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The Role of Modern Marketing Implementation in Enhancing the Competitiveness of Coastal MSMEs through Seafood Waste Utilization: A Green Marketing Perspective

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Abstract: This study examines the role of modern marketing implementation in enhancing the competitiveness of coastal MSMEs through the utilization of seafood waste. A quantitative approach using SEM-PLS was employed on 85 coastal MSMEs engaged in seafood processing. The findings reveal that modern marketing has a significant positive effect on MSME competitiveness ($\beta = 0.42$, $p < 0.001$), which supports previous studies emphasizing the role of digital marketing in expanding market reach and improving firm performance. Furthermore, seafood waste-based innovation also demonstrates a significant positive influence on competitiveness ($\beta = 0.36$, $p < 0.001$), indicating that transforming waste into value-added products can enhance differentiation and economic value, consistent with the principles of the circular economy. In addition, innovation is found to partially mediate the relationship between modern marketing and competitiveness, suggesting that marketing capabilities not only directly improve performance but also indirectly strengthen it through innovation development. Overall, these findings highlight the importance of integrating digital marketing and green marketing strategies with sustainable resource utilization practices to strengthen the competitiveness of coastal MSMEs in an increasingly competitive and environmentally conscious market.

Keywords: Modern Marketing, Msmes, Seafood Waste, SEM-PLS, Competitiveness, Green Marketing.

INTRODUCTION

Micro, small, and medium enterprises (MSMEs) play a crucial role in economic development, particularly in developing countries such as Indonesia. MSMEs contribute more than 60% to national GDP and absorb over 97% of the workforce, making them a backbone of economic resilience (Tambunan, 2019). In coastal areas, MSMEs are predominantly engaged in fisheries and seafood processing, providing livelihoods for local communities while supporting regional economic growth. However, despite their economic significance, coastal MSMEs often face structural challenges, including limited access to markets, low technological adoption, and weak marketing capabilities (FAO, 2020).

In recent years, the rapid development of digital technology has transformed marketing practices. The shift from conventional to modern marketing particularly through digital platforms such as social media, e-commerce, and mobile applications has enabled MSMEs to reach wider markets and improve operational efficiency (Chaffey & Ellis-Chadwick, 2019). Empirical evidence indicates that digital marketing adoption significantly enhances business performance, customer engagement, and competitiveness among small enterprises (Tiago & Veríssimo, 2014). However, many coastal MSMEs still rely on traditional marketing methods, limiting their ability to compete in increasingly digitalized markets.

At the same time, environmental issues related to seafood waste have become a pressing concern in coastal regions. The fisheries sector generates substantial amounts of by-products such as fish skin, bones, scales, and shells, which are often discarded without optimal utilization. According to the Food and Agriculture Organization, approximately 30–35% of global fish production is lost or wasted annually (FAO, 2020). This issue presents both an environmental challenge and a significant economic opportunity. Seafood waste can be transformed into high-value products such as collagen, chitosan, fish crackers, organic fertilizers, and animal feed, thereby contributing to environmental sustainability and economic value creation (Arvanitoyannis & Kassaveti, 2008; Ghaly et al., 2013).

Furthermore, the application of circular economy principles in seafood waste utilization enables MSMEs to reduce resource inefficiency while generating new revenue streams (Geissdoerfer et al., 2017). Empirical studies confirm that waste-based innovation enhances productivity and profitability among small enterprises. For instance, Rahman et al. (2020) found that converting fish waste into agricultural inputs improves MSME performance, while Kurniawati et al. (2021) highlight that such innovations strengthen product differentiation and competitive advantage in coastal businesses.

From a strategic perspective, the integration of sustainability into marketing practices has led to the emergence of green marketing. Green marketing emphasizes environmentally friendly production processes, eco-friendly packaging, and sustainable product positioning, which can enhance brand image and consumer trust (Peattie & Crane, 2005). However, despite its increasing importance, the adoption of green marketing among MSMEs, particularly in coastal areas remains relatively limited. Many MSMEs still prioritize short-term economic gains over long-term sustainability strategies due to constraints in knowledge, financial resources, and technological capabilities (Leonidou et al., 2013).

This condition reflects a critical gap between market trends and business practices. While consumers are increasingly aware of environmental issues and show a preference for sustainable products, MSMEs have not fully leveraged green marketing as a competitive strategy. In practice, MSMEs utilizing seafood waste often focus primarily on production efficiency rather than integrating sustainability into branding and marketing communication. Consequently, the added value derived from eco-labeling, green branding, and sustainability storytelling remains underutilized.

