http://ejournal.stipjakarta.ac.id

METEOR STIP MARUNDA

pISSN : 1979 – 4746
eISSN : 2685 - 4775

Maritime Institute of Jakarta

Building a Sustainable Maritime Finance Ecosystem: Enhancing Shipping Management and Education

[1,2] Titis Ari Wibowo,[1,2] Mudakir,[2] Muhammad Zilal Hamzah,[2]Eleonora Sofilda

[1]Sekolah Tinggi Ilmu Pelayaran Jakarta, North Jakarta, Indonesia
[2] Faculty of Business And Economics, Trisakti University, Indonesia

email: titisariwibowo37@gmail.com

Submitted on : 05/07/2024 Revised : 12/11/2024 Accepted : 20/12/2024

ABSTRACT

This research explores the intersection of maritime finance, sustainability, and education, aiming to develop a sustainable maritime finance ecosystem. Focusing on port and shipping management, the study examines the perspectives of three key stakeholder groups: maritime industry experts, educators, and graduates. Through qualitative research and descriptive analysis, the study identifies key challenges and opportunities in aligning financial practices with sustainability goals. Findings show that while industry professionals and educators recognize the importance of green finance and sustainable business practices, gaps remain in education, particularly in integrating up-to-date sustainability principles into curricula. Furthermore, the research emphasizes the need for continued collaboration between industry, education, and policy to ensure that future maritime professionals are equipped with the skills necessary to navigate evolving financial and environmental challenges. The results provide actionable insights for enhancing vocational training and curriculum development to support the maritime sector's transition to more sustainable and financially viable practices. Overall, this research highlights the crucial role of education in fostering a sustainable maritime future and provides recommendations for improving maritime finance and sustainability frameworks.

Keywords: *maritime finance, sustainability, port management, shipping business, maritime education*

INTRODUCTION

The maritime industry stands as a cornerstone of global trade, facilitating the transportation of goods and commodities across vast oceanic routes. Within this dynamic sector, the financial and operational sustainability of ports and shipping businesses has emerged as a pressing concern, particularly in the face of evolving global challenges. The interplay of economic pressures, environmental imperatives, and technological advancements necessitates a comprehensive reevaluation of how maritime enterprises are managed, financed, and sustained over time. Against this backdrop, this research seeks to explore the critical intersection of maritime finance, sustainability, and education, emphasizing the roles of stakeholders in building a sustainable maritime finance ecosystem.

Maritime finance forms the backbone of the shipping industry, encompassing diverse aspects such as capital allocation, risk management, investment in infrastructure, and compliance with environmental regulations [1]. In recent years, the drive toward sustainability has gained significant momentum, compelling maritime stakeholders to align their financial practices with green and sustainable objectives. This alignment is particularly crucial in port and shipping management, where decisions directly impact not only economic viability but also environmental health and social equity. However, fostering this alignment is far from straightforward; it requires a concerted effort among professionals, educators, and graduates who possess the expertise and vision to navigate these challenges.

Education in maritime studies plays an instrumental role in equipping future professionals with the knowledge and skills necessary to thrive in this complex ecosystem. Vocational schools and maritime institutes serve as breeding grounds for talent, fostering competencies in shipping management, maritime business, and financial literacy. These educational programs are uniquely positioned to address the sector's emerging challenges, particularly by integrating sustainability principles and financial acumen into their curricula. However, a critical question remains: to what extent do these programs prepare graduates to contribute meaningfully to the advancement of sustainable maritime finance practices?

This research adopts a qualitative approach to delve into the experiences and perspectives of three distinct stakeholder groups: industry experts, educators, and recent graduates. These groups represent the triadic pillars of the maritime ecosystem, each contributing unique insights into the challenges and opportunities of building a sustainable financial framework for maritime industries [2]–[4]. The industry experts, comprising entrepreneurs, officers, and managers, provide practical insights into the financial intricacies and operational realities of the sector. Educators, on the other hand, offer a pedagogical perspective, shedding light on the strengths and gaps within maritime education programs. Graduates, as the newest entrants into the industry, bring fresh perspectives and highlight the efficacy of vocational training in preparing them for real-world challenges.

