

CONSUMER WILLINGNESS TO PAY MODEL FOR GLUTEN FREE AND MICROALGAE BASED COOKIES

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Abstract

Background: The growing demand for healthy and functional foods has increased consumer interest in gluten-free and microalgae-based products. However, these innovative products face challenges related to consumer acceptance, unfamiliarity, and relatively higher prices.

Purpose: This study aimed to analyze consumers' willingness to pay (WTP) for gluten-free products based on mocaf flour and microalgae, as well as to examine the influence of individual factors and subjective norms on WTP.

Design/methodology/approach: This study used a quantitative survey of 220 consumers in Malang Raya, East Java. Respondents tasted the product before answering a five-point Likert scale questionnaire. Structural Equation Modeling-Partial Least Squares (SEM-PLS) was used to test the structural model through bootstrapping. The Contingent Valuation Method (CVM) with a bidding game estimated the mean WTP.

Findings/Result: Consumers demonstrated a relatively high willingness to pay, with a mean WTP of IDR 30,213 and a dominant price range of IDR 29,000–34,800. Purchase intention emerged as the strongest direct predictor of WTP ($\beta = 0.419$), whereas perceived behavioral control was the strongest determinant of purchase intention ($\beta = 0.575$). Perceived value and nudge significantly influenced attitude, while social influence positively contributed to WTP both directly and indirectly through attitude and purchase intention. Overall, the findings indicate that consumers' willingness to pay is primarily associated with purchase intention, perceived behavioral control, and perceived product value.

Conclusion: Consumers demonstrated a relatively high WTP for gluten-free and microalgae-based cookies. WTP is shaped by individual factors through attitude and purchase intention, with purchase intention and perceived behavioral control playing particularly important roles. Social influence also contributes to WTP both directly and through the mediating roles of attitude and purchase intention.

Originality/value (State of the art): This study extends the Theory of Planned Behavior by integrating individual factors, nudge, and social influence into a comprehensive WTP model for gluten-free and microalgae-based cookies. It contributes empirical evidence from Indonesia to the limited literature on consumer valuation of innovative local functional foods.

Keywords: willingness to pay, gluten-free products, microalgae, purchase intention, perceived behavioral control

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INTRODUCTION

Consumer demand for healthy and functional foods continues to grow in Indonesia. Buyers no longer judge snacks only based on taste and convenience. They also seek added health value such as fiber, protein, and bioactive compounds (Jendyose, 2024). Within this shift, gluten-free food has drawn steady attention, both as a medical need and as a lifestyle choice. Gluten triggers several health problems. Celiac disease, wheat allergy, and non-celiac gluten sensitivity all involve an immune response to gluten. A study at RSCM Jakarta found a celiac disease prevalence of 2.83% among high-risk patients with functional digestive disorders (Syam et al. 2024). High gluten is also associated with intake also links to a higher risk of type 1 diabetes through systemic inflammation (Johansen et al. 2023). These risks encourage more consumers to adopt a gluten-free diet as a preventive measure.

Modified cassava flour (mocaf) offers a local, gluten-free alternative to wheat flour. Fermentation with lactic acid bacteria raises its functional value and removes gluten (Andiani et al. 2023). Adding microalgae enriches the product further. Microalgae, such as *Spirulina* and *Chlorella*, carry 50% to 70% protein, essential amino acids, vitamins, minerals, and natural antioxidants (Hernández-López et al. 2024). Combining mocaf and microalgae in cookies produces a snack that is safe for gluten-sensitive consumers and richer in nutrients than conventional wheat cookies (Silva-Paz et al. 2023). Strong nutrition does not guarantee market success. Microalgae-based products still face low acceptance. The taste and color feel unfamiliar, prices are higher than those of conventional snacks, and consumer knowledge remains limited (Ampofo & Abbey, 2022). These barriers raise an important question for producers: what drives consumers to pay a premium for gluten-free microalgae cookies that are still relatively new to the market?

