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## Integrating Consumer Preference into Sustainable Development Planning for Fresh Shrimp Products in Indonesia

Vela Rostwentiavivi<sup>1\*</sup> , Rita Nurmalina<sup>2</sup> , Harmini<sup>2</sup> , Netti Tinaprilla<sup>2</sup> 

<sup>1</sup> Department of Resources and Environmental Economics, Faculty of Economics and Management, IPB University, Bogor 16151, Indonesia

<sup>2</sup> Department of Agribusiness, Faculty of Economics and Management, IPB University, Bogor 16151, Indonesia

### ABSTRACT

Shrimp is one of Indonesia's leading fishery commodities, holding strategic economic importance and playing a crucial role in supporting national food security. However, evolving consumer demand characterized by increasing emphasis on affordability, quality, and sustainability necessitates the integration of consumer preferences into development planning. This study aims to analyze consumer preferences for fresh shrimp products in Indonesia and to provide insights for sustainable development planning within the shrimp sector. A conjoint analysis was conducted to examine seven major attributes: price, quality, size, packaging, aroma, processing type, and practicality, using data from 100 purposively selected respondents across Java Island. The results reveal that price (21.99%), quality (17.86%), and practicality (17.07%) are the most influential attributes in purchasing decisions, while packaging, size, and processing type have moderate importance. Aroma shows the lowest influence. Consumers exhibit a strong preference for affordable, high-quality shrimp, particularly in headless or whole form and packaged in boxes. These findings highlight the need for consumer-oriented development strategies through the integration of competitive pricing schemes, quality assurance systems, and

#### \*CORRESPONDING AUTHOR:

Vela Rostwentiavivi, Department of Resources and Environmental Economics, Faculty of Economics and Management, IPB University, Bogor 16151, Indonesia; Email: [rostwentiavivivela@apps.ipb.ac.id](mailto:rostwentiavivivela@apps.ipb.ac.id)

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sustainable product design. The study contributes to the literature by linking consumer behavior with sustainable development planning, thereby providing a policy-relevant foundation for strengthening the competitiveness and resilience of Indonesia's shrimp industry.

**Keywords:** Conjoint Analysis; Consumer Preference; Fresh Shrimp; Sustainable Development Planning

## 1. Introduction

Fishery products particularly shrimp play a critical role as a source of animal protein for the Indonesian population and function as a strategic commodity supporting national economic growth<sup>[1-4]</sup>. This strategic role is reflected in both significant domestic consumption and strong contributions to global markets through exports. In recent years, consumers have shown an increasing concern for the quality, safety, and sustainability of food products, leading to marked shifts in their preferences for shrimp. Previous studies demonstrate that sustainable and organic production practices are effective strategies for producing high quality products with minimal environmental impact while simultaneously generating economic benefits<sup>[5-8]</sup>.

Previous studies consistently indicate that consumer preferences are largely shaped by product characteristics such as freshness, size, taste, and farming or harvesting methods. Studies in Bangladesh and the United States show that high-income consumers tend to prefer shrimp with superior sensory attributes, such as freshness and larger size, while simultaneously demonstrating price sensitivity<sup>[9,10]</sup>. Similar findings are reported by Hoque et al.<sup>[11]</sup>, who revealed that consumer preferences differ for conventional, safe, and organic shrimp, and are influenced by farming location as well as consumer knowledge of food safety and sustainability. Evidence suggests that consumer attitudes and knowledge about production methods significantly shape purchasing behavior, while appropriate communication strategies help promote more sustainable and environmentally responsible consumption<sup>[12]</sup>.

Sustainability and food safety have emerged as increasingly important criteria in consumer decision-making. Consumers in Taiwan and Spain have identified freshness and the absence of chemical residues as critical purchasing factors<sup>[13,14]</sup>. In Vietnam, Xuan<sup>[15]</sup> demon-

strated that environmental certification labels enhance consumer preferences, particularly among individuals who understand their credibility and significance. This result is further supported by Huang et al.<sup>[16]</sup>, who found that traceability certification strengthens consumer trust and increases willingness to allocate higher budgets for certified products. The dissemination of credible scientific information has likewise been shown to enhance the perceived value of certified products and encourage higher willingness to pay<sup>[17]</sup>.

The findings of studies conducted at the global level further illustrate the diversity of consumer preferences. For instance, Phiri<sup>[18]</sup> reported that consumers in Malawi preferred small tilapia with an average weight of approximately 130 grams, a demand that can be effectively addressed through aquaculture practices. In a different study, Sayeed et al.<sup>[19]</sup> observed that consumers were willing to pay USD 17.48 more for live crab compared to fresh crab, while frozen crab was valued approximately USD 9.34 lower. Similarly, Davidson et al.<sup>[20]</sup> found that consumers in Hawaii were willing to pay a premium for wild-caught over farmed fish, and showed a preference for fresh rather than frozen products.

