

A DATA-DRIVEN ANALYSIS OF CONSUMER SEGMENTATION AND MARKET POSITIONING STRATEGY

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Abstract

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This study explores consumer segmentation and market positioning for pigmented rice, using the segmentation, targeting, and positioning (STP) marketing model. A descriptive quantitative design was employed, with data from 192 pigmented rice consumers collected through structured questionnaires. Cluster analysis and Spearman's correlation identified purchasing behavior patterns and their links to socio-demographic and behavioral variables. Four consumer clusters emerged, differing in health motivation, price sensitivity, and lifestyle. Key correlations were found with health motivation, income, and food safety concerns in online transactions. These findings support prior research highlighting health consciousness and affordability in functional food adoption (Baker et al., 2022). Recent studies further emphasize that health-related information plays a key role in shaping consumer decisions in the functional food market (Nazzaro et al., 2025). The study contributes to marketing literature by presenting a data-driven clustering model and offering targeted marketing strategies based on age, income, and education. Practical strategies focused on affordability, health messaging, and online accessibility are recommended to improve adoption. This research provides actionable insights for agribusinesses, marketers, and policymakers to boost the visibility and consumption of pigmented rice, supporting the broader promotion of functional foods in the Philippines' emerging health-conscious market.

Keywords: Consumer Segmentation, Market Positioning, Pigmented Rice, Data-Driven Analysis, Agribusiness, Consumer Behavior

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1. INTRODUCTION

Health-conscious Filipinos are becoming more mindful of their diets, favoring nutritious and functional foods such as rice. As a national staple, rice has attracted renewed attention from consumers seeking healthier alternatives. This growing interest in functional foods has opened

a promising market for nutrient-rich rice varieties, benefiting both producers and consumers. Among these, pigmented rice, like red, brown, and black rice, offers superior nutritional value due to its higher levels of fiber, antioxidants, and essential nutrients. Colombo et al. (2023) emphasized that pigmented rice varieties are rich in antioxidant and anti-inflammatory compounds (e.g., anthocyanins

and proanthocyanidins). Despite these nutritional advantages, the cultivation of pigmented rice in the Philippines faces challenges related to production costs and commercialization. Efforts to improve high-yielding pigmented rice varieties aim to enhance production for Filipino farmers, targeting both domestic and export markets. Nueva Ecija, the country's "Rice Granary", is well-positioned to expand this market. Yet, limited producer engagement and low market penetration persist.

One key barrier to adoption is the lack of consumer awareness regarding the health benefits of pigmented rice. Marketing challenges, such as poor promotion and limited education, hinder growth. A strong marketing strategy is needed to bridge this gap and boost consumer engagement (Kotler & Keller, 2016). This study aims to address these issues by developing a tailored marketing framework for the pigmented rice sector. The outcomes contribute both to academic marketing literature and to actionable strategies for stakeholders such as farmers, traders, and policymakers.

There is a notable research gap in understanding the segmentation, targeting, and positioning (STP) of pigmented rice consumers in the Philippines. Most prior studies have focused on its nutritional benefits or production, with little attention to consumer profiling or marketing strategies. Several studies have explored specialty rice consumption in the Philippines. For instance, Hopio and Delos (2017) analyzed consumer behavior regarding specialty rice in Sta. Cruz and Los Baños, Laguna, focusing on attributes like aroma, price, and cooking time. Similarly, Ramos (2020) examined awareness, perception, and consumption patterns of specialty rice in San Pablo City, Laguna. However, comprehensive studies specifically addressing the marketing of pigmented rice remain scarce, indicating a gap in the literature that warrants further research. This study seeks to fill that gap by developing data-driven marketing strategies for the health-oriented pigmented rice market.

The study's objective is to classify consumers by demographic, attitudinal, and behavioral characteristics using the STP marketing model. Specifically, it aims to:

- identify distinct consumer segments;
- determine key factors influencing their choices;
- propose customer-centric strategies to broaden the pigmented rice market in the Philippines.

Guided by the STP framework, the study profiles consumer groups based on purchasing behavior, demographics, and preferences, essential for designing targeted branding and marketing strategies. Using a descriptive quantitative design, the study collected data from 192 pigmented rice consumers through structured questionnaires. Cluster analysis and factor analysis identified market segments and key attributes influencing preferences. The resulting insights support the development of a customer-focused marketing strategy promoting pigmented rice as a healthy food option.

These findings offer practical value for agribusinesses, marketers, and policymakers aiming to expand market reach.

The rest of this paper includes the following parts. Section 2 provides a literature review. Section 3 describes the methodology. Sections 4 and 5 present the results and discussion. Section 6 gives the conclusions.

