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New E-Marketing Strategies Through Big Data Optimization In Fisheries MSMEs

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Abstract *The shift towards digitalization in recent times has significantly impacted the maritime and fisheries sector, particularly Micro, Small, and Medium Enterprises (MSMEs), as they navigate through post-pandemic market challenges. This study investigates the utilization of big data to enhance the marketing efficacy of MSMEs in the fisheries industry. Employing a quantitative approach, the research engaged with over 510 respondents from fisheries MSMEs, utilizing purposive sampling. The findings indicate that new e-marketing strategy through big data optimization proves effective in enhancing sales, brand awareness, and customer retention, with a key emphasis on sustainability. Furthermore, responsiveness to market dynamics and the incorporation of e-marketing strategy within the Blue Economy are suggested as innovative approaches to address post-pandemic market shifts.*

Keywords: *Big Data, Fisheries MSMEs, New Strategy, E-Marketing, Sustainability*

1. INTRODUCTION

The dynamic era of digitalization has heralded profound transformations across various industrial sectors, particularly in the Blue Economy, notably the fishery sector. Micro, small, and medium enterprises (MSMEs) in this sector are grappling with significant sales challenges, particularly in the wake of post-pandemic market disruptions. This situation is further complicated by evolving consumer behaviors and the increasing reliance of business governance on technology. Hence, it is imperative to enhance the quality of products and services to ensure the sustainability of fisheries MSMEs amidst this climate of uncertainty. The digital age has compelled micro, small, and medium enterprises (MSMEs) in the fishing industry to confront several challenges, including restricted market access, intensifying global competition, and underutilization of information technology. Traditional marketing methods are becoming less effective, necessitating the adoption of new, more adaptable strategies by businesses. This underscores the importance of employing targeted and measurable approaches, such as digitalization and the implementation of strategic marketing concepts within the Blue Economy.

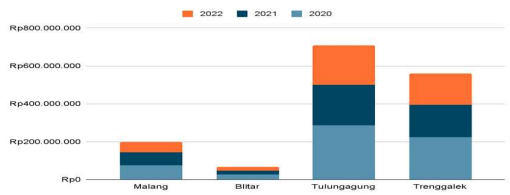

Figure 1. Contribution and Growth of the Marine & Fisheries Market

Source: Author's Elaboration, 2024

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Sales challenges encountered by MSMEs in the fisheries sector encompass alterations in consumer behavior, challenges in accessing markets efficiently, and constraints in leveraging technology. In the aftermath of the pandemic, market conditions have become more dynamic and unpredictable. For instance, empirical data from 2020 to 2022 indicates that several marine fisheries micro, small, and medium enterprises (MSMEs) in the coastal regions in Java island witnessed an average sales reduction of 30% compared to the pre-pandemic era (see Figure 1). In tackling this challenge, the adoption of digitization is deemed imperative. Digital transformation is not merely a requisite for surmounting sales hurdles; rather, it serves as the linchpin for enhancing the competitiveness of fisheries MSMEs. Broadening market reach via online platforms, leveraging data for more discerning decision-making, and adapting to evolving consumer trends are pivotal measures in this transformative strategy.

This study endeavors to comprehend the operational mechanisms of big data systems aimed at enhancing marketing efficacy within the marine and fisheries domain. The ramifications of this study are multifaceted. From an academic perspective, it aspires to augment the comprehension surrounding the implementation of big data within the marketing milieu of the marine and fisheries sector. For stakeholders entrenched within the blue economy, this study offers pragmatic counsel for refining their marketing tactics. Moreover, governmental bodies and non-profit organizations can leverage the insights gleaned from this research as a framework for formulating supportive policies and initiatives tailored to Fisheries MSMEs.

The marine and fisheries sector plays a pivotal role within the sustainable development framework termed the Blue Economy, which emphasizes the responsible utilization of marine and fisheries resources. This framework encompasses the integration of economic, ecological, and social dimensions to optimize marine resources within a development framework that prioritizes sustainability. The Blue Economy transcends mere economic exploitation of marine resources, instead emphasizing endeavors to safeguard both economic assets and the marine ecosystem. With over 80% of global trade reliant on oceanic routes , achieving a harmonious balance between sustainability and economic prosperity is imperative for ensuring global economic resilience. Furthermore, the global maritime industry contributes approximately $1.5 trillion in value annually, underscoring its substantial contribution to the global societal framework.