In Indonesia, research on shrimp consumer preferences is relatively limited, particularly regarding fresh products. Existing studies predominantly examined processed fishery products<sup>[21,22]</sup>. Evidence indicates that consumers prioritize packaging durability, material type, and brand reputation, while physical attributes such as color and aroma receive less attention, although these studies do not specifically address fresh shrimp attributes. This gap reflects the challenges faced by Indonesia's shrimp industry in responding to increasingly complex consumer demands. In contrast, studies on fruit commodities<sup>[23]</sup> reveal high sensitivity to color and nutritional value among health-conscious consumers, who demonstrated a preference for fresh, unprocessed fruit perceived as healthier and more nat-

ural.

Sustainable production practices have been shown to exert a strong positive influence on global supply chains and packaging trends<sup>[24]</sup>. Research highlights the critical role of global supply chains as intermediaries that amplify the adoption of environmentally friendly packaging. Modern consumers value not only physical characteristics but also non-physical attributes such as environmental sustainability, food safety, and transparency regarding product origin. Without effective information dissemination, consumer confidence in local products may decline, potentially hindering domestic market development. A parallel situation can be observed in Malawi, where weight-based pricing systems are less appealing to consumers, despite their importance for price standardization in aquaculture development<sup>[18]</sup>.

A growing body of evidence across various countries demonstrates that adequate information and consumer education significantly influence preferences for certified products. Credible and comprehensible environmental labeling increases the perceived value of products and enhances willingness to pay. These findings provide an important basis for developing information and transparency-driven marketing strategies, which remain underutilized within the Indonesian market. A global shift in consumer preferences is evident from purely sensory considerations toward ethical and sustainability-oriented criteria. This transition presents new opportunities while requiring adaptation within the fisheries sector, especially the shrimp sub-sector, to highlight sustainability attributes throughout the production process. Products that communicate these values effectively are more likely to enjoy competitive advantages in domestic and export markets. Given these dynamics, a comprehensive and systematic investigation of consumer preferences for fresh shrimp products in Indonesia is essential. This study aims to analyze how key product attributes, such as price, quality, practicality, size, processing type, packaging, and aroma, influence purchasing decisions. Specifically, the study seeks to identify which attributes have the greatest importance in shaping consumer choices and to determine the combination of characteristics most

preferred by consumers. The findings hold important implications, suggesting that shrimp sector development should prioritize consumer-oriented strategies through competitive pricing, quality assurance, and practical product design innovations. Aligning development planning with consumer preferences is expected to strengthen the resilience and competitiveness of the national shrimp industry while supporting economic and environmental sustainability.

## 2. Literature Review

Consumer preference integration refers to an approach that embeds consumer needs and expectations into product design and marketing strategies to create added value and competitive advantage<sup>[25,26]</sup>. In the context of shrimp products, this approach allows the simultaneous evaluation of multiple product attributes, thereby capturing the complexity of consumer value and providing direction for product development and marketing strategies<sup>[27]</sup>. Recent research highlights the importance of health, convenience, distribution, sensory quality, and environmental and social sustainability as key factors that enhance consumer trust and increase the consumption of fishery products<sup>[28,29]</sup>.

A substantial body of research has examined consumer preferences for fishery products, with increasing attention devoted to the interplay between product attributes, sustainability considerations, and purchasing behavior. Studies by Uddin et al.<sup>[9]</sup> and Wirth<sup>[10]</sup> indicate that attributes such as freshness, size, taste, and production methods significantly influence consumer decision-making. Even among high-income consumers, price sensitivity remains notable, suggesting that affordability continues to play a decisive role<sup>[10-12]</sup>. Consistent findings in Bangladesh and the United States show that consumers associate superior sensory quality with higher willingness-to-pay; however, they often must balance this preference against price considerations.

The influence of sustainability attributes such as food safety labels and eco-labelling on consumer behavior has gained prominence. Research from Taiwan, Spain, and Vietnam indicates that consumers prioritize

freshness and chemical-free products when purchasing seafood [13-15]. The presence of traceability systems and credible certifications strengthens consumer trust and enhances willingness-to-pay [16,17]. These findings underscore the critical role of transparent and credible communication strategies in fostering consumer confidence and supporting demand for certified seafood products.

Beyond shrimp, research on other aquaculture commodities provides valuable comparative insights. A study in Malawi reported consumer preferences for smaller-sized tilapia produced through aquaculture [18]. Meanwhile, research among Southeast Asian consumers demonstrated a strong willingness-to-pay for live mud crabs over fresh or frozen alternatives [19]. In Hawaii, consumers showed a clear preference for wild-caught over farmed fish and consistently favored fresh over frozen seafood [20]. These cases illustrate the complex trade-offs among sensory quality, price, and perceived authenticity that shape consumer choices.

In Indonesia, studies on shrimp consumer behavior remain limited and primarily focus on processed seafood products [21,22]. Existing evidence suggests that consumers tend to prioritize packaging durability and brand reputation over intrinsic attributes such as color and aroma. This reveals a gap in the literature regarding fresh shrimp product characteristics in the Indonesian context. Furthermore, recent studies indicate that consumer preferences extend beyond physical attributes to include non-physical product credentials such as environmental sustainability, traceability, and transparency [23,24]. Without credible and accessible information, consumer trust in local seafood products may diminish, hindering domestic market growth.