Prior research has studied some aspects of this question. Maehle and Skjeret (2022) showed that purchase intention and attitude toward innovation drive WTP for microalgae food. Wahyuningtyas et al. (2024) reported that lifestyle, knowledge, attitude, and subjective norms influence consumers' willingness to try microalgae-based food products in Indonesia. Fu et al. (2024) found that perceived value and subjective norms predict WTP for circular products. Lafarga et

al. (2021) linked consumer knowledge of microalgae to purchase intention. These studies confirm that both psychological and social factors are important. Three gaps remain. First, most studies test single mediation and rarely combine attitude and purchase intention as sequential mediators in one WTP model. Second, few studies have integrated product strategies, such as nudge, with core psychological factors. Third, evidence on gluten-free microalgae cookies in Indonesian markets remains limited, particularly regarding the role of social influence in explaining WTP. This study addresses these gaps by testing an extended Theory of Planned Behavior (TPB) model among 220 consumers in Malang Raya, using PLS-SEM to examine the structural relationships and the Contingent Valuation Method (CVM) to estimate willingness to pay (WTP).

Based on the extended TPB framework and previous empirical findings, this study expects the proposed relationships to be positive. Higher health consciousness, multisensory experience, nudge, perceived value, and perceived behavioral control are expected to positively influence consumers' attitudes toward gluten-free and microalgae-based cookies. Perceived behavioral control is also expected to positively influence purchase intention and WTP, while a favorable attitude is expected to increase purchase intention and WTP. Purchase intention is expected to have a positive effect on WTP, as consumers with stronger purchase intentions are more likely to accept the price of the product. Social influence is likewise expected to positively affect attitude, purchase intention, and WTP. Furthermore, attitude and purchase intention are expected to mediate the relationships between the antecedent variables and WTP, with the sequential pathway from the antecedent variables through attitude and purchase intention expected to positively affect WTP. These expected relationships provide the basis for the hypotheses tested in the structural model.

This study pursues three objectives. First, to estimate consumer WTP for gluten-free microalgae cookies. Second, to test how individual factors, namely health consciousness, multisensory experience, nudge, perceived value, and perceived behavioral control, affect WTP through attitude and purchase intention. Third, to examine the effect of social influence, as a representation of subjective norms, on attitude, purchase intention, and WTP, including its indirect effects through attitude and purchase intention.

METHODS

This study used both primary and secondary data. Primary data were collected from 220 consumers in Malang Raya, East Java, Indonesia. Secondary data were obtained from scientific journals, previous empirical studies, and Statistics Indonesia (BPS). Malang Raya was purposively selected as the study area because of its high migration inflow, diverse socio-economic backgrounds, and openness to healthy food innovation. According to BPS Malang (2024), 22,397 in-migrants were recorded in 2023, indicating a relatively heterogeneous consumer population originating from different regions of Indonesia.

The researcher distributed a structured questionnaire to respondents who met two criteria: age 18 years or above and prior experience trying at least one new healthy food product. Respondents tasted the gluten-free microalgae cookies before answering, so their judgments reflected their direct sensory experience. The questionnaire used a five-point Likert scale ranging from strongly disagree (1) to strongly agree (5). Short interviews with selected respondents provided context. The sample size of 220 followed the Lemeshow formula for a large population, which produced a minimum of 196 and was rounded up to strengthen the structural estimates (Hair et al. 2022).

Data analysis was conducted in three stages. The first stage employed descriptive statistics to summarize the respondents' demographic characteristics and indicator responses using frequencies, percentages, means, and standard deviations. The second stage applied the Contingent Valuation Method (CVM) using a bidding game approach to estimate consumers' willingness to pay (WTP). The initial bid was determined based on the product's cost of goods sold (COGS), and respondents were assigned to predetermined bid levels. The mean WTP was calculated using the expected value approach by weighting each bid level according to the proportion of respondents willing to pay that amount (Hanemann et al. 1991).

The third stage employed Partial Least Squares Structural Equation Modeling (PLS-SEM) using SmartPLS software. The measurement model was evaluated by examining convergent validity through outer loadings and average variance extracted (AVE), discriminant validity through cross-loadings and the heterotrait-monotrait ratio (HTMT), and internal consistency reliability through Cronbach's alpha and composite

reliability. The structural model was assessed using path coefficients, coefficient of determination (R^2), predictive relevance (Q^2), effect size (f^2), and standardized root mean square residual (SRMR) as indicators of model fit. Hypothesis testing was performed using the bootstrapping procedure to estimate the t-values, path coefficients, and p-values. Statistical significance was determined at the 5% significance level ($\alpha = 0.05$), while p-values between 0.05 and 0.10 were interpreted as indicating marginal significance (Das, 2023).