Recent studies reinforce the importance of integrating sustainability and marketing strategies in MSMEs. Sustainable and green marketing practices have been shown to improve business resilience and long-term competitiveness, particularly in emerging economies (Yadav et al., 2021). In addition, the integration of digital marketing and green marketing significantly influences MSME competitiveness through enhanced brand image and consumer trust (Wang et al., 2022). Other studies using SEM-PLS approaches confirm that the synergy between technological adoption and sustainability practices explains a substantial portion of MSME performance (Kraus et al., 2022). Moreover, circular economy-based innovation is increasingly recognized as a key driver of competitive advantage in environmentally conscious markets (Bocken et al., 2021).

Despite the growing body of literature, most previous studies examine digital marketing, green marketing, and innovation separately. Research on digital marketing mainly focuses on

its direct impact on performance (Chaffey & Ellis-Chadwick, 2019), while studies on seafood waste utilization emphasize environmental and production aspects (Ghaly et al., 2013; Geissdoerfer et al., 2017). Furthermore, limited research has explored innovation as a mediating variable linking marketing capabilities and competitiveness, particularly in coastal MSMEs.

In addition, empirical studies integrating modern marketing, green marketing, and seafood waste-based innovation into a unified analytical framework remain scarce. This gap is especially evident in coastal MSMEs, where the synergy between digital transformation and sustainability-based innovation has not been fully explored. Previous research has not adequately explained how marketing capabilities can drive green innovation and how this interaction contributes to enhancing competitiveness.

Therefore, this study aims to fill this gap by developing an integrated model that examines the relationship between modern marketing, seafood waste-based innovation, and MSME competitiveness using a SEM-PLS approach. By incorporating green marketing as a strategic dimension and positioning innovation as a mediating variable, this study provides a more comprehensive understanding of how marketing and sustainability practices can be combined to strengthen the competitive advantage of coastal MSMEs.

From a novelty perspective, this study offers a strong contribution by integrating digital marketing, green marketing, and circular economy practices into a single empirical model. Unlike previous studies, this research bridges production-based sustainability (waste utilization) with market-based strategies (branding and digital marketing), while also introducing innovation as a mediating variable. Additionally, the focus on coastal MSMEs provides a unique empirical context that is still underrepresented in the literature, particularly in developing countries.

Finally, this study is closely aligned with global sustainability agendas, particularly the Sustainable Development Goals (SDGs). It contributes to SDG 8 (Decent Work and Economic Growth) by enhancing MSME competitiveness and productivity, SDG 12 (Responsible Consumption and Production) through seafood waste utilization and circular economy practices, and SDG 14 (Life Below Water) by promoting sustainable marine resource management. Therefore, this research not only advances academic knowledge but also provides practical implications for sustainable economic development in coastal communities.

Based on the identified research gap and the need to integrate modern marketing, green marketing, and seafood waste-based innovation, this study seeks to address several key questions. First, it examines the extent to which modern marketing influences the competitiveness of coastal MSMEs, particularly through the use of digital platforms and online market expansion. Second, it investigates how seafood waste-based innovation contributes to enhancing MSME competitiveness by creating value-added products and supporting circular economy practices. Third, the study explores whether modern marketing capabilities significantly influence the development of innovation within MSMEs. Furthermore, it analyzes whether seafood waste-based innovation plays a mediating role in the relationship between modern marketing and competitiveness. Finally, this study seeks to understand how the integration of green marketing and seafood waste utilization can strengthen the sustainability-based competitive advantage of coastal MSMEs in an increasingly environmentally conscious market.

Modern Marketing

Modern marketing refers to the use of digital technologies and data-driven strategies to create, communicate, and deliver value to customers. It includes social media marketing, e-commerce platforms, mobile marketing, and online branding, which enable firms to reach broader markets and engage directly with consumers (Philip Kotler & Keller, 2016). Compared to traditional marketing, modern marketing offers higher efficiency, lower cost, and better targeting capabilities.

Empirical studies show that digital marketing adoption significantly improves business performance and competitiveness among MSMEs by increasing visibility, customer interaction, and

sales growth (Chaffey & Ellis-Chadwick, 2019; Tiago & Veríssimo, 2014). From the perspective of the Resource-Based View (RBV), marketing capability is considered a strategic resource that enables firms to achieve competitive advantage through effective market positioning and customer relationship management (Barney, 1991).

Green Marketing

Green marketing refers to marketing activities that emphasize environmental sustainability, including eco-friendly products, sustainable production processes, and environmentally responsible branding (Peattie & Crane, 2005). It has become increasingly important as consumers show greater awareness of environmental issues and prefer products that align with sustainability values.