2. LITERATURE REVIEW

2.1. Consumer trends in functional foods and pigmented rice

According to Grand View Research (2023), the global rise in health consciousness and demand for functional foods continues to grow rapidly. The COVID-19 pandemic has significantly influenced consumer behavior, with increased focus on nutritional benefits such as improved digestion and immunity (Sidor & Rzymiski, 2021). This shift reflects greater health consciousness and a preference for foods that offer functional benefits beyond basic nutrition (Alomari et al., 2022). Additionally, the antioxidants present in pigmented rice help prevent cardiovascular disease and protect against cellular damage. The fiber content aids in improving digestive health and managing blood sugar levels, contributing to overall wellness (Cleveland Clinic, 2021). According to Bairagi et al. (2021), consumption of pigmented rice in the Philippines remains low due to high prices and limited awareness. Urban, educated consumers are more likely to adopt pigmented rice due to greater exposure to health information and functional food trends (Goufo et al., 2024).

2.2. Market segmentation in functional food consumption

Market segmentation is crucial for marketing functional foods like pigmented rice, as it enables businesses to identify and understand distinct consumer groups based on demographics, behaviors, and psychographics (Lamb et al., 2022). Applying the STP model allows marketers to not only divide the market into meaningful segments but also to select specific target audiences and position the product accordingly (Kotler & Keller, 2016). Research indicates that consumers can be segmented into distinct groups based on their priorities, such as health consciousness, convenience, and environmental sustainability (Schäufele-Elbers & Janssen, 2023). A scoping review found that female consumers are more likely to consume functional foods than males, possibly due to their primary role in purchasing and preparing foods for their families. Additionally, young adults are identified as an important future consumer group for functional foods, attributed to their open-mindedness and willingness to try novel foods (Baker et al., 2022). Moreover, pigmented rice is increasingly recognized as a "superfood" of the XXI century, with research supporting its health benefits, including anti-obesity, anti-aging, anti-cancer, and anti-diabetic properties (Tiozon et al., 2023). Balancing price and quality are vital for broader market reach.

2.3. Consumer perceptions and purchasing behavior

Consumer choices are shaped by health perceptions, taste, and price sensitivity. While health-conscious buyers value nutritional content, price-sensitive consumers need incentives. According to Kardas et al. (2024), sensory attributes like flavor and texture play a crucial role in shaping food preferences. Marketing should highlight both health and sensory appeal. Digital strategies, such as influencer marketing, search engine optimization, and live selling, are increasingly effective in reaching health-driven consumers.

2.4. Positioning strategies for pigmented rice

Effective positioning differentiates pigmented rice from conventional varieties by emphasizing its unique benefits to target consumers. One approach is health-based positioning, which is a marketing strategy that emphasizes the health benefits of a product or service to appeal to health-conscious consumers (Parker White, 2019). Lifestyle-based positioning effectively targets fitness-conscious and wellness-oriented consumers through digital platforms, particularly social media, by emphasizing the health benefits of pigmented rice, such as its high antioxidant content and low glycemic index (Wuryandani et al., 2022). Affordability-based positioning is a marketing strategy where a company emphasizes its product or service as the most cost-effective option in the market to attract price-sensitive consumers (Bartolacci, 2022). Technological developments and marketing strategies have made various business units and various types of products appear and conditions during the pandemic and after the pandemic have also resulted in changes in consumer buying behavior, from offline to online so that it is not only an increase when buying products on various online shopping platforms, but various business units and new products are emerging with all their innovations (Samalua et al., 2024). The increasing role of digital marketing and e-commerce has further amplified these strategies.

2.5. Government policies and institutional support

Government support is crucial in commercializing pigmented rice. Programs like the National Organic Agriculture Program and Rice Competitiveness Enhancement Fund promote productivity and sustainability (Department of Agriculture, 2023), while Food and Drug Administration regulations ensure food safety (Bureau of Agriculture and Fisheries Standards, 2024). Initiatives like e-Kadiwa help farmers connect with consumers online (Department of Trade and Industry, 2024). Key challenges include high costs, consumer unawareness, and inconsistent supply. Addressing these requires cost-reduction measures, awareness campaigns, and technological innovations. Future research should explore regional preferences and breeding techniques to improve productivity and affordability. Collaborations among stakeholders are essential for sustainable growth.

2.6. Synthesis

The literature suggests that health-conscious consumers, urban professionals, and higher-income buyers are the most promising market segments for pigmented rice. However, price sensitivity, traditional dietary preferences, and limited awareness hinder broader adoption. Businesses should implement data-driven segmentation, targeted marketing, and strategic pricing to maximize consumer reach.

A well-structured marketing approach, emphasizing affordability, health benefits, and accessibility, combined with digital marketing innovations and government support, can help pigmented rice establish a stronger presence in the functional food industry, benefiting both farmers and consumers in the long term.

3. RESEARCH METHODOLOGY

This study employed a descriptive quantitative research design to examine consumer attitudes and purchasing behavior toward pigmented rice in Nueva Ecija. The quantitative approach was chosen to enable statistical analysis and objective interpretation of consumer trends, allowing for the identification of segment-specific behaviors and generalizations (Creswell & Creswell, 2018). Descriptive research is suitable for exploring relationships between variables without influencing them.

