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Blue-Marketing Strategy: The Opportunities and Challenges of Big Data Integration in Coastal MSMEs

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Abstract: *Changing times leading to digitalization have brought about profound changes in a number of industrial sectors, including maritime and fisheries. Micro, small and medium enterprises (MSMEs) in this sector face significant sales challenges, especially amidst post-pandemic market turmoil. This research objective understands how big data systems work in order to increase marketing efficiency in the marine and fisheries business sector. By detailing the digitization process and application of big data in this context, this research will provide a clearer picture of how marine and fisheries MSMEs can utilize technology to improve their marketing performance. This research was conducted using a quantitative approach. Aims to understand the influence of the application of big data on the marketing efficiency of marine and fisheries MSMEs. The research population involved more than 5000 MSME players, with a sample of 210 respondents selected using the purposive sampling method. The main research instrument is a questionnaire. These findings show that the implementation of the Blue-Marketing Strategy in marine and fisheries MSMEs has proven to have a positive impact on sales growth, brand awareness and customer retention, with an emphasis on sustainability as the main factor for increasing marketing effectiveness through empowering consumers in making sustainable choices. The research proposes a new concept regarding responsiveness to market dynamics, especially through implementationBlue-Marketing Strategy, as an innovative approach to dealing with changes in the post-pandemic market. Meanwhile, the integration of Marketing Strategy into the Blue Economy is considered a significant step that not only creates new marketing opportunities but also supports the sustainability of the marine ecosystem and the growth of the Blue Economy sector as a whole.*

Keywords: *Blue-Marketing, SME, Blue Economy, Strategy.*

INTRODUCTION

The changing times towards digitalization have brought about a deep transformation in various industrial sectors, including maritime and fisheries. Micro, small and medium enterprises (MSMEs) in this sector are experiencing significant sales challenges, especially

amidst post-pandemic market turmoil (Suryawijaya & Aqmala, 2023). This dynamic is increasingly complex by shifts in consumer behavior and the reliance of business governance on technology (JosephNg & Eaw, 2023). Therefore, the online presence of products and services is a necessity to ensure the sustainability of marine and fisheries MSMEs in facing this uncertainty (Fudge et al., 2023). In running business in the digital era, marine and fisheries MSMEs face various obstacles, such as limited market accessibility, increasingly tight global competition, and suboptimal use of information technology (Xu et al., 2023). Conventional marketing approaches are no longer effective enough, and business actors need new strategies that are more adaptive to these changes. Therefore, there is a need for a targeted and measurable strategy, one of which is through digitalization and the application of the blue marketing concept.

Sales obstacles faced by marine and fisheries MSMEs include changes in consumer behavior, difficulties in accessing markets optimally, and limitations in utilizing technology. Post-pandemic, market conditions are increasingly dynamic and difficult to predict. As an empirical example, data from 2020 to 2022 (BPS, 2022, 2023) shows that a number of marine and fisheries MSMEs in the oceanic coastal areas of East Java Province, such as Malang, Blitar, Tulungagung and Trenggalek, experienced an average sales decline of 30% compared to the pre-pandemic period (seeFigure 1).

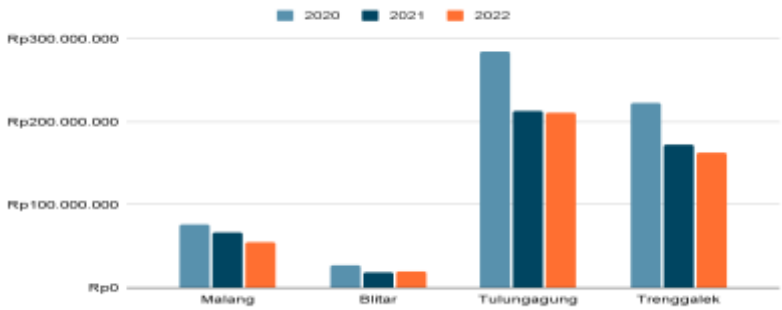

Figure 1. Fishery Production Value according to main commodities in East Java, southern coastal region
Source: Author's Elaboration, 2023

In an effort to overcome this challenge, digitization and digitization are inevitable solutions. Digital transformation is not only a necessity to overcome sales obstacles, but is also the key to increasing the competitiveness of marine and fisheries MSMEs. Expanding market access through online platforms, utilizing data for more informed decision making, and adapting to changing consumer trends are essential steps in this change strategy.

