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The Role of Blue Technology as a Driver in Realizing Sustainable Production of People's Salt in East Java Province

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Abstract: This study explores how institutions and knowledge management influence the success of blue technology adoption in supporting sustainable community salt production in East Java Province. This research employs a quantitative approach, with primary data gathered through questionnaires distributed to salt farmers across various regencies/cities in East Java Province. The data was analyzed using structural equation modeling-partial least squares (SEM-PLS) with the assistance of SmartPLS 4 software to address the study's objectives. The study results indicate that institutions positively influence sustainable production, with blue technology as a significant mediator in the relationship. In addition, knowledge management has also been proven to have a positive effect on sustainable production, where blue technology again significantly mediates this relationship. Overall, blue technology has a positive impact on the sustainability of salt production in East Java Province. This study offers novelty by highlighting the role of blue technology as a mediator in the relationship between institutions and knowledge management with sustainable production. In addition, this study emphasizes the importance of blue technology in increasing efficiency, reducing environmental impacts, and strengthening the adoption of innovative production method technology, waste management, salt processing products, and the use of renewable energy in more environmentally friendly salt businesses, which have not been widely discussed before.

Keywords: Blue Economy, Blue Technology, Food Security, Salt Production, Sustainable Production

A. Introduction

Indonesia's food security vulnerability is reflected in the import of basic necessities, including salt, despite having the longest coastline (KKP RI, 2023; Maruf, 2023). Domestic salt production is inadequate in quantity and quality, resulting in increased imports (KKP RI, 2023). The volume of Indonesian salt imports continues to grow, especially for industries that require better quality (Central Statistics Agency, 2024; Widjaja et al., 2021). National salt problems are related to salt quality, production, and industrial salt imports (Amalyos, 2020). National salt production fell during the

COVID-19 pandemic, reaching a record low in 2022 (Annur, 2023). However, in 2023, production increased to 2.5 million tons, exceeding the target (KKP RI, 2024). This production target has decreased due to the 2023 performance agreement compared to the 2020-2024 KKP RENSTRA (Regulation of the Minister of Marine Affairs and Fisheries of the Republic of Indonesia Number 17/PERMEN-KP/2020). The community salt production sector contributes the largest (KKP RI, 2024).

Indonesia has great potential as a salt producer, but sustainable production practices are still challenging. East Java Province, the largest contributor, recorded the largest production volume in 2023 but experienced a decline in 2022 (Annur, 2023; KKP RI, 2024). The unpredictability of sea salt production poses a risk to the growth of a sustainable salt industry (H. Wang et al., 2015). The concept of sustainable production is important in development and considers social, economic, and environmental goals, which align with Indonesia's blue economy program (Iqbal, 2021; Krajnc & Glavic, 2003). Sustainable production involves generating goods and services through methods and systems that avoid pollution, conserve energy and natural resources, promote a sustainable economy, ensure the safety and health of employees, communities, and consumers, and offer social benefits and creative opportunities for all workers (Veleva & Ellenbecker, 2001). The principles of sustainable production include environmentally friendly product design, waste reduction, energy, and material conservation, elimination of hazardous substances, safe workplace design, management commitment to continuous improvement, efficient and creative work, prioritizing employee safety and well-being, and respect for surrounding communities with equality and justice (Alayón et al., 2017). This aligns with Indonesia's blue economy policy design for a more inclusive and sustainable development transformation (Iqbal, 2021). However, salt farmers in East Java often reuse bitter liquid waste according to the blue economy principle, but they risk reducing the quality of the salt. On the other hand, some dispose of bittern without management, potentially damaging the environment and violating the blue economy concept in Law No. 32 of 2014 concerning Marine Affairs (Badi'ah et al., 2023; Badiu, 2016; Handayani & Badi'ah, 2023). Implementing sustainable production is necessary by introducing eco-friendly technology and enhancing oversight of salt production practices.

Salt farming has opportunities in the blue economy model that can provide economic and social benefits (Iqbal, 2021). Modern technology can increase productivity and community empowerment (KKP RI, 2024). Technological innovation supports sustainable economic growth and reduces environmental pollution (Ahmad et al., 2023). Blue technology is important in overcoming environmental challenges and economic development (Alam et al., 2021; Media Maritim Muda, 2023). Although farmers in East Java use technology, weather constraints and technological limitations still occur (Handayani & Badi'ah, 2023). Dependence on nature, low technology, and lack of human resources are problems (Nugraha, 2021). The concept of the blue economy can be seen as a marine-focused extension of the green economy, incorporating innovative science and technology with ocean resources (Kathijotes, 2014). Green technology involves methods and tools applied in product design, manufacturing, and distribution to enhance efficiency, minimise energy and water waste, and address environmental challenges (Silva et al., 2021). Blue technology focuses on applying innovative practices in the maritime sector to address environmental challenges and drive economic development (Media Maritim Muda, 2023).

