Promoting Sustainable Consumption: The Role of Green Marketing Communication in Plant-Based Meat Alternative Adoption

Review of Integrative Business & Economics Research

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ABSTRACT

This study investigates the factors influencing consumers' green purchase decisions regarding plant-based meat alternatives, utilizing the Theory of Green Purchase Behavior (TGPB) and the Theory of Reasoned Action (TRA) as theoretical frameworks. The research explores critical determinants such as perceived health benefits, perceived quality, social norms, awareness of consequences, environmental concerns, and their impact on consumer attitudes and behavioral intentions. The moderating role of Green Marketing Communication (GMC) is also examined to understand how marketing strategies influence the relationship between these determinants and consumers' purchase decisions. Empirical analysis was conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM) on data collected from a diverse sample of consumers. The findings reveal that perceived health benefits and quality significantly enhance consumer attitudes toward plant-based meat, which strongly predicts behavioral intentions. Social norms and environmental concerns also play critical roles in shaping attitudes and behavioral intentions. Notably, Green Marketing Communication effectively moderates the relationships between social norms, attitudes, environmental concerns, and behavioral intentions, amplifying the impact of these factors on actual purchase decisions. This study provides valuable insights for marketers, policymakers, and businesses promoting sustainable consumption, with the potential to significantly influence consumer behavior toward adopting plant-based meat alternatives and thereby advance environmental sustainability and public health goals. Future research directions are suggested to explore the long-term effects of these factors on consumer loyalty and behavior across different cultural and demographic contexts.

Keywords: sustainable consumption, plant-based meat, green purchase decision, green marketing communication.

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1. INTRODUCTION

The global food industry transforms as consumers seek sustainable and health-conscious alternatives to traditional animal-based products. This shift is driven by growing

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awareness of meat consumption's environmental, health, and ethical implications, which has spurred interest in plant-based meat alternatives. These products, designed to mimic the taste, texture, and nutritional profile of conventional meat, are positioned as a solution to several pressing global challenges, including climate change, food security, and public health concerns (Carfora et al., 2022; Graça et al., 2019; Sendhil et al., 2024).

Moreover, environmental sustainability is particularly compelling, as livestock production significantly contributes to greenhouse gas emissions, deforestation, and water use. The United Nations has repeatedly emphasized the need for a global dietary transition towards more plant-based foods to meet sustainability goals. Plant-based meat alternatives, which require fewer resources and produce fewer emissions than traditional meat, are increasingly considered a critical component of this transition (Hartmann et al., 2022). Similarly, health considerations also play a pivotal role in consumer interest in plant-based meats. The growing prevalence of lifestyle-related diseases, such as heart disease, diabetes, and obesity, has led many consumers to seek healthier dietary options. Plant-based meats, often lower in saturated fats and free from cholesterol, are perceived as a healthier alternative to conventional meat (Ahmad et al., 2022; Bakar et al., 2023). Additionally, the ethical concerns surrounding animal welfare and the impact of industrial farming practices have further fueled consumer demand for plant-based alternatives (Graça et al., 2019).

However, despite the rising interest, adopting plant-based meat is not yet universal, and understanding the factors that drive consumer decisions is essential for further market growth. Previous research has identified a range of determinants that influence consumer attitudes and behaviors, including perceived health benefits, product quality, environmental concerns, social norms, and individual awareness of the consequences of their dietary choices (Hwang, 2020; Hammami et al., 2023; Chen, 2022). Yet, the interplay between these factors and the role of marketing communication in shaping consumer perceptions requires deeper exploration.

This study seeks to bridge this knowledge gap by integrating the Theory of Green Purchase Behavior (TGPB) (Han, 2011) and the Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1980) to examine the determinants of green purchase decisions related to plant-based meat alternatives. The TGPB posits that environmental concern, perceived consumer, and product effectiveness are critical in driving green purchase behavior. Meanwhile, the TRA emphasizes the role of attitudes and subjective norms in shaping behavioral intentions. Combining these theories, this research aims to comprehensively understand how perceived health benefits, perceived quality, awareness of consequences, social norms, and environmental concerns influence consumer attitudes and intentions (Ma et al., 2023).

Furthermore, the study explores the moderating role of Green Marketing Communication (GMC) in this context. As marketing strategies increasingly emphasize plant-based meat's environmental and health benefits, understanding how these messages impact consumer behavior is crucial. Effective GMC has the potential to amplify the positive effects of social norms, attitudes, and environmental concerns on purchase intentions, thereby accelerating the adoption of plant-based meat products (De Jesus et al., 2023).

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This study examines the effects of green marketing communication on diverse demographic groups, including various age ranges, income levels, and educational backgrounds, to understand its impact across different consumer segments. Additionally, the study emphasizes the importance of consumer education and awareness in green marketing strategies, making the findings applicable to a wider range of sustainable products. This research aims to provide a framework that can be applied to other emerging sustainable food trends by identifying common drivers and barriers to adopting plant-based meat alternatives. The findings of this study provide valuable insights for policymakers by highlighting the role of green marketing in promoting sustainable consumption practices across various food categories.

2. THEORETICAL BACKGROUND

2.1 Theoretical Framework

This research leverages two established theories to understand consumer green purchase decisions for plant-based meat: the Theory of Green Purchase Behavior (Han, 2011) and the Theory of Reasoned Action (Fishbein & Ajzen, 1980).

Theory of Green Purchase Behavior (TGPB): Developed by Han (2011), TGPB suggests that environmental concern, perceived consumer effectiveness (PCE), and perceived product effectiveness (PPE) are key drivers of green purchase behavior. PCE reflects consumers' belief in their ability to make a positive impact through their purchasing choices, while PPE pertains to their belief in the environmental benefits of the product. This theory emphasizes the relationship between environmental awareness and the perceived effectiveness of choosing plant-based meat.