Globally, consumer preferences are shifting from sensory-focused criteria toward ethical and sustainability-oriented considerations. This evolution presents both challenges and opportunities for the shrimp sector, necessitating adaptive strategies that incorporate sustainability into product design and marketing efforts. Despite extensive international evidence, empirical research on Indonesian consumer preferences for fresh shrimp, particularly regarding attributes such as price, quality, convenience, and packaging, remains

limited. Addressing this gap is essential for developing consumer-oriented and sustainability-aligned strategies that enhance the competitiveness and growth of Indonesia's shrimp industry.

### 3. Methodology

This study employed conjoint analysis as the methodological framework to assess consumer preferences for fresh shrimp products in Indonesia. This method was chosen for its ability to capture the multifaceted nature of consumer decision-making by simultaneously evaluating multiple attributes [25-30]. The seven primary attributes assessed included price, quality, size, processing method, packaging, aroma, and convenience, each comprising multiple levels. Attribute combinations were generated through an orthogonal design, producing 18 product profiles that effectively represented the diversity of potential consumer preferences. Orme [26] provides a formula for estimating the minimum sample size required for conjoint analysis:

$$n = \frac{500 \times c}{t \times a}$$

where  $n$  denotes the minimum sample size,  $c$  represents the maximum number of levels within any attribute,  $t$  is the number of profiles evaluated by each respondent, and  $a$  is the number of alternatives per profile. Based on this calculation, the minimum required sample size is:

$$n = \frac{500 \times 3}{18 \times 1} = \frac{1500}{18} = 83.3 \approx 84.$$

Given this requirement, a sample of 100 respondents was deemed appropriate. Conjoint analysis does not require large samples; rather, it prioritizes the estimation of individual-level utilities for attribute combinations. Sample sizes of 50-100 respondents are generally adequate to generate stable utility estimates [25,26]. Data validity was assessed using Pearson's R and Kendall's Tau coefficients generated through SPSS. Both coefficients indicated strong correlations between observed and predicted utilities, confirming that the model produced valid estimations. Reliability was evaluated by examining internal consistency across similar pro-

files and assessing the orthogonality of attribute combinations, ensuring that the resulting utility estimates were stable and non-redundant.

Respondents were selected using purposive sampling based on the following criteria: (1) a minimum age of 18 years; (2) having purchased fresh shrimp within the past month; and (3) having experience in shopping at either traditional or modern markets. The use of a purposive sampling strategy aligns with practical principles in conjoint research, where representativeness of consumer decision-making patterns is prioritized over probability sampling [26]. Data were collected through face-to-face surveys using a structured questionnaire [27-31]. Respondents evaluated each product profile using a Likert scale ranging from 1 = not important to 4 = very important. A 1-4 scale was chosen for two primary reasons. First, the even-numbered scale eliminates the neutral option, compelling respondents to state clear preferences an approach well suited for conjoint analysis because it yields more distinct attribute prioritization [26,31]. Second, the restricted scale reduces central tendency bias and simplifies utility interpretation, which is beneficial in contexts where respondents may display diverse literacy levels, such as in Indonesian domestic markets. The collected data were

processed using SPSS version 26. Descriptive statistics were used to analyze respondents' socio-demographic characteristics, including gender, age, education level, marital status, purchasing frequency, purchase timing, and income.

This research methodology begins with the identification of product attributes and their corresponding levels, as presented in **Table 1**, which were established through and extensive literature review and market assessment to capture the key characteristics that influence consumer preferences for shrimp products. These attributes and levels were subsequently used to construct combinations of product profiles through an efficient experimental design, as shown in **Table 2**, ensuring that each profile reflects realistic variations of shrimp products that respondents can evaluate in the survey. Building upon the structure of attributes and the resulting product profiles, the study then formulated a set of research hypotheses, presented in **Table 3**, which systematically examine the influence of each attribute on consumer preferences and product selection decisions. Collectively, these stages constitute an integrated methodological framework that enables a rigorous empirical analysis of the factors shaping the value and market appeal of shrimp products.

**Table 1.** List of attributes and attribute levels of shrimp products.

Attribute	Level	Level Description
Price	1	Premium
	2	Normal
	3	Low price
Processed	1	Fresh
	2	Processed products
	3	Shrimp crisp
Aroma	1	Fresh
	2	Fishy smell
Practicality	1	Peel
	2	Headless
	3	Whole
Quality	1	Super
	2	Standart
	3	Reject
Packaging	1	Vacum
	2	Plasctic
	3	Box
Size	1	Large
	2	Medium
	3	Small

Source: Processed data (2025).