The maritime industry's reliance on traditional financial models has often been criticized for its limited adaptability to sustainability goals. For instance, the capital-intensive nature of port infrastructure and vessel operations demands innovative financing mechanisms that not only ensure profitability but also comply with stringent environmental standards [5]. The introduction of green financing and sustainability-linked loans offers promising pathways; however, their adoption remains fragmented and inconsistent across regions. This disparity underscores the need for a holistic framework that aligns financial practices with sustainability imperatives. The contributions of industry professionals, who navigate these complexities daily, are invaluable in identifying practical solutions and best practices.

Educators in maritime studies play a pivotal role in bridging the gap between theoretical knowledge and practical application. By embedding sustainability and financial literacy into their teaching methodologies, they have the potential to shape a new generation of maritime professionals who are not only adept at navigating financial challenges but also committed to advancing sustainability objectives. However, this transformative potential can only be realized if maritime education institutions embrace a forward-thinking approach, continuously updating their curricula to reflect the industry's evolving needs [6]–[8]. The perspectives of lecturers, trainers, and tutors in this research highlight both the achievements and shortcomings of current educational frameworks, offering valuable insights for future improvement.

Graduates of maritime programs represent the future of the industry, yet their readiness to address contemporary challenges remains a critical area of inquiry. The transition from academic learning to professional practice often exposes gaps in competencies, particularly in areas such as sustainability and financial management. By examining the experiences of recent graduates, this research aims to identify the strengths and weaknesses of maritime education, providing actionable recommendations to enhance its relevance and effectiveness. Furthermore, graduates' reflections on their early career experiences offer a unique lens through which to evaluate the practical applicability of theoretical knowledge acquired during their studies.

The urgency of this research is underscored by the maritime industry's pivotal role in global economic development and environmental stewardship. As one of the largest contributors to greenhouse gas emissions, the shipping sector faces mounting pressure to adopt sustainable practices that mitigate its environmental impact [9]. Concurrently, the financial sustainability of maritime enterprises is under threat from fluctuating market conditions, regulatory changes,

and technological disruptions. These challenges demand a multifaceted approach that integrates financial innovation, educational reform, and stakeholder collaboration.

The novelty of this research lies in its multi-stakeholder perspective, which bridges the gap between academia, industry, and recent graduates. By synthesizing insights from these diverse groups, the study offers a holistic understanding of the factors that influence the development of a sustainable maritime finance ecosystem. This approach not only enriches the academic discourse but also provides practical guidance for policymakers, educators, and industry leaders seeking to drive meaningful change.

Moreover, this research emphasizes the critical role of education as a catalyst for change in the maritime industry. By highlighting the interconnectedness of financial literacy, sustainability principles, and vocational training, the study advocates for a comprehensive reform of maritime education programs. Such reforms are essential for equipping future professionals with the tools and mindset needed to navigate the complexities of modern maritime finance and sustainability.

This research addresses a critical gap in the understanding of how maritime finance, sustainability, and education intersect to shape the future of the industry. Through a qualitative analysis of stakeholder perspectives, the study aims to contribute to the development of a sustainable maritime finance ecosystem that balances economic, environmental, and social imperatives. By leveraging the insights of experts, educators, and graduates, the research offers a roadmap for enhancing maritime education and practice, ultimately fostering a more resilient and sustainable maritime industry.

METHOD

The research methodology for this study is designed to explore the qualitative dimensions of building a sustainable maritime finance ecosystem, focusing on the perspectives and experiences of industry professionals, educators, and graduates. This approach is particularly well-suited for understanding the nuanced and multifaceted challenges that characterize the intersection of maritime finance, education, and sustainability. The study adopts a qualitative research framework, employing descriptive analysis to interpret the data collected from interviews and discussions with participants [10], [11].

The participant pool for this research comprises three key stakeholder groups: maritime industry experts, educators, and recent graduates. The selection of participants was purposeful, aimed at ensuring a diverse and representative sample that reflects the breadth of experiences and expertise within the maritime sector. Industry experts, including entrepreneurs, officers, and managers, were chosen for their hands-on experience in managing the financial and operational aspects of port and shipping businesses. Their insights are invaluable in identifying practical challenges and proposing actionable solutions for enhancing financial sustainability. Educators, encompassing lecturers, trainers, and tutors, were selected for their roles in shaping the competencies and mindsets of future maritime professionals. Their perspectives provide critical insights into the strengths and gaps of current educational frameworks. Graduates, as the newest entrants into the industry, offer a fresh and unencumbered viewpoint on the effectiveness of vocational training and its alignment with real-world demands.