The adoption of blue technology, directly and indirectly, poses several challenges. One of them is the difficulty for farmers in adopting blue technology due to lack of information, ineffective communication, and low levels of education (Alam et al., 2021). Another problem in the salt industry is the weakness of institutional institutions, which are influenced by the bargaining position of salt farmers (Izzaty & Hendra Pernama, 2011). In East Java Province, salt production is still not optimal in terms of quantity and quality due to the lack of knowledge and skills of salt farmers and the absence of clear Standard Operating Procedures (SOPs) for production, so they only use hereditary expertise or experience (Badi'ah et al., 2023). For salt farmers, the reluctance to adopt blue technology or to continue using traditional methods is often driven by economic factors, as the expenses related to innovation and the potential risks involved are typically beyond their financial capabilities. In conditions like this, institutions and knowledge management are two important factors to consider.

Institutions are a process and social interaction involving organizations as implementers to achieve common goals (Noor, 2014). The government needs to intervene in terms of policies to support salt institutions and establish harmonious relationships between salt business actors. Institutions with innovative technology following local wisdom so that local farmers responsibly follow the available technology, both physical processing technology and advanced processing technology, are one of the salt business institutions that must be available (Erlina & Kurniawan, 2015). Strong institutions can create a supportive framework for developing and implementing blue technology. Institutional quality is key to sustainable development (Azam et al., 2021). This aligns with the research results, which explain that institutional activities have a positive relationship with sustainability (Alam et al., 2021). On the other hand, knowledge management is key in ensuring that knowledge about blue technology and best practices is available and accessible to community salt farmers. Knowledge management refers to a series of processes aimed at enhancing the utilization of organizational knowledge by employing information management techniques and fostering organizational learning, ultimately supporting competitive decision-making (Octara Venthio & Daud, 2022). Knowledge management is a system that can accommodate business needs in capturing and processing knowledge obtained from human resources to be reused for business sustainability (Ode et al., 2017). This is supported by several research results that explain that knowledge management significantly impacts sustainability (Demir et al., 2023; Gofur & Soediantono, 2022; Weina & Yanling, 2022; Wesly et al., 2021).

The implementation of eco-friendly technology is anticipated to aid in environmental restoration, consequently enhancing the quality of life for communities (F. Wang et al., 2021). Institutional activities can encourage the adoption of blue technology and increase sustainability (Alam et al., 2021). Bringing more advanced technologies to the market under the Blue Economy Concept will open new revenue streams, generate employment opportunities, and strengthen social capital (Kathijotes, 2014). Technology cannot be separated from the need for knowledge management (Widayati, 2016). The study's findings indicate that knowledge management plays a vital role in facilitating technological innovation in both processes and products, and the implementation of such technologies can enhance economic, environmental, and social sustainability (Siagian & Ikatrinasari, 2019; Stefanini & Vignali, 2024).

Earlier research by Alam et al. (2021) revealed a strong positive connection between adopting blue technology and fisheries sustainability. In contrast, institutional activities showed a weaker yet positive link to both the adoption of blue technology and the sustainability of fisheries. On the other hand, Weina & Yanling's (2022) study indicated that knowledge management practices are significantly associated with environmental sustainability. However, no mediating effect was found from using environmentally friendly technology in the relationship between knowledge management practices and a sustainable environment. Wesly et al. (2021) explained that knowledge management significantly influences sustainability management. Therefore, this study will fill this research gap by exploring how institutions and knowledge management influence the success of blue technology to support sustainable community salt production. Blue technology offers innovative solutions to overcome the problem of community salt production's sustainability. Blue technology utilizes marine resources sustainably for various purposes, including improving the quality and quantity of salt harvests. Gaining a deeper understanding of this relationship is expected to offer valuable insights for formulating more effective policies and practices to enhance the sustainability of community-based salt production and achieve national food security while highlighting the role of blue technology in advancing the blue economy.

B. Methods

The study employs a quantitative approach to address the research objectives, which are to examine the relationship between institutions and knowledge management in influencing the successful adoption of blue technology to support sustainable salt production by local communities. The operational definitions of variables include: 1) Sustainable production is creating community salt through processes and systems that align with sustainable development, focusing on environmental, social, and economic dimensions; 2) Institutions are the processes and interactions of salt farmers that involve organizations as their implementers to achieve common goals; 3) Knowledge management is a series of new practices that adopt technology in the production process to optimize the use of science to increase allocation efficiency in the field of community salt production; and 4) Blue technology is the application of innovative practices in the salt sector for production activities in overcoming environmental challenges and encouraging economic development. The questionnaire instrument utilizes a five-point Likert scale to assess the variables. Code 1 is given to the answer "Strongly Disagree," which indicates the highest level of disagreement with the statement, while code 5 indicates "Strongly Agree," which reflects the highest level of agreement. The measurement of blue technology is adapted from the research of C. Li et al. (2023), Z. Li et al. (2024), and Zhu et al. (2023). To measure sustainable production variables using the model developed by Cheng et al. (2023), Manso et al. (2021), Setyadi et al. (2023), and Ting et al. (2024). Institutional activity variables are measured using indicators developed by Jaber & Oftedal (2020) and knowledge management adopted by Albreiki & Bhaumik (2019) and Rehman et al. (2022).

