

Marketing Mix Strategies and Demand for Vermicompost: The Mediating Role of Environmental Behavior

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Abstract

Organic agriculture continues to gain global recognition because of increasing environmental concerns and consumer preference for sustainable farming practices (Food and Agriculture Organization of the United Nations [FAO], 2022; United Nations, 2015). Vermicompost, an organic fertilizer produced through earthworm-mediated decomposition of organic waste, has become an important component of environmentally sustainable agriculture due to its ability to improve soil fertility while reducing dependence on synthetic fertilizers and promoting sustainable waste management (Food and Agriculture Organization of the United Nations [FAO], 2022). The global demand for vermicompost has steadily increased, creating opportunities for small-scale agricultural enterprises (International Federation of Organic Agriculture Movements, 2023; World Bank, 2023).

In the Philippines, vermicomposting has become an alternative livelihood for many rural communities as the government continues to promote organic and agriculture and sustainable farming practices (Department of Agriculture, 2023). Despite its growing market potential, difficulties in marketing their products continue to be experienced by many vermicompost producers because of weak pricing strategies, limited distribution networks, inadequate promotional activities, and insufficient institutional support. These challenges restrict producers from expanding beyond their local markets (Department of Agriculture, 2023; Philippine Statistics Authority, 2024).

According to Kotler and Keller (2022), market performance is collectively determined by the effective integration of product, price, place, and promotion. Likewise, the Theory of Planned Behavior explains that individuals' decisions and behaviors are influenced by attitudes, subjective norms, and perceived behavioral control (Ajzen, 1991, 2002). Previous studies have independently examined sustainable agriculture, sustainable marketing, and environmental behavior (Ferdous, 2010; Li et al., 2022; Shen et al., 2022; Scalco et al., 2017). However, limited studies have investigated how environmental behavior mediates the relationship between marketing mix strategies and market demand among vermicompost producers, particularly within the Philippine context (Ilagan et al., 2024).

This study examines whether environmental behavior strengthens the influence of sustainable marketing strategies on the demand for vermicompost products. The findings contribute to the development of sustainable marketing practices that support both environmental protection and enterprise competitiveness by extending the application of the Theory of Planned Behavior to sustainable agricultural marketing (Ajzen, 1991; Ferdous, 2010; Canova et al., 2020).

Keywords: Marketing Mix, Vermicompost, Environmental Behavior, Marketing Mix Strategies, Demand, SEM-PLS

1. Introduction

This study examines whether environmental behavior strengthens the influence of sustainable marketing strategies on the demand for vermicompost products. The findings contribute to the development of sustainable marketing practices that support both environmental protection and enterprise competitiveness (Ferdous, 2010; Ajzen, 1991).

Organic agriculture continues to gain global recognition due to growing environmental concerns and consumer preference for sustainable farming practices (Food and Agriculture Organization of the United Nations [FAO], 2022; United Nations, 2015). Vermicompost, an organic fertilizer produced through earthworm-mediated decomposition of organic waste, has become an important component of environmentally sustainable agriculture because of its ability to improve soil fertility while reducing dependence on synthetic fertilizers (Drivers and Barriers in Farmers' Adoption of Vermicomposting as Keys for Sustainable Agricultural Waste Management, 2023; FAO, 2022). The global demand for vermicompost has steadily increased, creating opportunities for small-scale agricultural enterprises (International Federation of Organic Agriculture Movements, 2023; World Bank, 2023).

In the Philippines, vermicomposting has become an alternative livelihood for many rural communities through the promotion of organic agriculture and sustainable farming initiatives (Department of Agriculture, 2023). Despite its growing market potential, many vermicompost producers continue to experience difficulties in marketing their products because of weak pricing strategies, limited distribution networks, inadequate promotional activities, and insufficient institutional support. These challenges restrict producers from expanding beyond their local markets (Department of Agriculture, 2023; Philippine Statistics Authority, 2024).

