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Blue Innovation, Value Creation, and Decision-making on Digital Performance and Sustainability

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Abstract
This study proposed model framework introduces a novel approach by positioning Blue Innovation as a primary driver of Value Creation and Decision-Making, which in turn mediate the relationship between Digital Performance and Sustainability. In this quantitative research, data will be collected using a structured questionnaire. The sample size will be 155 respondents. This study uses Structural Equation Modeling (SEM) analysis to analyze the influence of independent, intervening, and control variables on the dependent variable. The findings provide significant insights into how these variables interact and influence one another, summarized as blue innovation significantly enhances digital performance, value creation has a strong positive impact on digital performance, decision-making significantly improves digital performance, blue innovation positively influences sustainability, value creation cannot directly increase sustainability, decision-making has a significant positive impact on sustainability, digital performance significantly enhances sustainability, blue innovation increases sustainability through digital performance, value creation indirectly increases sustainability through digital performance, decision-making positively influences sustainability through digital performance.

Keywords: Sustainability, Digital Performance, Blue Innovation, Value Creation, Decision-making
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1.0 INTRODUCTION

In the era of rapid technological advancement and global environmental concerns, businesses are increasingly pressured to balance profitability with sustainability (Feroz et al., 2021). This dual focus has led to the emergence of Blue Innovation, which integrates eco-friendly and water-conscious practices into business operations while fostering technological and operational advancements. Simultaneously, the concepts of Value Creation, Decision-Making, and Digital Performance have gained prominence as key drivers of competitive advantage in the digital economy (Junaedi, Renaldo, Yovita, Veronica, & Sudarno, 2023). Understanding how these elements collectively impact organizational sustainability is essential for formulating effective strategies in the modern business landscape (Junaedi, Renaldo, Yovita, Veronica, & Jahrizal, 2023a; Junaedi, Panjaitan, et al., 2024).

Despite the growing emphasis on sustainability, many organizations struggle to integrate blue innovation into their core operations. A significant gap exists in leveraging digital tools to enhance both environmental performance and profitability (Tjahjana et al., 2024), particularly in industries reliant on water-intensive processes (Renaldo et al., 2024). For instance, sectors such as agriculture and manufacturing report challenges in aligning their technological advancements with water sustainability practices, leading to inefficiencies and stakeholder dissatisfaction.

Moreover, decision-making processes often fail to incorporate the long-term benefits of sustainability, resulting in short-sighted strategies that undermine digital performance (Bansal & DesJardine, 2014). This disconnect highlights the need for a comprehensive framework that links blue innovation, value creation, and informed decision-making to achieve superior digital performance while promoting sustainability.

A report by the World Resources Institute (2023) revealed that over 40% of companies in water-intensive industries lack strategies for reducing water usage. According to Gartner (2024), 78% of companies prioritize digital transformation, but only 25% align these initiatives with water sustainability goals. Reports from Statista (2023) indicate that global spending on water-saving technology innovation reached $450 billion, yet the adoption rate in operational decision-making remains at just 35%. A Deloitte (2022) survey found that organizations with integrated water sustainability and digital performance frameworks report a 30% higher stakeholder trust score.

The proposed model framework introduces a novel approach by positioning Blue Innovation as a primary driver of Value Creation and Decision-Making, which in turn mediate the relationship between Digital Performance and Sustainability. Unlike traditional frameworks, it explicitly links blue innovation with digital outcomes, highlighting the role of water-conscious practices in enhancing technological efficiency and operational productivity. The framework recognizes the critical role of informed decision-making in aligning innovation and value creation with long-term water sustainability goals. By incorporating blue initiatives into value creation processes, the model broadens the scope of value beyond financial returns to include environmental and social impacts related to water conservation. The framework addresses the interplay between short-term digital performance metrics and long-term water sustainability objectives, offering a holistic perspective on organizational success.

2.0 LITERATURE REVIEW

Triple Bottom Line Theory

Integrating the three key dimensions of sustainability, economic, social and environmental into business strategy. Becoming the main framework for understanding sustainability in the context of modern business, especially when linked to digital performance and innovation (Correia, 2019).

Sustainable Innovation Theory

Emphasizing innovation that not only improves operational efficiency but also reduces environmental impact. This theory explains how environmentally friendly innovation, especially related to water (blue innovation), can support sustainability and provide competitive advantage (Agrawal et al., 2024).

Stakeholder Theory

This theory emphasizes the importance of creating value not only for shareholders but also for all stakeholders (employees, customers, communities, and the environment). It also helps explain how blue innovation can create broader value in the context of sustainability and stakeholder satisfaction (Awa et al., 2024).

Bounded Rationality Theory

Recognizing that decisions are often made with imperfect information and within the limits of human cognitive capacity. It is useful to understand how decisions about innovation and sustainability are made under time, cost, and information constraints (Constantino et al., 2021).

Diffusion of Innovation Theory

Explains how new technologies are adopted and spread in organizations or societies. This theory helps analyze how digital performance can be improved through the adoption of technologies related to blue innovation and sustainability (Khan et al., 2022).

Sustainability

Sustainability encompasses the ability to meet current needs without compromising the ability of future generations to meet theirs (Elsawy & Youssef, 2023). The triple bottom line: economic, social, and environmental serves as the foundation for sustainable business practices (Wati et al., 2023). Research by Elkington (1997) and subsequent scholars has demonstrated that sustainability is no longer a choice but a necessity for long-term competitiveness. The integration of water sustainability into this framework is increasingly relevant, given the global water crisis.

Digital Performance

Digital performance refers to the effectiveness of digital tools and technologies in achieving organizational objectives (Junaedi, Renaldo, et al., 2024). As highlighted by Gartner (2024), digital performance is increasingly viewed as a critical enabler of sustainability. By leveraging data analytics, IoT, and AI, organizations can optimize resource use, monitor environmental impacts, and enhance operational efficiency. Studies by Patel et al. (2023) show that companies with high digital performance metrics tend to have better sustainability outcomes, yet the role of blue innovation in driving these outcomes is still under-researched.

Blue Innovation

Blue Innovation emphasizes the integration of sustainable water management practices into business operations, focusing on reducing water consumption and pollution while enhancing operational efficiency (Ramin et al., 2024).

Scholars such as Smith and Brown (2022) have highlighted the importance of blue innovation in addressing water scarcity, particularly in industries with high water usage. Their studies indicate that adopting water-saving technologies not only mitigates environmental impact but also enhances cost efficiency and compliance with regulatory standards.

Value Creation

Value creation, a cornerstone of business strategy, refers to the processes by which organizations deliver superior benefits to stakeholders (Baltova & Baltov, 2017). Porter (1985) introduced the concept of value chains, which has since evolved to include environmental and social dimensions. Recent studies by Nguyen and Lee (2023) emphasize that integrating sustainability into value creation processes leads to increased customer loyalty, brand reputation, and long-term financial performance. The intersection of value creation and blue innovation remains underexplored, offering fertile ground for research.