This research aims to understand how big data systems work in order to increase marketing efficiency in the marine and fisheries business sector. By detailing the digitalization process and application of big data in this context, this research will provide a clearer picture

of how marine and fisheries MSMEs can utilize technology to improve their marketing performance. The benefits of this research can be felt by various parties. Academically, it is hoped that this research can contribute to a deeper understanding of the application of big data in the marketing context in the marine and fisheries sector. For blue economy industry players, this research will provide practical guidance for optimizing their marketing strategies. In addition, other stakeholders, such as governments and non-profit institutions, can use the findings of this research as a basis for developing supporting policies and programs for marine and fisheries MSMEs.

The marine and fisheries industry occupies a central role in the sustainable development paradigm known as the Blue Economy, a conceptual framework that focuses on the sustainable use of marine and fisheries resources (Youssef, 2023). This concept explores the integration of economic, ecological and social aspects as a basis for optimizing marine potential in a development system that pays attention to sustainability. The Blue Economy is not simply about exploiting marine resources for economic gain alone, but rather involves efforts to protect and maintain economic resources and the marine environment. More than 80% of world trade involves the ocean (Amon et al., 2022), making the balance between sustainability and profit crucial in ensuring global economic stability. Additionally, the global maritime economy is capable of creating approximately $1.5 trillion in value annually, reinforcing the sector's significant role in the framework of global society (Deeptrekker, 2023).

The sustainability of the Blue Economy lies in the main role of marine ecosystems and industries in food production, tourism, aquaculture and biodiversity conservation. The Blue Economy is not only about economic profits, but also the pursuit of a sustainable environment for the overall welfare of society (Ayilu et al., 2022). One of the key elements in modern marketing strategies is the use of Big Data (Saura, 2023). Big data plays a central role in the Blue Economy by providing deep understanding of existing patterns and creating valuable models and strategies.*World Ocean Database*, as the largest and oldest collection of global marine information, has become an invaluable asset with more than two decades of research and amassing more than 20,000 datasets. The information contained in it provides crucial knowledge for various related industries (Flynn, 2023; Zhou, 2023). Even though data regarding marine and coastal aspects is abundant, most of this information is still stored in private storage. Data collections that hold an exclusive character tend to be closely guarded, perhaps because they are considered sources of high value, and are therefore less available to the public (Manik et al., 2019).

The application of big data is not limited to one type of entity. For example, big data is able to predict weather patterns, optimize renewable energy sources, and provide efficiency in hydroelectric power plants (Hassani et al., 2021). Governments and energy companies can use this data set to improve the efficiency of their installations. Although big data is primarily a tool, its potential extends to various sectors and anyone can use it according to their market needs (Gandomi & Haider, 2015). The benefits of big data are not only limited to increasing income or production potential. In the marine observation industry, big data is becoming increasingly relevant as demand for maritime technology increases (Munim et al., 2020). The benefits are not only for increased income, but also for the well-being of marine habitats and ecosystems that cannot be ignored.

Blue Economy Strategy involves collecting and analyzing data to improve, expand, or manage key components of the marine economy or environment (Nthia, 2021). While this process is complex, ultimately, it translates marine and coastal interests into plans that can be implemented. Various industries can benefit from the management and advancements resulting from the application of modern technology to optimize revenue potential and sustainability (Martínez-Vázquez et al., 2021). Therefore, the goal of the Blue Economy is to maintain and protect these, and the strategy must include development and expansion plans that are in line with sustainable practices.

The importance of big data in implementing a Blue Economy strategy lies in its ability to put things in proper perspective. For example, water temperature data can be applied as a model to improve efficiency in the fishing industry (Xiao et al., 2023; Xu et al., 2023). Big data covering multiple aspects of the ocean provides critical insights for each sector, enabling them to coordinate, assess and adapt their interactions with marine resources (El Aissi et al., 2022). Making information accessible and transparent is an integral part of sound strategy, which will ultimately benefit the global maritime economy. In this way, big data provides benefits to various aspects of the Blue Economy, enabling entities of various types to coordinate the use of natural resources, and as an effective tool in developing sustainable and functional strategies.