One of the fundamental components of contemporary marketing strategies lies in the utilization of Big Data. Big data plays a pivotal role within the Blue Economy by furnishing an intricate comprehension of prevailing trends and formulating invaluable models and

strategies. The World Ocean Database, the most extensive and long-standing repository of global marine data, has emerged as an indispensable resource, boasting over two decades of research and accumulating more than 20,000 datasets, thereby imparting critical insights for various related sectors. Despite the abundance of marine and coastal data, a significant portion of it remains stored in private and manual repositories. Proprietary data tends to be closely guarded and less publicly accessible, likely due to its perceived high value.

The utilization of big data transcends specific entities, showcasing its versatility. For instance, it facilitates weather pattern forecasting, enhances the optimization of renewable energy sources, and boosts efficiency in hydroelectric power plants . Both governments and energy companies can leverage this dataset to enhance the effectiveness of their operations. Despite its primary role as a tool, the potential of big data spans across diverse sectors, catering to individual market requirements. The advantages of big data are not confined to merely augmenting revenue or production capacities. In the marine observation sector, big data is gaining significance in tandem with the rising demand for maritime technology. Its advantages extend beyond economic gains, encompassing the well-being of marine habitats and ecosystems, which are integral considerations.

The significance of big data in the implementation of a Blue Economy strategy lies in its capacity to offer valuable insights. For instance, data on water temperature can be utilized as a model to enhance efficiency in the fishing industry. Big data encompassing various facets of the ocean provides crucial insights for each sector, enabling them to coordinate, evaluate, and adjust their interactions with marine resources. Ensuring information accessibility and transparency is an integral component of a robust strategy, which will ultimately benefit the global maritime economy. In this manner, big data offers advantages to various facets of the Blue Economy, facilitating different entities to coordinate the utilization of natural resources and serving as an effective tool in crafting sustainable and practical strategies.

Big Data constitutes a vast and intricate dataset that can be scrutinized to unveil patterns, trends, and correlations beneficial for business decision-making. Despite its promising prospects, leveraging information technology and implementing blue-based marketing strategies encounter several challenges. A primary challenge is the constrained market access for MSMEs in the coastal sector. Limited infrastructure and information accessibility frequently impede MSMEs from broadening their market reach, particularly in the digitalization era that intensifies global competition. Furthermore, escalating global competition poses a hindrance for MSMEs in the coastal sector. They must competently contend with rivals from diverse regions worldwide, often endowed with greater resources and

broader market access. Hence, a fitting marketing strategy is imperative to triumph in this global competition . Drawing from these prevailing circumstances, a conceptual framework was formulated as the groundwork for this study (see Figure 2).

There is considerable research on the application of Big Data in marketing. However, studies focusing on its impact on marketing in the Fisheries MSMEs sector are scarce. Therefore, this study aims to fill this gap in the literature and offer valuable insights for industry practitioners and stakeholders.

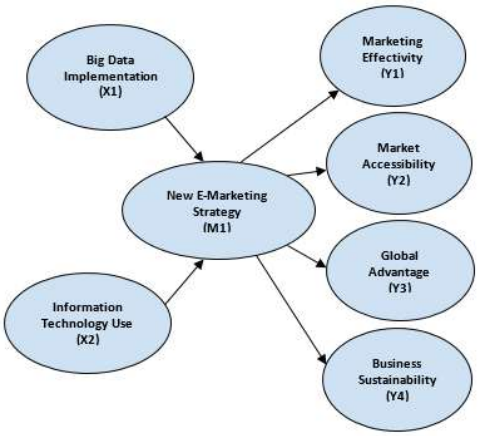

Figure 2. Research Conceptual Framework

2. METHODS

This study was undertaken in the calendar year 2023, employing a quantitative approach aimed at elucidating the impact of big data application on marketing efficiency among MSMEs in the fisheries sector situated in coastal regions. The study population comprised fisheries MSME operators located in the southern coastal areas of Java Island, numbering over 5000 establishments. A total of 510 respondents were selected as research participants using purposive sampling methodology, wherein the selection criteria were intentionally aligned with the research objectives. Data collection from respondents was facilitated through the utilization of a questionnaire as the primary research instrument.

Table 1. Distribution of Variables

Variable	Indicator
Application of Big Data (X1)	X1.1 FrequencyData collection
	X1.2 IntegrationData Digital
	X1.3 Capacity Data Management
	X1.4 GuaranteeData Security
Use of Information Technology	X2.1 Technology Acceptance

(X2)	X2.2	Utilizing Digitalization
	X2.3	System Adaptation
New E-Marketing Strategy (M1)	M1.1	PMarketing personalization
	M1.2	Data-Based Decision Making Marketing
	M1.3	Responsibilitas Pasar
	M1.4	Based Market Segmentation Data
Marketing Effectiveness (Y1)	Y1.1	LevelSales 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	Principle Environmentally Friendly Material
	Y4.2	Participation in Sustainability Initiatives
	Y4.3	Business System Justice

Source: Author's Elaboration, 2024

The questionnaire was designed to elicit the views, experiences, and attitudes of respondents regarding the utilization of big data in marketing their MSMEs, as detailed in Table 1. Data were gathered via an online survey conducted using Google Forms, offering respondents the option of selecting a response on an interval scale of 1-10. Subsequently, the collected data will be subjected to analysis utilizing the SEM-PLS using SmartPLS software. This study will adhere to the tenets of research ethics, ensuring data validity, respondent confidentiality, and the utilization of data solely for research purposes.