Decision-Making

Effective decision-making involves selecting the best course of action among alternatives to achieve organizational goals (Panpatte & Takale, 2019). In the context of sustainability, decision-making processes must account for long-term environmental and social impacts. According to Miller and Johnson (2024), organizations with robust decision-making frameworks are more likely to align their operations with sustainability goals. However, integrating water-conscious considerations into decision-making remains a challenge, particularly in industries with complex supply chains.

Hypothesis

H1: Blue innovation increases digital performance
H2: Value creation increases digital performance
H3: Decision making increases digital performance
H4: Blue innovation increases sustainability
H5: Value creation increases sustainability
H6: Decision making increases sustainability
H7: Digital performance increases sustainability
H8: Blue innovation increases sustainability through digital performance
H9: Value creation increases sustainability through digital performance
H10: Decision making increases sustainability through digital performance

Research Framework

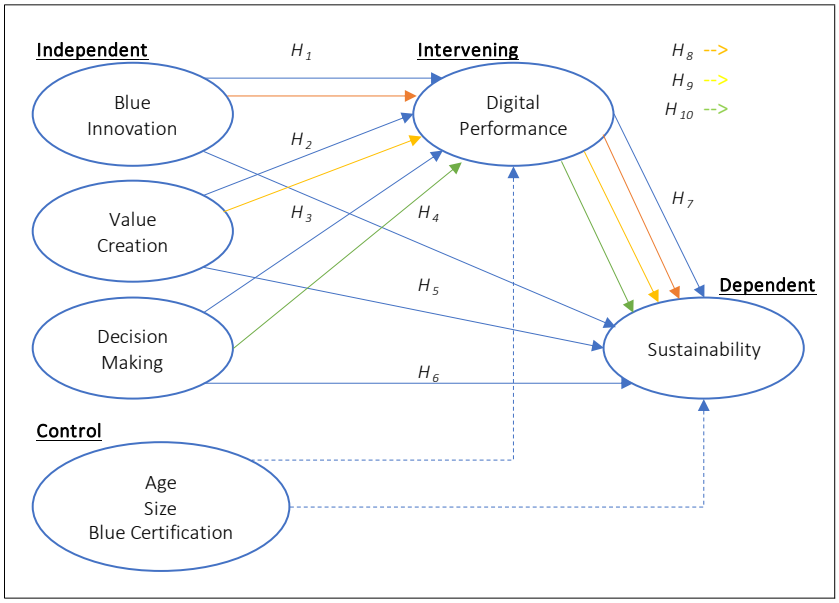

Figure 1. Research Framework

3.0 METHODOLOGY

Research Design

In this quantitative research, data will be collected using a structured questionnaire, employing a 6-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree) to measure participants' responses (Sekaran & Bougie, 2016). The data will then be analyzed using various tools, including descriptive statistics to summarize the characteristics of

the dataset, validity and reliability testing to ensure the accuracy and consistency of the measurements, and Structural Equation Modeling (SEM) to examine the relationships between variables and test the proposed hypotheses. These methods will provide insights into the underlying patterns and relationships within the data, supporting a robust analysis of the research questions.

Population and Sample

Companies in Indonesia involved in water or sea-related sectors, such as aquaculture, fisheries, shipping, marine tourism, and water treatment. The sampling technique employed in this research will be purposive sampling, where participants are selected based on specific characteristics that align with the research objectives. The sample size will be a minimum of 155 respondents, in accordance with SEM guidelines, which recommend having 5 times the number of dimensions in the questionnaire to ensure reliable results (Hair et al., 2019). This approach ensures that the sample is both relevant and sufficient for the analysis, providing a solid foundation for testing the proposed hypotheses and examining the relationships between the variables.

Variable Operationalizations

The operationalization of the variables can be seen in Appendix 1. For control variable, thi study use firm age (Age), firm size (Size), and blue certification. Age was measured by the number of firm establish. Size was measured by the number of employees in the firm. Blue certification was measured by the number of water, ocean, etc. certification that the firm has.

Descriptive Statistics

Descriptive statistics summarize the demographic and operational characteristics of the respondents and companies (Lind et al., 2018). The company profile includes details such as the industry type, company size, and years of operation, providing context for understanding the organizational setting in which the research is conducted. For the respondent profile, key information such as job title, years of experience, and educational background will be gathered to better understand the demographic characteristics of the participants and their relevance to the study. In terms of the key variables, the research will present statistical measures including the mean, median, mode, standard deviation, minimum, and maximum scores for each variable, offering insights into the distribution and central tendency of the data, as well as the variability across the respondents. These details will support a comprehensive analysis of the data and the relationships between the variables under investigation.

Validity and Reliability Test

For the validity test, outer loadings test is used with value greater than 0.6, indicating that the sample size is adequate for next analysis. Additionally, average variance extracted (AVE) must be greater than 0.5 to ensure that each item is well-represented by the factors. For the reliability test, Cronbach's Alpha will be used to evaluate the internal consistency of the scales. A Cronbach's Alpha value greater than 0.7 will be considered acceptable, indicating that the items within each scale are consistently measuring the same construct. This study also use discriminant validity, with criteria all of the result should under 0.8. These methods will ensure the robustness and reliability of the measurement instruments used in the research.

Multicollinearity Test

Multicollinearity test is useful for analyzing the correlation between independent variables in a research model. A good research model is detected through the Variance Inflation Factor (VIF) value which must be below 10. If it meets the requirements, then the next analysis can be carried out.

Model Test

This assess the proportion of variance explained by the independent variables in the dependent variables. The criteria is higher R^2 indicates stronger explanatory power. This is the first model test. The second model test is f-square test. The more higher the value, indicates good effect from the independent variable. The last test it predictive relevance (Q^2). To calculate the Q^2 value, the following formula is used::

$$Q^2 = 1 - (1 - R_1^2)\,(1 - R_2^2)\,\ldots.\,(1 - R_n^2)$$

Predictive relevance is a test conducted to show how good the observation value is produced using the blindfolding procedure by looking at the Q^2 value. If the Q^2 value> 0 then it can be said to have a good observation value, while if the Q^2 value < 0 then it can be stated that the observation value is not good. Q^2 predictive relevance for structural models, measures how well the conservation value is produced by the model and also its parameter estimates. A Q^2 value > 0 indicates that the model has predictive relevance; conversely, if the Q^2 value ≤ 0 indicates that the model has less predictive relevance. The larger the Q^2 value indicates a more relevant predictive value. All three of these model tests are expected to have large values.