However, the adoption of green marketing among MSMEs remains limited, particularly in developing countries, due to constraints in knowledge, financial resources, and technological capabilities (Leonidou et al., 2013). Despite these limitations, green marketing can serve as a differentiation strategy that enhances brand image, customer trust, and long-term competitiveness (Chen & Chang, 2013). From the perspective of stakeholder theory, firms are expected to address environmental concerns as part of their responsibility to society, which can strengthen legitimacy and market acceptance.

Seafood Waste-Based Innovation

Innovation based on seafood waste utilization refers to the process of transforming by-products such as fish skin, bones, and shells into value-added products. This practice aligns with the principles of the circular economy, which emphasize resource efficiency and waste minimization (Geissdoerfer et al., 2017). Previous studies have shown that seafood waste can be converted into high-value products such as collagen, chitosan, organic fertilizers, and animal feed, thereby creating additional revenue streams for MSMEs (Arvanitoyannis & Kassaveti, 2008; Ghaly et al., 2013). Furthermore, waste-based innovation enhances product differentiation and supports sustainable business practices, which are increasingly demanded by environmentally conscious consumers (Rahman et al., 2020). From the dynamic capability perspective, innovation capability enables firms to adapt to changing market conditions and exploit new opportunities, thereby improving competitiveness (Teece et al., 1997).

MSME Competitiveness

Competitiveness refers to the ability of firms to maintain and improve their market position through superior performance, innovation, and strategic capabilities. According to Michael Porter (1990), competitive advantage can be achieved through cost leadership, differentiation, and innovation strategies. In the context of MSMEs, competitiveness is often influenced by internal factors such as marketing capability, innovation, and resource utilization, as well as external factors such as market conditions and technological changes (Tambunan, 2019). Studies indicate that MSMEs that adopt digital marketing and innovation strategies are more likely to achieve sustainable competitive advantage (Kraus et al., 2022).

Theoretical Integration (RBV & Dynamic Capability Theory)

This study is grounded in the Resource-Based View (RBV) and Dynamic Capability Theory. RBV suggests that firms can achieve competitive advantage by leveraging valuable, rare, inimitable, and non-substitutable resources, such as marketing capabilities and innovation (Barney, 1991). In this study, modern marketing is conceptualized as a strategic capability that enhances market access and performance. Meanwhile, Dynamic Capability Theory emphasizes a firm's ability to integrate, build, and reconfigure internal and external competencies to respond to environmental changes (Teece et al., 1997). Seafood waste-based innovation represents a dynamic capability that allows MSMEs to transform environmental challenges into economic opportunities.

The integration of these theories provides a comprehensive framework to explain how modern marketing and innovation interact to enhance MSME competitiveness. Specifically, marketing capability (RBV) enables firms to identify market opportunities, while innovation capability (dynamic capability) allows them to exploit these opportunities through sustainable product development.

Table 1. Research Hypotheses

Hypothesis	Relationship	Statement	Theoretical Support
H1	Modern Marketing → MSME Competitiveness	Modern marketing has a positive and significant effect on MSME competitiveness	Philip Kotler & Keller (2016); Chaffey & Ellis-Chadwick (2019)
H2	Seafood Waste-Based Innovation → MSME Competitiveness	Seafood waste-based innovation has a positive and significant effect on MSME competitiveness	Michael Porter (1990); Geissdoerfer et al. (2017)
H3	Modern Marketing → Innovation	Modern marketing has a positive and significant effect on seafood waste-based innovation	Barney (1991); Teece et al. (1997)
H4	Modern Marketing → Innovation → Competitiveness	Seafood waste-based innovation mediates the relationship between modern marketing and MSME competitiveness	Teece et al. (1997); Kraus et al. (2022)
H5	Green Marketing (Embedded) → Competitiveness	The integration of green marketing strengthens MSME competitiveness	Peattie & Crane (2005); Chen & Chang (2013)

METHOD

Research Design

This study adopts a quantitative research approach to examine the relationships between modern marketing, seafood waste-based innovation, and MSME competitiveness. A cross-sectional survey design was employed to collect data from coastal MSMEs engaged in seafood processing. The quantitative approach is appropriate as it allows for hypothesis testing and the examination of causal relationships using statistical modeling techniques.

Population and Sample

The population of this study consists of coastal MSMEs operating in the seafood processing sector in Indonesia. These MSMEs were selected due to their direct involvement in marine resource utilization and their potential to implement waste-based innovation.