Theory of Reasoned Action (TRA): Proposed by Fishbein and Ajzen (1980), TRA asserts that behavior is primarily determined by attitude and subjective norms. In the context of green purchases, attitude involves a consumer's overall evaluation of plant-based meat, considering factors like perceived quality, environmental benefits, and health benefits. Subjective norms refer to the influence of social pressures, such as societal expectations, on consumers' purchasing decisions.

By integrating these theories, the research examines the impact of several independent variables on green purchase decisions: perceived quality of plant-based meat, environmental concern, perceived health benefits, awareness of consequences, attitude toward plant-based meat, and social norms. The dependent variable of interest is the green purchase decision, which refers to consumers' purchasing behavior regarding plant-based meat products.

Additionally, the study explores the moderating effect of green marketing communication, which refers to marketing strategies that emphasize a product's environmental benefits, on the relationship between the independent and dependent variables (see Figure 1). Understanding how these messages influence the connection between the other factors and green purchase decisions will provide deeper insights into consumer behavior.

2.2 Literature Review

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Perceived Health Benefit

Perceived health benefit (PHB) is a significant determinant in shaping consumer behavior toward plant-based meat alternatives. Existing literature emphasizes the positive correlation between PHB and consumers' attitudes and purchase intentions. Ahmad et al. (2022) and Avelino et al. (2022) suggest that health-related marketing strategies are critical in influencing consumer attitudes toward plant-based meat. Moreover, Bakar et al. (2023) and Carfora et al. (2022) stress the importance of highlighting health benefits to drive adoption, particularly among health-conscious consumers. This consensus forms the basis for the following hypothesis:

H1: Better-perceived health benefits lead to a more favorable consumer attitude toward plant-based meat options.

Perceived Quality of Plant-Based Meat

Perceived quality, particularly taste, is critical in purchasing plant-based meat. As noted by Szenderák et al. (2022) and Michel et al. (2021), consumers evaluate plant-based meat based on sensory attributes such as taste, texture, and appearance. These attributes are vital for competing with conventional meat, as noted by Watson (2021), who emphasizes that plant-based meat must meet or exceed taste expectations to influence consumption patterns. This assertion supports the following hypothesis:

H2: The higher the perceived quality, the more favorable the consumer attitude toward plant-based meat options.

Awareness of Consequences

Consumer awareness of the consequences of their dietary choices, particularly in environmental, ethical, and health aspects, is a pivotal factor in purchasing decisions. Research by Sendhil et al. (2024) highlights that awareness of the negative impacts of conventional meat production can motivate consumers to choose more sustainable alternatives. Studies by Hartmann et al. (2022) and Graça et al. (2019) also emphasize the role of informed decision-making in preferring plant-based foods. This leads to the following hypothesis:

H3: Better awareness of the consequences leads to a more favorable consumer attitude toward plant-based meat options.

Social Norm

Social norms, defined as the implicit or explicit rules within a social group, significantly shape consumer attitudes and behaviors, particularly in the context of sustainable consumption. Michel et al. (2021) and Hammami et al. (2023) note that social norms can encourage or discourage the adoption of plant-based diets. Positive social norms that endorse sustainable food choices can drive individuals to align their behavior with these

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norms (Graça et al., 2019). These insights lead to the formulation of the following hypotheses:

H4: Social norms significantly influence consumer attitudes toward plant-based meat options.

H6: Social norms influence consumers' behavioral intention toward plant-based meat options.

Environmental Concern

Environmental concern, which encompasses awareness, attitudes, and beliefs regarding environmental issues related to food production, is a crucial driver of consumer behavior. Carfora et al. (2022) and Sendhil et al. (2024) identify environmental concern as a motivator for choosing sustainable and environmentally friendly products, including plant-based meat. Consumers with higher environmental concerns are more inclined to favor plant-based diets due to their lower environmental impact compared to conventional meat (Hartmann et al., 2022). This forms the basis for the following hypotheses:

H5: Better environmental concern leads to a more favorable consumer attitude toward plant-based meat options.

H8: Better environmental concern leads to a more favorable behavioral intention toward plant-based meat options.

Attitude Toward Plant-Based Meat

Multiple factors, including perceived health benefits, environmental concerns, and cultural influences, influence consumer attitudes toward plant-based meat alternatives. Research by Ahmad, Khalil, and Javed (2022) and Avelino, Gaylord, and Lin (2022) indicates that nutritional attributes and environmental concerns significantly shape consumer attitudes. Bakar et al. (2023) and Chen (2022) provide further insight into the cultural factors influencing these attitudes. The studies collectively suggest that a positive attitude toward plant-based meat is essential for its adoption, leading to the following hypothesis:

H7: Consumer attitude significantly influences their behavioral intentions toward plant-based meat options.

Behavioral Intention and Green Purchase Decisions for Plant-Based Meat

The literature underscores several factors influencing consumer behavioral intention and green purchase decisions concerning plant-based meat. Erfanian et al. (2024) and Faber et al. (2024) emphasize the need to understand consumer motivations in promoting sustainable food choices. Social norms and environmental concerns also play a significant role, as discussed by Hammami et al. (2023) and Hartmann et al. (2022). These findings lead to the following hypothesis:

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H9: Behavioral intention significantly influences customers' green purchase of plant-based meat options.

Green Marketing Communication as a Moderating Variable

Green marketing communication influences consumer attitudes and behaviors toward plant-based meat alternatives. Research by Romero and Ladwein (2023) and Shan et al. (2022) illustrates the impact of effective communication strategies on consumer perceptions and purchase intentions. Furthermore, Sendhil et al. (2024) highlight the moderating role of green marketing communication in shaping the relationship between social norms, attitudes, and environmental concerns on behavioral intentions. This leads to the formulation of the following hypotheses:

H10: Green marketing communication moderates the effect of social norms on behavioral intention toward plant-based meat options.