The population for this study comprised all community salt farmers in East Java Province, totalling 6,417 individuals. The sample size was determined using the formula proposed by Isacc and Michael (1989), resulting in a sample of 98 salt farmers. A proportional sampling technique was employed for each Regency/City. Primary data were collected through a questionnaire, and data analysis was conducted using Partial Least Squares (PLS). PLS is preferred in Structural Equation Modeling (SEM) as it aims to test predictive relationships between constructs by analyzing the influence or relationships between them (Ghozali & Latan, 2015). The analysis process was conducted with the aid of SmartPLS software. The path model in PLS involves three sets of relationships: (1) the inner model, which specifies relationships between latent variables; (2) the outer model, which specifies the relationship between latent variables and their indicators or manifests; and (3) the weight relation, which calculates latent variable scores (Abdillah & Hartono, 2015).

C. Results and Discussion

Results

Outer Model Evaluation (Measurement Model): Validity and Reliability Testing

Convergent validity is an aspect of the measurement model, referred to as the outer model in SEM-PLS and known as confirmatory factor analysis (CFA) in covariance-based SEM. Two criteria are used to determine if the outer model satisfies the requirements for convergent validity in reflective constructs: (1) the loading should exceed 0.7, and (2) the p-value must be significant (<0.05). However, the loading value above 0.7 is not always achieved, particularly in newly developed questionnaires. Therefore, loadings between 0.40 and 0.70 should still be considered for retention. Indicators with loadings below 0.40 should be removed. For those between 0.40 and

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0.70, it is necessary to assess the impact of removing them on the average variance extracted (AVE) and composite reliability. Indicators can be removed if their exclusion improves AVE and composite reliability above their respective thresholds, with AVE having a minimum value of 0.50 and composite reliability of 0.70. Another factor to consider when removing indicators is their contribution to the content validity of the construct. Indicators with lower loadings may remain if they contribute to the construct's content validity (Ghozali & Latan, 2015). Table 1 displays the loading values for each indicator.

Table 1. Validity Testing Based on Outer Loading

	Blue Technology	*Institutional*	*Knowledge Management*	*Sustainable Production*
BT1	0.948			
BT2	0.960			
BT3	0.939			
BT4	0.963			
BT5	0.802			
BT6	0.863			
INS1		0.930		
INS2		0.953		
INS3		0.936		
INS4		0.947		
KM1			0.934	
KM2			0.950	
KM3			0.961	
KM4			0.824	
KM5			0.947	
KM6			0.825	
KM7			0.936	
SP1				0.719
SP2				0.826
SP3				0.915
SP4				0.973
SP5				0.874
SP6				0.968
SP7				0.953
SP8				0.919
SP9				0.915

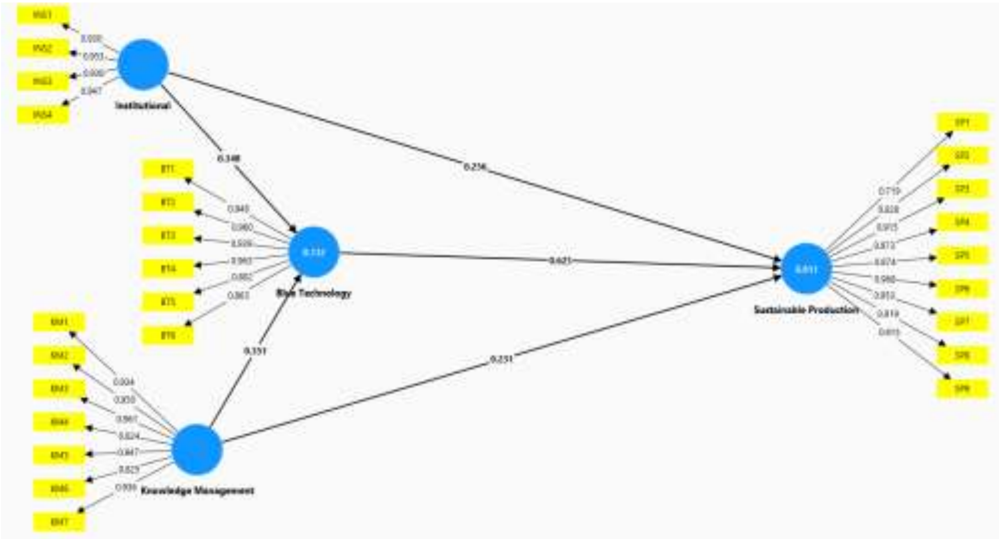

Figure 1. Validity Testing Based on Outer Loading

According to the outer loading validity test results in Table C.1 and Figure C.1, all outer loading values are greater than 0.7, indicating that the validity requirements have been fulfilled based on the outer loading values. Next, the validity test uses the average variance extracted (AVE) value.

Table 2. Validity Testing Based on Average Variance Extracted (AVE)

	Average Variance Extracted (AVE)
Blue Technology	0.836
Institutional	0.886
Knowledge Management	0.833
Sustainable Production	0.808

The suggested AVE value is above 0.5. All AVE values are greater than 0.5, indicating that they meet the validity criteria based on AVE. In addition, reliability is assessed using composite reliability (CR) and Cronbach's alpha (CA) values.