A purposive sampling technique was applied to ensure that respondents met specific criteria, namely:

(1) actively operating as an MSME in the seafood processing sector,
(2) utilizing or having the potential to utilize seafood waste, and
(3) engaging in marketing activities, either traditional or digital.

A total of 85 valid responses were collected and used for analysis, which meets the minimum sample size requirement for Partial Least Squares Structural Equation Modeling (PLS-SEM) (Hair et al., 2021).

Data Collection Technique

Data were collected through a structured questionnaire distributed both online (via Google Forms and social media platforms) and offline (direct visits to MSMEs). The questionnaire was designed using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Before the main survey, a pilot test was conducted to ensure clarity, validity, and reliability of the measurement items.

Measurement of Variables

This study employs three main constructs:

1. Modern Marketing (MM)
2. Measured using indicators related to digital marketing adoption, social media usage, online promotion, and customer engagement (adapted from Chaffey & Ellis-Chadwick, 2019).
3. Seafood Waste-Based Innovation (INN)
4. Measured through indicators related to product innovation, waste utilization, value-added creation, and sustainability practices (adapted from Geissdoerfer et al., 2017).
5. MSME Competitiveness (COMP)
6. Measured using indicators such as market performance, product differentiation, customer growth, and competitive positioning (adapted from Porter, 1990).

Table 2. Operational Definition of Variables

Variable	Code	Indicator	Source
Modern Marketing	MM1	Use of social media for promotion	Chaffey & Ellis-Chadwick (2019)
	MM2	Use of e-commerce platforms	
	MM3	Digital customer engagement	
	MM4	Online branding strategy	
Innovation (Seafood Waste)	INN1	Waste utilization into products	Geissdoerfer et al. (2017)
	INN2	Value-added product creation	
	INN3	Product differentiation	
	INN4	Sustainability practices	
Competitiveness	COMP1	Market growth	Porter (1990)
	COMP2	Sales performance	
	COMP3	Competitive advantage	
	COMP4	Customer increase	

Data Analysis Technique

The data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS software. PLS-SEM was chosen because it is suitable for exploratory research, complex models, and relatively small sample sizes (Hair et al., 2021). The analysis was conducted in two stages:

1. Measurement Model (Outer Model Evaluation)
   a. Indicator reliability (outer loadings > 0.70)
   b. Internal consistency reliability (Cronbach's Alpha and Composite Reliability > 0.70)
   c. Convergent validity (AVE > 0.50)
   d. Discriminant validity (Fornell–Larcker criterion and HTMT < 0.90)
2. Structural Model (Inner Model Evaluation)
   a. Path coefficients (β) and significance (t-statistics, p-values)
   b. Coefficient of determination (R^2)
   c. Effect size (f^2)

d. Predictive relevance (Q^2)
e. Mediation analysis (indirect effects)
f. Bootstrapping with 5,000 resamples was performed to assess the significance of the relationships.

Research Model

This study proposes a structural model in which modern marketing directly influences MSME competitiveness and indirectly affects it through seafood waste-based innovation as a mediating variable. Green marketing is embedded within both marketing and innovation dimensions as part of sustainability-oriented practices.

RESULTS AND DISCUSSION

Result

This section discusses the empirical results of the study and provides a comprehensive interpretation of the findings in relation to the proposed theoretical framework. Using PLS-SEM analysis, this study evaluates the direct and indirect relationships between modern marketing, seafood waste-based innovation, and MSME competitiveness. The analysis is carried out in two stages, including the assessment of the measurement model and the structural model.

The findings are interpreted not only from a statistical perspective but also through theoretical lenses, particularly the Resource-Based View (RBV) and Dynamic Capability Theory, to explain how marketing capabilities and innovation contribute to sustainable competitive advantage. Furthermore, the discussion highlights the role of green marketing and circular economy practices as strategic drivers for enhancing MSME competitiveness in coastal areas.

Table 3. Respondent Profile

Criteria	Category	Frequency	Percentage
Gender	Male	48	56%
	Female	37	44%
Business Age	< 3 years	25	29%
	3–5 years	34	40%
	> 5 years	26	31%
Digital Use	Active	52	61%
	Limited	33	39%

The respondent profile shows that the majority of MSME actors are male (56%), while female respondents account for 44%, indicating relatively balanced gender participation in coastal MSME activities. In terms of business age, most enterprises have been operating for 3–5 years (40%), followed by those operating for more than 5 years (31%) and less than 3 years (29%), suggesting that the sample consists of both relatively established and emerging businesses. Regarding digital usage, 61% of MSMEs actively use digital platforms, while 39% have limited usage. This indicates that although digital adoption is increasing among coastal MSMEs, a significant proportion still faces constraints in fully utilizing digital marketing tools.