According to Kotler and Keller (2022), Marketing Mix Theory explains that market performance is collectively determined by product, price, place, and promotion. Likewise, the Theory of Planned Behavior suggests that producers' decisions and business outcomes are influenced by attitudes, subjective norms, and perceived behavioral control (Ajzen, 1991, 2002). Sustainable agriculture, marketing strategies, and environmental behavior have been examined independently in previous studies (Ferdous, 2010; Li et al., 2022; Shen et al., 2022; Scalco et al., 2017). However, limited research has investigated how environmental behavior mediates the relationship between marketing mix strategies and market demand among vermicompost producers, particularly in the Philippine context (Ilagan et al., 2024).

This study addresses this research gap by examining whether environmental behavior strengthens the influence of sustainable marketing strategies on the demand for vermicompost products. The findings are expected to contribute to the development of sustainable marketing practices that support both environmental protection and enterprise competitiveness while extending the application of the Theory of Planned Behavior to sustainable agricultural marketing (Ajzen, 1991; Canova et al., 2020; Ferdous, 2010).

Objectives

The objectives of this study were:

- to have the level of marketing mix strategies among vermicompost farmers determined;
- to have the demand for vermicompost products assessed;
- to have farmers' environmental behavior evaluated;
- to have the influence of marketing mix strategies on demand determined;
- to have the influence of marketing mix strategies on environmental behavior examined;

- to have the influence of environmental behavior on demand determined; and
- to have the mediating effect of environmental behavior examined.

2. Experimental Methods

A quantitative descriptive-correlational research design was employed in this study.

119 vermicompost farmers from three barangays surrounding Laguna de Bay were selected as respondents through stratified random sampling from an estimated population of 150 producers. Sample size was determined using G*Power analysis.

Data were collected using a researcher-developed questionnaire composed of four sections:

- Demographic Profile of the Respondents
- Marketing Mix (Product, Price, Place, Promotion)
- Demand for Vermicompost
- Environmental Behavior

Excellent reliability, with Cronbach's Alpha values of 0.94 across constructs, was demonstrated by the instrument.

Descriptive statistics, including frequency, percentage, weighted mean, and standard deviation, were used to describe respondents' perceptions. The hypothesized relationships and mediation effects among variables were analyzed using Structural Equation Modeling–Partial Least Squares (SEM-PLS). Convergent validity was established using Average Variance Extracted ($AVE > 0.50$), while the recommended threshold of 0.70 was exceeded by Composite Reliability.

3. Results and Discussion

3.1 Marketing Mix Strategies

Table 1. Summary of Marketing Mix Strategies of Vermicompost Farmers

Marketing Mix Component	Overall Mean	SD	Verbal Interpretation
Product	4.11	0.54	Agree
Price	3.91	0.58	Agree
Place	3.81	0.55	Agree
Promotion	3.80	0.61	Agree
Overall Marketing Mix	3.91	0.57	Agree

Note. Scale: 4.20–5.00 Strongly Agree; 3.40–4.19 Agree; 2.60–3.39 Somewhat Agree; 1.80–2.59 Disagree; 1.00–1.79 Strongly Disagree.

It was revealed by the findings that effective marketing mix strategies were generally implemented by respondents (Overall Mean = 3.91). The highest evaluation was received by the product component, indicating that product quality, consistency, and customer satisfaction were prioritized by farmers. However, comparatively lower ratings were received by branding and product identity, suggesting that opportunities to strengthen product differentiation exist. This finding supports the Marketing Mix Theory, which emphasizes that product quality and differentiation are fundamental determinants of market performance and customer value (Kotler & Keller, 2022).

Pricing strategies were generally found to be satisfactory; however, affordability initiatives, such as offering smaller packaging sizes, were less emphasized. Distribution practices remained concentrated

within local communities, while participation in trade fairs and digital marketing platforms was limited. Community-based networks and word-of-mouth marketing, rather than online promotional channels, were primarily relied upon for promotion. These findings suggest that while farmers have established traditional marketing practices, greater emphasis on pricing innovation, market expansion, and modern promotional strategies is needed to improve competitiveness and sustainability (Kotler & Keller, 2022; Ferdous, 2010). The findings further suggest that, although producers successfully maintain product quality, improvements in branding, digital promotion, and market expansion remain necessary. Strengthening these marketing strategies may enhance market competitiveness while encouraging environmentally responsible business practices, consistent with the Theory of Planned Behavior and sustainable marketing principles (Ajzen, 1991; Ferdous, 2010; Ilagan et al., 2024).