Due to the absence of a formal database of pigmented rice consumers, snowball sampling was utilized to recruit participants. However, it is not without limitations, particularly in its potential to introduce sampling bias due to network-based referrals. To reduce this risk, participants were recruited through a diverse set of sources, including local enterprises and the Department of Agriculture. Data were collected through a structured questionnaire, administered via Google Forms, a widely used tool for gathering insights on functional food consumption patterns. The questionnaire was designed to assess behavioral, demographic, and motivational factors influencing consumer preferences. The instrument included a four-point Likert scale and select open-ended questions. Online data collection is effective for broad geographic reach and faster response times, although it can limit participation among digitally underserved groups (Dong et al., 2023).

To assess the reliability of the instrument, Cronbach's alpha was used to measure internal consistency, with results falling within the acceptable range. A pre-test was also conducted among a small group of respondents to evaluate clarity, comprehension, and usability, leading to minor adjustments in question phrasing. For data analysis, the study employed cluster analysis to classify consumer segments based on shared attitudes, motivations, and behavioral traits. Additionally, Spearman's rank-order correlation was used to examine associations between socio-demographic variables like income, education, and behavioral indicators such as health motivation and online purchasing concerns. Spearman's correlation was chosen for its suitability in analyzing ordinal and non-parametric data, particularly when the assumptions of normality are not met, making it appropriate for Likert scale responses and non-linear relationships. These methods provided a robust statistical foundation to identify patterns in consumer behavior and inform the development of targeted marketing strategies.

4. RESULTS

Findings about the socio-demographic profile of the respondents, consumer attitudes, behavior, and purchasing decisions are discussed below.

4.1. Description of the socio-demographic profile of the respondents

The figure and summary table present the socio-demographic characteristics of pigmented rice consumers in Nueva Ecija. A significant portion of the respondents (57.81%) fall under the early adulthood age group (21–35 years old). This finding aligns with literature identifying younger adults

as more health-conscious and inclined toward functional foods like pigmented rice. A moderate positive correlation ($\rho = 0.41$, $p = 0.05$) confirms a statistically significant relationship between age and preference for pigmented rice, indicating that younger consumers are more likely to prioritize nutrition in their food choices.

Female respondents comprised 65% of the sample, consistent with existing research that women are primary household decision-makers for food purchases (Wuryandani et al., 2022). However, no statistically significant difference ($p > 0.05$) was observed between gender and pigmented rice preference, suggesting that while descriptive data point to women's influence, gender may not be a strong predictor of purchasing behavior in this context.

Interestingly, 35.95% of respondents were unemployed, many of whom were in the midlife and older age categories. A statistically significant correlation ($p = 0.04$) was observed between occupational status and pigmented rice preference; unemployed individuals still engage in health-conscious food buying, possibly due to support from family members. Even low-income or dependent Filipino consumers tend to prioritize affordable yet nutritious food options, especially when health is a concern, as seen in their reliance on rice, vegetables, and less-preferred foods to maintain dietary adequacy under budget constraints (Gregorio, 2024).

Civil status also showed a meaningful relationship with consumer behavior. A substantial 62.5% of respondents were single, and a mild positive correlation ($\rho = 0.35$, $p = 0.05$) was observed between being single and preference for pigmented rice. This supports Björnwall et al.'s (2021) assertion that single individuals tend to be more independent

in managing their diets and are often more mindful of nutrition and wellness. Income levels appear to be one of the strongest predictors of pigmented rice purchasing. About 34.38% of respondents earned PHP 40,000 or more per month. A strong positive correlation ($\rho = 0.48$, $p = 0.01$) indicates that higher income levels are associated with a greater likelihood of buying pigmented rice, likely due to better financial capacity to prioritize health and specialty foods. This is consistent with findings from Wijayanti et al. (2022), who stated that financially capable consumers are more likely to adopt functional foods, whereas low-income consumers often deprioritize them due to budget constraints.

Education is another important factor, with 54.69% of respondents having attained at least a bachelor's degree. A moderate correlation ($\rho = 0.39$, $p = 0.05$) between education level and pigmented rice preference supports the view that nutritional awareness and health-conscious behavior are influenced by educational attainment. More educated consumers are generally more aware of the long-term health benefits of nutrient-rich foods like pigmented rice. They are also more likely to understand food labels and make informed dietary choices, which influences their preference for functional foods (Santos et al., 2020).

Lastly, 26.56% of respondents lived in households with three or fewer members. Although a weak negative correlation ($\rho = -0.22$, $p = 0.12$) was found between household size and pigmented rice purchasing frequency, this result was not statistically significant. Nonetheless, Caswell and Yaktine (2013) suggested that smaller households may have greater flexibility in food choices due to fewer financial constraints and more autonomy in spending.