Structural Equation Modeling Analysis

This study uses Structural Equation Modeling (SEM) analysis to analyze the influence of independent, intervening, and control variables on the dependent variable. The SEM analysis in this study uses SMART PLS. The structural equations formed are as follows:

$$\text{Digital Performance} = a_1 \text{ Blue Innovation} + a_2 \text{ Value Creation} + a_3 \text{ Decision Making} + a_4 \text{ Age} + a_5 \text{ Size} + a_6 \text{ Blue Certification} + e_1$$

$$\text{Sustainability} = a_7 \text{ Blue Innovation} + a_8 \text{ Value Creation} + a_9 \text{ Decision Making} + a_{10} \text{ Digital Performance} + a_{11} \text{ Age} + a_{12} \text{ Size} + a_{13} \text{ Blue Certification} + e_2$$

Hypothesis Testing

Path coefficients (β) from SEM will test the direct relationships among variables. If p-value < 0.05 than it is has significant relationship. Standardized Coefficients (β) to determine strength and direction.

Mediation Test

Baron & Kenny's approach to assess if the mediator reduces the direct effect between the independent and dependent variable. We use SEM to perform indirect effect testing. If p-value < 0.05 than it is significant indirect effects. Sobel Test or bootstrapped confidence intervals can be used in this study.

4.0 RESULTS AND DISCUSSION

Descriptive Statistics

Table 1. Descriptive Statistics Output

	Sustainability	Digital Performance	Blue Innovation	Value Creation	Decision Making	Age	Size	Certification
Mean	4.523	4.515	4.513	4.475	4.515	16.116	-	2.684
Median	4.448	4.524	4.500	4.500	4.500	16.000	4.000	3.000
Mode	4.581	4.524	4.750	4.500	4.750	6.000	5.000	5.000
Stdev	0.557	0.528	0.384	0.368	0.381	6.664	0.915	1.701
Min	3.162	3.214	3.250	3.250	3.250	4.000	2.000	0.000
Max	6.000	5.786	5.500	5.500	5.750	27.000	6.000	5.000

Source: Processed data, 2024

Based on the results of descriptive statistical tests, it can be seen that the variables of sustainability, digital performance, blue innovation, value creation and decision making using a 6-scale Likert scale show good results. For the age of the company with an average of 16 years, the size of the company based on the number of employees is in category 4, namely 151-200 employees and on average each company has 2 to 3 certifications related to marine affairs.

Validity and Reliability Test

Table 2. Outer Loadings Output

Variable	Ind.	Outer loadings	Variable	Ind.	Outer loadings	Variable	Ind.	Outer Loadings
Sustainability	Y2.1	0.953	Blue Innovation	X1.1	0.978	Decision Making	X3.1	0.977
	Y2.2	0.945		X1.2	0.980		X3.2	0.983
	Y2.3	0.942		X1.3	0.977		X3.3	0.972
	Y2.4	0.958		X1.4	0.959		X3.4	0.964
	Y2.5	0.990		X1.5	0.970		X3.5	0.960
							X3.6	0.959
Digital Performance	Y1.1	0.956	Value Creation	X2.1	0.982		X3.7	0.947
	Y1.2	0.975		X2.2	0.979			
	Y1.3	0.980		X2.3	0.981			
	Y1.4	0.984		X2.4	0.956	Age		1.000
	Y1.5	0.982		X2.5	0.959	Blue Certification		1.000
	Y1.6	0.974		X2.6	0.942			
	Y1.7	0.957		X2.7	0.895	Size		1.000

Source: Processed data, 2024

Based on the results of the outer loadings test, all values are above 0.7. This means that all indicators are valid and can be continued to the next stage of analysis.

Table 3. Construct Reliability and Validity Output

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Sustainability	0.977	0.978	0.982	0.917

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Digital Performance	0.990	0.991	0.992	0.946
Blue Innovation	0.986	0.986	0.989	0.946
Value Creation	0.984	0.984	0.987	0.915
Decision Making	0.988	0.988	0.990	0.933

Source: Processed data, 2024

Based on the analysis results, all reliability criteria are above 0.7 and the AVE value is above 0.5. This means that it has met the rules and can be continued to the next stage of analysis.

Table 4. Discriminant Validity Output

	Age	Blue Certification	Blue Innovation	Decision Making	Digital Performance	Size	Sustainability
Age							
Blue Certification	0.032						
Blue Innovation	0.018	0.101					
Decision Making	0.041	0.061	0.504				
Digital Performance	0.107	0.134	0.667	0.616			
Size	0.027	0.053	0.188	0.272	0.315		
Sustainability	0.039	0.192	0.589	0.595	0.682	0.311	
Value Creation	0.021	0.225	0.554	0.602	0.709	0.283	0.614

Source: Processed data, 2024

Based on the results of the analysis, all results of the discriminant validity test are below 0.8. This means that it has met the requirements of discriminant validity and can be continued to the next stage of analysis.

Multicollinearity Test

Table 5. Multicollinearity Test Output

	VIF
Age -> Digital Performance	1.005
Age -> Sustainability	1.031
Blue Certification -> Digital Performance	1.076
Blue Certification -> Sustainability	1.077
Blue Innovation -> Digital Performance	1.526
Blue Innovation -> Sustainability	1.854
Decision Making -> Digital Performance	1.695
Decision Making -> Sustainability	1.794
Digital Performance -> Sustainability	2.802
Size -> Digital Performance	1.121
Size -> Sustainability	1.149
Value Creation -> Digital Performance	1.916
Value Creation -> Sustainability	2.302

Source: Processed data, 2024

Based on the test results, it can be seen that all VIF values are below 10. This means that the research model is free from multicollinearity problems and can be continued to the next stage of analysis.

Model Test

Table 6. Coefficient Determination Test Output

	R-square	R-square adjusted
Digital Performance	0.643	0.629
Sustainability	0.548	0.527

Source: Processed data, 2024

Based on the test results for the digital performance variable, the adjusted R-square value is 0.629. This means that the variables blue innovation, value creation, decision making, age, size, and blue certification have an effect of 62.9% on digital performance, while the rest is influenced by other factors. While the adjusted R-square value for the sustainability variable is 0.527. This means that the variables blue innovation, value creation, decision

making, digital performance, age, size, and blue certification have an effect of 52.7% on sustainability, while the rest is influenced by other factors.

Table 7. f-square Test Output

	Digital Performance	Sustainability
Blue Innovation	0.215	0.042
Value Creation	0.201	0.015
Decision Making	0.058	0.055
Digital Performance		0.066
Age	0.026	0.000
Size	0.024	0.018
Blue Certification	0.000	0.020

Source: Processed data, 2024

Based on the results of the f-square test, it can be seen that the dominance of the results has a large number. This means that most of the independent variables have a good influence on the digital performance and sustainability variables.

In calculating predictive relevance (Q^2), it is obtained based on the following calculations:

$$Q^2 = 1 - (1 - 0.643)\ (1 - 0.548) = 0.839$$

This means that the model in this study has a relevant predictive value, where the model used can explain the information in the research data by 83.9%.