Table 3. Reliability Testing Based on Composite Reliability (CR) and Cronbach's Alpha (CA)

	Composite Reliability (rho_c)	Cronbach's Alpha
Blue Technology	0.968	0.960
Institutional	0.969	0.957
Knowledge Management	0.972	0.966
Sustainable Production	0.974	0.969

The recommended CR value is above 0.7, and all CR values exceed this threshold, indicating that they fulfil the reliability requirements based on CR. Similarly, the suggested CA value is above 0.7, and all CA values are above this mark, confirming that they meet the reliability criteria based on Cronbach's alpha. Additionally, discriminant validity is assessed using the Fornell-Larcker approach. The results of the discriminant validity test are shown in Table 4.

Table 4. Discriminant Validity Testing: Fornell & Larcker

	Blue Technology	Institutional	Knowledge Management	Sustainable Production
Blue Technology	(0.914)			
Institutional	0.446	(0.941)		
Knowledge Management	0.448	0.279	(0.913)	
Sustainable Production	0.840	0.598	0.582	(0.899)

Note: The values between "( )" are the square roots of AVE.

In testing discriminant validity, the square root of the AVE for a latent variable is compared to the correlation values between that latent variable and others. The square root of the AVE for each latent variable is observed to be higher than the correlation values with other latent variables, leading to the conclusion that the discriminant validity requirements have been fulfilled.

Table 5. Discriminant Validity Testing: HTMT

	Blue Technology	Institutional	Knowledge Management
Institutional	0.461		
Knowledge Management	0.466	0.293	
Sustainable Production	0.863	0.617	0.593

Based on the discriminant validity test results using the HTMT approach, all values are <0.9, indicating that the discriminant validity requirements have been satisfied according to the HTMT approach.

Significance Test of Influence (Boostrapping) (Hypothesis Test) (Inner Model)

Table 6. presents the results of the significance test of influence.

Table 6. Path Coefficient Test & Significance of Influence

	Original Sample	Sample Mean	Standard Deviation	T Statistics	P Values	R-Squares	Q-Squares	SRMR
Knowledge Management -> Blue Technology	0.351	0.359	0.143	2.464	0.014	0.312	0.252	0.083
Institutional -> Blue Technology	0.348	0.339	0.137	2.529	0.012			
Institutional -> Sustainable Production	0.256	0.255	0.098	2.613	0.009	0.811	0.644	
Knowledge Management -> Sustainable Production	0.231	0.237	0.103	2.240	0.026			

Blue Technology -> Sustainable Production	0.623	0.611	0.128	4.847	0.000
Institutional -> Blue Technology -> Sustainable Production	0.216	0.211	0.100	2.165	0.031
Knowledge Management -> Blue Technology -> Sustainable Production	0.219	0.225	0.109	2.009	0.045

Based on the results in Table 6, the results of the direct and indirect influences are as follows:

- ⇨ Institutional positively influence Sustainable Production, with a coefficient value of 0.256 and statistical significance, as indicated by T-Statistics = 2.613 > 1.96 and P-Values = 0.009 < 0.05 (Hypothesis 1 is Accepted).
- ⇨ Knowledge Management positively influence Sustainable Production, with a coefficient value of 0.231 and statistical significance, as indicated by T-Statistics = 2.240 > 1.96 and P-Values = 0.026 < 0.05 (Hypothesis 2 is Accepted).
- ⇨ Blue Technology positively influence Sustainable Production, with a coefficient value of 0.623 and statistical significance, as indicated by T-Statistics = 4.847 > 1.96 and P-Values = 0.000 < 0.05 (Hypothesis 3 is Accepted).

The R-squares value of Sustainable Production is 0.811, which means that Knowledge Management, Institutional, and Blue Technology can explain or influence Sustainable Production by 81.1%. The Q-Square value of Sustainable Production is 0.644 > 0, which means that Knowledge Management, Institutional, and Blue Technology have predictive relevance to Sustainable Production.

- ⇨ Blue Technology significantly mediates the relationship between Institutional and Sustainable Production, with T-Statistics = 2.165 > 1.96 and P-Values = 0.031 < 0.05 (Hypothesis 4 Mediation Accepted).
- ⇨ Blue Technology significantly mediates the relationship between Knowledge Management and Sustainable Production, with T-Statistics = 2.009 > 1.96 and P-Values = 0.045 < 0.05 (Hypothesis 5 Mediation Accepted).

It is known that based on the results of the SRMR goodness of fit test, the SRMR value = 0.083 < 0.1, so it is concluded that the model is FIT.