Table 1. Socio-demographic profile of the respondents

<i>Construct</i>	<i>Percentage</i>	<i>Correlation (ρ)</i>	<i>Significance (p-value)</i>
Age (21-35 years old)	57.81	0.41	0.05
Gender (female)	65.0	-	> 0.05
Occupation (unemployed)	35.95	0.33	0.04
Civil status (single)	62.5	0.35	0.05
Income (\geq PHP 40,000)	34.38	0.48	0.01
Bachelor's degree	54.69	0.39	0.05
Household (\leq 3 members)	26.56	-0.22	0.12

Note: PHP — Philippine peso.

Source: Primary data collected from survey respondents.

4.2. Consumer attitude and behavior

Table 2 summarizes key factors influencing consumer attitudes toward pigmented rice. Health motivation (88%), health perception (85%), and health

awareness (82%) had the highest percentages and showed significant positive correlations ($p < 0.01$). In contrast, peer influence and cognitive benefit awareness had lower percentages and were not statistically significant.

Table 2. Factors influencing consumer attitudes toward pigmented rice

<i>Construct</i>	<i>Percentage</i>	<i>Correlation (ρ)</i>	<i>Significance (p-value)</i>
Health motivation	88.0	0.52	< 0.01
Peer influence	35.0	0.08	0.42
Health perception	85.0	0.49	< 0.01
Sensory perception	66.0	0.26	0.09
Health awareness	82.0	0.45	< 0.01
Cognitive benefit awareness	63.0	0.2	0.18
Income influence	81.0	0.51	< 0.01
Diet program adherence	60.0	0.18	0.15

Source: Primary data collected from survey respondents.

4.2.1. Motivation

The findings indicate that health consciousness is the dominant factor influencing consumer decisions to purchase pigmented rice. The statement *"I purchase pigmented rice due to its health benefits"* received the highest level of agreement among respondents, reflecting a strong inclination toward making health-driven food choices. This suggests that consumers are increasingly aware of the nutritional advantages of pigmented rice, which is often associated with high antioxidant content, fiber, and potential benefits for heart health and diabetes management.

In contrast, external influences such as peer persuasion played a less significant role in purchasing decisions. The statement *"I purchase colored rice due to the persuasion of a friend"* received the lowest level of agreement, indicating that social influence has minimal impact on consumer preference for pigmented rice. This finding aligns with Cheikh Ismail et al. (2025), who noted that individuals' perceptions of healthy eating are shaped by their personal beliefs and knowledge, with factors such as balance, variety, and completeness being prioritized over social influences.

A correlation analysis between health-related motivation and purchasing frequency yielded a strong positive association (Spearman's $\rho = 0.52$, $p < 0.01$), reinforcing that health motivations are a statistically significant driver of purchasing behavior. Conversely, peer influence showed no significant correlation ($\rho = 0.08$, $p = 0.42$), validating its minimal impact.

These results suggest that consumers prioritize their health over social or promotional influences when selecting pigmented rice.

Furthermore, the preference for health-driven food choices over social influence suggests important implications for marketing strategies. Rather than relying on word-of-mouth marketing or peer recommendations, businesses should emphasize the scientific and nutritional benefits of pigmented rice to appeal to health-conscious consumers. The statistical findings strengthen the narrative by demonstrating that health motivation is not just commonly stated but measurably impactful in influencing purchasing behavior.

4.2.2. Perception

The findings indicate that health perception plays a critical role in consumer preference for pigmented rice. Respondents strongly agreed with the belief that consuming pigmented rice contributes to better health, reflecting a growing awareness of its nutritional benefits. Research further supports this trend, noting that red and black rice contain high levels of anthocyanins and polyphenols, which enhance antioxidant properties and support disease prevention. The study also reveals that consumers recognize the health advantages of pigmented rice over conventional white rice. Similarly, according to Custodio et al. (2024), health-conscious consumers are more likely to integrate pigmented rice into their daily diet, reinforcing its position as a functional food. Statistical results show a strong positive correlation between health perception scores and pigmented rice preference ($\rho = 0.49$, $p < 0.01$), suggesting that perception of health benefits significantly influences purchasing choices.

While health perception is a dominant factor, sensory characteristics also shape consumer preferences. Although respondents generally agreed that pigmented rice offers a unique flavor profile, it was the least strongly endorsed aspect of their preference. A weak but positive correlation ($\rho = 0.26$, $p = 0.09$) was observed between sensory perception and preference, indicating that while sensory appeal is a factor, it is not a primary driver.

Overall, the results confirm that health consciousness is the primary driver of consumer preference for pigmented rice, with nutritional benefits being the key factor influencing purchasing decisions. However, traditional sensory preferences still play a role in consumer behavior. To encourage greater market adoption, businesses should implement targeted awareness campaigns that educate consumers on the health advantages of pigmented rice while also addressing sensory expectations through product differentiation and strategic positioning.