Structural Equation Modeling Analysis

Table 8. Structural Equation Modeling Output

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values (1-tailed)
Blue Innovation -> Digital Performance	0.342	0.342	0.061	5.599	0.000
Value Creation -> Digital Performance	0.371	0.373	0.080	4.649	0.000
Decision Making -> Digital Performance	0.188	0.186	0.072	2.603	0.005
Age -> Digital Performance	0.096	0.095	0.051	1.884	0.030
Size -> Digital Performance	0.098	0.101	0.059	1.673	0.047
Blue Certification -> Digital Performance	0.013	0.014	0.053	0.253	0.400
Blue Innovation -> Sustainability	0.188	0.189	0.085	2.200	0.014
Value Creation -> Sustainability	0.124	0.121	0.099	1.244	0.107
Decision Making -> Sustainability	0.210	0.208	0.095	2.204	0.014
Digital Performance -> Sustainability	0.289	0.293	0.096	3.022	0.001
Age -> Sustainability	0.001	-0.001	0.057	0.011	0.496
Size -> Sustainability	0.096	0.097	0.056	1.718	0.043
Blue Certification -> Sustainability	0.098	0.101	0.059	1.654	0.049

Source: Processed data, 2024

Based on the results of SEM testing, it can be seen that all variables have a positive influence on both digital performance and sustainability. The resulting structural equations are as follows:

Digital Performance = 0.342 Blue Innovation + 0.371 Value Creation + 0.188 Decision Making + 0.096 Age + 0.098 Size + 0.013 Blue Certification

Sustainability = 0.188 Blue Innovation + 0.124 Value Creation + 0.210 Decision Making + 0.289 Digital Performance + 0.001 Age + 0.096 Size + 0.098 Blue Certification + e_2

Table 9. Mediation Test Output

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values (1-tailed)
Blue Innovation -> Digital Performance -> Sustainability	0.099	0.100	0.038	2.589	0.005
Value Creation -> Digital Performance -> Sustainability	0.107	0.109	0.043	2.514	0.006
Decision Making -> Digital Performance -> Sustainability	0.054	0.054	0.028	1.949	0.026

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values (1-tailed)
Age -> Digital Performance -> Sustainability	0.028	0.028	0.018	1.563	0.059
Size -> Digital Performance -> Sustainability	0.028	0.030	0.022	1.312	0.095
Blue Certification -> Digital Performance -> Sustainability	0.004	0.004	0.016	0.236	0.407

Source: Processed data, 2024

Hypothesis Testing

Based on the results of the one-tailed SEM test, it shows that several hypotheses are accepted and rejected, with the following details:

H1: Blue innovation increases digital performance, accepted in 1%
H2: Value creation increases digital performance, accepted in 1%
H3: Decision making increases digital performance, accepted in 1%
H4: Blue innovation increases sustainability, accepted in 5%
H5: Value creation increases sustainability, rejected
H6: Decision making increases sustainability, accepted in 5%
H7: Digital performance increases sustainability, accepted in 5%

To assess hypothesis 8 to hypothesis 10, we use mediation test result, with the following details:

H8: Blue innovation increases sustainability through digital performance, accepted in 1%
H9: Value creation increases sustainability through digital performance, accepted in 1%
H10: Decision making increases sustainability through digital performance, accepted in 5%

Discussion

Blue Innovation Increases Digital Performance

Blue innovation refers to innovative approaches aimed at fostering sustainable practices while leveraging resources efficiently, particularly in industries and activities connected to oceans and water ecosystems. It focuses on eco-friendly solutions, advanced technology adoption, and innovative business models that prioritize sustainability and performance (Renaldo, 2023).

Blue innovation incorporates cutting-edge digital technologies such as IoT, artificial intelligence (Junaedi, Renaldo, Yovita, Veronica, & Jahrizal, 2023b), and blockchain for monitoring, data collection, and optimization of resources (Williams et al., 2024). Advanced data analytics tools improve decision-making processes, enabling businesses to identify inefficiencies and optimize operations. The use of IoT sensors in marine resource management enhances tracking and optimization, directly improving operational digital performance.

Blue innovation acts as a catalyst for digital performance improvement by integrating sustainable practices with advanced digital technologies (He & Chen, 2024). It fosters efficiency, innovation, and adaptability, which are key to achieving competitive advantage and sustainability in a rapidly changing digital economy. This alignment enables organizations to thrive while contributing to ecological preservation and resource optimization.

The research results are in line with the diffusion of innovation theory because advanced marine technology will support the company's digital performance. The adoption of advanced marine technology represents an innovative solution that integrates cutting-edge tools and methods into organizational practices. This aligns with the theory's premise that innovations, particularly those perceived as beneficial, compatible, and technologically advanced, are more likely to be adopted.

Value Creation Increases Digital Performance

Value creation refers to the process of delivering benefits to stakeholders, such as customers, employees, investors, and society, through innovative, efficient, and impactful strategies (Kurznack et al., 2021). It encompasses economic, social, and environmental contributions that enhance stakeholder satisfaction and organizational success. When organizations focus on value creation, they can directly or indirectly boost their digital performance.

Value creation involves delivering personalized solutions to customers. Leveraging digital platforms and tools (e.g., AI, CRM systems) enables businesses to provide tailored services that improve engagement and loyalty. By focusing on customer needs, businesses can use digital innovations to deliver value effectively, increasing traffic and interaction on digital platforms. A company using AI chatbots to provide real-time customer support creates value through responsiveness and boosts digital engagement metrics.

Value creation and digital performance are mutually reinforcing. By prioritizing value creation, organizations invest in innovation, efficiency, and customer satisfaction, which drives the effective use of digital tools and platforms. This synergy results in enhanced digital metrics, such as productivity, engagement, and operational excellence, positioning organizations for long-term success in the digital economy.

Decision Making Increases Digital Performance

Effective decision-making is a cornerstone of organizational success, directly influencing digital performance (Salehzadeh & Ziaeian, 2024). Decision-making involves choosing the best course of action based on data, insights, and strategic objectives. When organizations adopt robust decision-making frameworks, they optimize their digital processes, improve efficiency, and adapt to dynamic environments, thereby enhancing overall digital performance.

Leveraging advanced analytics and business intelligence tools empowers leaders to make data-driven decisions that directly enhance digital performance. Real-time data processing enables quick responses to emerging trends, optimizing digital operations and improving user experiences. A retail company using predictive analytics to manage inventory can reduce stockouts, improving customer satisfaction on digital platforms.

Effective decision-making is instrumental in driving digital performance. By utilizing data-driven strategies, fostering collaboration, and focusing on continuous improvement, organizations can align their digital initiatives with strategic objectives. This alignment results in improved efficiency, user satisfaction, and overall organizational success in the digital age.

The results of the study are in line with stakeholder theory. This is because the decision-making implemented will benefit stakeholders who lead to improved digital performance. Transparent and inclusive decision-making fosters trust among stakeholders. Engaged stakeholders are more likely to support digital initiatives, such as adopting advanced technologies or embracing digital transformation strategies.