There has been a lot of research discussing the use of Big Data in marketing. However, research that specifically explores the influence of Big Data in supporting the marketing of marine and fisheries MSMEs is still limited. Therefore, this research aims to fill this knowledge gap, providing deeper and more applicable insights regarding how Big Data can be an effective tool in identifying potential risks and increasing sales opportunities for MSMEs in the Blue Economy sector. Thus, it is hoped that this research can make a significant contribution to

scientific literature and provide practical guidance for industry players and related stakeholders.

LITERATURE REVIEW & HYPOTHESIS DEVELOPMENT

The use of information technology is the main key in marketing strategies for Micro, Small and Medium Enterprises (MSMEs) in the coastal sector, including MSMEs in the marine and fisheries sectors. The application of information technology, especially in the form of the use of Big Data, has provided new opportunities for MSMEs to increase their marketing effectiveness. Big Data is a large and complex collection of data that can be analyzed to reveal patterns, trends and associations that are useful for decision making in business (Martínez-Vázquez et al., 2021). However, even though the opportunities offered by Big Data are very promising, the use of information technology and the implementation of blue-based marketing strategies are faced with various challenges. One of the main challenges is limited market accessibility for MSMEs in the coastal sector. Limited infrastructure and information accessibility often become obstacles for MSMEs to expand their market reach, especially in the era of digitalization which increasingly tightens global competition (Ayilu et al., 2022; Suryawijaya & Wardhani, 2023). Apart from that, increasingly tight global competition is also an obstacle for MSMEs in the coastal sector. MSMEs must be able to compete effectively with competitors from various parts of the world, who often have greater resources and wider market accessibility. Therefore, the right marketing strategy is very necessary to win this global competition (Gandomi & Haider, 2015; Kephart & Munro, 2023). Based on the existing literature review, a conceptual framework was developed as a foundation for this research (see Figure 2)

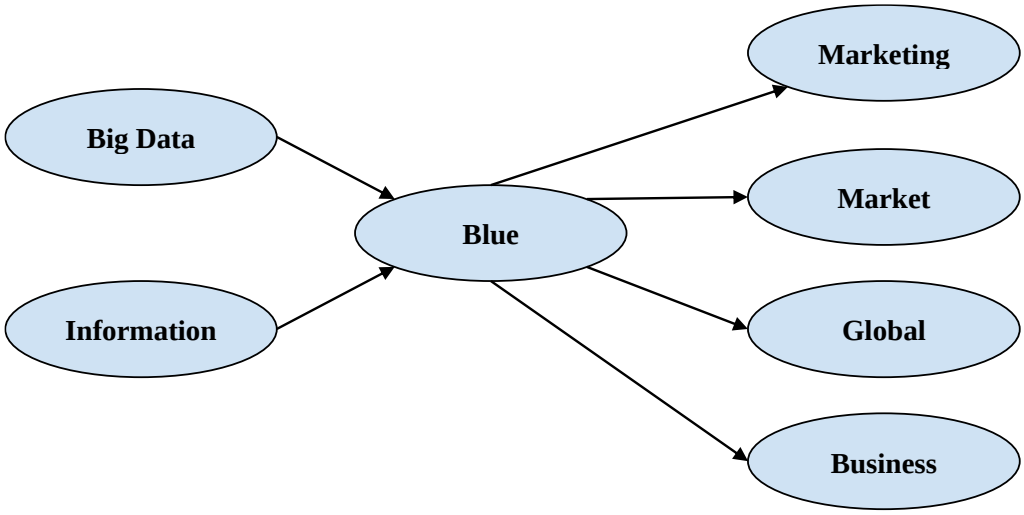

Figure 2. Research Conceptual Framework
Source: Author's Elaboration, 2023

RESEARCH METHODOLOGY

This research was conducted from February to October 2023. A quantitative approach was used in this research (Scharrer & Ramasubramanian, 2021) with the aim of understanding the influence of the application of big data on the marketing efficiency of marine and fisheries MSMEs in the southern coastal areas of Malang, Blitar, Tulungagung and Trenggalek. The population of this research is marine and fisheries MSMEs in the southern coastal areas of Malang, Blitar, Tulungagung and Trenggalek, totaling more than 5000 MSMEs. The research sample was taken as many as 210 respondents using a purposive sampling method, where the selection of respondents was carried out deliberately based on certain criteria that were relevant to the research objectives (Tryfos, 2023). The research instrument used was a questionnaire as a means of collecting data from respondents.