Discussion

The results indicate that institutions positively influence sustainable production, and blue technology significantly mediates the relationship in community salt production in East Java Province. The existence of strong institutions, supported by the application of blue technology, encourages environmentally friendly and sustainable salt production practices. Salt farmers and relevant agencies view sustainable production practices as future opportunities and have begun implementing sustainable strategies for the development of salt ponds. Various innovations in production methods such as tunnels, prism houses, on-off systems, and geomembranes have been implemented, producing salt with high NaCl content. In addition, processed salt products and waste utilization also provide promising business opportunities. In collaboration with relevant agencies and universities, the government continues to provide technical guidance and advance production methods in non-production regions like Malang and Blitar. This development is further supported by marketing assistance and regular guidance to ensure the sustainability of salt production. The study highlights the critical role of institutional support and eco-friendly technologies in achieving sustainable production, aligning with prior research demonstrating a significant connection between institutional factors and adopting sustainable production practices (Habib et al., 2022). Institutional development as a social aspect supports sustainability following the findings that institutional activities positively correlate with sustainability (Alam et al., 2021; Nalefo, 2020). In addition, institutional activities also have a positive influence on the adoption of blue technology (Alam et al., 2021), which acts as a mediator in this relationship. Institutional strength significantly shapes technology adoption (Chen & Filieri, 2024), where blue technology helps improve production efficiency and reduce environmental impacts, thereby strengthening the influence of institutions on sustainable production.

The results indicate that knowledge management positively affects sustainable production, and blue technology significantly mediates the relationship in community salt production in East Java Province. Good knowledge management, including absorbing knowledge from organizations to individuals and exchanging knowledge between farmers, is crucial in creating more efficient and sustainable production practices. Technical guidance activities, a collaboration between farmers, and the application of environmentally friendly innovations such as blue technology further support the sustainability of salt production. Knowledge and innovation are key elements in improving the quality and efficiency of salt production, strengthening the competitiveness of the salt pond industry. Blue technology plays an important role in increasing production efficiency and reducing emissions, thereby enhancing the impact of knowledge management on sustainability. This study is consistent with previous findings showing that knowledge management is important in technological innovation and sustainability (Siagian & Ikatrinasari, 2019; Stefanini & Vignali, 2024). Applying effective knowledge management significantly increases innovativeness in environmentally friendly technologies like blue technology (Sahoo et al., 2023). In addition, knowledge management has been shown to influence sustainable production significantly (Guimarães et al., 2018).

The results show that blue technology positively affects the sustainable production of community salt in East Java Province. Applying this environmentally friendly technology helps reduce negative environmental impacts and increases production efficiency. Blue technology effectively reduces emissions of hazardous substances or waste in salt ponds and supports environmental conservation and ecosystem sustainability. In addition, using the latest technology in salt production, such as renewable energy (solar, windmills, solar cells, and PLTB), allows for a faster and more environmentally friendly production process. Salt farmers have adopted technological innovations such as geomembranes, tunnels, prism houses, and on-off systems to facilitate year-round production. These advancements align with the principles of blue technology, which prioritizes environmental preservation and sustainability.

This study shows that sustainable production of community salt in East Java Province prioritizes cleaner production and environmental compliance from all stakeholders, creating synergy between business units, stakeholders, and the environment. Transparency of information regarding ecological factors of production is also important, as it strengthens trust and commitment to responsible production practices. Some farmers have implemented more advanced clean production practices, such as utilizing old water waste (bittern) for re-production or processing into fertilizer. Bittern can be further refined into $MgSO_4$, $MgCl_2$, and $CaCl_2$ for chemical use and extracted for lithium to serve as a raw material for electric vehicle batteries. Additionally, it can be processed into fertilizers, isotonic beverages, beauty products, tofu-making ingredients, and various other products (Badi'ah et al., 2023; Handayani & Badi'ah, 2023). In addition, geomembrane plastic waste is used to cover the edges of salt ponds, and gypsum is also being researched to make fertilizer. The synergy between farmers, government, academics, and industry encourages the development of new technologies to improve the quality and quantity of production and waste management. Blue technology significantly increases production efficiency, reduces environmental impacts, and advances production sustainability. This study is in line with previous findings showing that the adoption of blue technology positively impacts sustainability (Alam et al., 2021). Adopting and implementing innovative, environmentally friendly technologies is important in achieving sustainable development goals (Shahzad et al., 2022).

D. Conclusions

Based on the results of this study, it can be concluded that institutions and knowledge management contribute to sustainable production in people's salt businesses in East Java Province, with blue technology as a significant mediator. Strong institutions and effective knowledge management encourage the implementation of environmentally friendly technologies, which ultimately increase production efficiency and reduce negative environmental impacts. Adoption of innovative technologies, such as geomembrane production methods, tunnels, prism houses, and on-off systems, as well as bittern waste management for fertilizers and processed salt products such as health therapy salt, salt soap, livestock salt, and fish salt, as well as the use of renewable energy, such as solar energy, windmills, a combination of windmills and water pumps, solar cells, and wind power plants (PLTB), have proven to be able to increase the sustainability of salt production throughout the year and strengthen clean production practices. This implementation also requires strong synergy between farmers, government, academics, and industry in environmental management and sustainability of salt production. This study recommends increasing institutional support through training and technical guidance, strengthening knowledge management for better technology adoption, innovating waste processing to create value-added products, and enhancing collaboration between farmers, government, academics, and industry to promote sustainable salt production.

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References

Abdillah, W., & Hartono, J. (2015). *Partial Least Square (PLS): Alternatif Structural Equation Modeling (SEM) dalam Penelitian Bisnis*. Andi.