H11: Green marketing communication moderates the effect of attitude on behavioral intention toward plant-based meat options.

H12: Green marketing communication moderates the effect of environmental concern on behavioral intention toward plant-based meat options.

2.3 Conceptual Framework

The conceptual framework (Figure 1) shows the determinants of plant-based meat consumers' attitudes, such as perceived health benefits, perceived quality, awareness of consequences, and social norms. Similarly, it demonstrates that green marketing communication moderates the effect of social norms, attitudes, and environmental concerns on consumers' behavioral intentions, leading to their green purchase decisions.

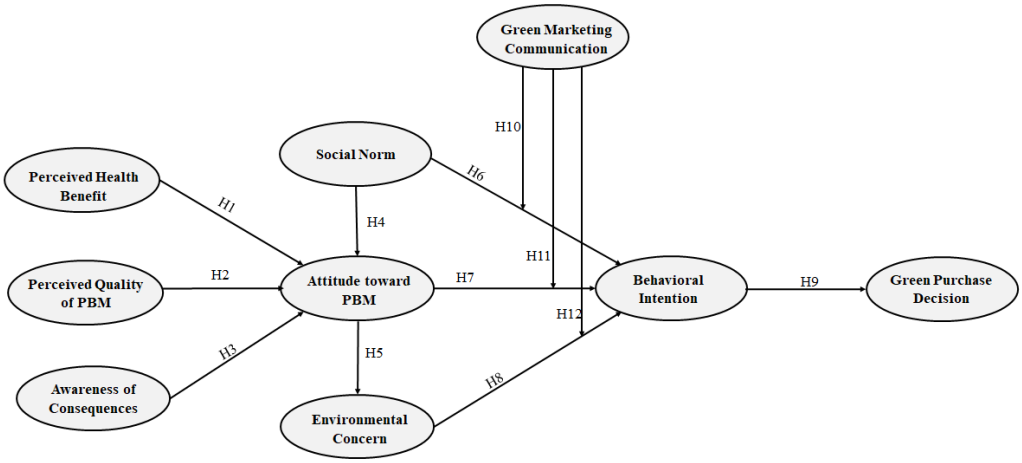

Figure 1. Hypothesized Model

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3. METHODS

3.1 Research Design

The researchers adopted a quantitative research design, employing a descriptive-correlational analysis to explore the determinants influencing the adoption of plant-based meat alternatives. Descriptive analysis was utilized to characterize the respondents' demographic profile and provide a comprehensive overview of their perceptions of critical determinants, including perceived health benefits, perceived quality, awareness of consequences, and social norms.

A correlational analysis examined the relationships between these determinants and the adoption of plant-based meat alternatives, offering insights into the impact of exogenous variables on the dependent variable. The hypotheses were rigorously tested using Partial Least Squares Structural Equation Modeling (PLS-SEM), a robust statistical technique well-suited for analyzing complex models with multiple variables. This methodological approach ensured a thorough examination of the hypothesized relationships, providing a solid foundation for drawing valid and reliable conclusions.

3.2 Subjects and Study Site

The target respondents are plant-based meat consumers in Metro Manila who are at least 18 years of age and have consumed it at least once in the past 6 months. A purposive random technique and snowball sampling were used to gather respondents. The researcher collected 824 participants from different cities and municipalities in Metro Manila, Philippines.

Table 1. Demographic Profile of the Respondents

Demographic	Category	F	%
Sex	Female	466	56.6
	Male	323	39.2
	Prefer not to say	35	4.2
Civil Status	Single	710	84.5
	Married	106	12.9
	Separated	4	.5
	Widowed	4	.5
Age	18 - 24	643	78.0
	25 - 31	67	8.1
	32 - 38	24	2.9
	39 - 45	28	3.4
	46 and above	62	7.5
Occupation	Employed	177	21.5
	Student	601	72.9
	Unemployed	20	2.4
	Retired	8	1.0
	Others	18	2.2
Place of Residence	Caloocan	45	5.5
	Makati	12	1.5
	Malabon	11	1.3
	Mandaluyong	8	1.0
	Manila	148	18.0
	Marikina	9	1.1
	Muntinlupa	4	.5

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	Navotas	29	3.5
	Paranaque	10	1.2
	Pasay	11	1.3
	Pasig	154	18.7
	Quezon City	364	44.2
	San Juan	13	1.6
	Taguig	6	.7
	Valenzuela	45	5.5
Frequency of consumption of PBM	Daily	28	3.4
	Weekly	82	10
	3-4 Times a month	90	10.9
	Twice a month	79	9.6
	Once a month	78	9.5
	Occasional	467	56.7
Amount spent on plant-based meat (in pesos) per meal	100 or less	257	31.2
	101 - 200	279	33.9
	201 - 300	244	29.6
	301 - 400	102	12.4
	401 - 500	41	5.0
	More than 500	53	6.4
Vendor	Grocery	553	67.1
	Supermarket	451	54.7
	Online	165	20.0
	Restaurant	8	1.0

The demographic characteristics of a sample population consuming plant-based meat alternatives in Metro Manila, as shown in Table 1, reveal a diverse group. The majority of participants were female (56.6%), followed by males (39.2%), with a small percentage opting not to disclose their gender (4.2%). Most participants were single (84.5%), with smaller proportions being married (12.9%), separated (0.5%), or widowed (0.5%). The age distribution was skewed toward younger individuals, with 78.0% falling within the 18-24 age range. In terms of occupation, the majority were students (72.9%), followed by those employed (21.5%), with smaller percentages being unemployed (2.4%), retired (1.0%), or engaged in other occupations (2.2%).