The study is grounded in the Theory of Planned Behavior (TPB) (Ajzen, 1991), which posits that individual and social factors influence consumers' behavioral decisions. This study extends the TPB framework by examining individual factors and social influences as determinants of consumers' willingness to pay (WTP) for gluten-free and microalgae-based products.

The individual factors consist of health consciousness, multisensory experience, nudge, perceived value, and perceived behavioral control. Health consciousness reflects consumers' awareness of health and nutritional benefits, whereas multisensory experience represents their sensory evaluation of the product (Pan & Wu, 2024; Sagha et al. 2022). Nudge refers to interventions such as nutrition labels and educational packaging that encourage favorable choices without restricting consumer freedom (Hoenink et al. 2020). Perceived value reflects consumers' evaluation of product benefits relative to costs (Fu et al. 2024), while perceived behavioral control represents their perceived ability to access and purchase the product (Yadav & Pathak, 2017). These factors are expected to positively influence consumers' willingness to pay.

Social influence refers to the influence of friends, peers, communities, and the surrounding social environment on consumer decision-making. Positive social influence can strengthen consumers' perceptions of and acceptance of innovative food products, thereby increasing their willingness to pay (WTP) for such products. Research framework in Figure 1. Based on these arguments, the following hypotheses are proposed:

H1: Individual factors, consisting of health consciousness, multisensory experience, nudge, perceived value, and perceived behavioral control, have a positive effect on consumers' willingness to pay for gluten-free and microalgae-based products.

H2: Social influence has a positive effect on consumers' willingness to pay for gluten-free and microalgae-based products.

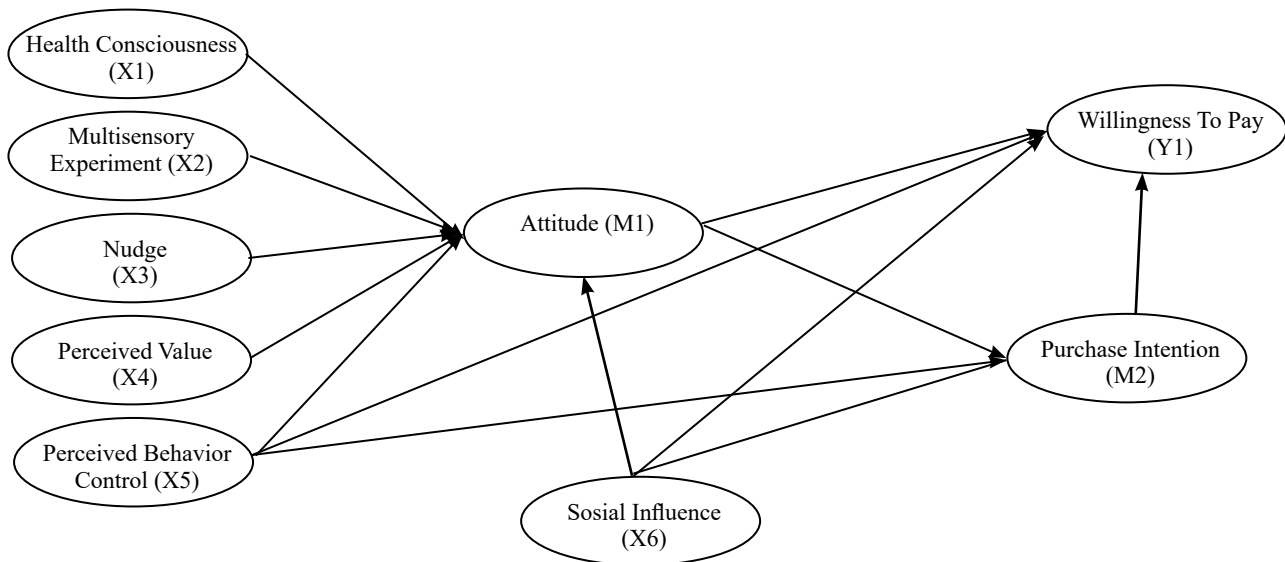


Figure 1. Research framework

RESULTS

Respondent Characteristics

Of the 220 respondents, 132 (60%) were female and 88 (40%) were male. Women reported a higher snack frequency and a stronger interest in health and visual appeal. Young adults constituted the largest age group among the respondents. Consumers aged 18 to 22 years accounted for 69.1%, and those aged 23 to 27 accounted for 23.6%. Younger consumers tend to have more positive attitudes toward new and sustainable foods (Laureati et al. 2024). Education was high: 55% finished senior high school and 40% held a bachelor's degree. Monthly income or allowance was clustered at IDR1,000,001 to IDR2,000,000 (41.6%) and IDR2,000,001 to IDR3,000,000 (22.7%). Students comprised 81.8% of the sample. By origin, 52.7% came from East Java, followed by West Java (12.3%). Table 1 summarizes the profile.