Blue Innovation Increases Sustainability

Blue innovation refers to the development and implementation of innovative practices, technologies, and policies aimed at utilizing ocean resources sustainably while preserving marine ecosystems. It aligns with sustainable development goals (SDGs) by promoting eco-friendly solutions that balance economic growth, environmental protection, and social well-being. This directly contributes to enhanced sustainability across environmental, economic, and social dimensions (Santos et al., 2023).

Blue innovation emphasizes the sustainable exploitation of ocean resources, such as fisheries, renewable energy, and marine biotechnology, reducing environmental degradation. Encouraging the reuse and recycling of marine resources minimizes waste and promotes sustainability. Using algae-based biofuels as a renewable energy source reduces dependence on fossil fuels and decreases greenhouse gas emissions.

Blue innovation is a transformative force in achieving sustainability by fostering responsible marine resource use, conserving biodiversity, and combating climate change. Through advancements in renewable energy, ecosystem restoration, and sustainable economic practices, blue innovation strengthens the environmental, economic, and social pillars of sustainability, paving the way for a balanced and prosperous future. The research results are in line with sustainable innovation theory, because blue innovation will increase company sustainability. Blue innovation, as a type of sustainable innovation, focuses on marine and water-related technologies that balance environmental protection with economic benefits. Innovations such as renewable energy from oceans (e.g., tidal and wave energy) reduce reliance on fossil fuels, lower carbon emissions. Technologies for waste management in marine environments (e.g., plastic collection systems) contribute to cleaner ecosystems. Sustainable fishing technologies and marine conservation tools help maintain biodiversity and ecological balance.

Value Creation Increases Sustainability

While value creation aims to enhance economic, social, or stakeholder benefits, it does not automatically lead to increased sustainability. Sustainability involves balancing environmental, economic, and social dimensions over the long term, whereas value creation may focus primarily on short-term gains, profitability, or customer satisfaction, which could sometimes conflict with sustainable practices.

Value creation prioritizes immediate economic gains, which may come at the expense of long-term environmental or social sustainability. A company increasing profits by intensifying production may exploit natural resources unsustainably or generate excessive waste, undermining ecological balance. Efforts to maximize value may lead to overuse of natural resources, contributing to resource depletion and environmental degradation. Value creation processes that do not internalize environmental costs may lead to pollution, carbon emissions, and habitat destruction.

Value creation does not guarantee equitable benefits for all stakeholders, potentially neglecting marginalized communities or creating social inequalities (Tantalo & Priem, 2014). Value creation often drives consumerism, leading to increased demand and waste generation, which is counterproductive to sustainability. Value creation strategies not explicitly tied to sustainability goals may fail to address long-term environmental or social impacts.

For value creation to enhance sustainability, it must incorporate sustainable principles, such as eco-efficiency (creating value by reducing waste, conserving resources, and minimizing environmental impacts), social responsibility (ensuring equitable value distribution and addressing community needs), and long-term thinking (balancing short-term gains with long-term sustainability objectives).

Value creation, while essential for economic and organizational growth, does not inherently lead to sustainability. Without integrating sustainability principles into value creation strategies, the pursuit of profit or stakeholder satisfaction may result in negative environmental and social consequences. To align value creation with sustainability, organizations must adopt holistic approaches that prioritize eco-friendly practices, social equity, and long-term goals over immediate economic returns.

The research results are not in line with the triple bottom line theory because value creation cannot increase sustainability. A focus on maximizing profits could lead to practices that overlook long-term environmental and social impacts. Value creation activities may involve higher resource consumption or waste generation, negatively affecting environmental sustainability. Value creation efforts may lack investments in green technologies, renewable energy, or eco-friendly practices, limiting their contribution to environmental sustainability. Value creation activities may heavily favor economic outcomes, failing to deliver measurable improvements in the other two dimensions.

Decision Making Increases Sustainability

Effective decision-making plays a critical role in advancing sustainability by ensuring that choices align with environmental, social, and economic goals (Dharmayanti et al., 2023). Strategic decisions that prioritize long-term benefits, ethical considerations, and resource efficiency contribute directly to sustainable practices and outcomes.

Decision-making that focuses on optimizing resource allocation and minimizing waste enhances environmental sustainability. A company adopting sustainable supply chain management ensures raw materials are sourced responsibly, reducing ecological impact. Sustainable decision-making emphasizes long-term goals over short-term gains, ensuring environmental and societal well-being. Using sustainability indicators (e.g., carbon footprint (Chandra et al., 2024), energy efficiency, water usage) in decision-making processes helps organizations track and reduce their environmental impact. Decisions to establish clear sustainability policies and report progress increase accountability and build trust with stakeholders.

Decision-making that integrates sustainability principles is a cornerstone for advancing environmental, social, and economic goals. By prioritizing long-term impacts, ethical considerations, and stakeholder engagement, organizations can ensure that their choices drive positive outcomes for future generations. Effective decision-making aligns operational and strategic goals with sustainability, fostering resilience, innovation, and shared value creation.

The research results are in line with bounded rationality theory, because decision making can improve sustainability. Bounded Rationality Theory, introduced by Herbert Simon, suggests that individuals and organizations make decisions within the constraints of limited information, cognitive limitations, and time pressures. Despite these constraints, rational decisions can still lead to positive outcomes when they are made strategically and with a focus on balancing available resources and objectives.

Sustainable decision-making focuses on balancing immediate needs with long-term environmental, social, and economic outcomes. Rational choices within constraints ensure the efficient allocation of resources, reducing waste and promoting sustainability. Decisions to adopt eco-friendly practices, such as renewable energy use or waste reduction, demonstrate strategic thinking within constraints. Simplified rules or decision frameworks help leaders make effective choices that support sustainability, even with incomplete information. Sustainability initiatives often operate within financial, informational, and regulatory constraints. Decision-making that accounts for these limitations achieves tangible progress.

Digital Performance Increases Sustainability

Digital performance refers to the efficiency, effectiveness, and innovation achieved through the use of digital technologies in various aspects of business, industry, and society (Vărzaru & Bocean, 2024). Digital performance can significantly contribute to sustainability by optimizing resource use, enhancing operational efficiency, reducing environmental impacts, and fostering innovative solutions that promote long-term ecological and social balance.

Digital technologies, such as artificial intelligence (AI) and Internet of Things (IoT), enable better resource management, reducing energy consumption, and minimizing waste (Junaedi, Sudarno, Renaldo, Tanjung, Komardi, et al., 2023). Digital tools provide real-time data on the supply chain, enabling companies to track the sustainability of their operations, reduce transportation emissions, and ensure ethical sourcing. Digital technologies enhance energy efficiency by optimizing power consumption and integrating renewable energy sources into the grid.