**Table 2.** Combination of shrimp product profiles based on attributes and attribute levels.

Card ID	Price	Processed	Aroma	Practicality	Quality	Packaging	Size
1	Low price	Processed product	Fresh	Peel	Standart	Plastic	Medium
2	Premium	Fresh	Fresh	Peel	Super	Vacum	Large
3	Low price	Shrimp crisp	Fresh	Whole	Super	Vacum	Small
4	Normal	Fresh	Fresh	Headless	Reject	Plastic	Small
5	Low price	Fresh	Fishy smell	Headless	Reject	Vacum	Medium
6	Premium	Processed product	Fishy smell	Headless	Super	Plastic	Large
7	Normal	Processed product	Fresh	Whole	Reject	Box	Large
8	Low price	Shrimp crisp	Fishy smell	Peel	Reject	Box	Large
9	Premium	Fresh	Fishy smell	Whole	Standard	Box	Small
10	Premium	Shrimp crisp	Fresh	Peel	Reject	Plastic	Small
11	Low price	Processed product	Fresh	Headless	Super	Box	Small
12	Normal	Fresh	Fresh	Peel	Super	Box	Medium
13	Premium	Processed product	Fresh	Whole	Reject	Vacum	Medium
14	Low price	Fresh	Fresh	Whole	Standard	Plastic	Large
15	Normal	Shrimp crisp	Fresh	Headless	Standard	Vacum	Large
16	Premium	Shrimp crisp	Fresh	Headless	Standard	Box	Medium
17	Normal	Shrimp crisp	Fishy smell	Whole	Super	Plastic	Medium
18	Normal	Processed product	Fishy smell	Peel	Standard	Vacum	Small

Source: Processed data (2025).

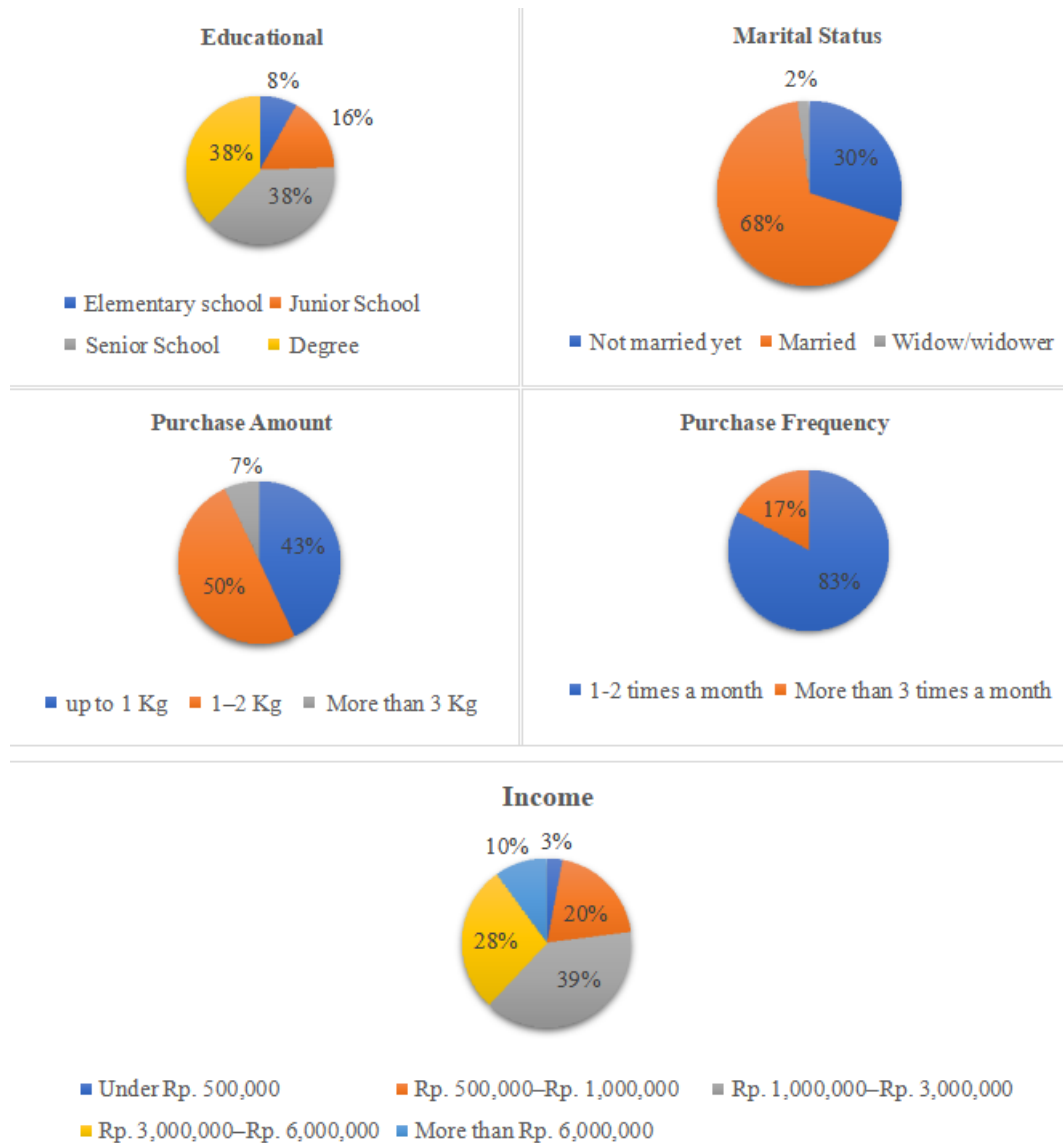
**Table 3.** Formulation of research hypotheses.