Ahmad, N., Youjin, L., Žiković, S., & Belyaeva, Z. (2023). The Effects of Technological Innovation on Sustainable Development and Environmental Degradation: Evidence from China. *Technology in Society*, *72*. https://doi.org/10.1016/j.techsoc.2022.102184

Alam, M. N., Masroor, I., Rokon, T. M., & Rakib, S. G. (2021). Blue Technology for Sustainability of Small and Medium Fish Firms: A Study on Small and Medium Fish Firms of Bangladesh. *Environment, Development and Sustainability*, *23*, 635–646. https://doi.org/10.1007/s10668-020-00599-z

Alayón, C., Säfsten, K., & Johansson, G. (2017). Conceptual Sustainable Production Principles in Practice: Do they Reflect what Companies do? *Journal of Cleaner Production*, *141*, 693–701. https://doi.org/10.1016/j.jclepro.2016.09.079

Albreiki, S., & Bhaumik, A. A. A. (2019). The Influence of Knowledge Management on the Smart Government Effectiveness: An Empirical Study in UAE. *International Journal on Emerging Technologies*, *10*(1a), 105–114.

Amalyos. (2020). *The Role of the Coordinating Ministry for Maritime Affairs and Investment in the Development of Diversification of Salt Derivative Products in the Future*. kkp.go.id.

Annur, C. M. (2023). *Indonesia's Salt Production Plummets Since Covid-19 Pandemic*. Databoks. https://databoks.katadata.co.id/datapublish/2023/10/31/produksi-garam-indonesia-anjlok-sejak-pandemi-covid-19

Azam, M., Hunjra, A. I., Bouri, E., Tan, Y., & Al-Faryan, M. A. S. (2021). Impact of Institutional Quality on Sustainable Development: Evidence from Developing Countries. *Journal of Environmental Management*, *298*. https://doi.org/10.1016/j.jenvman.2021.113465

Badan Pusat Statistik. (2024). *Salt Imports by Major Country of Origin, 2017-2023*. Badan Pusat Statistik. https://www.bps.go.id/id/statistics-table/1/MjAxMyMx/impor-garam-menurut-negara-asal-utama--2017-2022.html

Badi'ah, R., Handayani, W., & Swasti, I. K. (2023). Improving the Quality of People's Salt Using the Blue Economy Concept in East Java Province, Indonesia. *Journal of Business and Management Studies*, *5*(1), 110–126. https://doi.org/10.32996/jbms.2023.5.1.12

Badiu, D. L. (2016). Is urban green space per capita a valuable target to achieve cities' sustainability goals? Romania as a case study. *Ecological Indicators*, *70*, 53–66. https://doi.org/10.1016/j.ecolind.2016.05.044

Chen, W., & Filieri, R. (2024). Institutional Forces, Leapfrogging Effects, and Innovation Status: Evidence from the Adoption of a Continuously Evolving Technology in Small Organizations. *Technological Forecasting and Social Change*, *206*, 1–16. https://doi.org/10.1016/j.techfore.2024.123529

Cheng, Y., Masukujjaman, M., Sobhani, F. A., Hamayun, M., & Alam, S. S. (2023). Green Logistics, Green Human Capital, and Circular Economy: The Mediating Role of Sustainable Production. *Sustainability*, *15*(2), 1–22. https://doi.org/10.3390/su15021045

Demir, A., Budur, T., Omer, H. M., & Heshmati, A. (2023). Links Between Knowledge Management and Organisational Sustainability: Does the ISO 9001 Certification Have an Effect? *Knowledge Management Research and Practice*, *21*(1), 183–196. https://doi.org/10.1080/14778238.2020.1860663

Erlina, M. D., & Kurniawan, T. (2015). Increasing the Institutional Capacity of People's Salt to Support the Salt Industry in Indonesia. *Buletin Ilmiah Marina Sosial Ekonomi Kelautan Dan Perikanan*, *1*(2), 49. https://doi.org/10.15578/marina.v1i2.2071

Ghozali, I., & Latan, H. (2015). *Partial Least Square Concept, Technique, and Application Using Smart PLS 3.0 Program for Empirical Research*. Badan Penerbit Universitas Diponegoro Semarang.

Gofur, A., & Soediantono, D. (2022). The Relationship between Knowledge Management and Sustainability of Defense Industry Organizations: Does ISO 9001:2015 Certification Make a Difference? *Journal of Industrial Engineering & Management Research*, *3*(4), 50–60. https://doi.org/10.7777/jiemar.v3i4.301

Guimarães, J. C. F. de, Severo, E. A., & Vasconcelos, C. R. M. de. (2018). The Influence of Entrepreneurial, Market, Knowledge Management Orientations on Cleaner Production and the Sustainable Competitive Advantage. *Journal of Cleaner Production*, *174*, 1653–1663. https://doi.org/10.1016/j.jclepro.2017.11.074

Habib, M. A., Karim, M. R., Dulal, M., & Munir, M. S. (2022). Impact of Institutional Pressure on Cleaner Production and Sustainable Firm Performance. *Sustainability*, *14*(24), 1–25. https://doi.org/10.3390/su142416748