Regarding consumption patterns, most participants consumed plant-based meat occasionally (56.7%), with 10.0% consuming it weekly. The majority spent between 101-200 pesos per meal on plant-based meat (33.9%). Grocery stores were the most common source for purchasing plant-based meat (67.1%), followed by supermarkets (54.7%), online platforms (20.0%), and restaurants (1.0%).

These findings indicate a predominantly young, single, and student population with occasional consumption habits. The data suggest a trend toward individual rather than family-based consumption and highlight the importance of urban areas like Quezon City and Manila in plant-based meat adoption.

3.3 Instrumentation

This study employed a meticulously designed questionnaire to comprehensively capture the key constructs under examination, drawing upon a robust theoretical framework

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derived from the existing literature. The questionnaire encompassed a range of constructs including Perceived Quality (PQ), Perceived Health Benefits (PHB), Environmental Concerns (EC), Attitude (Atti), Social Norms (SN), Awareness of Consequences (AC), Behavioral Intention (BI), Green Purchase Decision (GPD), and Green Marketing Communication (GMC). Rigorous validation procedures were implemented to ensure the robustness and validity of the instrument.

To establish the face and content validity of the questionnaire, a panel comprising subject matter experts and academic faculty members scrutinized its components. Their feedback was carefully considered and incorporated into refining the instrument, ensuring its alignment with the theoretical underpinnings of the study and its comprehensive coverage of the intended constructs. Following this meticulous validation process, the questionnaire underwent pilot testing to assess its internal consistency and reliability.

During the pilot testing phase, the questionnaire demonstrated strong internal consistency, as evidenced by the Cronbach Alpha coefficients obtained for each construct. Specifically, the coefficients were 0.904 for Perceived Quality, 0.930 for Perceived Health Benefits, 0.900 for Environmental Concerns, 0.928 for Attitude, 0.903 for Social Norms, 0.880 for Awareness of Consequences, 0.916 for Green Purchase Decision, and 0.951 for Green Marketing Communication. These high coefficients indicate the reliability and suitability of the questionnaire for the present research, affirming its capacity to measure the targeted constructs with precision and consistency effectively. This rigorous validation ensures the integrity of the study's findings and enhances the credibility of the research outcomes within the scholarly community.

3.4 Data Gathering Procedure

The questionnaire was distributed via Google Forms, with the link shared through email and group chats with friends and relatives. A snowball sampling technique was employed, where participants were asked to forward the survey link to their friends who met the criteria to be respondents. This approach helped ensure that the required sample size was achieved by leveraging the participants' networks.

3.5 Ethical Considerations

In performing the study, the researcher observed ethical practices. The researcher added a privacy statement as part of the major disclaimer to guarantee that all critical information acquired was solely used for its intended purpose. No sensitive personal information such as name, email address, or the like was gathered to minimize needless complications. A questionnaire cover letter was also sent to clarify the scope of the research study and ensure that the study participants understood why the questions were asked. Furthermore, by assigning respondents codes, the researcher ensured the secrecy of all gathered replies.

3.6 Data analysis

Data analysis was conducted using SPSS version 22 and WARP PLS. SPSS provided descriptive statistics to summarize respondent demographics. Hypotheses were tested using WARP PLS for Partial Least Squares Structural Equation Modeling (PLS-SEM),

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ideal for handling complex models. The analysis included assessing reliability and validity, evaluating path coefficients, and confirming model fit with indices like Tenenhaus GoF. This approach ensured robust, reliable insights into the factors driving the adoption of plant-based meat alternatives.

4. RESULTS

Evaluation of the Measurement Model and Structural Model

Confirmatory Factor Analysis (CFA) was the primary method for validating the measurement model's convergent validity, construct reliability, and discriminant validity. This analytical approach allows for the rigorous examination of how well the observed variables align with the hypothesized latent constructs, providing critical insights into the measurement model's robustness.

Table 2. Latent Variable Coefficients

Construct	Items		Factor Loading	Cronbach's Alpha	Composite reliability	Ave. Variance Extracted
Perceived Quality	PQ	1-6	.781-.894	0.904	0.929	0.724
Perceived Health Benefits	PHB	1-5	.825-.895	0.930	0.945	0.742
Environmental Concerns	EC	1-5	.729-.893	0.900	0.927	0.717
Attitude	Att	1-6	.829-.867	0.928	0.944	0.736
Social Norms	SN	1-5	.839-.882	0.903	0.932	0.775
Awareness of Consequences	AC	1-5	.787-.873	0.880	0.912	0.676
Behavioral Intention	BI	1-5	.866-.921	0.945	0.958	0.821
Green Purchase Decisions	GPD	1-5	.899-.934	0.916	0.937	0.748
Green Marketing Communication	GMC	1-5	.844-.887	0.951	0.962	0.835

Table 2 presents the Cronbach's alpha and composite reliability coefficients for the constructs examined in this study. The range of Cronbach's alpha coefficients falls between .829 and .948, while all composite reliability coefficients exceed the threshold of 0.80. These findings indicate that the constructs exhibit robust reliability and internal consistency (Fornell & Larcker, 1981).

Moreover, the item loadings of the indicators associated with each construct surpass the threshold value of .70, underscoring the excellent convergent validity of the latent variables (Hair et al., 2011). Additionally, the average variance extracted (AVE) from the latent variables ranges from .511 to .736, all of which exceed the recommended threshold of .50. This suggests that the constructs possess acceptable validity, further affirming the robustness of the measurement model (Hair et al., 2011).