3.2 Demand for Vermicompost

Table 2. Assessment of Market Demand for Vermicompost Products

Indicator	Mean	SD	Verbal Interpretation
Highest: Consumers are willing to pay for high-quality vermicompost	4.21	0.47	Strongly Agree
Lowest: I struggle to meet demand because of limited production	3.03	0.86	Somewhat Agree
Overall Demand for Vermicompost	3.95	0.58	Agree

Note. Scale: 4.20–5.00 Strongly Agree; 3.40–4.19 Agree; 2.60–3.39 Somewhat Agree; 1.80–2.59 Disagree; 1.00–1.79 Strongly Disagree.

A generally high demand for vermicompost products was reported by respondents. A favorable market outlook is indicated by repeat purchases, customer willingness to pay for quality products, and increasing consumer interest. However, limitations in meeting growing demand were experienced by many producers because of production constraints and insufficient marketing infrastructure.

3.3 Environmental Behavior

Table 3. Level of Environmental Behavior Among Vermicompost Farmers

Indicator	Mean	SD	Verbal Interpretation
Highest: I ensure that my vermicomposting process does not harm the soil or water	4.36	0.55	Strongly Agree
Lowest: I study the benefits of vermicomposting by reading and attending seminars	3.86	0.65	Agree
Overall Environmental Behavior	4.19	0.55	Agree

Note. Scale: 4.20–5.00 Strongly Agree; 3.40–4.19 Agree; 2.60–3.39 Somewhat Agree; 1.80–2.59 Disagree; 1.00–1.79 Strongly Disagree.

A high level of environmental behavior was demonstrated by farmers through sustainable production practices, proper waste management, and environmentally responsible farming activities. Nevertheless,

participation in environmental training programs remained moderate, indicating that opportunities for capacity-building initiatives exist.

3.4 Structural Model

Table 4. Path Analysis for the Direct Effects of the Variables

Path	Coefficient (β)	p-value	Remark
Marketing Mix $\rightarrow$ Demand	0.53	<0.001	Significant
Marketing Mix $\rightarrow$ Environmental Behavior	0.30	<0.001	Significant
Environmental Behavior $\rightarrow$ Demand	0.61	<0.001	Significant

Note. $p \leq .05$ indicates a statistically significant path coefficient.

Table 5. Mediation Analysis: Role of Environmental Behavior Between Marketing Mix and Demand for Vermicompost

Path	Indirect Effect	p-value	Total Effect	p-value	VAF	Interpretation
Marketing Mix $\rightarrow$ Environmental Behavior $\rightarrow$ Demand	0.232	0.003	0.806	<0.001	28.78%	Partial Mediation

Note. $VAF < 20\%$ = no mediation; $VAF 20\text{--}80\%$ = partial mediation; $VAF > 80\%$ = full mediation.

SEM analysis demonstrated that marketing mix strategies significantly influenced both demand for vermicompost and environmental behavior. Demand was likewise significantly influenced by environmental behavior, which was found to partially mediate the relationship between marketing mix strategies and market demand.

These findings suggest that environmental responsibility enhances the effectiveness of sustainable marketing strategies by strengthening consumer confidence and increasing demand for environmentally friendly agricultural products.

4. Conclusion

Marketing mix strategies make a significant contribution to the demand for vermicompost products among farmers in the Laguna de Bay area. Product quality remains the strongest marketing component, while pricing, promotion, and distribution require further enhancement, particularly through digital marketing and wider distribution channels.

Environmental behavior positively influences market demand and partially mediates the relationship between marketing mix strategies and demand. This suggests that environmentally responsible practices not only support ecological sustainability but also function as strategic marketing assets that strengthen customer trust and enhance market competitiveness.

The study recommends strengthening digital marketing capabilities, improving distribution systems, promoting product branding, expanding environmental education programs, and increasing institutional support to improve the long-term sustainability of vermicompost enterprises.

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