3. RESULT & DISCUSSION

Data Evaluation

The model is assessed for internal reliability using convergent validity tests. Convergent validity is evaluated by examining the Convergent Validity Test value, where the Minimum Average Variance Extracted value is expected to exceed the threshold of 0.5. Additionally, reliability is tested by verifying the Composite Reliability value, which should

exceed 0.7, ensuring the model's reliability. The analysis results, as shown in Table 2, indicate that all data meet the criteria for validity and reliability.

Table 2. Reliability & Convergent Validity Test Results

Variables	CR	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's elaboration, 2024

Table 3. Uji R-Square

Variables	R^2	Adjusted R^2
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, 2024

The structural model was assessed using the R-Square test, as presented in Table 3 The findings indicate that the R-Square value approaches 1, suggesting that the model adequately explains the variation in the dependent variable in this study.

Testing Construct Relationships

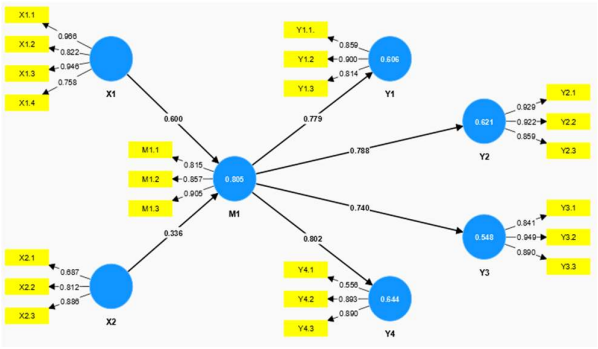

Figure 3. Path Analysis Results

Source: Author's Elaboration, 2024

The hypothesis was examined using Total Effects to uncover the impact of the formulated construct values. The results of the Total Effects analysis on the research sample indicate that the influence of M1 on Y1, Y2, Y3, and Y4 respectively is 0.779, 0.788, 0.740, and 0.802, surpassing the sample mean (M) and showing a relatively small standard deviation. This suggests that the relationship between M1 and the dependent variable (Y) tends to be stable and significant. The t-test statistic for the influence of M1 on Y1 to Y4 also demonstrates a significant value, with P Values of 0.000, indicating a high level of statistical significance. Moreover, the impact of the independent variable (X1) on M1 and the dependent variables (Y1 to Y4) was also found to be significant, with values of 0.600 and 0.467, 0.473, 0.445, and 0.482, respectively. With consistent P values of 0.000 throughout the analysis, it can be concluded that all relationships observed in this study are statistically significant. These results offer empirical support for the model utilized in this research, suggesting that the factors measured by these variables interact and contribute significantly to understanding the phenomenon being studied.

Table 4. Total *Effects Results*

	O	M	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, 2024

Responsive Strategy for Facing Market Changes

The phenomenon of changing times and post-pandemic challenges underscores the necessity for agile responsiveness to sustain and enhance competitiveness. The significance of responsiveness in market dynamics is evident in the impact of big data optimization on marketing effectiveness. Sales growth, brand awareness, and customer retention are the primary focuses, with big data optimization proving to be a pertinent and effective aspect in achieving these objectives . This strategy extends beyond mere product sales, emphasizing the establishment of a positive image as a business entity committed to sustainability and environmental values. Communicating sustainability through products and services fosters uniqueness, enhances brand appeal, and instills consumer awareness regarding the importance of supporting sustainability principles.

The marketing efficacy of fisheries MSMEs receives a considerable uplift through the adoption of big data optimization. The emphasis on sustainability principles has yielded substantial value in goods and services, encouraging consumers to opt for sustainable alternatives. Hence, the adaptability of MSMEs to market dynamics not only ensures continual sales but also establishes a robust brand image.

Big data optimization can be effective by embedding sustainability values in the consumer experience, creating sustainable relationships. In responding to changes in market dynamics, big data optimization is an important foundation that is able to answer challenges and take advantage of opportunities. The ability of fisheries MSMEs to respond nimbly through this strategy illustrates their commitment to sustainability and excellence in an ever-changing market.