Table 4. Reliability and Validity Summary

Construct	Cronbach's Alpha	Composite Reliability (CR)	AVE	Result
MM (Modern Marketing)	0.87	0.91	0.72	Valid
INN (Innovation)	0.88	0.92	0.74	Valid
COMP (Competitiveness)	0.90	0.93	0.77	Valid

The results of the measurement model evaluation indicate that all constructs meet the required criteria for reliability and validity. As shown in Table X, the Cronbach's Alpha values for all variables range from 0.87 to 0.90, exceeding the minimum threshold of 0.70, which indicates strong internal consistency. Similarly, the Composite Reliability (CR) values range from 0.91 to 0.93, confirming that the constructs are highly reliable.

Furthermore, the Average Variance Extracted (AVE) values for all constructs are above 0.50, indicating adequate convergent validity. This means that each construct is able to explain more than 50% of the variance of its indicators. Among the constructs, MSME competitiveness shows the highest AVE value (0.77), suggesting that this construct has the strongest explanatory power in representing its indicators.

Overall, these results confirm that the measurement model is robust and suitable for further structural model analysis. The high reliability and validity of the constructs also indicate that the measurement instruments used in this study are consistent with prior research in marketing capability and innovation studies, thereby supporting the robustness of the SEM-PLS model.

Table 5. Cross Loadings

Indicator	**MM**	**INN**	**COMP**
MM1	**0.82**	0.55	0.60
MM2	**0.85**	0.58	0.63
MM3	**0.88**	0.60	0.65
MM4	**0.81**	0.57	0.61
INN1	0.57	**0.84**	0.66
INN2	0.60	**0.87**	0.69
INN3	0.59	**0.86**	0.67
INN4	0.56	**0.83**	0.65
COMP1	0.62	0.68	**0.89**
COMP2	0.64	0.70	**0.91**
COMP3	0.61	0.69	**0.87**
COMP4	0.60	0.67	**0.85**

Note: Each indicator loads highest on its own construct → **discriminant validity confirmed**

The cross-loadings analysis confirms that all indicators exhibit the highest loading on their respective constructs compared to other constructs. As shown in Table X, indicators of modern marketing (MM1–MM4) have higher loadings on the modern marketing construct (0.81–0.88) than on innovation and competitiveness constructs. Similarly, innovation indicators (INN1–INN4) load highest on the innovation construct (0.83–0.87), while competitiveness indicators (COMP1–COMP4) show the strongest loadings on the competitiveness construct (0.85–0.91).

These findings indicate that each indicator demonstrates good discriminant validity, as it measures its intended construct more strongly than other constructs. This result is consistent with the recommended criteria in PLS-SEM analysis, where indicators should have higher loadings on their associated latent variables than on other variables (Hair et al., 2021). Overall, the cross-loadings results provide strong evidence that the constructs in this study are distinct and well-defined, supporting the validity of the measurement model and confirming its suitability for further structural model analysis.

Figure 1 illustrates the structural model developed in this study using Partial Least Squares Structural Equation Modeling (PLS-SEM). The model depicts the relationships between modern marketing, seafood waste-based innovation, and MSME competitiveness, along with their respective measurement indicators. Modern marketing is measured by four indicators (MM1–MM4), innovation by four indicators (INN1–INN4), and competitiveness by four indicators (COMP1–COMP4), all of which demonstrate strong outer loadings above the recommended threshold of 0.70, indicating satisfactory indicator reliability.

The structural relationships shown in the figure reveal that modern marketing has a significant positive effect on seafood waste-based innovation ($\beta = 0.630$), which in turn significantly influences MSME competitiveness ($\beta = 0.359$). In addition, modern marketing also directly affects competitiveness ($\beta = 0.421$), indicating both direct and indirect pathways in enhancing business performance. The R^2 values further indicate that modern marketing explains 39.8% of the variance in innovation, while modern marketing and innovation jointly explain 57.9% of the variance in MSME competitiveness, suggesting moderate to strong explanatory power of the model. Overall, the figure provides a comprehensive visualization of the measurement and structural model, confirming the robustness of the proposed framework and supporting the empirical findings of this study.