Hypothesis	Hypothesis Statement	Theoretical/Literature Basis
H1	<i>Price has been demonstrated to exert a substantial influence on consumer preferences for fresh shrimp in Indonesia, emerging as the attribute that holds the highest level of importance.</i>	Utility theory <sup>[10]</sup> ; Price is the main determinant of fresh fishery products, especially in the lower-middle income segment <sup>[32]</sup> .
H2	<i>The quality of a product has been shown to exert a significant positive influence on consumer preferences, with super quality being preferred over standard or reject quality.</i>	Theory of product characteristics <sup>[33]</sup> ; Quality as the main indicator of the suitability of food products <sup>[21]</sup> .
H3	<i>The practicality of the physical form of shrimp (e.g., headless or whole) exerts a substantial influence on consumer preferences.</i>	Ease of processing is an important factor in food product purchasing decisions <sup>[31]</sup> .
H4	<i>The size of the shrimp influences consumer preferences, with consumers tending to prefer larger shrimp.</i>	Size is a symbol of value and visual appeal of fresh fishery products <sup>[34]</sup> .
H5	<i>Attractive and functional packaging, such as boxes, has been shown to positively influence consumer preferences.</i>	Packaging increases the visual appeal and perception of quality in food products <sup>[35]</sup> .

## 4. Results and Discussion

A preliminary investigation into the socio-demographic characteristics of respondents was conducted prior to the evaluation of consumer preferences for attributes associated with shrimp products. A variety of demographic factors, including gender, age, educational attainment, marital status, and income level, have been demonstrated to exert a substantial influence on consumer behavior patterns, the perception of quality, and purchasing decisions for food products, particu-

larly shrimp. Demographic factors, including income, have been found to exert a substantial influence on consumer segmentation <sup>[36]</sup>. Conversely, factors such as education and other social elements exert a lesser influence on this phenomenon. This information provides an empirical basis for understanding consumer heterogeneity and serves as a strategic basis for formulating market segmentation, product innovation, and relevant marketing strategies. The distribution of respondents' socio-demographic characteristics is presented in **Figure 1**.



**Figure 1.** Distribution of socio-demographic characteristics of shrimp consumers on Java Island.

An analysis of the socio-demographic profile of shrimp consumers on Java Island reveals several important patterns relevant to consumer segmentation and market development. The majority of respondents were women (76%), indicating that women play a dominant role in seafood purchasing decisions, particularly shrimp, at the household level. This finding aligns with the results of numerous consumer studies, which have indicated that housewives frequently assume a primary role in the management of their family's food consumption, including the selection of animal protein sources. The findings of research by Yang and Panjaitan<sup>[37]</sup> indicated that women with higher education levels

and residing in urban areas exhibited a predominant interest in imported fruits and vegetables. Conversely, the majority of Indonesian consumers exhibited minimal interest in imported products. The consumers who expressed interest in the product tended to be from minority and middle-class groups, with various specific socio-demographic factors.

With respect to age group, the largest proportion of the sample comprised individuals aged 30 and under (40%), followed by those aged 31–40 (24%), those aged 41–50 (20%), and those aged 50 and above (16%). The distribution indicates a tendency for increased shrimp consumption among younger demographics,

a phenomenon that can be attributed to shifts in consumption patterns, enhanced access to seafood in urban and semi-urban regions, and heightened awareness of the nutritional merits of shrimp among millennials and Generation Z. This development presents a substantial opportunity for producers to leverage a creative and educational digital marketing approach to target this youthful market segment.

The majority of respondents exhibited a relatively high level of education, with 37% having obtained a high school diploma or a university degree. This relatively high level of education often correlates with health awareness, food literacy, and more stable purchasing power. Consequently, the marketing strategies employed by shrimp producers may benefit from an educational approach, which could include the communication of nutritional values, food safety guidelines, and sustainability information through various channels, such as social media, product labeling, or collaborative initiatives with health-conscious communities. Additionally, marital status emerged as a salient variable in the study, as the majority of shrimp consumers (68%) were married. The remaining individuals were either unmarried (30%) or widowed (2%). This finding is particularly salient in the context of shrimp consumption, which is prevalent in family households. This is primarily attributed to the cultural practice of shared meals and the emphasis on providing adequate protein sources for family members. This scenario underscores the significance of marketing products in the context of family or bundled packages, which are designed to meet the consumption needs of households.

With respect to income, the majority of consumers are classified as members of the middle-income bracket. The range of monthly incomes is from Rp 1,000,000 to Rp 3,000,000 (39%), from Rp 3,000,000 to Rp 6,000,000 (28%), and below Rp 1,000,000 (23%). It has been determined that only consumers with incomes that exceed Rp 6,000,000 (10%) will be subject to the aforementioned financial obligations. This circumstance underscores the pivotal role that price plays in the marketing of shrimp products, particularly given that the majority of consumers are situated within the lower-middle income bracket. Competitive pricing strategies, when employed in conjunction with season-

al discount offers or loyalty programs, are critical to increasing sales volume and accessibility.

Consumer purchasing behavior indicates that respondents typically purchase 1–2 kilograms of shrimp in a single purchase (50%), less than 1 kilogram (43%), and more than 3 kilograms (7%). This pattern indicates that shrimp is predominantly purchased in moderate quantities and primarily consumed for household purposes rather than for commercial culinary enterprises. Moreover, the majority of consumers purchase shrimp on a monthly basis (83%), with a significant proportion purchasing it more than twice per month (17%). This low purchase frequency suggests that shrimp is still regarded as a complementary or luxury food product, rather than a staple, and is likely consumed on special occasions such as weekends or holidays.