Table 1.Variable Distribution

Variable	Indicator	
Application of Big Data (X1)	X1.1	Data Collection Levels
	X1.2	Digital Resource Integration
	X1.3	Data Analysis Capacity
	X1.4	Data Security
Use of Information Technology (X2)	X2.1	Information Systems Adoption Level
	X2.2	Utilization of Digital Platforms
	X2.3	Adaptation Level
Blue-Marketing Strategy (M1)	M1.1	PMarketing personalization
	M1.2	Data Integration with Marketing Decisions
	M1.3	Responsiveness to Market Changes
	M1.4	Market segmentation
Marketing Effectiveness (Y1)	Y1.1	Sales Growth
	Y1.2	Brand Awareness
	Y1.3	Customer Retention
Market Accessibility (Y2)	Y2.1	Distribution channel
	Y2.2	Response Intensity
	Y2.3	Omnichannel Marketing
Global Competition (Y3)	Y3.1	Market Expansion
	Y3.2	Global Partnership
	Y3.3	Adaptation of International Standards
Business Sustainability (Y4)	Y4.1	Use of Environmentally Friendly Materials
	Y4.2	Participation in Sustainability Initiatives
	Y4.3	Business System Justice

Source: Author's Elaboration, 2023

The questions in the questionnaire were designed to understand respondents' perceptions, experiences and attitudes regarding the application of big data in their MSME marketing activities (see Table 1). Recording questionnaire data uses online studies, namely Google Form with an interval scale of 1-10 as an option for each question (Renold, 2022). The collected data will be analyzed using the Structural Equation Modeling technique with Partial Least Squares (SEM-PLS) via SmartPLS software (Magno et al., 2022). This research will follow the principles of research ethics, including data validity, confidentiality of respondents,

and use of data only for research purposes. Respondents' consent and participation will be obtained through an ethical approach and in accordance with research guidelines (Abrar & Sidik, 2019).

RESULTS AND DISCUSSION

RESULTS

Summary of Respondents

Table 2 provides an in-depth description of the respondent profile in this study. In mapping business type clusters, it can be seen that fishing dominates with 1917 respondents or around 38.34% of the total. Followed by catch distribution, biota cultivation, seafood processing, feed production, cold storage, seafood, and water tourism management, each of which has varying percentages but contributes significantly to the diversity of business sectors in the fisheries and marine sector. The distribution of respondents by region shows an even presence in a number of regions, with Tulungagung being the region with the highest number of respondents at 1432 or around 28.64%. Furthermore, Malang, Blitar, and Trenggalek also made significant contributions to this research. In looking at the length of business, the majority of respondents have been involved in the fisheries and marine business for 2 to 5 years, with a total of 3155 respondents or around 63.10%, while respondents with business of less than 1 year or more than 5 years show a variety of levels of experience that can provide valuable insight into the analysis to be carried out. This data provides a strong foundation for understanding the diversity and characteristics of fisheries and marine MSME actors in the context of this research.

Table 2. Respondent Profile

Cluster	Type	Amount	Present
Type of Business	Fish catching	1917	38,34%
	Distribution of Catch	544	10,88%
	Biota Cultivation	561	11,22%
	Processed Sea Products	542	10,84%
	Feed Production	843	16,86%
	Cold Storage	379	7,58%
	Seafood	125	2,50%
	Water Tourism Management	89	1,78%
Region	Poor	1365	27,30%
	Tulungagung	1432	28,64%

	Blitar	976	19,52%
	Trenggalek	1227	24,54%
Long Effort	< 1 Year	235	4,70%
	12 years old	581	11,62%
	25 years	3155	63,10%
	> 5 Years	1029	20,58%

Source: Author's Elaboration, 2023

Data Evaluation

This research evaluates the reliability of the internal model through the application of a convergent validity test. Convergent validity is evaluated by considering the Convergent Validity Test value, where it is expected that the Minimum Average Variance Extracted (AVE) value exceeds the threshold of 0.5. In addition, reliability testing is carried out by checking the Composite Reliability value, which should exceed 0.7, to ensure the reliability of the model being tested (Hair, 2014). From the analysis results, Table 3 shows that all data meets the requirements in valid and reliable conditions.