Handayani, W., & Badi'ah, R. (2023). The Application of Blue Economy Principles to the Salt Sector in the Province of East Java, Indonesia. *International Journal of Multidiciplinary Research and Analysis*, *06*(04), 1523–1533. https://doi.org/10.47191/ijmra/v6-i4-23

Iqbal. (2021). *Indonesia Blue Economy Plan*. Antara News. https://www.antaranews.com/infografik/2554485/rancangan-ekonomi-biru-indonesia

Izzaty, & Hendra Pernama, S. (2011). National Salt Production Development Policy. *Jurnal Ekonomi & Kebijakan Publik*, *2*(2), 657–679. https://doi.org/10.22212/jekp.v2i2.122

Jaber, T., & Oftedal, E. M. (2020). Legitimacy for Sustainability : A Case of A Strategy Change for An Oil and Gas Company. *Sustainability*, *12*(2), 1–19. https://doi.org/10.3390/su12020525

Kathijotes, N. (2014). Blue Technology Towards Sustainable Urban and Coastal Development. *Ecological Engineering and Environment Protection*, *1*(1), 62–68. https://hdl.handle.net/20.500.14279/8778

Peraturan Menteri Kelautan dan Perikanan Republik Indonesia Nomor 17/PERMEN-KP/2020 About the Strategic Plan of the Ministry of Maritime Affairs and Fisheries 2020-2024, Pub. L. No. 17/PERMEN-KP/2020, 1 (2020). https://kkp.go.id/artikel/22319-permen-kp-no-17-2020

Kementerian Kelautan dan Perikanan Republik Indonesia. (2023). *Ministry of Marine Affairs and Fisheries Performance Report 2022*. https://kkp.go.id/artikel/50030-laporan-kinerja-kkp-2022

KKP RI. (2024). *National Salt Production Reaches 2.5 Million Tons*. Kkpgoid. https://www.instagram.com/kkpgoid/p/C4F58m-y90a/?img_index=2

Krajnc, D., & Glavic, P. (2003). Indicators of Sustainable Production. *Clean Techn Environ Policy*, *5*, 279–288. https://doi.org/10.1007/s10098-003-0221-z

Li, C., Fayaz, S., Bani, A. Y. A., Ayassrah, A., Irshad, M., Telba, A. A., Awwad, E. M., & Majid, M. I. (2023). Green Production and Green Technology for Sustainability: The Mediating Role of Waste Reduction and Energy Use. *Heliyon*, *9*(12), 1–16. https://doi.org/10.1016/j.heliyon.2023.e22496

Li, Z., Rasool, S., Fedai, M., & Shahid, W. (2024). Sustaining the Future: How Green Capabilities and Digitalization Drive Sustainability in Modern Business. *Heliyon*, *10*(1), 1–18. https://doi.org/10.1016/j.heliyon.2024.e24158

Manso, J. F., Muntaka, A. S., Owusu-Bio, M. K., & Entsie, E. (2021). Sustainable Production, Supply-Side Collaboration and Market Performance. *African Journal of Business and Economic Research (AJBER)*, *16*(1), 273 – 290. https://doi.org/10.31920/1750-4562/2021/v16n1a12

Maruf, M. (2023). *Indonesia is in a Food Import Emergency!* CNBC Indonesia. https://www.cnbcindonesia.com/research/20230704185303-128-451320/indonesia-negara-darurat-impor-pangan

Media Maritim Muda. (2023). *Blue Technology in Supporting Blue Economy*. Media Maritim Muda. https://media.maritimmuda.id/blue-technology-dalam-menunjang-blue-economy/

Nalefo, L. (2020). Institutional Development for Project Sustainability. *Prosiding Seminar Nasional Pangan Dan Perkebunan: Realitas Pangan Dan Perkebunan Saat Ini Dan Prospeknya Menuju Swasembada Berkelanjutan*, 113–118. https://ojs.uho.ac.id/index.php/procnaskotim/article/view/11343

Noor, M. (2014). Institutional Analysis of the National Urban Independent Community Empowerment Program (PNPM-MP) for Poverty Alleviation. *Serat Acitya-Jurnal Ilmiah UNTAG Semarang*, *3*(2), 113–124. https://doi.org/10.56444/sa.v3i2.137

Nugraha, S. A. (2021). *National Salt Problems*. Universitas Gadjah Mada. https://ugm.ac.id/id/berita/21284-problematika-garam-nasional/

Octara Venthio, J., & Daud, I. (2022). The Role of Knowledge Management, Knowledge Sharing, and Work Innovation on Employee Performance. *Proceeding Seminar Nasional Bisnis Seri VI 2022*, 217–229. https://pascasarjanafe.untan.ac.id/wp-content/uploads/2022/09/23-1.pdf

Ode, W., Muizu, Z., Sule, E. T., & Deitas, M. A. (2017). The Influence of Leadership on Knowledge Management at PT. Pelindo III (Persero). *Jurnal Sains Manajemen Dan Kewirausahaan (JSMK)*, *1*(1), 9–16. https://ppjp.ulm.ac.id/journal/index.php/jsmk/article/view/4500