Digital performance significantly boosts sustainability by optimizing resource use, fostering innovation in green technologies, enhancing operational efficiency, and enabling data-driven decision-making. The integration of digital technologies into business practices, urban planning, and daily activities creates a more sustainable future by reducing environmental impacts and promoting economic and social well-being. As digital performance improves, sustainability efforts can scale, leading to a more sustainable world across environmental, economic, and social dimensions.

Blue Innovation Increases Sustainability Through Digital Performance

Blue innovation refers to the development of new technologies, processes, or solutions that focus on preserving and enhancing marine and water ecosystems while promoting sustainable use of water resources. By leveraging digital performance, blue innovation can accelerate sustainability goals, reduce environmental impacts, and improve the management of aquatic ecosystems.

Digital technologies enable real-time monitoring of water quality, resource consumption, and ecosystem health, improving efficiency in the use of water and related resources. Digital performance supports predictive analytics, which can forecast environmental changes and help protect aquatic ecosystems. Digital innovation can integrate renewable energy sources, such as solar and wind, into water management systems, reducing reliance on fossil fuels and minimizing carbon emissions.

Blue innovation, when integrated with digital performance, drives significant improvements in sustainability. By leveraging real-time data, predictive analytics, and energy-efficient solutions, blue innovation optimizes water use, reduces environmental impacts, promotes marine conservation, and enhances the sustainability of aquatic ecosystems. The synergy between digital performance and blue innovation not only helps preserve natural water resources but also contributes to global sustainability efforts by fostering efficient, responsible, and sustainable use of water resources across industries.

Value Creation Increases Sustainability Through Digital Performance

Value creation refers to the process of generating long-term benefits, not only for businesses but also for society and the environment. Through digital performance, value creation can drive sustainability by optimizing processes, enhancing resource management, reducing environmental impacts, and fostering innovation that aligns with sustainable development goals. When digital performance enhances value creation, it leads to improved operational efficiency, innovation in green technologies, and better environmental, social, and economic outcomes.

Value creation through digital performance can drive sustainability by optimizing resource usage and minimizing waste. Technologies such as AI and IoT enable businesses to monitor energy use, water consumption, and material waste in real time, helping companies make decisions that reduce resource consumption. Value creation through digital performance supports the transition to a circular economy by enabling businesses to track the lifecycle of materials, reduce waste, and promote recycling. Digital performance drives innovation in green technologies and sustainable business practices, creating value by developing solutions that reduce environmental impact while benefiting society.

Value creation through digital performance plays a crucial role in promoting sustainability by optimizing resource use, enhancing efficiency, and driving innovation. Digital tools and technologies enable businesses to track, measure, and improve their environmental performance, contributing to more sustainable practices across industries. By aligning business strategies with sustainability goals, digital performance helps organizations create long-term value for both the environment and society, leading to improved business outcomes and a more sustainable future.

Decision Making Increases Sustainability Through Digital Performance

Effective decision-making, when enhanced by digital performance, plays a crucial role in advancing sustainability. By leveraging digital technologies and data-driven insights, organizations can make more informed, efficient, and proactive decisions that not only optimize their operations but also contribute positively to environmental, social, and economic sustainability. The synergy between decision-making and digital performance helps businesses align their strategies with sustainability objectives, driving long-term positive impact.

Digital tools such as data analytics, AI, and IoT provide real-time data, enabling decision-makers to understand resource consumption patterns, optimize processes, and reduce waste. With digital performance tools, organizations can employ predictive analytics to anticipate environmental trends and make decisions that minimize negative impacts on the environment. Digital performance enables real-time monitoring of environmental variables, such as water usage, emissions, and energy consumption, facilitating timely decisions that reduce environmental harm.

Decision-making enhanced by digital performance empowers organizations to make informed, efficient, and proactive choices that promote sustainability. By utilizing real-time data, predictive analytics, and digital monitoring systems, businesses can reduce resource consumption, minimize waste, and improve operational efficiency. Furthermore, digital performance facilitates transparency, accountability, and collaboration, which are crucial for achieving long-term sustainability goals. As decision-making becomes more data-driven and digitally supported, sustainability efforts are strengthened, leading to positive environmental, social, and economic outcomes.

5.0 CONCLUSION

Conclusion

This study examines the relationships between blue innovation, value creation, decision-making, digital performance, and sustainability. The findings provide significant insights into how these variables interact and influence one another, summarized as follows: (1) Blue innovation significantly enhances digital performance. This finding underscores the critical role of innovative practices, especially those focused on environmental sustainability, in driving organizations' digital advancements. (2) Value creation has a strong positive impact on digital performance. This indicates that the ability to generate and deliver value to stakeholders through products, services, and processes boosts an organization's digital capabilities. (3) Decision-making significantly improves digital performance. Effective decision-making processes, supported by data and technology, play a pivotal role in enhancing digital outcomes for organizations. (4) Blue innovation positively influences sustainability. This result highlights the indirect contribution of innovation centered on environmental considerations to sustainable practices. (5) Value creation cannot directly increase sustainability. This suggests that value creation alone, without the support of other mediating factors like digital performance, may not sufficiently drive sustainability outcomes. (6) Decision-making has a significant positive impact on sustainability. Organizations that implement strategic, data-informed decisions are more likely to achieve sustainable outcomes. (7) Digital performance significantly enhances sustainability. Digital tools and technologies enable organizations to implement efficient, eco-friendly practices, improving their overall sustainability. (8) Blue innovation increases sustainability through digital performance. This mediating effect suggests that the integration of blue innovation with digital strategies amplifies its impact on sustainability. (9) Value creation indirectly increases sustainability through digital performance. This demonstrates the critical role of digital performance as a mediator in transforming value creation efforts into sustainable outcomes. (10) Decision-making positively influences sustainability through digital performance. The mediating role of digital performance underscores how informed and efficient decision-making enhances sustainable practices.

Implications

The results emphasize the importance of digital performance as a central factor mediating the relationships between blue innovation, value creation, decision-making, and sustainability. While some variables, like value creation, may not directly impact sustainability, their influence becomes significant when digital performance is considered as a mediating factor.

Organizations aiming to achieve sustainability goals should focus on strengthening their digital capabilities, fostering innovation with a focus on sustainability (blue innovation), and improving decision-making processes through data and technology integration. These strategic approaches can help bridge the gap between operational excellence and sustainable outcomes.

Limitations

This study has several limitations that need to be acknowledged. The study focuses on blue innovation, value creation, decision-making, digital performance, and sustainability, potentially overlooking other critical factors, such as organizational culture, leadership style, or external regulatory influences, which may also impact digital performance and sustainability. The research was conducted in specific industries or regions, which may affect the generalizability of the results to other sectors or geographical areas with different technological, economic, or cultural contexts.

This study employs a cross-sectional research design, capturing data at a single point in time. The data primarily relies on self-reported surveys and perceptions from participants, which may introduce bias due to overestimation, underestimation, or social desirability effects. External factors such as market competition, technological advancements, and policy changes were not explicitly included in the study model.