Consumers' Willingness to Pay (WTP) for Gluten-Free and Microalgae Products

Willingness to pay (WTP) is an important indicator for assessing the extent to which consumers are willing to pay for a product based on its perceived benefits. In the context of gluten-free and microalgae-based products, WTP is particularly relevant because these products belong to the functional food category and offer added value in terms of health benefits and nutritional content. In this study, WTP was measured using the Contingent

Valuation Method (CVM), a widely applied approach in economic research for estimating consumer preferences and willingness to pay for non-market and innovative products (Li & Kallas, 2021). The results are presented in Table 2.

The analysis shows that the average willingness to pay (Expected WTP) is IDR30,213, indicating a relatively high level of consumer willingness to pay for gluten-free and microalgae-based products. This value exceeds the lowest offered price, suggesting that consumers are not solely price-oriented but also consider product benefits. This finding aligns with Islam et al. (2023) who reported that consumers are willing to pay a premium for foods with health and sustainability claims. The distribution of respondents reveals that most consumers selected prices of IDR29,000 (41.82%) and IDR34,800 (39.55%), while only a smaller proportion chose IDR23,200 (18.64%). This indicates that the majority of consumers are inclined toward medium-to-high price ranges, reflecting a shift in preferences toward value-added products, particularly in the functional food segment such as gluten-free and microalgae-based products (Alsubhi et al. 2023).

Wassmann et al. (2024) also highlight that microalgae are increasingly accepted as an alternative food source with high nutritional value, enhancing consumer purchase intention and WTP. Critically, the high WTP can be explained by several factors. First, perceived value plays a crucial role, as consumers are willing to pay more when they perceive the benefits to be worth

the price. Second, health consciousness influences consumers to accept premium prices for healthier products. Third, a positive attitude toward the product strengthens WTP, as favorable perceptions reduce price sensitivity. Additionally, perceived behavioral control suggests that while willingness may be high, actual decisions are still constrained by financial capability, as reflected in the dominance of the IDR29,000 price point. Other factors such as nudges and multisensory experiences have also been shown to enhance perceived quality and consumption experience, thereby increasing WTP. In conclusion, consumer willingness to pay for gluten-free and microalgae-based products is relatively high and positive, with an optimal price range between IDR29,000 and IDR34,800, and an average WTP of approximately IDR30,213. These findings suggest strong market potential and support the positioning of the product as a functional food using a value-based pricing strategy rather than a cost-based approach.

Influence of Individual Factors on Consumers' Willingness to Pay (WTP) for Gluten-Free and Microalgae Products

Consumers' willingness to pay (WTP) for gluten-free and microalgae-based products is influenced by various psychological and behavioral factors, including health consciousness, multisensory experience, nudging, perceived value, and perceived behavioral control.

These factors not only exert direct effects but also operate through mediating mechanisms, namely attitude and purchase intention. Previous studies have indicated that consumer behavior toward healthy food products is strongly shaped by health awareness, perceived value, and perceived behavioral control (Chen, 2024). In the context of innovative products such as microalgae and gluten-free foods, individual factors become increasingly important, as these products are relatively new and require the formation of attitudes and trust before consumers are willing to pay a premium.

The results in Table 3 show that all individual factors significantly and positively influenced attitude at the 10% significance level. Health consciousness significantly influenced attitude ($\beta = 0.121$; $p = 0.006$), indicating that consumers who were more concerned about health tended to evaluate gluten-free and microalgae-based products more positively. Multisensory experience also had a significant positive effect on attitude ($\beta = 0.134$; $p = 0.005$), suggesting that favorable sensory perceptions can support the acceptance of unfamiliar ingredients such as microalgae. This finding is consistent with that of Wahyungtyas et al. (2024). Nudge has a positive effect on attitude ($\beta = 0.196$; $p < 0.001$), indicating that product information and cues can facilitate consumers' evaluation without restricting their freedom of choice (Sampa et al. 2024).