4.2.3. Health awareness

The findings present consumer attitudes and behaviors concerning health awareness in relation to pigmented rice consumption. The items *"I am aware that pigmented rice contains more fiber, nutrients, and antioxidants than white rice"* and *"I am aware that pigmented rice is a natural product good for beating obesity, diabetes, cancer, and cholesterol"* received the highest weighted mean of 3.67 (strongly agree). Conversely, *"I am aware that eating pigmented rice will improve my memory"* had the lowest weighted mean of 3.16 (agree). The overall weighted mean stood at 3.48, suggesting that respondents generally hold a strong awareness of the health benefits of pigmented rice. A regression analysis showed that higher health awareness significantly predicted a stronger preference for pigmented rice ($\rho = 0.37$, $p < 0.01$), supporting the idea that awareness directly impacts consumer behavior.

These findings align with previous research by Tiozon et al. (2023), which highlights that pigmented rice varieties contain bioactive compounds that contribute to disease prevention, particularly in reducing the risks of obesity, diabetes, cardiovascular diseases, and certain cancers. The lower mean score for memory improvement suggests that while consumers recognize general health benefits, they may be less informed about cognitive advantages. This is consistent with Lorzadeh et al. (2025), who found that anthocyanins in black rice may enhance brain function and memory, although consumer awareness of these cognitive benefits remains limited. This insight points to a gap in public understanding and highlights a potential area for expanded health education through marketing or labeling. Overall, the study confirms that health awareness significantly influences consumer behavior when choosing pigmented rice. As consumers increasingly seek functional foods with health-promoting properties, the demand for pigmented rice is expected to grow.

4.2.4. Lifestyle

The findings reveal that *income* plays a significant role in consumer purchasing decisions, particularly in food selection. Respondents strongly agreed that

their income influences their buying behavior. Correlation analysis shows a strong relationship between income and preference for pigmented rice ($\rho = 0.51$, $p < 0.01$), indicating that financial capacity significantly affects consumer decisions. This aligns with Consumer Behavior Theory, which suggests that individuals adjust their spending based on income fluctuations (Baumol & Blinder, 2022).

Despite the emphasis on income, the results indicate that adherence to a structured diet program is not a primary concern. This is statistically supported by a non-significant correlation between diet program adherence and pigmented rice preference ($\rho = 0.18$, $p = 0.15$), showing that structured dieting does not necessarily translate to specific food choices. Beyond individual financial considerations, the study underscores the intersection of income and lifestyle choices in shaping purchasing behavior. Consumers with higher income levels tend to incorporate healthier options into their diets,

whereas those with lower incomes prioritize cost over nutrition (French et al., 2019). Overall, the results suggest that while consumers recognize the health benefits of pigmented rice, affordability remains a major barrier. Marketing strategies should thus emphasize not only health benefits but also explore pricing models, subsidies, or packaging alternatives to reach low- to middle-income consumers.

4.3. Factors influencing consumer purchasing decisions for pigmented rice

Consumer purchasing decisions for pigmented rice are shaped by multiple factors, including product quality, price, promotional strategies, and accessibility. The survey results provide insights into how these elements influence consumer preferences and buying behavior.

Table 3. Summary of marketing factors affecting pigmented rice purchase decisions

Marketing factor	Item	Weighted mean	Interpretation	Correlation (ρ)	p-value	Significance
Product	I consider the quality of the pigmented rice when buying.	3.33	High priority	0.50	< 0.01	Significant
	I consider the packaging of pigmented rice.	3.00	Moderate priority	0.32	0.03	Significant
Place	I consider food safety when buying pigmented rice online.	3.41	High priority	0.53	< 0.01	Significant
	I am willing to travel to purchase pigmented rice.	2.56	Low priority	-0.21	0.08	Not significant
Promotion	I believe the retailers offer free delivery.	3.42	High priority	0.55	< 0.01	Significant
	I consider discounts and loyalty programs in choosing where to buy.	2.84	Moderate priority	0.29	0.04	Significant
Price	Pigmented rice is more expensive than white rice.	3.47	High priority	0.58	< 0.01	Significant
	I prefer retailers that offer flexible payment terms.	3.03	Moderate priority	0.26	0.07	Not significant

Source: Primary data collected from survey respondents.

4.3.1. Product

The survey findings indicate that product quality is the most crucial factor in consumer purchasing decisions. Respondents strongly agreed with the statement “*I consider the quality of the pigmented rice when buying*”, which received the highest weighted mean of 3.33 (high priority). This underscores the significance of factors such as grain texture, aroma, and nutritional value. These results align with Fang et al. (2024), who found that consumers prioritize rice quality, especially attributes like taste and nutritional value, when making purchasing decisions. Additionally, Fang et al. (2024) highlight that consumers are willing to pay a premium for superior quality attributes such as taste, appearance, and nutritional value. Statistical analysis revealed a strong positive correlation between product quality and purchasing preference ($\rho = 0.50$, $p < 0.01$), confirming its significant influence on consumer decisions.