Table 3. Reliability & Convergent Validity Test Results

Variable	Composite Reliability	AVE
M1	0.894	0.739
X1	0.930	0.769
X2	0.840	0.638
Y1	0.893	0.737
Y2	0.930	0.817
Y3	0.923	0.800
Y4	0.832	0.632

Source: Author data, 2023

Table 4. Uji R-Square

Variable	R-Square	R-Square Adjusted
M1	0.805	0.801
Y1	0.606	0.602
Y2	0.621	0.617
Y3	0.548	0.544
Y4	0.644	0.640

Source: Author's elaboration, 2023

Testing of the structural model was also carried out using the R-Square test, as shown in Table 4. The evaluation results show that the R-Square value is close to 1. Therefore, it can be concluded that the variation in the dependent variable in this study can be explained by the model with levels appropriate adequacy (Westfall & Arias, 2020).

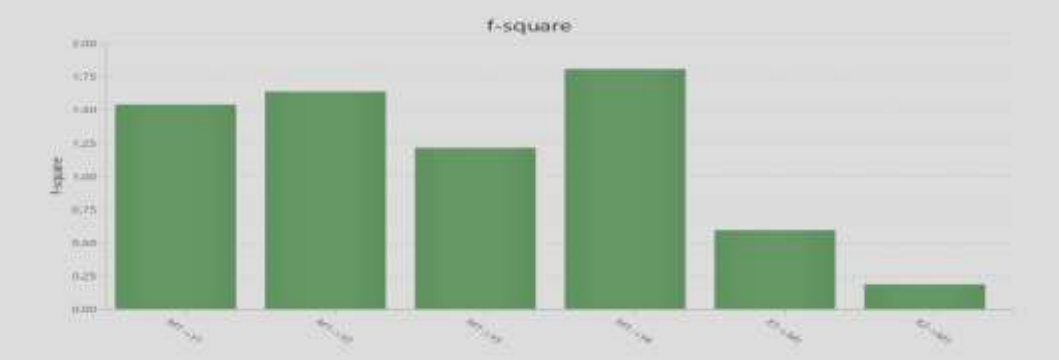

Figure 3. F Test Results
Source: Author's Elaboration, 2023

The F-Square test was also carried out to evaluate the significance of linear regression. Figure 3 shows the very satisfactory results of the regression significance. Therefore, it can be concluded that the data used in this research can be categorized as very good.

Testing Construct Relationships

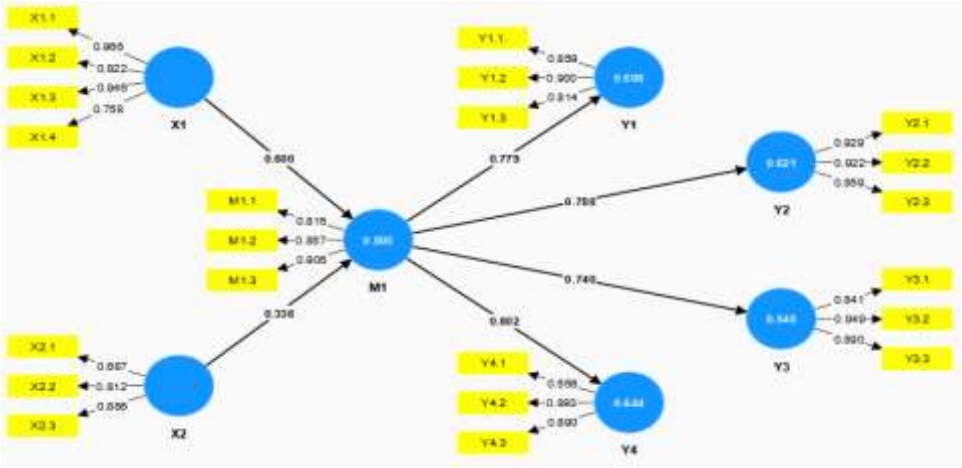

Figure 4. Path Analysis Results
Source: Author's Elaboration, 2023

The hypothesis is tested through the application of Total Effects to reveal the impact of the construct values that have been formulated. Table 5 presents the results of the Total Effects analysis on research samples sourced from original data (O), with details of the sample mean value (M), standard deviation (STDEV), t test statistics (T Statistics), and significance values (P Values) for various variables observed. In this context, M1 refers to the mediator variable, while X1 and Y1 to Y4 are the independent and dependent variables involved in the research model.