Table 3. Square Roots of AVE Coefficients and Correlation Coefficients

Latent Variables	PQ	PHB	EC	Att	SN	AC	BI	GPD	GMC
Perceived Quality	**0.851**	0.695	0.64	0.580	0.658	0.531	0.648	0.627	0.604
Perceived Health Benefits	0.695	**0.862**	0.771	0.694	0.782	0.560	0.615	0.573	0.633
Environmental Concerns	0.640	0.771	**0.847**	0.81	0.823	0.593	0.642	0.646	0.694

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Attitude	0.580	0.694	0.810	**0.822**	0.816	0.626	0.682	0.683	0.719
Social Norms	0.658	0.782	0.823	0.816	**0.858**	0.644	0.724	0.706	0.758
Awareness of Consequences	0.531	0.56	0.593	0.626	0.644	**0.881**	0.625	0.666	0.644
Behavioral Intention	0.648	0.615	0.642	0.682	0.724	0.625	**0.906**	0.849	0.672
Green Purchase Decisions	0.627	0.573	0.646	0.683	0.706	0.666	0.849	**0.914**	0.598
Green Marketing Communication	0.604	0.633	0.694	0.719	0.758	0.644	0.672	0.598	**0.865**

Diagonal values are the square roots of AVE, and off-diagonals are inter-construct correlations.

Table 4. HTMT Ratios

Latent Variables	PQ	PHB	EC	Att	SN	AC	BI	GPD
Perceived Quality								
Perceived Health Benefits	0.763							
Environmental Concerns	0.711	0.842						
Attitude	0.652	0.766	0.906					
Social Norms	0.721	0.841	0.899	0.902				
Awareness of Consequences	0.589	0.611	0.653	0.702	0.703			
Behavioral Intention	0.702	0.655	0.691	0.746	0.771	0.676		
Green Purchase Decisions	0.676	0.610	0.693	0.745	0.751	0.719	0.895	
Green Marketing Communication	0.665	0.686	0.763	0.801	0.823	0.709	0.722	0.728

Note: Ratios are Good if < .90, best < .85

Tables 3 and 4 assess the instrument's discriminant validity by presenting the square roots of Average Variance Extracted (AVE) coefficients and the Heterotrait-Monotrait (HTMT) Ratios. As per Fornell and Larcker (1981), discriminant validity is established when the values on the main diagonal of Table 3 (square root of the AVEs) exceed those in the off-diagonal positions (inter-construct correlations). In addition, Table 4 displays HTMT ratios, all below the threshold of 0.90, indicating good discriminant validity.

Consequently, the results in Tables 3 and 4 affirm the instrument's robust discriminant validity, a crucial prerequisite for making reliable inferences from the gathered data. This suggests that we can have a high degree of confidence in the outcomes of our study and the subsequent conclusions we draw.

Structural Model and Hypotheses

Table 5. Model Fit and the Quality Indices of the Emerging Model

Measure	Estimate	Threshold	Interpretation
Average Path Coefficient (APC)	0.315, p <.001	p < .05	Significant
Average R-squared (ARS)	0.672, p <.001	p < .05	Significant
Average Adjusted R-squared (AARS)	0.670, p <.001	p < .05	Significant

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Average block VIF (AVIF)	2.871	≤ 3.3	Ideally
Average Full Collinearity VIF (AFVIF)	3.031	≤ 3.3	Ideally
Tenenhaus Goodness of Fit (GoF)	0.740	≥ .36	Large
Simpson's paradox ratio (SPR)	1.000	= 1.000	Ideally
R-squared contribution ratio (RSCR)	1.000	= 1.000	Ideally
Statistical suppression ratio (SSR)	1.000	= 1.000	Ideally
Standardized threshold difference sum	1.000	= 1.000	Ideally
Standardized mean absolute residual (SMAR)	0.040	≤ 0.10	Acceptable

Table 5 comprehensively assesses the model's fit and quality, confirming its robustness and validity. The Average Path Coefficient (APC), Average R-squared (ARS), and Average Adjusted R-squared (AARS) are statistically significant ($p < .001$), indicating the model's overall significance.

The Average Block VIF (AVIF) and Average Full Collinearity VIF (AFVIF) are below the threshold of 5.0, indicating no multicollinearity issues. The Tenenhaus Goodness of Fit (GoF) exceeds .36, reflecting a robust model fit.

Key indices such as Simpson's Paradox Ratio (SPR), R-squared Contribution Ratio (RSCR), and Statistical Suppression Ratio (SSR) all achieve the ideal value of 1.000, suggesting the model is free from anomalies. The Standardized Threshold Difference Sum Ratio (STDSR) is above 0.70, and the Standardized Mean Absolute Residual (SMAR) is below 0.10, indicating an excellent fit with minimal residuals.

The model demonstrates strong fit, minimal multicollinearity, and high reliability, making it robust for drawing valid inferences.

Emerging Model

As presented in Table 6, the hypothesis testing results illuminate significant relationships between various exogenous and endogenous variables influencing green purchase decisions. These findings offer critical insights into the factors shaping attitudes (Att), environmental concern (EC), behavioral intention (BI), and green purchase decisions (GPD) within the context of plant-based meat consumption.

The analysis reveals that Attitude is significantly and positively influenced by Perceived Health Benefits (PHB) ($\beta = 0.328$, $p < 0.001$, $f^2 = 0.257$), with a medium effect size, thereby supporting H1. Similarly, Perceived Quality (PQ) ($\beta = 0.106$, $p < 0.001$, $f^2 = 0.070$) and Social Norms (SN) ($\beta = 0.122$, $p < 0.001$, $f^2 = 0.079$) show significant but more minor impacts on attitude, affirming H2 and H4. Awareness of Consequences (AC) ($\beta = 0.451$, $p < 0.001$, $f^2 = 0.368$) exerts a significant and large positive influence on attitude, supporting H3. Notably, Environmental Concerns (EC) ($\beta = 0.824$, $p < 0.001$, $f^2 = 0.362$) also significantly affect attitude toward plant-based meat, with a medium effect size, supporting H5.