A comprehensive analysis of the socio-demographic characteristics of shrimp consumers in Java reveals that individual backgrounds significantly influence consumer preferences for product attributes. The preponderance of female, young, and highly educated consumers suggests a predilection for products that are pragmatic, salubrious, and provide demonstrable added value. Consumers in this segment have expectations for quality, practicality, and transparent product information. Conversely, the significant proportion stemming from lower-middle income groups underscores the pivotal role of price in consumer decision-making. Furthermore, the moderate and low-frequency purchasing patterns indicate that shrimp is still positioned as a non-daily commodity, consumed only on special occasions. This results in purchasing decisions that are more selective and based on perceived value. Török et al. <sup>[38]</sup> underscored the pivotal role of socioeconomic factors, including gender, age, education, income, and family size, in consumer preference segmentation. This finding aligns with the utility estimation results from conjoint analysis, which demonstrate that price, quality, and convenience are the most valued aspects by consumers. The consumers' inclination towards low prices, superior quality, and whole, headless shrimp exemplifies a strategic balancing act between affordability, quality, and convenience. **Table 4** presents the results of the utility estimation for each attribute that was studied.

**Table 4.** Estimated utility value of each level of shrimp product attributes.

Utilities	Attributes	Utility Estimate
Price	Premium	-0.471
	Normal	0.124
	Low price	0.346
Processed	Fresh	0.238
	Shrimp crisp	-0.014
	Processed product	-0.224
Aroma	Fresh	0.044
	Fishy smell	-0.044
Practicality	Peel	-0.484
	Headless	0.313
	Whole	0.171
Quality	Super	0.358
	Standart	-0.312
	Reject	-0.046
Packaging	Vacum	-0.159
	Plastic	-0.161
	Box	0.319
Size	Large	0.271
	Medium	-0.216
	Small	-0.056
(Constant)		2.694

Source: Data processed (2025).

The study indicates that consumer preferences for fresh shrimp are primarily shaped by three dominant attributes: price (21.99%), quality (17.86%), and practicality (17.07%). The highest utility scores low price (0.346) and superior quality (0.358) demonstrate that consumers are highly price-sensitive while simultaneously demanding high product standards. These patterns are consistent with existing literature emphasizing affordability, food safety, and product quality as key determinants of seafood consumption in emerging markets. Additional attributes, including

large size (12.83%), processed (12.33%), and packaging (12.04%), also have significant contribution, although they are not among the main drivers of preference. The positive utilities for large size (0.271) and packaging (0.319) suggest that consumers associate premium value and product safety with these characteristics. In contrast, aroma is the least influential attribute (5.87%), indicating that Indonesian consumers tend to rely more on visual and physical cues than on olfactory cues when assessing shrimp freshness and quality (**Table 5**).

**Table 5.** Importance values.

Importance Values	Values
Price	21.993
Processed	12.332
Aroma	5.872
Practicality	17.071
Quality	17.859
Packaging	12.042
Size	12.832

Source: Data processed (2025).

These findings carry important implications for sustainability-oriented policies and production practices. High price sensitivity highlights the need for sustainability strategies that ensure cost efficiency, price stability, and strong support for small-scale farmers so that environmentally friendly technologies and quality improvements do not increase consumer costs. Meanwhile, strong preferences for quality and freshness point to opportunities for expanding certification schemes, product traceability, and low-residue aquaculture as part of strengthening sustainability standards. Consumer interest in box packaging can also be directed toward the development of environmentally friendly packaging innovations that maintain perceptions of safety and added product value.

A thorough analysis of the salient attributes of shrimp products reveals that price emerges as the pre-eminent factor influencing consumer purchasing decisions, with a score of 21.993. This finding underscores high price sensitivity, especially among middle-income consumers, and emphasizes the importance of a competitive pricing strategy. This finding is consistent with the results reported by Hukom et al.<sup>[39]</sup>, who found that warm-water shrimp are priced at a premium compared to cold-water shrimp, particularly among low-income consumers. This phenomenon occurs despite the targeting of high-income consumers, who, by virtue of their inclination towards quality, are considered key demographics. Conversely, the freshness of shrimp can exert a twofold effect on market prices, namely, an increase in the cost of warm-water shrimp and a decrease in the cost of cold-water shrimp. This phenomenon is associated with consumer consumption patterns, which demonstrate a preference for frozen shrimp. Research by Huang et al., Sari et al., Yang et al.,<sup>[16,32,37]</sup> and Dumitru et al.<sup>[40]</sup>, indicates that price is a key determinant in attracting consumer interest in staple products. As Mohebalian et al.<sup>[41]</sup> underscored, product origin attributes play a pivotal role in influencing consumer preferences. This finding stands in contrast to the conclusions of Stanton<sup>[42]</sup>, who found that price does not always play a predominant role in purchasing decisions.