Table 1. Respondent profile (n = 220)

Characteristic	Largest categories	Share
Gender	Female / Male	60% / 40%
Age	18–22 yr; 23–27 yr	69.1%; 23.6%
Education	Senior high; bachelor	55%; 40%
Occupation	Students; private sector	81.8%; 12.7%
Monthly income	IDR1–2 mn; IDR2–3 mn	41.6%; 22.7%
Province of origin	East Java; West Java	52.7%; 12.3%

Table 2. Respondents' willingness to pay (WTP) levels

Price (IDR)	Number of Respondents	pfi (Proportion)	EWTP (IDR)
23,200	41	0.18636	4,324
29,000	92	0.41818	12,127.27
34,800	87	0.39545	13,761.82
Total	220	1.00000	30,213

Perceived value had the strongest effect on attitude ($\beta = 0.215$; $p < 0.001$). This finding indicates that consumers' evaluation of product benefits relative to the costs incurred is a key consideration in developing a favorable attitude toward the product. For innovative functional foods, perceived health, nutritional, and functional benefits may justify a relatively higher price

when consumers consider the benefits to be worth the cost. This result is consistent with that of Fu et al. (2024). Perceived behavioral control also significantly influenced attitude ($\beta = 0.109$; $p = 0.030$), indicating that consumers who perceive greater ability to access and purchase the product tend to have more favorable evaluations.

Table 3. Results of direct and indirect effects of individual factors

Variables	Original Sample	P-Value	Description
Direct			
Health Consciousness (X1) → Attitude (M1)	0.121	0.006	Positive
Multisensory Experience(X2) → Attitude (M1)	0.134	0.005	Positive
Nudge (X3) → Attitude (M1)	0.196	0.000	Positive
Perceived Value (X4) → Attitude (M1)	0.215	0.000	Positive
Perceived Behavioral Control (X5) → Attitude (M1)	0.109	0.030	Positive
Perceived Behavioral Control (X5) → Purchase Intention (M2)	0.575	0.000	Positive
Perceived Behavioral Control (X5) → Willingness to Pay (Y)	0.181	0.015	Positive
Attitude (M1) → Purchase Intention (M2)	0.283	0.000	Positive
Attitude (M1) → Willingness to Pay (Y)	0.173	0.008	Positive
Purchase Intention (M2) → Willingness to Pay (Y)	0.419	0.000	Positive
Indirect			
Health Consciousness (X1) → Attitude (M1) → Purchase Intention (M2)	0.034	0.019	Positive
Multisensory Experience(X2) → Attitude (M1) → Purchase Intention (M2)	0.038	0.016	Positive
Nudge (X3) → Attitude (M1) → Purchase Intention (M2)	0.055	0.001	Positive
Perceived Value (X4) → Attitude (M1) → Purchase Intention (M2)	0.061	0.006	Positive
Attitude (M1) → Purchase Intention (M2) → Willingness to Pay (Y)	0.118	0.001	Positive
Perceived Behavioral Control (X5) → Attitude (M1) → Purchase Intention (M2)	0.031	0.037	Positive
Health Consciousness (X1) → Attitude (M1) → Purchase Intention (M2) → Willingness to Pay (Y)	0.014	0.032	Positive
Health Consciousness (X1) → Attitude (M1) → Willingness to Pay (Y)	0.021	0.063	Positive
Multisensory Experience (X2) → Attitude (M1) → Purchase Intention (M2) → Willingness to Pay (Y)	0.016	0.033	Positive
Multisensory Experience (X2) → Attitude (M1) → Willingness to Pay (Y)	0.023	0.046	Positive
Nudge (X3) → Attitude (M1) → Purchase Intention (M2) → Willingness to Pay (Y)	0.023	0.008	Positive
Nudge (X3) → Attitude (M1) → Willingness to Pay (Y)	0.034	0.017	Positive
Perceived Value (X4) → Attitude (M1) → Willingness to Pay (Y)	0.037	0.030	Positive
Perceived Behavioral Control (X5) → Attitude (M1) → Willingness to Pay (Y)	0.019	0.000	Positive
Perceived Behavioral Control (X5) → Purchase Intention (M2) → Willingness to Pay (Y)	0.241	0.076	Positive
Perceived Behavioral Control (X5) → Attitude (M1) → Purchase Intention (M2) → Willingness to Pay (Y)	0.013	0.051	Positive
Perceived Value (X) → Attitude (M1) → Purchase Intention (M2) → Willingness to Pay (Y)	0.025	0.018	Positive