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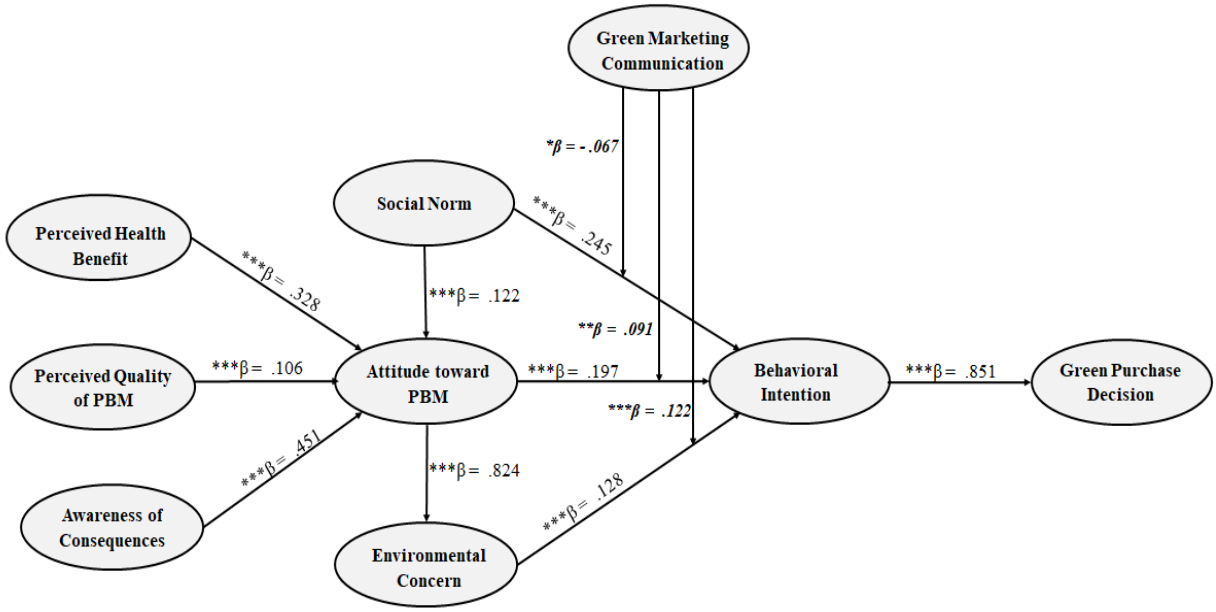

Note: *** significant at p <0.001; ** significant at p <0.01; ** significant at p <0.05

Figure 2. The Emerging Model

Table 6. Result of the Hypothesis Testing

Relationship			Path Coefficient (β)	P -values	Effect Sizes (f^2)	Effect Size Interpretation (Cohen, 1988)**	Description	Decision
Exogeneous Variable		Endogenous Variable						
PHB	→	Att	0.328	< 0.001	0.257	Medium	Significant	H1 is supported
PQ	→	Att	0.106	< 0.001	0.070	Small	Significant	H2 is supported
AC	→	Att	0.451	< 0.001	0.368	Large	Significant	H3 is supported
SN	→	Att	0.122	< 0.001	0.079	Small	Significant	H4 is supported
EC	→	Att	0.260	< 0.001	0.214	Medium	Significant	H5 is supported
SN	→	BI	0.245	< 0.001	0.678	Large	Significant	H6 is supported
Atti	→	BI	0.450	< 0.001	0.326	Medium	Significant	H7 is supported
EC	→	BI	0.128	< 0.001	0.083	Small	Significant	H8 is supported
BI	→	GPD	0.851	< 0.001	0.724	Large	Significant	H9 is supported
GMC*SN	→	BI	-0.067	0.025	0.022	Small	Significant	H10 is supported
GMC*Atti	→	BI	0.091	0.004	0.034	Small	Significant	H11 is supported
GMC*EC	→	BI	0.122	< 0.001	0.038	Small	Significant	H12 is supported

Note: Perceived Quality (PQ); Perceived Health Benefits (PHB); Environmental Concerns (EC); Attitude (Atti); Social Norms (SN); Awareness of Consequences (AC); Behavioral Intention (BI); Green et al. (GPD); and Green Marketing Communication (GMC)
***0.02 – small, 0.15 – medium, 0.35 – large*

The results further demonstrate that Behavioral Intention (BI) is significantly influenced by Social Norms (SN) (β = 0.245, p < 0.001, f^2 = 0.678), Attitude (Att) (β = 0.450, p < 0.001, f^2 = 0.326), and Environmental Concerns (EC) (β = 0.128, p < 0.001, f^2 = 0.083), with effect sizes ranging from small to large, thereby supporting H6, H7, and H8. The study also underscores the pivotal role of Behavioral Intention (BI) in driving Green Purchase Decisions (GPD), reflected by a substantial coefficient and large effect size (β = 0.851, p < 0.001, f^2 = 0.724), supporting H9.

These findings highlight the complex interplay between individual perceptions, attitudes, intentions, and actual purchasing behavior in plant-based meat consumption. They

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provide valuable insights for businesses, policymakers, and marketers focused on promoting sustainable food choices and encouraging environmentally conscious consumer behavior.