The analysis results show that the influence of M1 on Y1, Y2, Y3, and Y4 has a value of 0.779, 0.788, 0.740, and 0.802, respectively. These values exceed the sample mean (M) and show a relatively small standard deviation, providing an indication that the relationship between M1 and the dependent variable (Y) tends to be stable and significant. The t test statistics for each influence of M1 on Y1 to Y4 also show significant values, with P Values of 0.000, indicating a high level of statistical significance. Furthermore, the influence of the independent variable (X1) on M1 and the dependent variables (Y1 to Y4) also looks significant. The influence of X1 on M1 has a value of 0.600, while the influence of These results illustrate that the independent variable has a fairly strong impact on the mediator (M1) and also on the dependent variable. With P Values consistently being 0.000 throughout the analysis, it can be concluded that all relationships observed in this study are statistically significant. These results provide empirical support for the model used in this research, and the implication can be interpreted that the factors measured by these variables interact with each other and provide a significant contribution in understanding the phenomenon under study. Therefore, these findings provide a solid basis for the interpretation of results and conclusions in the context of this study and contribute to the relevant scientific literature.

Table 5. Total Effects Results

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistic	P Values
M1 -> Y1	0.779	0.778	0.071	11.012	0.000
M1 -> Y2	0.788	0.788	0.070	11.216	0.000
M1 -> Y3	0.740	0.751	0.069	10.751	0.000
M1 -> Y4	0.802	0.804	0.059	13.519	0.000
X1 -> M1	0.600	0.602	0.079	7.596	0.000
X1 -> Y1	0.467	0.470	0.086	5.459	0.000
X1 -> Y2	0.473	0.475	0.083	5.706	0.000
X1 -> Y3	0.445	0.453	0.076	5.851	0.000
X1 -> Y4	0.482	0.485	0.081	5.953	0.000
X1 -> M1	0.336	0.338	0.085	3.928	0.000
X1 -> Y1	0.262	0.263	0.068	3.841	0.000
X1 -> Y2	0.264	0.267	0.073	3.628	0.000
X1 -> Y3	0.248	0.254	0.069	3.581	0.000
X1 -> Y4	0.269	0.272	0.070	3.828	0.000

Source: Author's elaboration, 2023

DISCUSSION

Responsiveness to Market Dynamics

The phenomenon of changing times and post-pandemic challenges encourages the need for agile responsiveness to maintain and increase competitiveness (Labrecque & Milne, 2012). Through the implementation of appropriate responsiveness strategies, marine and fisheries MSMEs are able to optimize opportunities and overcome obstacles that arise. The importance of responsiveness in market dynamics is reflected in the impact of Blue-Marketing Strategy on marketing effectiveness (Choudhary et al., 2021). Sales growth, brand awareness and customer retention are the main focus, and Blue-Marketing Strategy has proven to be an effective instrument in achieving these goals (Lang et al., 2023; Saura, 2023). This marketing strategy is not only about selling products, but also about establishing a positive image as a business actor who is committed to sustainability and environmental values. Sustainability communicated through products and services creates uniqueness, increases brand appeal, and permeates consumer awareness of the importance of supporting sustainability principles (Winton et al., 2024).

The marketing effectiveness of marine and fisheries MSMEs, in the context of sales growth, received a significant boost from the implementation of the Blue-Marketing Strategy. An emphasis on sustainability creates great added value in products and services, inspiring consumers to make sustainable choices. MSMEs that are responsive to market dynamics through this strategy gain profits in increasing sales volume and expanding into new markets (Cadden et al., 2023). Brand awareness, as a vital indicator of responsiveness to market dynamics, describes the extent to which MSMEs are known and recognized by consumers. Blue-Marketing Strategy, with a focus on sustainability, opens up space to increase brand awareness (Tolentino-Zondervan & Zondervan, 2022). Communicating sustainability values through marketing strategies creates a strong image, differentiates MSMEs from competitors, and strengthens the brand's position in the minds of consumers. Thus, MSMEs' responsiveness to market dynamics not only creates sustainable sales but also builds a solid foundation for brand image (Saddington, 2023).

Customer retention is an integral part of the responsiveness strategy, marking the extent to which loyal customers remain connected with MSMEs. Blue-Marketing Strategy, by embedding sustainability values in the consumer experience, creates sustainable relationships. Consumers who experience the positive impact of sustainability in products and services are more likely to maintain business relationships, creating loyalty that has long-term impacts for

MSMEs (Malinauskaite & Jouhara, 2024). Therefore, responsiveness to market dynamics through Blue-Marketing Strategy is not only about reaching new customers but also ensuring the continuity of relationships with existing customers. In responding to changes in market dynamics, Blue-Marketing Strategy is an important foundation that is able to answer challenges and take advantage of opportunities (Ni et al., 2024). The ability of marine and fisheries MSMEs to respond nimbly through this strategy illustrates their commitment to sustainability and excellence in an ever-changing market (Kephart & Munro, 2023). Responsiveness to market dynamics through Blue-Marketing Strategy not only has a positive impact in sales growth, brand awareness and customer retention, but also strengthens the position of MSMEs as impactful players in the maritime and fisheries sector.