Recommendations

Based on the findings, the following recommendations are proposed for organizations aiming to enhance digital performance and sustainability through blue innovation, value creation, and decision-making: (1) Embrace blue innovation to boost digital performance and sustainability, (2) Strengthen digital capabilities to act as a sustainability catalyst, (3) Enhance decision-making through data-driven insights, (4) Focus on integrating value creation with digital strategies, (5) Leverage digital performance as a core strategic asset, (6) Promote cross-functional collaboration for sustainability goals, (7) Explore policy and ecosystem support for sustainability, and (8) Prioritize continuous improvement and monitoring.

Future Research

Future research should further explore the contexts and conditions under which value creation directly contributes to sustainability and identify additional mediators or moderators that may enhance these relationships. Future research can add new variable such as digital leadership, cybersecurity maturity, digital literacy, green IT adoption, technological agility, stakeholder pressure, circular economy integration, artificial intelligence utilization, digital culture, ESG integration, data-driven sustainability, digital ecosystem collaboration, etc.

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Appendix 1

Variable	Dimension	Indicator	Statement	Attribute	Source
Sustainability	Resource	Area	Increase in area required per unit of production or service	Y2.1.1	(Albawab et al., 2020)
		Material	Increase in the percentage of materials recycled or re-used in the production process.	Y2.1.2	
		Energy	Increase in the percentage of renewable energy used in total energy consumption.	Y2.1.3	
	Environment	Carbon emissions	Reduction in CO2 emissions per unit of production	Y2.2.1	
		Greenhouse gas emissions	Reduction in total greenhouse gas emissions over the life cycle of a product or service	Y2.2.2	
	Economic	Capital	Efficiency of invested capital compared to the amount of output produced	Y2.3.1	
		Storage per economic unit	Increase in energy storage capacity in economic units	Y2.3.2	
	Social	Physical capacity	Increase in installed capacity in physical units	Y2.4.1	
		Installed capacity	Increase in annual growth in installed capacity	Y2.4.2	
		Accidents	Reduction in the number of accidents or injuries	Y2.4.3	
	Technology	Energy per unit	Increase in stored energy per unit	Y2.5.1	
		Energy per volume	Increase in stored energy per unit volume	Y2.5.2	
		Power per unit	Increase in power generated per unit	Y2.5.3	
		Energy loss	Reduction in the percentage of energy lost during the operating cycle.	Y2.5.4	
		Charging cycles	Reduction in the number of charge and discharge cycles that can be performed before the system capacity drops below a certain level.	Y2.5.5	
		Time	Reduction in the time required to discharge the system at a given power level.	Y2.5.6	
		Integration	Ease of integration into mobile systems, such as size, weight, stability, and efficiency	Y2.5.7	
Digital Performance	Benefit	User retention	Companies experience increased user retention	Y1.1.1	(Junaedi, Renaldo, et al., 2024)
		Information	Companies accelerate the use of information	Y1.1.2	
		Conversion	Companies improve the conversion of data into information	Y1.1.3	
	Operational Efficiency	Process Automation	Percentage of business processes automated using digital tools	Y1.2.1	Self
		System Uptime	Average uptime of digital systems and platforms	Y1.2.2	
		Digital Integration	Level of integration between different digital systems (e.g., CRM, ERP, SCM)	Y1.2.3	
		Cost Efficiency	Reduction in operational costs through digital technologies	Y1.2.4	
	Customer Experience	User Satisfaction	Customer satisfaction score (CSAT) for digital channels (e.g., websites, mobile apps)	Y1.3.1	
		Response Time	Average time to respond to customer inquiries on digital platforms	Y1.3.2	
		Engagement Rate	User engagement on digital platforms (e.g., time spent on the website, app downloads)	Y1.3.3	
		Personalization	Extent of personalized experiences delivered through digital channels	Y1.3.4	
	Innovation and Agility	Time-to-Market	Average time required to launch a new digital product or service	Y1.4.1	
		Innovation Index	Number of new digital innovations introduced annually	Y1.4.2	
		Agility Score	Ability to adapt to market changes using digital solutions	Y1.4.3	
		Employee Training	Percentage of employees trained in new digital technologies	Y1.4.4	
	Data-Driven Decision Making	Data Utilization	Percentage of decisions supported by data and analytics	Y1.5.1	
		Real-Time Insights	Availability of real-time dashboards for performance tracking	Y1.5.2	
		Predictive Analytics	Usage of predictive models to anticipate trends or outcomes	Y1.5.3	

Variable	Dimension	Indicator	Statement	Attribute	Source
		Data Accuracy	Accuracy and reliability of data used in decision-making	Y1.5.4	
	Digital Revenue Generation	Digital Sales Contribution	Percentage of total revenue generated from digital channels	Y1.6.1	
		Customer Acquisition Cost (CAC)	Cost-effectiveness of acquiring customers via digital platforms	Y1.6.2	
		Return on Digital Investments (RODI)	ROI from digital transformation projects	Y.1.6.3	
		E-commerce Conversion Rate	Percentage of users completing purchases on digital platforms	Y1.6.4	
	Cybersecurity and Compliance	Security Incidents	Number of security breaches or incidents reported	Y1.7.1	
		Compliance Rate	Adherence to digital regulatory requirements (e.g., GDPR, ISO 27001)	Y1.7.2	
		Data Protection Measures	Implementation of encryption, firewalls, and access controls	Y1.7.3	
		Employee Awareness	Percentage of employees trained on cybersecurity practices	Y1.7.4	
Blue Innovation	Environmental Sustainability	Marine Resource Conservation	Use of innovation to reduce resource depletion (e.g., reduction in overfishing, habitat destruction)	X1.1.1	Self
		Carbon Footprint Reduction	Innovations that reduce carbon emissions in marine industries	X1.1.2	
		Waste Management	Use of technology or practices to minimize waste (e.g., marine litter reduction, biodegradable materials)	X1.1.3	
		Ecosystem Restoration	Innovations that support the restoration of damaged marine ecosystems (e.g., coral reef restoration, coastal habitat conservation)	X1.1.4	
	Economic Viability	Economic Impact	Contribution to job creation in sustainable marine industries (e.g., eco-tourism, sustainable aquaculture)	X1.2.1	
		Cost-Effectiveness	Efficiency of innovation in terms of cost savings (e.g., reducing operational costs in marine industries through sustainable practices)	X1.2.2	
		Revenue Growth	Generation of new revenue streams from environmentally sustainable business models (e.g., marine renewable energy)	X1.2.3	
		Market Demand	Consumer demand for sustainable products and services (e.g., eco-friendly seafood, marine conservation services)	X1.2.4	
	Technological Innovation	Tech Adoption in Marine Industries	Rate of adoption of new technologies in marine sectors (e.g., IoT in fisheries, AI for ocean monitoring)	X1.3.1	
		R&D Investment in Blue Economy	Amount of investment in research and development focused on marine innovation	X1.3.2	
		Technological Advancements	Introduction of groundbreaking technologies that address marine challenges (e.g., ocean-cleaning drones, renewable energy from tidal waves)	X1.3.3	
		Scalability	The potential for the technology to be scaled to address global or regional marine challenges	X1.3.4	
	Governance and Collaboration	Regulatory Support	Existence of policies and regulations that support innovation in the blue economy (e.g., marine spatial planning, marine protected areas)	X1.4.1	
		Collaborative Partnerships	Level of cooperation between private companies, governments, and NGOs on marine sustainability issues	X1.4.2	
		Public Awareness and Engagement	Efforts to engage the public in blue innovation projects (e.g., community-driven marine conservation initiatives)	X1.4.3	
		Cross-sectoral Cooperation	Collaborative efforts between different sectors (e.g., between tech companies and marine biologists)	X1.4.4	
	Social Impact and Responsibility	Community Empowerment	Involvement of local communities in blue innovation projects, such as sustainable fisheries or eco-tourism ventures	X1.5.1	

