their products in line with health standards and ensure that consumers are equipped with the necessary information to make informed purchasing decisions. By fostering a regulatory environment that prioritizes health and sustainability, policymakers can contribute to the long-term improvement of public health outcomes while simultaneously supporting industry innovation.

Conclusions

This study explored Generation Z's preferences for packaged beverage quality attributes, identifying sensory appeal, certification, and price as

the primary drivers of consumer choice. Factor analysis revealed three key dimensions that shape Gen Z's perception of quality: intrinsic credence (e.g., safety, nutrition, certification), extrinsic (e.g., branding, advertising, packaging), and intrinsic search (e.g., sensory appeal, price, perceived value). These findings demonstrate how Gen Z consumers evaluate products through a combination of health-consciousness, trust indicators, and practical value assessments.

The study contributes to the literature by applying Caswell's quality framework in a multidimensional model tailored to Generation Z's values and behaviors. The findings have several practical implications. For instance, producers should enhance sensory attributes by reducing artificial additives and using natural ingredients. Certifications such as Halal or certificate from national food and drug authority should be clearly displayed on front-of-pack labels to foster consumer trust. Since price also plays a key role, offering smaller, affordable packaging sizes may help attract price-sensitive consumers without compromising perceived quality.

For policymakers, the findings reinforce the value of front-of-pack nutrition labeling systems that simplify health information for consumers. Additionally, incentives or tax policies that support the production of low-sugar or functional beverages could help drive healthier market trends. Public health campaigns that leverage social media and influencer channels – platforms familiar to Gen Z – may also prove effective in promoting healthier consumption.

Nevertheless, the study has limitations. The use of non-probability purposive sampling and self-reported online data may limit generalizability. Future research should expand demographic and geographic diversity and consider post-purchase experiences to better understand long-term consumer behavior and satisfaction.

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