Although packaging ranked the lowest in priority under product attributes, it still received a weighted mean of 3.00. Packaging also showed a modest but statistically significant correlation with purchasing decisions ($\rho = 0.32$, $p = 0.03$), indicating that while not a primary driver, it contributes to overall consumer perception. According to Golden West Packaging Group (2024), well-designed packaging significantly enhances consumer perception and fosters brand loyalty. These results suggest that

businesses should continue to invest in improving grain quality while also exploring packaging innovations to strengthen brand positioning.

4.3.2. Place

Accessibility emerged as another critical factor. The statement “*I consider food safety when buying pigmented rice online*” received the highest weighted mean of 3.41 (high priority). This suggests that consumers are highly cautious about online food safety. This was supported by a strong positive correlation ($\rho = 0.53$, $p < 0.01$), highlighting that food safety perception significantly influences online buying behavior.

Conversely, the willingness to travel for purchase scored the lowest with a weighted mean of 2.56. This variable had a weak negative correlation with purchase preference ($\rho = -0.21$, $p = 0.08$), suggesting that local availability is preferable, though the relationship was not statistically significant. The results reinforce the need for improving local retail access and trusted e-commerce options to meet consumer expectations on safety and convenience.

4.3.3. Promotions

Promotional strategies, especially those tied to convenience, significantly affect consumer behavior. The statement “*I believe the retailers offer free*

delivery” received the highest weighted mean of 3.42 (high priority). It also had a strong positive correlation with purchase behavior ($\rho = 0.55$, $p < 0.01$), indicating that delivery incentives meaningfully drive buying decisions. This supports Freedman’s (2023) report, free delivery consistently ranks as the top reason why consumers choose to shop online, often ahead of price and convenience.

In contrast, general promotions such as discounts and loyalty programs were rated lower, with a weighted mean of 2.84. Still, the correlation was modest yet significant ($\rho = 0.29$, $p = 0.04$), suggesting these strategies influence behavior to a lesser degree. These findings suggest that promotions centered on delivery convenience outperform traditional promotional tactics and should be prioritized in marketing campaigns.

4.3.4. Price

Price remains a dominant factor, with the statement *“Pigmented rice is more expensive than white rice”* earning the highest weighted mean of 3.47. A high correlation ($\rho = 0.58$, $p < 0.01$) further supports that price awareness strongly influences purchasing decisions. Despite this, the perception of health benefits continues to outweigh cost concerns.

The item on payment terms received the lowest weighted mean in the price category (3.03). Its correlation with purchase decision was low and not statistically significant ($\rho = 0.26$, $p = 0.07$), implying that flexible payment options are not a critical factor. These results confirm that while consumers are sensitive to price differences, they are still willing to pay more for health-related value, supporting a value-based pricing approach.

5. DISCUSSION

5.1. Clustering of pigmented rice consumers

Based on the findings of this study, consumers of pigmented rice were clustered according to their levels of motivation, perception, health awareness, and lifestyle characteristics. These clusters offer insights into consumer segments and provide a foundation for targeted marketing and development strategies.

5.1.1. Cluster 1: Health-conscious and highly motivated consumers

This cluster represents consumers who are highly motivated to purchase pigmented rice primarily due to its health benefits. They exhibit a strong perception of pigmented rice as a superior product, with high awareness of its nutritional advantages. They are also committed to a healthy lifestyle and regularly integrate functional foods into their diets. As confirmed in the results, health motivation and health awareness both demonstrated strong and statistically significant correlations with purchasing preference ($\rho = 0.52$ and $\rho = 0.45$, respectively; $p < 0.01$). These consumers are ideal targets for marketing strategies emphasizing pigmented rice’s functional properties and disease-preventive benefits.

This finding aligns with Alsubhi et al. (2023) that health-conscious consumers are more willing to invest in premium, nutrient-rich food products, as supported by recent systematic reviews. Thus,

communicating scientific evidence of pigmented rice’s health benefits could further strengthen brand trust among this segment.

5.1.2. Cluster 2: Moderately motivated and health-aware consumers

Consumers in this group are also motivated by the health benefits of pigmented rice, though to a lesser extent than Cluster 1. They are price-conscious and have slightly lower health awareness. However, they still demonstrate a positive perception of pigmented rice’s quality and maintain a generally healthy lifestyle.

As supported by correlation analysis, price sensitivity is a critical factor for this group ($\rho = 0.58$, $p < 0.01$), suggesting that cost remains a key barrier to regular consumption. According to Baker et al. (2022), moderately health-conscious consumers are influenced by affordability and convenience when selecting functional foods. Therefore, price promotions, free delivery ($\rho = 0.55$, $p < 0.01$), and discount bundles could be effective in encouraging more frequent purchases among this cluster.

5.1.3. Cluster 3: Passive and price-sensitive consumers

This segment consists of consumers with limited health awareness and weak motivation to buy pigmented rice. Their purchasing decisions are primarily influenced by price, social influence, or convenience rather than health benefits. The results showed a weaker correlation between packaging, promotions, and purchase intent ($\rho = 0.29$ – 0.32), though still statistically significant.