According to Bernabeu et al.<sup>[43]</sup>, additional research has indicated that elevated prices act as a sig-

nificant impediment to the consumption of nutritious foods, including organic produce such as tomatoes. Consequently, a price segmentation strategy based on the purchasing power of the target market is imperative to ensure that shrimp products reach a broader consumer base without compromising quality. A study by Alam and Alfnes<sup>[44]</sup> revealed that consumers demonstrated a willingness to allocate higher financial resources for the acquisition of local, or indigenous, fish species in comparison to foreign species. Furthermore, the study indicated a preference among consumers for domestically produced fish over imported alternatives. Furthermore, consumers prioritize fish freshness, exhibiting a pronounced preference for fresh fish over frozen alternatives.

A study by Hossain et al.<sup>[34]</sup> revealed that consumers in Bangladesh exhibit a clear preference for tiger prawns over white shrimp, primarily due to their preferred taste and larger size. A multitude of factors, including price, size, freshness, color, and awareness of food safety (e.g., the use of contaminants), have been shown to significantly influence consumer preferences and willingness to pay. Moreover, consumers are willing to pay a premium for large, fresh, brown shrimp (tiger prawns), as well as for products guaranteed to be free of contaminants. Conversely, frozen products and those known to contain contaminants tend to be priced lower. The study underscores the significance of the supply chain, encompassing product grading to ensure price transparency and the necessity of certification to safeguard food safety, as well as the potential for market expansion, particularly on an international scale. Consistent with the findings of Yang and Panjaitan<sup>[37]</sup>, the importance of food safety certification to consumers in Taiwan, Japan, and Indonesia is noteworthy. Concurrently, Wang et al.<sup>[23]</sup> identified safety and taste as pivotal factors in purchasing decisions. Research indicated that size is less of a concern<sup>[16]</sup>.

The quality attribute was ranked second, with a score of 17.859. This finding underscores the significance of product quality perceptions in shaping consumer behavior. Consumer research consistently demonstrates a strong preference for products of superior quality over those of standard or rejected quality.

This finding underscores the critical role that quality plays in the evaluation of food products. This finding aligns with the observations reported by Nurliza and Dolorosa<sup>[21]</sup> regarding consumer preferences for fishery products in Pontianak. The mounting awareness among consumers regarding health and sustainability concerns has prompted manufacturers to prioritize quality assurance by adopting quality standards, including Hazard Analysis and Critical Control Points (HACCP) certification, nutrition labeling, and the provision of product origin information (traceability). Products that explicitly communicate their quality have the potential to gain added value in the market. This finding aligns with the research by Huang et al.<sup>[16]</sup>, which underscores the importance of clear product labeling and accurate information in facilitating consumer choices that are in alignment with their beliefs and values. Zhang et al.<sup>[45]</sup> underscored the significance of dynamic pricing, a strategy that takes into account consumer characteristics and product quality, thereby fostering the development of sustainable and lucrative green agricultural products.

The practicality attribute, which received a value of 17.071, demonstrated that consumers exhibited a preference for headless and whole shrimp over peeled shrimp. This finding suggests that consumers value the practicality of the product, while maintaining the integrity of the shrimp's shape as an indicator of freshness. This finding aligns with the conclusions of Hong et al.<sup>[46]</sup>, who underscored the pivotal role of product physicality and the transparency of information, including traceability and certification, in influencing purchasing decisions for green tea products. Research by Adasme-Berrios et al.<sup>[47]</sup> found that the attributes most preferred by consumers were vegetable presentation, type of vegetable, label, producer, and vegetable origin. The inclination to opt for pre-cut vegetables is driven by the pursuit of convenience in food preparation. This study underscores the significance of enhancing the nutritional value of vegetables.

The attributes of size (12.832), processed form (12.332), and packaging (12.042) exhibited a moderate influence on preference, yet their significance remained substantial. A greater preference for large shrimp indi-

cates that size serves as a symbol of the product's value and visual competitiveness, as is also found in preferences for horticultural products such as tomatoes<sup>[48]</sup>. Furthermore, consumers demonstrated a clear preference for raw shrimp over processed shrimp, reflecting a desire to maintain control over the home-processing process to ensure freshness and safety. With respect to packaging, the observed inclination towards box packaging suggests that the functional characteristics, durability, and aesthetic appeal of packaging significantly influence consumers' perceptions of quality. Research by Salmiah et al.<sup>[35]</sup> on bottled coffee products also supports these findings, demonstrating that packaging plays a role in increasing product appeal and trust. A study by Jha et al.<sup>[49]</sup> revealed that certain respondents exhibited positive purchase intentions for packaged products associated with social objectives, particularly those with elevated cultural capital, who demonstrated heightened awareness and knowledge. The remaining 53.46% of respondents expressed minimal concern regarding the social impact of the packaging, suggesting a deficiency in promotional initiatives and public awareness campaigns that would effectively communicate the concept of socially motivated packaging.

The lowest score, 5.872, was obtained by the aroma. The discrepancy in consumer preference between fresh and fishy aromas indicates that sensory attributes should not be disregarded. In certain instances, aroma can serve as an indicator of freshness, particularly for consumers who are more attuned to quality. However, given the prevalence of strong spices and sauces in shrimp preparations, the aroma attributes of the latter tend to be given less consideration. Sensory attributes such as aroma and texture continue to play a complementary role in enhancing the consumption experience<sup>[46-49]</sup>.