Utilizing Personalized Marketing in the Blue Economy

Personalized marketing is not only a tool to achieve business goals, but also the key to understanding and meeting customer needs more effectively. This research will discuss in depth the use of marketing personalization in the Blue Economy (Ben-Jebara et al., 2023), exploring its impact on marketing efficiency, the sustainability of marine ecosystems and the growth of the sector as a whole. The Blue Economy places sustainability and wise use of marine resources as a top priority (Saura, 2023). In the midst of efforts to optimize maritime potential, marketing personalization has emerged as a strategy that can increase the relevance of business communications with various stakeholders, from business people to end consumers (Ben-Jebara et al., 2023; Huyn et al., 2022). Marketing personalization involves the use of data and technology to deliver messages tailored to individual characteristics, behaviors and preferences (Saura, 2023; Suryawijaya & Wardhani, 2023). In the Blue Economy, where sustainability is at the core of business values, marketing personalization can be geared towards conveying those messages and values more directly to consumers. Businesses must navigate complex challenges related to sustainability and diversity of marine resources, marketing efficiency is the key to success. Marketing personalization can play a crucial role in increasing this efficiency (El Aissi et al., 2022; Krishen et al., 2021; Suryawijaya & Wardhani, 2023). Through careful data analysis, businesses can understand consumer behavior in depth, predict their needs, and present relevant information. For example, business actors in the aquaculture sector can use personalized marketing to convey sustainable practices that are relevant to consumers who are more likely to care about environmental aspects.

Implementing marketing personalization can also contribute to the effectiveness of marketing campaigns and customer retention. By understanding consumers' individual preferences, businesses can craft more appropriate product and service offerings, increase

consumer response rates, and build long-term relationships (Y. Wang et al., 2023). In a competitive business environment, this kind of efficiency can create competitive advantages, strengthen business positions and support the growth of the Blue Economy sector (Ni et al., 2024; Suryawijaya & Wardhani, 2023).

One of the main goals of the Blue Economy is to ensure the sustainability of the marine ecosystem (Nham & Ha, 2023). In this context, personalized marketing can be a tool to increase public awareness and participation in sustainable practices (Q. Wang, 2024). Through personalization, businesses can educate consumers about the importance of conservation and responsibility for the marine environment. Personalized marketing can also be applied to invite consumers to become agents of change by establishing more sustainable consumer behavior (Cao Minh & Nguyen Thi Quynh, 2024). For example, business actors in the marine tourism sector can use personalized marketing to convey information about ecotourism locations that suit the preferences of tourists who prefer environmentally friendly destinations. By providing a more relevant, personalized experience, consumers can be more encouraged to support sustainable practices and feel involved in efforts to conserve marine resources.

Despite its great potential, the application of marketing personalization to BE is also faced with a number of challenges and considerations. One of them is data security, especially due to the use of sensitive consumer data (Chaudhary et al., 2021). Businesses need to ensure that their marketing personalization practices are in line with applicable privacy regulations and business ethics. Additionally, equality of access to marketing personalization is also a consideration, ensuring that all stakeholders have an equal opportunity to benefit from this practice. The use of marketing personalization in BE opens up opportunities to increase marketing efficiency, strengthen the sustainability of the marine ecosystem, and support the growth of this sector. By combining data intelligence and technology, businesses can deliver more relevant messages and empower consumers to support sustainable practices (Kenza et al., 2023). Although explicit challenges need to be overcome, the positive potential of marketing personalization in BE shows a promising direction for increasing positive impacts on the environment and society.

Big Data Marketing Integration in the Blue Economy

Before the digital era, business actors could only interact with consumers through advertising and physical stores. However, with the development of digital and social media, as well as the growing popularity of mobile devices, these interactions have transformed into more interactive and ongoing dialogues (Cao Minh & Nguyen Thi Quynh, 2024; Winton et al.,

2024). Digital technology has given marketers powerful tools to understand customers and make more informed decisions. The integration of Big Data Marketing in the Blue Economy is a concept that aims to optimize aquatic resources and improve the marine and fisheries economy. Integration of Big Data-based Marketing Strategy in the Blue Economy, which provides an innovative view in facing marketing challenges in the BE sector. Marketing strategy integration is important in optimizing BE potential (Lal et al., 2023).