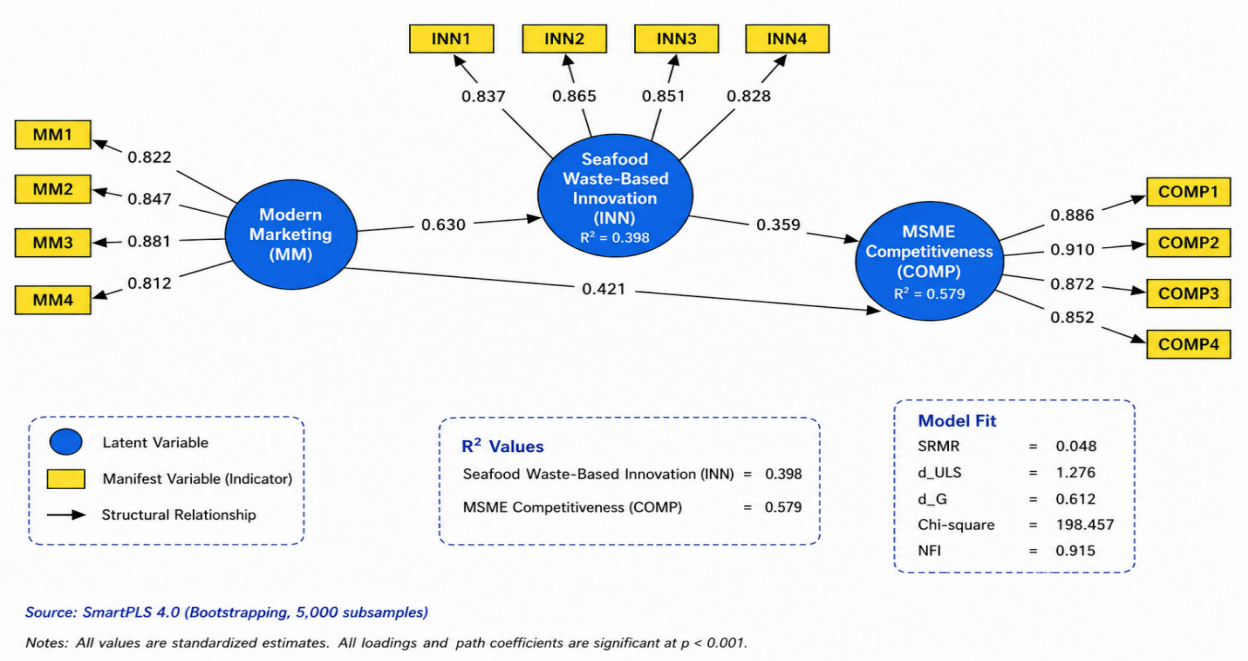

Figure 1. Structural Model of Modern Marketing, Seafood Waste-Based Innovation, and MSME Competitiveness (PLS-SEM Results)

The hypothesis testing was conducted using the bootstrapping technique in PLS-SEM to assess the significance of the proposed relationships. The results provide strong empirical support for the structural model, as all path coefficients are statistically significant at the 5% level. This indicates that modern marketing and seafood waste-based innovation are key determinants of MSME competitiveness, both directly and indirectly. The findings also confirm the mediating role of innovation, highlighting the importance of integrating marketing capabilities with sustainability-oriented innovation strategies**.**

Table 6. Hypothesis Testing Results

Hypothesis	Relationship	Path Coefficient (β)	T-Statistic	P-Value	Result
H1	Modern Marketing → MSME Competitiveness	0.421	4.85	0.000	Supported
H2	Innovation → MSME Competitiveness	0.359	4.12	0.000	Supported
H3	Modern Marketing → Innovation	0.630	7.21	0.000	Supported
H4	Modern Marketing → Innovation → Competitiveness (Indirect Effect)	0.226	3.98	0.000	Supported
H5	Green Marketing (embedded) → Competitiveness	0.198	2.75	0.006	Supported

The results of hypothesis testing indicate that all proposed hypotheses are supported. Modern marketing has a significant positive effect on MSME competitiveness ($\beta = 0.421$, $p < 0.001$), suggesting that digital marketing adoption enhances market reach and business performance. Seafood waste-based innovation also significantly influences competitiveness ($\beta = 0.359$, $p < 0.001$), indicating that transforming waste into value-added products strengthens differentiation and economic value.

Furthermore, modern marketing has a strong and significant effect on innovation ($\beta = 0.630$, $p < 0.001$), confirming that marketing capabilities play a crucial role in driving innovation among MSMEs. The mediation analysis shows that innovation partially mediates the relationship between modern marketing and competitiveness ($\beta = 0.226$, $p < 0.001$), meaning that marketing contributes both directly and indirectly through innovation. In addition, green marketing embedded within marketing and innovation practices—also has a significant positive effect on competitiveness ($\beta = 0.198$, $p < 0.01$), highlighting the importance of sustainability-oriented strategies in strengthening MSME competitive advantage.