Variable	Dimension	Indicator	Statement	Attribute	Source
		Inclusive Growth	Equity in the benefits derived from blue innovation, ensuring marginalized communities benefit from sustainable marine industries	X1.5.2	
		Social Awareness	Impact of innovation in raising awareness of ocean and marine conservation among the public	X1.5.3	
		Education and Capacity Building	Support for educational initiatives that build skills and knowledge in sustainable marine practices	X1.5.4	
Value Creation	Financial Performance	Revenue Growth	Year-over-year increase in revenue	X2.1.1	Self
		Profit Margins	Net profit as a percentage of revenue	X2.1.2	
		Return on Investment (ROI)	ROI on projects or initiatives	X2.1.3	
		Shareholder Value	Growth in earnings per share (EPS) or dividends paid	X2.1.4	
	Operational Efficiency	Cost Savings	Reduction in operational costs through efficiency initiatives	X2.2.1	
		Process Optimization	Number of optimized processes or time saved	X2.2.2	
		Resource Utilization	Percentage of resources effectively utilized	X2.2.3	
		Waste Reduction	Decrease in material or energy wastage	X2.2.4	
	Customer Value	Customer Satisfaction Score (CSAT)	Average customer satisfaction rating	X2.3.1	
		Net Promoter Score (NPS)	Likelihood of customers recommending the organization	X2.3.2	
		Customer Retention Rate	Percentage of repeat customers	X2.3.3	
		Value-Added Services	Number of additional benefits provided to customers	X2.3.4	
	Employee Value	Employee Satisfaction	Employee satisfaction or engagement survey results	X2.4.1	
		Retention Rate	Percentage of employees retained year-over-year	X2.4.2	
		Training Hours	Average hours of training provided per employee	X2.4.3	
		Career Progression	Percentage of employees promoted internally	X2.4.4	
	Social and Environmental Impact	Community Investment	Percentage of profits reinvested in community initiatives	X2.5.1	
		Carbon Footprint Reduction	Decrease in emissions or environmental impact	X2.5.2	
		Diversity and Inclusion	Representation of diverse groups within the organization	X2.5.3	
		Sustainability Initiatives	Number of eco-friendly practices implemented	X2.5.4	
	Innovation and Intellectual Capital	Innovation Index	Number of new products, services, or patents developed	X2.6.1	
		R&D Investment	Percentage of revenue invested in research and development	X2.6.2	
		Intellectual Property Value	Valuation of patents, trademarks, or proprietary technologies	X2.6.3	
		Market Differentiation	Level of differentiation achieved through innovation	X2.6.4	
	Stakeholder Relationships	Stakeholder Satisfaction	Overall satisfaction rating from stakeholders	X2.7.1	
		Partnership Growth	Number of strategic alliances formed	X2.7.2	
		Transparency	Regularity and quality of stakeholder communications	X2.7.3	
		Trust Index	Measurement of trust from stakeholders through surveys	X2.7.4	
Decision Making		Data Utilization Rate	Percentage of decisions supported by data analytics	X3.1.1	Self

Variable	Dimension	Indicator	Statement	Attribute	Source
	Data-Driven Decision Making	Real-Time Insights	Availability and usage of real-time dashboards	X3.1.2	
		Predictive Analytics Implementation	Frequency of predictive models used in decision-making	X3.1.3	
		Data Accuracy	Accuracy and reliability of data utilized	X3.1.4	
	Strategic Alignment	Goal Alignment Score	Percentage of decisions aligned with organizational goals	X3.2.1	
		Strategic Success Rate	Percentage of strategic decisions leading to successful outcomes	X3.2.2	
		Balanced Scorecard Usage	Frequency of using frameworks like balanced scorecards to guide decisions	X3.2.3	
		Stakeholder Agreement	Level of consensus among stakeholders on strategic decisions	X3.2.4	
	Agility and Responsiveness	Time to Decision	Average time taken to make critical decisions	X3.3.1	
		Crisis Response Time	Speed of decision-making during crises or emergencies	X3.3.2	
		Decision Revision Rate	Frequency of revisiting decisions based on new insights	X3.3.3	
		Adaptability Score	Ability to adjust decisions in response to dynamic environments	X3.3.4	
	Ethical Considerations	Ethical Compliance Rate	Percentage of decisions compliant with ethical guidelines	X3.4.1	
		Diversity and Inclusion Score	Consideration of diverse perspectives in decisions	X3.4.2	
		Transparency Level	Degree of openness in decision-making processes	X3.4.3	
		Social Responsibility Impact	Assessment of decisions on social and environmental factors	X3.4.4	
	Collaborative Decision Making	Participation Rate	Percentage of stakeholders involved in key decisions	X3.5.1	
		Collaboration Tools Utilization	Frequency of using digital tools for collaborative decision-making	X3.5.2	
		Consensus Building Success	Rate of achieving consensus in group decisions	X3.5.3	
		Team Satisfaction	Team satisfaction with the decision-making process	X3.5.4	
	Innovation and Risk Management	Risk Assessment Usage	Percentage of decisions preceded by formal risk assessment	X3.6.1	
		Innovation Success Rate	Percentage of innovative decisions leading to successful outcomes	X3.6.2	
		Risk Mitigation Plans	Number of decisions accompanied by mitigation strategies	X3.6.3	
		Calculated Risk Index	Balance between risk-taking and organizational safety	X3.6.4	
	Outcome Measurement	Decision Success Rate	Percentage of decisions achieving desired outcomes	X3.7.1	
		Feedback Integration	Rate of feedback incorporated into future decisions	X3.7.2	
		Key Performance Indicator (KPI) Achievement	Percentage of decisions that meet KPIs	X3.7.3	
		Post-Decision Review Frequency	Frequency of evaluating decisions for effectiveness	X3.7.4	