In light of the aforementioned findings, it can be posited that the amalgamation of affordable prices, superior quality, practicality, substantial size, and aesthetically pleasing and functional packaging constitutes an optimal combination to satisfy consumer preferences for shrimp products. The practical implications of these findings are manifold. They indicate, first, the need for business actors, which include producers, processors,

and retailers, to develop shrimp products that are not only high quality, but also attractively packaged, sold at competitive prices, and easy to prepare for daily consumption. Additionally, effective communication and promotional strategies must prioritize value for money, quality assurance, and ease of use. It is imperative that the information conveyed through packaging or digital media reflects this added value<sup>[50]</sup>. Consequently, consumer education regarding the quality, safety, and health benefits of local shrimp products must be reinforced to cultivate brand loyalty and positive perceptions. This strategy is consistent with the recommendations of Rozaki et al.<sup>[51]</sup>, concerning market strengthening, particularly the significance of clear and educational labeling to enhance consumer trust. Consequently, these results provide a robust foundation for the development of consumer-oriented shrimp marketing strategies and product innovation, particularly in the context of domestic market competition and export potential.

A comprehensive review of the extant research reveals a substantial impact of socio-demographic characteristics on consumer preferences for attributes pertaining to fresh shrimp products. The preponderance of female respondents in the survey (76%) suggests that household consumption decisions, particularly with regard to animal protein sources, are predominantly influenced by women. This phenomenon elucidates the rationale behind the prioritization of price and quality attributes, which are accorded the highest relative weighting. This phenomenon can be attributed to the tendency of female consumers to prioritize a balance between financial constraints and the nutritional requirements of their families. In terms of age, consumers under 30 (40%) exhibited a stronger preference for practicality (headless/whole) and modern packaging (box). This phenomenon is indicative of changes in younger generations' consumption patterns, which prioritize efficiency and suitability for urban lifestyles. In contrast, older age groups prioritize product quality and authenticity, guided by health concerns and confidence in food sources.

Education level is a salient factor in this study. A

majority of respondents with a secondary or higher education (76%) expressed heightened concerns regarding quality, food safety, and sustainability. This finding aligns with the observed heightened predilection for "super" quality shrimp, as well as packaging that is perceived to offer enhanced value. Income factors also play a role in this matter. The majority of respondents (62%) come from the lower-middle class, with incomes of less than Rp 3,000,000. This condition has been demonstrated to reinforce price sensitivity, as evidenced by the highest utility observed in the "low price" category. In contrast, higher-income consumers (10%) with incomes exceeding Rp 10,000,000 demonstrated a preference for premium attributes, including quality and traceability. The results of this study demonstrate that consumer profiles have a significant impact on the formation of preference structures. Demand-adaptive and segmented strategies for the shrimp sector should be developed according to target market characteristics.

Consumer preferences play a strategic role in shaping the direction and effectiveness of sustainable development, as societal demand patterns directly influence production structures, investment orientations, and the legitimacy of public policies. When consumers exhibit strong preferences for environmentally friendly products, resource efficient solutions, and ethically produced goods, these market signals drive economic sectors to adopt greener practices and encourage governments to formulate policies aligned with sustainability objectives. Conversely, without shifts in consumer preferences and consumption behavior, government interventions and industrial innovations often fail to achieve their intended impacts. Thus, the success of sustainable development is highly dependent on the alignment between consumer choices, behavior-change strategies, and policy planning, positioning consumer preferences as a key variable that strengthens the integration of economic, social, and environmental dimensions within development processes.

## 5. Conclusion

The study concludes that consumer preferences

for fresh shrimp in Indonesia are primarily shaped by affordable prices, high product quality, and practical physical forms. Consumers also value large size, processing type, and packaging as supportive attributes that enhance product appeal. These findings underscore the importance of understanding consumer preferences as a critical factor in formulating strategies aimed at developing a competitive and sustainable shrimp sector. Based on the results, several policy recommendations can be proposed. The government should ensure price stability, strengthen supply chain efficiency, reinforce quality standards and traceability systems, and expand inclusive cold-chain infrastructure to maintain product freshness and quality. Enhancing public knowledge of food safety, nutritional value, and sustainable aquaculture practices is also crucial for building consumer trust and awareness. For industry stakeholders, the development of high-quality shrimp products that align with consumer purchasing power is imperative. Producers are encouraged to prioritize whole or headless forms, adopt environmentally friendly box packaging, and offer practical product formats that meet the needs of urban consumers. Strengthening partnerships among farmers, processors, and retailers is also essential to maintain supply consistency and product quality. These recommendations are expected to support the Indonesian shrimp sector in becoming more competitive, market-responsive, and aligned with sustainability principles.

## Author Contributions

Conceptualization, V.R., R.N., H., and N.T.; methodology, V.R. and H.; validation, R.N., H., and N.T.; formal analysis, V.R.; data collection, V.R.; writing-original draft preparation, V.R.; writing-review and editing, V.R., R.N., H., and N.T.; visualization, V.R., R.N., H., and N.T.; supervision, R.N., H., and N.T. All authors have read and agreed to the published version of the manuscript.

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## Institutional Review Board Statement

Not applicable.

## Informed Consent Statement

Not applicable.

## Data Availability Statement

Data will be made available on request.

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## Conflicts of Interest

The authors declare that there are no conflict of interest.

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