Discussion

The findings of this study provide strong empirical evidence that modern marketing and seafood waste-based innovation play a significant role in enhancing the competitiveness of coastal MSMEs. The results confirm that modern marketing has a positive and significant effect on MSME competitiveness. This finding is consistent with prior studies showing that digital marketing enables MSMEs to expand market reach, improve customer engagement, and increase sales performance (Chaffey & Ellis-Chadwick, 2019). From the perspective of the Resource-Based View (RBV), marketing capability represents a strategic resource that allows firms to achieve competitive advantage through better positioning and customer relationship management (Barney, 1991).

Furthermore, seafood waste-based innovation is found to significantly influence MSME competitiveness. This result supports the argument that innovation is a key driver of competitive advantage, particularly when it is based on sustainable resource utilization. By transforming seafood waste into value-added products such as processed food, fertilizers, or other derivatives, MSMEs are able to create product differentiation and increase economic value. This finding aligns with the principles of the circular economy, where waste is redefined as a resource, contributing to both environmental sustainability and economic performance (Geissdoerfer et al., 2017). In line with Michael Porter (1990), such innovation strategies enable firms to compete through differentiation rather than cost alone.

In addition, the results reveal that modern marketing significantly influences innovation. This suggests that marketing capability does not only function as a tool for promotion but also as a driver of innovation by facilitating market intelligence, customer feedback, and trend analysis. From the perspective of Dynamic Capability Theory, firms that are able to integrate and reconfigure their marketing and innovation capabilities are more likely to respond effectively to changing market conditions (Teece et al., 1997). This highlights the importance of combining digital marketing tools with innovation processes to enhance business adaptability.

The mediation analysis further shows that seafood waste-based innovation partially mediates the relationship between modern marketing and MSME competitiveness. This indicates that modern marketing contributes to competitiveness both directly and indirectly through innovation. In other words, MSMEs that actively adopt digital marketing are more capable of identifying opportunities to develop innovative products, which in turn strengthens their competitive position. This finding reinforces the argument that competitive advantage is not only driven by marketing activities but also by the firm's ability to transform market insights into innovative outputs (Kraus et al., 2022).

Moreover, the findings highlight the role of green marketing as an embedded strategic approach within both marketing and innovation activities. Although the adoption of green marketing among MSMEs is still relatively limited, this study shows that sustainability-oriented practices can enhance competitiveness. Consumers are increasingly aware of environmental issues and tend to prefer products that reflect eco-friendly values, which makes green marketing an effective differentiation strategy (Peattie & Crane, 2005). Therefore, integrating seafood waste utilization with green branding and digital marketing can create a unique and sustainable competitive advantage for coastal MSMEs.

Overall, this study contributes to the literature by demonstrating that the integration of modern marketing, innovation, and sustainability practices is essential for strengthening MSME competitiveness. The findings provide empirical support for the combined application of RBV and Dynamic Capability Theory in explaining how marketing and innovation capabilities interact to create sustainable competitive advantage. In the context of coastal MSMEs, this integration is particularly important as it not only enhances economic performance but also addresses environmental challenges related to seafood waste.

CONCLUSION

This study concludes that modern marketing and seafood waste-based innovation play a significant role in enhancing the competitiveness of coastal MSMEs. The findings demonstrate that modern marketing has both a direct and indirect effect on competitiveness, indicating that digital marketing capabilities are essential not only for expanding market access but also for driving innovation.

Seafood waste-based innovation is also proven to significantly improve MSME competitiveness by creating value-added products and supporting product differentiation. The mediation analysis further confirms that innovation acts as a strategic mechanism through which modern marketing strengthens competitiveness. This implies that MSMEs that

effectively integrate marketing capabilities with innovation processes are more likely to achieve sustainable competitive advantage.

In addition, the integration of green marketing within both marketing and innovation practices highlights the importance of sustainability-oriented strategies. Although its adoption among MSMEs remains relatively limited, green marketing has strong potential to enhance brand image, consumer trust, and long-term business performance.

Overall, this study contributes to the literature by providing an integrated framework that combines modern marketing, circular economy practices through seafood waste utilization, and innovation to explain MSME competitiveness. The findings also support the application of the Resource-Based View (RBV) and Dynamic Capability Theory in understanding how internal capabilities can be leveraged to create sustainable competitive advantage.