Moderating Role of Green Marketing Communication

The study also conducted a moderation analysis to evaluate the interactive role of Green Marketing Communication (GMC) in the relationships between Social Norms (SN), Attitude (Att), and Environmental Concern (EC) on behavioral intention toward plant-based meat (PBM). The results indicate that Green Marketing Communication significantly moderates the relationship between Social Norms and Behavioral Intention toward PBM ($\beta = -0.067$, $p = 0.025$, $f^2 = 0.022$), as evidenced by p-values below 0.05. The negative β-coefficient suggests that the influence of social norms on behavioral intention is amplified when Green Marketing Communication is less effective, supporting H10.

Additionally, significant positive interaction effects were observed between Green Marketing Communication (GMC) and Attitude ($\beta = 0.091$, $p = 0.004$, $f^2 = 0.034$), confirming H11. This positive β-coefficient indicates that the impact of attitude on behavioral intention toward PBM is strengthened when Green Marketing Communication is more effective, thereby supporting the moderating role of GMC.

Furthermore, the study found that Green Marketing Communication (GMC) moderates the effect of Environmental Concerns on behavioral intention toward PBM ($\beta = 0.122$, $p < 0.001$, $f^2 = 0.038$), supporting H12. The positive β-coefficient suggests that the influence of environmental concerns on behavioral intention is enhanced when Green Marketing Communication is more pronounced.

5. DISCUSSION

The results confirm that perceived health benefits influence consumer attitudes toward plant-based meat. Consumers who view plant-based options as healthier alternatives are more likely to develop positive attitudes toward these products. This finding aligns with previous studies, which suggest that the perception of healthiness is a critical driver in the acceptance and adoption of plant-based foods (Ahmad et al., 2022; Avelino et al., 2022; Bakar et al., 2023). These results underscore the importance of emphasizing the health benefits of plant-based meat in marketing strategies to foster favorable consumer attitudes.

Similarly, perceived quality significantly impacts consumer attitudes, though the effect size is smaller than perceived health benefits. This suggests that while quality—encompassing factors such as taste, texture, and appearance—matters to consumers, it is perhaps not as influential as health considerations in shaping attitudes toward plant-based meat (Hwang, 2020; Szenderák et al., 2022). Nonetheless, ensuring high sensory quality remains crucial for maintaining consumer satisfaction and encouraging repeat purchases (Michel et al., 2021).

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Moreover, awareness of traditional meat production's environmental and ethical consequences strongly influences consumer attitudes toward plant-based alternatives. This is consistent with findings from Faber et al. (2024) and Graça et al. (2019), which highlight that consumers who are more informed about the negative impacts of meat consumption on the environment are more likely to adopt plant-based diets. This supports the notion that increasing consumer awareness through education and transparent information is vital to promoting sustainable food choices (Sendhil et al., 2024).

Furthermore, social norms play a significant role in shaping consumer attitudes toward plant-based meat. Positive social norms—where plant-based consumption is desirable or mainstream—encourage more favorable attitudes and can significantly boost purchase intentions (Hammami et al., 2023; Hartmann et al., 2022). This finding emphasizes the importance of leveraging social influences and peer behaviors in marketing campaigns to enhance the appeal of plant-based products (Graça et al., 2019).

In addition, the study confirms that environmental concerns substantially impact consumer attitudes toward plant-based meat. Consumers with heightened environmental awareness are likelier to hold positive attitudes toward these products (Carfora et al., 2022; Sendhil et al., 2024). This underscores the critical role that environmental messaging plays in shaping consumer attitudes and promoting sustainable consumption patterns (Hartmann et al., 2022).

The results also demonstrate that social norms significantly influence behavioral intention, indicating that consumers are likely to be swayed by the behaviors and opinions of their peers when deciding whether to purchase plant-based meat (Hammami et al., 2023). This suggests that marketing strategies should build positive social perceptions around plant-based eating to enhance consumer intentions to purchase these products (Graça et al., 2019; Ma et al., 2023).

Additionally, attitude toward plant-based meat is a strong predictor of behavioral intention. Consumers who develop positive attitudes—based on perceived health benefits, quality, and other factors—are more likely to purchase plant-based meat products (Chen, 2022; Hartmann et al., 2022). This finding highlights the importance of fostering positive consumer attitudes to drive purchase intentions and ultimately influence buying behavior (Huang & Uehara, 2023).

Environmental concerns also significantly influence behavioral intention. Consumers who are more concerned about the environmental impact of their food choices are more likely to intend to purchase plant-based meat (Sendhil et al., 2024). This reinforces the need for environmental messaging in marketing strategies to motivate consumers who prioritize sustainability (Carfora et al., 2022).

Likewise, behavioral intention is shown to be a pivotal driver of actual green purchase decisions. Consumers who firmly intend to buy plant-based meat are likelier to follow through with their purchases (Bakar et al., 2023; Graça et al., 2019). This finding suggests that strategies to strengthen consumer intentions—through positive attitudes and environmental concerns—are likely to increase plant-based meat product sales (Huang & Uehara, 2023; De Jesus et al., 2023).

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Moderating Role of Green Marketing Communication (GMC)

The study found that Green Marketing Communication moderates the relationship between social norms and behavioral intention. When effective, GMC mitigates the negative impact of less supportive social norms, enhancing consumer intentions to purchase plant-based meat (Bakar et al., 2023; Graça et al., 2019). This indicates the importance of targeted marketing that reinforces positive social norms around plant-based consumption.

Green Marketing Communication also strengthens the relationship between attitude and behavioral intention. Effective GMC amplifies the impact of positive attitudes on consumer behavior, suggesting that well-crafted marketing messages can enhance the likelihood that favorable attitudes will translate into purchase intentions (Romero & Ladwein, 2023; Shan et al., 2022).