The importance of perceived behavioral control becomes more evident in its effect on purchase intention, which is the strongest relationship in the model ($\beta = 0.575$; $p < 0.001$). This finding indicates that consumers' perceived ability to purchase the product is a major determinant of their behavioral readiness. Attitude positively influenced purchase intention ($\beta = 0.283$; $p < 0.001$), while attitude also had a significant direct effect on WTP ($\beta = 0.173$; $p = 0.008$). However, purchase intention had a stronger direct effect on WTP ($\beta = 0.419$; $p < 0.001$), indicating that consumers' willingness to pay is more closely associated with their readiness to purchase than with attitude alone. Perceived behavioral control also directly influences WTP ($\beta = 0.181$; $p = 0.015$), further demonstrating the importance of purchase feasibility in determining consumers' economic willingness to pay.

The mediation results further showed that individual factors influenced WTP through attitude and purchase intention. Significant indirect effects were found for health consciousness, multisensory experience, nudge, perceived value, and perceived behavioral control through attitude and purchase intention. The sequential effects on WTP were also significant for health consciousness ($\beta = 0.014$; $p = 0.032$), multisensory experience ($\beta = 0.016$; $p = 0.033$), nudge ($\beta = 0.023$; $p = 0.008$), and perceived value ($\beta = 0.025$; $p = 0.018$). These findings indicate that individual factors contribute to WTP through a behavioral process in which consumers' perceptions shape attitudes, attitudes strengthen purchase intentions, and purchase intentions increase willingness to pay.

The findings also show that perceived value has an important indirect role in the formation of WTP through attitude and purchase intention. This suggests that consumers may be more willing to pay for the product when its health, nutritional, sensory, and functional benefits are clearly perceived as valuable. Meanwhile, the strong effect of perceived behavioral control on purchase intention indicates that improving product accessibility and affordability may be particularly important for converting favorable evaluations into purchase decisions.

Overall, the results support H1, which states that individual factors consisting of health consciousness, multisensory experience, nudge, perceived value, and perceived behavioral control have a positive

effect on consumers' willingness to pay for gluten-free and microalgae-based products. The findings extend the TPB perspective by showing that WTP is not only associated with behavioral intention but is also shaped by a combination of consumers' health awareness, sensory experiences, responses to product cues, perceived value, and perceived purchasing capability. From a managerial perspective, increasing WTP requires strategies that communicate health and nutritional benefits, improve sensory quality, provide informative product cues, strengthen perceived value, and enhance product accessibility and affordability.

The Influence of Subjective Norms on Willingness to Pay (WTP)

Subjective norms in this study are represented by two main variables, namely social influence and family communication, which are analyzed in relation to consumers' willingness to pay (WTP) for gluten-free and microalgae-based products. Gluten-free products refer to food products that do not contain gluten and are typically consumed by individuals with high health consciousness or specific dietary needs, such as gluten intolerance. Meanwhile, microalgae (e.g., spirulina and chlorella) are recognized as superfoods with high nutritional value. Both categories are considered innovative food products with relatively higher prices compared to conventional alternatives. Therefore, WTP serves as an important indicator to assess market acceptance of these products. The results of the analysis are presented in Table 4.

The results in Table 4 The results show that social influence has a positive and significant effect on attitude ($\beta = 0.246$; $p < 0.001$). This indicates that stronger social influence is associated with more favorable consumer evaluations of gluten-free and microalgae-based products. Social recommendations and information from peers or communities may provide additional references for consumers when evaluating unfamiliar products. When consumers perceive that people around them support or accept the product, they may develop greater confidence in its benefits, quality, and acceptability. This finding is consistent with the Theory of Planned Behavior (Ajzen, 1991), which recognizes the importance of social expectations and the surrounding social environment in shaping behavioral evaluations.