Rather than payment flexibility, these consumers are more responsive to immediate pricing incentives and basic accessibility. As shown by Aschemann-Witzel et al. (2019), lower-income or disengaged consumers are often driven by practical considerations such as availability and affordability, rather than longer-term health motivations. Educational campaigns focusing on health and affordability, as well as product sampling in community settings, may help influence this segment.

5.1.4. Cluster 4: Unmotivated and unaware consumers

These consumers are the least likely to purchase pigmented rice. They demonstrate low awareness of its benefits and do not prioritize health in their lifestyle or purchasing decisions. This group showed negligible statistical relationships with any of the key factors ($\rho < 0.20$, $p > 0.10$), highlighting minimal engagement.

Hence, consumers are difficult to reach through traditional health-based appeals. Strategies such as experience-based marketing (e.g., in-store tastings) or bundling pigmented rice with familiar meal kits can create initial interest by lowering the perception of risk.

5.2. Analysis of consumer clusters and marketing implications

Clusters 1 and 2 reflect consumers who are most influenced by health-related factors, supported by significant correlations with health motivation

and awareness ($\rho > 0.45$, $p < 0.01$). Clusters 3 and 4 include price-sensitive and low-engagement consumers, with weaker statistical relationships, pointing to the need for price-based and awareness-raising strategies. The key marketing challenges identified include price sensitivity, low health awareness in certain segments, and limited accessibility to trusted sellers or safe online channels. These are consistent with global barriers to functional food marketing.

To address these marketing challenges, several strategic recommendations are proposed. First, value-based pricing and promotional offers should be implemented, particularly targeting Clusters 2 and 3, whose purchasing decisions are significantly influenced by cost considerations.

Second, localized awareness campaigns must be developed to educate Clusters 3 and 4 on the health benefits and affordability of pigmented rice, aiming to improve their perception and motivation. Third, it is important to strengthen online safety assurances, a factor that showed a strong correlation with purchasing behavior ($\rho = 0.53$, $p < 0.01$), to build greater consumer trust in digital platforms where pigmented rice is sold. Lastly, innovative packaging and sensory-focused marketing strategies can be introduced to attract consumers who are not primarily driven by health benefits by emphasizing appealing visual, taste, and convenience attributes of the product.

Table 4. Different clusters and their key characteristics

Cluster	Consumer type	Key characteristics	Primary influencers	Recommended strategies
1	Health-conscious and highly motivated	High health awareness, strong motivation, proactive healthy lifestyle	Health benefits, disease prevention	Emphasize health benefits; use scientific claims and premium branding
2	Moderately motivated and health-aware	Some health interest, more price-conscious, moderate awareness	Price sensitivity, convenience, and moderate health focus	Value-based pricing, discounts, and free delivery
3	Passive and price-sensitive	Low motivation, low awareness, and cost-driven decisions	Pricing, basic convenience, and social influence	Educational campaigns, sampling, and local promotions
4	Unmotivated and unaware	Minimal awareness or health interest, disengaged	None significant	In-store tastings, bundled products, and simplified messaging

Source: Primary data collected from survey respondents.

5.3. Comparison with global market trends

Globally, the demand for pigmented and functional rice is rising due to growing health consciousness and lifestyle diseases (Baker et al., 2022). Countries like Japan, South Korea, and the United States have integrated pigmented rice into health food markets through product innovation, branding, and policy support.

Compared to global consumers, Filipino consumers remain more price-sensitive, as shown by the high correlation between price and purchase preference in this study ($\rho = 0.58$, $p < 0.01$). However, similar to global markets, health consciousness is a significant driver, suggesting opportunities for convergence through better product positioning.

5.4. Policy implications

The findings present clear opportunities for policy development. Subsidies or incentives for small-scale pigmented rice producers could help reduce prices and improve accessibility. Support for product labeling and health claims regulation would further enhance consumer trust. Moreover, government-funded campaigns that highlight the nutritional benefits of pigmented rice could promote healthier food choices, particularly among low-income and Cluster 4 consumers.

This study demonstrates that health motivation, price sensitivity, and online trust are the most statistically significant factors influencing pigmented rice purchasing behavior. Consumers are clustered into four segments, each requiring targeted strategies based on their unique drivers. To improve adoption across all consumer types, marketing should balance health messaging with affordability and convenience. Policies must support market expansion through education, producer incentives, and digital platform trust. These insights

are not only relevant to local markets but also contribute to global discussions on promoting functional foods in emerging economies.

6. CONCLUSION

This study provides a comprehensive understanding of the purchasing behavior of pigmented rice consumers in Nueva Ecija and contributes valuable insights to the literature on functional food marketing. The majority of consumers were found to be women aged 21–35 years old, single, college-educated, and from small households with a monthly income below PHP 10,000. Their purchasing decisions are primarily driven by health consciousness, as they perceive pigmented rice to be beneficial in preventing diseases such as diabetes, obesity, and cardiovascular conditions. This finding reinforces prior research (Baker et al., 2022) that highlights the role of health motivation in functional food consumption.