Implications of New E-Marketing Strategies through Big Data Optimization on Personalized Marketing

Personalized marketing is not only a tool to achieve business goals, but also the key to understanding and meeting customer needs more effectively. The Blue Economy places sustainability and utilization of marine resources as a top priority. One of the right strategies is that marketing personalization appears to increase the relevance of business communications with various stakeholders, from business people to end consumers. Marketing personalization involves the use of data and technology to deliver messages tailored to individual characteristics, behaviors and preferences. Marketing personalization can play a crucial role in increasing this efficiency. Through careful data analysis, businesses can understand consumer behavior in depth, predict their needs, and present relevant information. By understanding consumers' individual preferences, businesses can craft more appropriate product and service offerings, increase consumer response rates, and build long-term relationships. This kind of efficiency can create competitive advantages, strengthen business positions, and support the growth of the Blue Economy sector.

Personalized marketing serves as a valuable tool to enhance public awareness and engagement in sustainable practices. This approach enables businesses to educate consumers on conservation and foster a sense of responsibility towards marine environments. Furthermore, personalized marketing can be instrumental in encouraging consumers to adopt more sustainable behaviors. For instance, businesses in the marine tourism sector can leverage personalized marketing strategies to promote ecotourism destinations tailored to the preferences of eco conscious tourists.

Despite its significant potential, one of the challenges in implementing personalization is data security, particularly concerning the use of sensitive consumer data. Businesses must ensure that their marketing personalization practices comply with relevant privacy regulations and business ethics. Additionally, ensuring equality of access to marketing personalization is essential, ensuring that all stakeholders have an equal opportunity to benefit from this practice. The utilization of marketing personalization in big data optimization has created opportunities

to enhance marketing efficiency, bolster the sustainability of the marine ecosystem, and bolster the growth of this sector. The amalgamation of data intelligence and technology can deliver more pertinent messages and empower consumers to endorse sustainable practices for businesses.

Data Integration for the Blue Economy Industry

Before the advent of the digital age, business entities primarily engaged with consumers through traditional advertising methods and brick-and-mortar stores. However, with the evolution of digital and social media platforms, coupled with the widespread use of mobile devices, these interactions have evolved into more interactive and continuous dialogues. Digital technology has provided marketers with potent tools to comprehend consumer behavior and make more informed strategic decisions. The incorporation of Big Data Marketing in the Blue Economy represents a concept aimed at optimizing aquatic resources and enhancing the marine and fisheries sector's economic performance. The assimilation of Big Data-driven Marketing Strategy within the Blue Economy presents an innovative approach to confronting future challenges.

If businesses employ big data methodologies, they can gain a deeper understanding of consumer behavior, market trends, and preferences. Big data also aids in identifying potential risks and devising market-responsive marketing strategies. The advantage of using this approach in marketing strategy integration lies not only in customer analysis but also in more precise marketing planning. Well-segmented customer data enables businesses to identify areas for enhancing customer satisfaction. These opportunities may manifest in the form of new product development, improvements in customer service, or adjustments to marketing strategies. By capitalizing on these opportunities, businesses can enhance customer satisfaction and cultivate stronger relationships. This indicates that small-scale fisheries not only enhance marketing effectiveness, but also contribute to fostering stronger relationships between businesses and customers.

Furthermore, the integration of marketing strategies with big data methodologies can enhance customer retention endeavors by providing a deeper insight into customer preferences and requirements. Big data enables firms to gain a more comprehensive understanding of markets, customers, and competitors, empowering them to make more informed strategic decisions. The outcomes of this study indicate that the amalgamation of marketing strategies with big data analytics is not merely about discovering novel marketing avenues, but also about enhancing sustainability and competitiveness within the Blue Economy sector.

4. CONCLUSION

The new e-marketing strategy proves to be effective in enhancing sales growth, brand awareness, and customer retention for fisheries MSMEs. The responsiveness of MSMEs to market dynamics through this strategy not only generates sustainable sales but also establishes a robust foundation for brand reputation. Personalized marketing within the Blue Economy is pivotal in comprehending and addressing customer needs more efficiently. Such marketing personalization enhances the relevance of business communications across diverse stakeholders, ranging from entrepreneurs to end consumers. The incorporation of Big Data Marketing within the Blue Economy presents a significant opportunity to enhance marketing efficacy, bolster the sustainability of the marine ecosystem, and bolster sectoral growth. Through the aggregation and analysis of customer data from varied sources, businesses can gain profound insights into consumer behavior, market trends, and consumer preferences, thereby aiding in the formulation of more effective marketing strategies that are attuned to market dynamics.

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