Table 4. The Influence of subjective norms on willingness to pay

Variable Relationship	Coefficient	P-value	Direction	Description
Social Influence (X6) → Attitude (M1)	0.246	0.000	Positif	Significant
Social Influence (X6) → Purchase Intention	0.086	0.085	Positif	Marginally significant
Social Influence (X6) → WTP (Y)	0.168	0.006	Positif	Significant
Social Influence (X6) → Attitude (M1) → Purchase Intention (M2)	0.070	0.000	Positif	Significant
Social Influence (X6) → Attitude (M1) → WTP (Y)	0.036	0.011	Positif	Significant

Social influence also has a positive effect on purchase intention ($\beta = 0.086$; $p = 0.085$). Although the coefficient is relatively small, the relationship is significant at the 10% significance level applied in this study. This suggests that social influence contributes to consumers' intention to purchase, although its direct contribution is weaker than its influence on attitude. The result indicates that consumers do not rely solely on social expectations when forming purchase intentions, but also consider their personal evaluations and perceived feasibility of purchasing the product. Nevertheless, social influence remains relevant in encouraging consumers to consider innovative food products as acceptable purchase alternatives.

Importantly, social influence has a positive and significant direct effect on WTP ($\beta = 0.168$; $p = 0.006$). This finding indicates that consumers who receive stronger social support or influence are more willing to pay for gluten-free and microalgae-based products. Social influence may increase consumers' confidence and reduce uncertainty associated with unfamiliar products, thereby increasing their acceptance of the price. This mechanism is particularly relevant for innovative functional foods, where consumers may rely on recommendations and social information to assess product credibility and value. The finding is consistent with Maehle and Skjeret (2022), who emphasized the role of social and normative factors in consumer responses to microalgae-based products.

The indirect effects further demonstrate that social influence contributes to WTP through attitude and purchase intention. Social influence significantly affects purchase intention through attitude ($\beta = 0.070$; $p < 0.001$) and WTP through attitude ($\beta = 0.036$; $p = 0.011$). Moreover, the sequential pathway from social influence through attitude and purchase intention to WTP is positive and significant ($\beta = 0.029$; $p = 0.004$). These results indicate that social influence does not operate only as a direct determinant of WTP but also contributes through a behavioral process in

which social information shapes favorable attitudes, strengthens purchase intentions, and ultimately increases willingness to pay.

Overall, the results support H2, which states that social influence has a positive effect on consumers' willingness to pay for gluten-free and microalgae-based products. The findings demonstrate that consumers' WTP is influenced not only by individual perceptions but also by their social environment. For innovative food products, social recommendations, peer experiences, and positive community perceptions can strengthen product acceptance and reduce uncertainty regarding unfamiliar ingredients and product benefits. From a managerial perspective, producers can utilize social influence through consumer testimonials, peer recommendations, community-based promotion, and positive word-of-mouth to strengthen product credibility and encourage consumers' willingness to pay.

Managerial Implications

The findings suggest that producers of gluten-free and microalgae-based cookies should adopt a value-based pricing strategy within the identified WTP range of IDR 29,000–34,800, supported by clear communication of nutritional, functional, and health benefits. Since perceived behavioral control has the strongest effect on purchase intention ($\beta = 0.575$; $p < 0.001$), improving product accessibility, affordability, and purchasing convenience through retail and online channels is essential. Producers should also strengthen perceived value and attitude through informative nutritional labels, educational packaging, and positive sensory experiences. In addition, social influence significantly affects WTP ($\beta = 0.168$; $p = 0.006$), suggesting that consumer testimonials, reviews, and community-based promotion can enhance product credibility and encourage purchase intention, ultimately increasing consumers' willingness to pay.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Consumers demonstrate a relatively high willingness to pay for gluten-free and microalgae-based cookies, with a mean WTP of IDR30,213 and a dominant price range of IDR29,000–34,800. The findings indicate that individual factors significantly contribute to WTP through direct and mediated pathways involving attitude and purchase intention. Purchase intention is the strongest direct determinant of WTP ($\beta = 0.419$), while perceived behavioral control has the strongest effect on purchase intention ($\beta = 0.575$). Among the individual factors, perceived value and nudge show the strongest effects on attitude. Social influence also has a significant positive effect on WTP both directly and indirectly through attitude and purchase intention.

Recommendations

Future research should examine additional factors, such as brand trust and green satisfaction, across different regions and market settings using larger probability-based samples. For practitioners, pricing should align with the identified WTP range while improving product accessibility, communicating nutritional and functional benefits, enhancing sensory quality, and leveraging social promotion to strengthen market acceptance.

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