Rehman, S. U., Bresciani, S., Ashfaq, K., & Alam, G. M. (2022). Intellectual Capital, Knowledge Management and Competitive Advantage: A Resource Orchestration Perspective. *Journal of Knowledge Management*, *26*(7), 1705–1731. https://doi.org/10.1108/JKM-06-2021-0453

Sahoo, S., Kumar, A., & Upadhyay, A. (2023). How do Green Knowledge Management and Green Technology Innovation Impact Corporate Environmental Performance? Understanding the Role of Green Knowledge Acquisition. *Business Strategy and the Environment*, *32*(1), 551–569. https://doi.org/10.1002/bse.3160

Setyadi, A., Akbar, Y. K., Ariana, S., & Pawirosumarto, S. (2023). Examining the Effect of Green Logistics and Green Human Resource Management on Sustainable Development Organizations: The Mediating Role of Sustainable Production. *Sustainability*, *15*(13), 1–20. https://doi.org/10.3390/su151310667

Shahzad, M., Qu, Y., Rehman, S. U., & Zafar, A. U. (2022). Adoption of Green Innovation Technology to Accelerate Sustainable Development among Manufacturing Industry. *Journal of Innovation and Knowledge*, *7*(4), 1–12. https://doi.org/10.1016/j.jik.2022.100231

Siagian, G. S., & Ikatrinasari, Z. F. (2019). The Impact of Knowledge Management on Innovation: The Case of IT Industry in Indonesia. *Operations Excellence: Journal of Applied Industrial Engineering*, *11*(1), 71–80. https://doi.org/10.22441/oe.v10.3.2018.017

Silva, P. C. da, Neto, G. C. de O., Correia, J. M. F., & Tucci, H. N. P. (2021). Evaluation of Economic, Environmental and Operational Performance of the Adoption of Cleaner Production: Survey in Large Textile Industries. *Journal of Cleaner Production*, *278*, 1–17. https://doi.org/10.1016/j.jclepro.2020.123855

Stefanini, R., & Vignali, G. (2024). The Influence of Industry 4.0 Enabling Technologies on Social, Economic and Environmental Sustainability of the Food Sector.

International Journal of Production Research, *62*(10), 3800–3817. https://doi.org/10.1080/00207543.2023.2248523

Ting, L. S., Zailani, S., Sidek, N. Z. M., & Shaharudin, M. R. (2024). Motivators and Barriers of Circular Economy Business Model Adoption and Its Impact on Sustainable Production. *Environment, Development and Sustainability*, *26*(7), 17551–17578. https://doi.org/10.1007/s10668-023-03350-6

Veleva, V., & Ellenbecker, M. (2001). Indicators of Sustainable Production: Framework and Methodology. In *Journal of Cleaner Production* (Vol. 9, Issue 6). https://doi.org/10.1016/S0959-6526(01)00010-5

Wang, F., Xie, J., Wu, S., Li, J., Barbieri, D. M., & Zhang, L. (2021). Life Cycle Energy Consumption by Roads and Associated Interpretative Analysis of Sustainable Policies. *Renewable and Sustainable Energy Reviews*, *141*, 1–14. https://doi.org/10.1016/j.rser.2021.110823

Wang, H., Xu, X., & Zhu, G. (2015). Landscape Changes and a Salt Production Sustainable Approach in the State of Salt Pan Area Decreasing on the Coast of Tianjin, China. *Sustainability*, *7*(8), 10078–10097. https://doi.org/10.3390/su70810078

Weina, A., & Yanling, Y. (2022). Role of Knowledge Management on the Sustainable Environment: Assessing the Moderating Effect of Innovative Culture. *Frontiers in Psychology*, *13*, 1–15. https://doi.org/10.3389/fpsyg.2022.861813

Wesly, J., Kristiana, V., Bong, T., & Saputra, N. (2021). The Influence of Digital Leadership, Total Quality Management, and Knowledge Management on Sustainability Management in Companies in DKI Jakarta. *Studi Ilmu Manajemen Dan Organisasi*, *2*(2), 97–124. https://doi.org/10.35912/simo.v2i2.543

Widayati, Y. T. (2016). Knowledge Management: Leveraging Experience and Information. *Komputaki*, *1*(1), 114–132. https://www.unaki.ac.id/ejournal/index.php/komputaki/article/view/117

Widjaja, S., Radiarta, I. N., Suhelmi, I. R., Bramawanto, R., Akhwady, R., Widodo, A. W., Triwibowo, H., Prabawa, F. Y., Mahabror, D., Sagala, S. L., Kurniawan, T., Yanti, B. V. I., Apriliani, T., Deswati, R. H., & Dwiyitno. (2021). *Academic Review of National Salt Portrait*. Amafrad Press.

Zhu, Y., Zhang, H., Siddik, A. B., Zheng, Y., & Sobhani, F. A. (2023). Understanding Corporate Green Competitive Advantage through Green Technology Adoption and Green Dynamic. *Systems*, *11*(9), 1–21. https://doi.org/10.3390/systems11090461