Marketing integration includes methods of using big data as a basis for analyzing customers. Modern technology allows companies to collect data about their customers from various sources, such as transactions, surveys, and social media. If business actors apply big data methods, business actors can understand customer behavior, market trends and consumer preferences in more detail (Yoshikuni et al., 2023). Big Data can also help detect risks and design marketing strategies that are responsive to market dynamics (Gao et al., 2023). Business actors who can utilize big data methods can integrate marketing strategies more effectively and responsively to changes in market share and provide strong reasons for making the right decisions.

The advantage of business actors in using this method in integrating marketing strategies in BE lies not only in customer analysis, but also in more targeted marketing design. Well-segmented customer data can help businesses identify opportunities to improve customer satisfaction. These opportunities may take the form of new product development, customer service improvements, or changes to marketing strategies. By taking advantage of these opportunities, businesses can increase customer satisfaction and build stronger relationships (Safi, 2022; Zhou, 2023). By collecting customer data from various sources, businesses can detail individual customer preferences, enabling the personalization of marketing messages in product offerings. This not only increases marketing effectiveness (Martin & Nagel, 2022), but also helps in building stronger relationships between business actors and customers in the BE sector (Chaudhary et al., 2021).

In addition, integrating marketing strategies with big data methods can strengthen customer retention efforts, through a better understanding of customer needs and what they want (Rumson et al., 2017; Xiao et al., 2023). By paying attention to customer needs and desires through big data analysis, companies can develop loyalty programs that are more effective in increasing customer satisfaction. Big data can help companies understand markets, customers and competitors better, so they can make more informed business decisions (Martin & Nagel, 2022). The findings of this research state that integrating marketing strategies with

big data is not only about creating new marketing opportunities but also increasing sustainability and competitiveness in the Blue Economy sector.

CONCLUSIONS

Maritime and fisheries MSMEs find effective solutions through implementing Blue-Marketing Strategy. Implementation of this strategy not only achieves sales growth, brand awareness and customer retention, but also creates a positive image as a business actor committed to sustainability and environmental values. Sustainability integrated into products and services not only adds value, but also creates uniqueness and increases brand attractiveness. The responsiveness of MSMEs as depicted through the Blue-Marketing Strategy not only creates sustainable sales but also builds a solid foundation for brand image, providing a positive impact in the ever-changing marine and fisheries sector.

Along with this, in utilizing marketing personalization in the Blue Economy, companies not only see it as a tool to achieve business goals, but also as a key to understanding and meeting customer needs more effectively. Marketing personalization in the Blue Economy can improve marketing efficiency, support the sustainability of marine ecosystems, and strengthen the growth of the sector as a whole. In the midst of efforts to optimize marine potential, personalized marketing has become a relevant strategy in communicating with various stakeholders, from business people to end consumers. By combining data intelligence and technology, companies can deliver more relevant messages to consumers, not only to increase marketing effectiveness, but also to guide consumers in supporting sustainable practices in the Blue Economy sector. Meanwhile, the integration of Big Data Marketing is an innovative concept in optimizing aquatic resources and improving the marine and fisheries economy.

LIMITATIONS AND IMPLICATIONS

This study is constrained by the utilization of a limited dataset as the population is derived from data collected in only four regencies, preventing generalization. Furthermore, the intricacies faced by coastal MSMEs in understanding data are formidable due to the inadequate level of digitalization in coastal areas, standing at less than 30%. Hence, future research endeavors could employ the Technology Acceptance Model (TAM) to gain a deeper understanding of data integration insights.

Digital technology gives marketers powerful tools to understand customers and make more informed decisions. The integration of Big Data-based marketing strategies not only helps customer analysis and targeted marketing design, but can also strengthen customer

retention efforts and increase sustainability and competitiveness in the Blue Economy sector. By utilizing customer data from various sources, businesses can detail individual customer preferences, enabling the personalization of marketing messages in product offerings. Thus, the positive potential of Big Data Marketing integration in the Blue Economy shows a promising direction for increasing positive impacts on the environment and society, although challenges such as data security and equality of access remain serious considerations.

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