This study further enriches the literature by incorporating statistical relationships between consumer attitudes and key purchasing factors, such as price sensitivity ($\rho = 0.58$, $p < 0.01$), food safety concerns in online transactions ($\rho = 0.53$, $p < 0.01$), and delivery incentives ($\rho = 0.55$, $p < 0.01$). These results confirm that although health benefits are a major driver, consumers also weigh affordability and convenience when deciding to purchase pigmented rice. This multifactor perspective builds on the findings of Aschemann-Witzel et al. (2019), who note that functional food buyers often balance health aspirations with practical constraints.

By clustering consumers into four segments based on their health motivation, awareness, and lifestyle, the study presents a practical framework for developing targeted marketing strategies. For example, highly motivated health-conscious consumers respond well to scientifically supported

health claims, while passive and price-sensitive buyers are more influenced by value-based promotions and accessibility improvements. These insights enable businesses to craft differentiated campaigns that meet the distinct preferences of each segment, thus enhancing consumer engagement and expanding market reach. This behavioral segmentation offers a localized model that contributes to functional food marketing strategies in emerging economies.

In terms of business applications, the findings suggest that companies should invest in campaigns emphasizing nutritional benefits, implement promotional strategies such as free delivery and seasonal discounts, and introduce sensory-focused packaging to appeal to a wider range of buyers. Farmers and suppliers can also benefit by improving product quality and expanding distribution through training, product innovation, and digital platforms. These recommendations provide a concrete roadmap for developing a consumer-centered marketing approach that aligns with both health trends and economic realities.

From a policy standpoint, the results underscore the need for government support in making pigmented rice more affordable and accessible. Initiatives such as production subsidies, postharvest technology assistance, and public health campaigns can increase both supply and demand. Support for cooperatives and micro, small, and medium-sized enterprises, along with clearer product labeling and nutritional claims, would further build trust and market growth. These implications are critical to building a more resilient and sustainable pigmented rice industry in the Philippines.

Despite these valuable insights, the study has several limitations. The use of snowball sampling may have introduced bias and limited the diversity of respondents. The geographic focus on Nueva Ecija also restricts the generalizability of the results to other regions. Additionally, the online survey method may have excluded consumers without digital access. Future research should address these gaps by using probability-based sampling techniques such as stratified or cluster sampling, expanding the geographic scope to include other provinces, and incorporating qualitative methods such as interviews or focus groups for deeper behavioral insights.

Overall, this study contributes to the academic discourse by empirically linking health awareness, price, and consumer behavior in the context of functional food marketing. It highlights the importance of tailoring marketing and policy interventions to the specific motivations and constraints of different consumer groups. As Nazzaro et al. (2025) emphasized, functional food acceptance depends not only on health claims but also on how well products fit consumers' lifestyles and values.

By aligning pigmented rice products with both health benefits and practical purchasing behavior, stakeholders can enhance market penetration, improve public nutrition, and support local economic development.

Based on the study's segmentation of pigmented rice consumers, a customer-centric marketing framework was developed to address the distinct motivations and barriers of each cluster. This framework emphasizes tailored strategies in five key areas: promotions, public information, product quality, branding and pricing, and service quality, each designed to respond to the specific needs of Clusters 1 to 4.

Promotional strategies focus on raising awareness and stimulating trial purchases among lower-income and passive consumers (Clusters 2, 3, and 4). These include distributing starter promotional kits in local markets, collaborating with barangay health workers for community-based endorsements, and launching digital campaigns on Facebook and TikTok with nutritionists and influencers to improve product recall and online engagement. Public information campaigns aim to enhance institutional visibility and societal acceptance of pigmented rice. This involves coordination with government agencies like the Department of Agriculture and the Department of Health to integrate pigmented rice into school feeding programs, and participating in regional trade expos with live cooking demos to reach health-conscious consumers in Clusters 1 and 2.

Improving product quality is also a core strategy. It includes training farmers in organic and low-input methods to reduce costs while enhancing nutritional value, designing resealable and eco-friendly packaging with visible health labels, and benchmarking best practices from successful organic brands to strengthen supply chains, targeting the quality-conscious Clusters 1 and 2. Branding efforts focus on developing a health-oriented sub-brand to appeal to all clusters by reinforcing trust and product differentiation. In tandem, pricing strategies propose affordable pack sizes (250 g to 1 kg) to support trial and adoption, especially for price-sensitive Clusters 3 and 4.

Lastly, service quality initiatives aim to deepen consumer relationships and access. These include establishing a customer service hotline and Facebook page to provide cooking tips and health information, and implementing a barangay-level delivery service via local riders, improving accessibility for all clusters. This customer-centric strategy integrates behavioral insights with actionable marketing interventions, reinforcing the enterprise's goal of increasing adoption and market reach of pigmented rice across diverse consumer segments.

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