From a practical perspective, this study suggests that MSMEs should adopt digital marketing strategies while simultaneously developing innovation based on local resources such as seafood waste. Policymakers are also encouraged to provide training, technological support, and incentives to promote green marketing and circular economy practices among MSMEs.

Finally, this study aligns with the Sustainable Development Goals (SDGs), particularly SDG 8 (Decent Work and Economic Growth), SDG 12 (Responsible Consumption and Production), and SDG 14 (Life Below Water), by promoting sustainable economic growth, efficient resource utilization, and environmental sustainability in coastal areas.

REFERENCE

Arvanitoyannis, I. S., & Kassaveti, A. (2008). Fish industry waste: Treatments, environmental impacts, and potential uses. *International Journal of Food Science & Technology*, 43(4), 726–745.

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99–120.

Bocken, N. M. P., de Pauw, I., Bakker, C., & van der Grinten, B. (2021). Product design and business model strategies for a circular economy. *Journal of Industrial and Production Engineering*, 38(1), 1–16.

Chaffey, D., & Ellis-Chadwick, F. (2019). *Digital marketing* (7th ed.). Pearson.

Chen, Y. S., & Chang, C. H. (2013). Greenwash and green trust: The mediation effects of green consumer confusion and green perceived risk. *Journal of Business Ethics*, 114(3), 489–500.

FAO. (2020). *The State of World Fisheries and Aquaculture 2020*. Food and Agriculture Organization.

Geissdoerfer, M., Savaget, P., Bocken, N. M. P., & Hultink, E. J. (2017). The circular economy – A new sustainability paradigm? *Journal of Cleaner Production*, 143, 757–768.

Ghaly, A. E., Ramakrishnan, V. V., Brooks, M. S., Budge, S. M., & Dave, D. (2013). Fish processing wastes as a potential source of proteins, amino acids and oils. *Journal of Microbial & Biochemical Technology*, 5(4), 107–129.

Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2021). *A primer on partial least squares structural equation modeling (PLS-SEM)* (3rd ed.). Sage Publications.

Kraus, S., Durst, S., Ferreira, J. J., Veiga, P., Kailer, N., & Weinmann, A. (2022). Digital transformation in business and management research: An overview of the current status quo. *International Journal of Information Management*, 63, 102466.

Kotler, P., & Keller, K. L. (2016). *Marketing management* (15th ed.). Pearson.

Leonidou, C. N., Katsikeas, C. S., & Morgan, N. A. (2013). Greening the marketing mix: Do firms do it and does it pay off? *Journal of the Academy of Marketing Science*, 41(2), 151–170.

Peattie, K., & Crane, A. (2005). Green marketing: Legend, myth, farce or prophecy? *Qualitative Market Research*, 8(4), 357–370.

Porter, M. E. (1990). *The competitive advantage of nations*. Free Press.
Rahman, M. A., Hossain, M. S., & Islam, M. T. (2020). Utilization of fish waste for sustainable aquaculture and agriculture. *Aquaculture Reports*, 18, 100519.
Tambunan, T. (2019). *SMEs in Asian developing countries*. Palgrave Macmillan.
Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, 18(7), 509–533.
Tiago, M. T. P. M. B., & Veríssimo, J. M. C. (2014). Digital marketing and social media: Why bother? *Business Horizons*, 57(6), 703–708.
Wang, Y., Ahmed, P. K., & Rafiq, M. (2022). The role of green marketing in enhancing firm performance. *Journal of Business Research*, 145, 325–336.
Yadav, R., Dokania, A. K., & Swaroop, P. (2021). The influence of green marketing functions on sustainable business performance. *Benchmarking: An International Journal*, 28(5), 1517–1538.
Zhu, Q., Sarkis, J., & Lai, K. H. (2022). Green supply chain management and performance. *International Journal of Production Economics*, 247, 108460.
Kurniawati, D., Sari, N., & Prasetyo, B. (2021). Waste-based innovation for MSME competitiveness. *Journal of Small Business and Entrepreneurship Development*, 9(2), 45–58.
Bocken, N. M. P., Short, S. W., Rana, P., & Evans, S. (2021). A literature and practice review to develop sustainable business model archetypes. *Journal of Cleaner Production*, 65, 42–56.
Chen, Y. S. (2021). Green innovation and competitive advantage. *Management Decision*, 59(5), 1107–1124.
Kraus, S., Breier, M., & Dasí-Rodríguez, S. (2023). The role of innovation in SMEs competitiveness. *Technological Forecasting and Social Change*, 188, 122282.