Finally, the study confirms that Green Marketing Communication enhances the relationship between environmental concerns and behavioral intention. By effectively communicating the environmental benefits of plant-based meat, GMC encourages environmentally conscious consumers to align their purchase intentions with their values, promoting the adoption of sustainable food choices (Carfora et al., 2022; Hartmann et al., 2022; Ma et al., 2023).

6. CONCLUSION

This study highlights the interaction between consumer perceptions, attitudes, and behavioral intentions while offering essential insights into the factors influencing consumers' green purchasing decisions for plant-based meat (PBM) substitutes. This research integrates the Theory of Green Purchase Behavior (TGPB) with the Theory of Reasoned Action (TRA), highlighting the significance of perceived health benefits, product quality, environmental concerns, social norms, and awareness of consequences in influencing consumer attitudes toward PBM. These variables affect consumer behavior in Metro Manila and are pertinent to other countries and markets where sustainability is increasingly prioritized.

The results indicate that favorable customer perceptions—motivated by health advantages, quality, and ecological considerations—substantially improve behavioral intentions and environmentally conscious purchasing choices. Green Marketing Communication (GMC) intensifies these impacts by augmenting the influence of societal norms, attitudes, and environmental issues on consumer behavior.

Moreover, the findings suggest that tailored communication approaches that resonate with specific target audiences can further amplify the impact of green marketing. As consumers continue to seek sustainable options, integrating these insights into marketing strategies drives the adoption of plant-based alternatives and contributes to broader efforts in fostering sustainable consumption patterns. Thus, businesses and policymakers can leverage these insights to promote healthier, more sustainable food choices, ultimately supporting environmental and social goals aligning with Sustainable Development Goals 2030.

Implications for Management

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The findings of this study offer practical insights for managers, governments, and enterprises seeking to encourage sustainable consumption. The identified determinants, such as perceived health benefits, perceived quality, societal norms, environmental concerns, and GMC, provide a framework that may be adapted to various markets and countries. The following are the principal managerial implications:

Effective Green Marketing Communication (GMC): Managers across various markets can utilize GMC to promote PBM uptake by customizing marketing communications to align with local influences. For instance, Beyond Meat and Impossible Foods have highlighted health and environmental advantages in the United States and Europe. This method can be modified for various locations by emphasizing health advantages in Southeast Asia and environmental issues in Europe, as these factors resonate more profoundly with local consumers. Highlighting PBM's role in sustainability objectives will augment consumer involvement in markets with increasing environmental consciousness.

The efficacy of GMC is contingent upon its alignment with regional issues. In Europe, which is characterized by heightened environmental consciousness, marketing initiatives ought to highlight the advantages of PBM's sustainability in combating climate change. In contrast, in health-oriented economies such as Japan and China, communication should emphasize PBM's nutritional benefits, including its ability to lower cholesterol and mitigate heart disease risks (Huang & Uehara, 2023). Companies such as Oatly have adeptly customized their messaging for various regions, highlighting health advantages in Asia and environmental sustainability in Europe, thereby illustrating the universal relevance of this approach.

Moroever, applying social norms is essential in influencing attitudes and behavioral intentions toward PBM. Managers can develop targeted marketing campaigns that resonate with specific consumer segments to showcase the position of plant-based diets as socially desirable and mainstream. Managers can leverage celebrity endorsers or social media influencers to alter public perception. Oatly and Alpro have partnered with prominent figures in the UK and Germany to normalize the use of plant-based milk, promoting societal acceptance and encouraging adoption.

Furthermore, managers must consider regional variations when customizing product offerings to market preferences while positioning PBM products. Product messaging must highlight excellence in areas such as the United States and Canada, where flavor and texture are paramount. Conversely, in Asian markets, where consumers prioritize health benefits, marketing should emphasize the nutritional advantages of PBM alternatives (Carfora et al., 2022). Product development and marketing initiatives must correspond with consumers' distinct preferences and expectations in each market.

Global Environmental Concerns: Environmental messaging is essential for PBM's marketing strategy, especially in areas with increased awareness of climate change. For areas with low environmental awareness, establish educational initiatives to inform consumers about the sustainability benefits of plant-based alternatives. Companies working in European markets should emphasize PBM's diminished carbon footprint relative to traditional meat. In China, where environmental consciousness is increasing but not yet a predominant motivation, integrating environmental advantages with health messages can establish a more persuasive value proposition (Romero & Ladwein, 2023).

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This dual-focus method guarantees that PBM marketing attracts a broader audience, bolstering environmental and health-related incentives.

Expanded Contributions and Prospective Research Avenues

The applicability of these findings extends to countries and markets beyond Metro Manila, illustrating the universal factors influencing sustainable consumption. With the growing worldwide consciousness regarding climate change and public health, alternatives to PBM are gaining significance. The characteristics found in this study offer a versatile framework for managers and policymakers to formulate region-specific strategies that correspond with local consumer demands while promoting global sustainability objectives.

Future research ought to investigate the enduring impacts of these characteristics on consumer loyalty and repeat purchases in various cultural contexts. Furthermore, analyzing the impact of government policies, economic situations, and cultural trends on PBM uptake will yield additional insights into the changing dynamics of sustainable consumption. Comprehending these processes would enable corporations and politicians to create targeted policies that cultivate sustainable food systems and encourage environmentally responsible consumer behaviors globally.

This research identifies the common factors influencing consumer behavior, namely health, quality, social norms, and environmental concerns, thereby enhancing the local discussion on PBM uptake and providing actionable recommendations for fostering sustainable consumerism worldwide. Businesses and politicians can utilize these data to formulate effective marketing strategies that correspond with customer expectations, expediting the shift towards sustainable food systems and advancing overarching public health and environmental sustainability objectives.

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