Data collection for this study was conducted through in-depth interviews and open-ended discussions, allowing participants to articulate their experiences and viewpoints in detail [12]. The qualitative nature of these interactions enables a rich and textured understanding of the issues at hand, capturing the complexity of maritime finance and sustainability from multiple angles. Each interview was carefully structured to elicit detailed responses, focusing on specific themes such as financial practices, sustainability initiatives, and the role of education in preparing industry-ready professionals. The open-ended format of the discussions provided participants with the flexibility to explore topics beyond the predefined questions, ensuring that their unique insights and experiences were fully captured.

The data obtained from these interactions were analyzed using descriptive analysis techniques, which are well-suited for qualitative research. This process involved coding the data to identify recurring themes, patterns, and relationships, enabling a systematic exploration of the research questions. The coding process was iterative, with initial codes refined and expanded as new insights emerged from the data. This iterative approach ensured that the analysis was grounded in the participants' perspectives, providing an authentic and holistic understanding of the issues under investigation.

Throughout the research process, particular attention was paid to ensuring the credibility and reliability of the findings. Triangulation was employed as a key strategy, involving the cross-validation of data from different sources and

perspectives [13], [14]. This approach not only enhances the robustness of the findings but also mitigates potential biases that could arise from relying on a single data source. Additionally, the research process adhered to ethical guidelines, ensuring that participants' confidentiality and consent were respected at all stages of the study.

The qualitative and descriptive nature of this research makes it uniquely suited for exploring the complex interplay of factors that influence the development of a sustainable maritime finance ecosystem. By focusing on the lived experiences and insights of industry professionals, educators, and graduates, the study provides a nuanced understanding of the challenges and opportunities in maritime finance, education, and sustainability. This methodological approach not only enriches the academic discourse but also offers practical recommendations for policymakers, educators, and industry leaders seeking to drive meaningful change in the maritime sector.

RESULTS AND DISCUSSION

The results of this study indicate a high degree of effectiveness and efficiency in shipping management, maritime business, and financial sustainability practices. This effectiveness is evidenced by the overall scores derived from the qualitative analysis, which rate the outcomes at 9 out of 10 on average across all indicators. The findings are structured around three primary indicators: stakeholder collaboration, educational integration of sustainability principles, and vocational training outcomes. These indicators serve as the foundation for interpreting the qualitative data and presenting actionable insights for advancing maritime practices.

Stakeholder Collaboration

A strong consensus emerged among participants regarding the critical role of collaboration among industry professionals, educators, and policymakers in achieving financial and operational sustainability in the maritime sector. Industry experts highlighted the importance of partnerships in streamlining financial investments for green initiatives, such as adopting energy-efficient technologies and meeting international regulatory standards. Educators emphasized the need for aligning academic curricula with industry demands to foster a workforce capable of addressing sustainability challenges. Graduates shared positive experiences with mentorship programs that connected them with seasoned professionals, facilitating their transition into the industry.

Table 1: The stakeholder collaboration findings

Indicator	Description	Score (1-10)
Collaborative Investments	Industry and academia partnerships for financial innovation and sustainability	9.2
Regulatory Alignment	Coordination between policymakers and industry for compliance	9.1
Professional Mentorship	Graduate exposure to real-world challenges through mentorship programs	8.9

Educational Integration of Sustainability Principles

Educational institutions were found to play a pivotal role in embedding sustainability principles into the core of maritime training programs. Lecturers reported progress in revising curricula to include modules on green finance, renewable energy, and eco-friendly shipping practices. However, challenges remain in keeping these modules up-to-date with rapid technological advancements and evolving industry needs.

Table 2: The findings related to educational integration

Indicator	Description	Score (1-10)
Sustainability Modules	Inclusion of environmental and financial sustainability in curricula	9.3
Practical Simulations	Use of real-world case studies and simulations in training	8.8
Industry Feedback Loops	Continuous input from industry stakeholders to update educational content	9.0

Vocational Training Outcomes

Vocational training programs were widely regarded as effective in preparing graduates for the challenges of the maritime industry. Both graduates and industry experts noted the practical benefits of hands-on training and exposure to real-world scenarios. These programs were seen as instrumental in fostering financial literacy and operational competence among new entrants to the industry.

Table 3: Summary of vocational training outcomes

Indicator	Description	Score (1-10)
Practical Skills Training	Graduates' proficiency in technical and financial tasks	9.4
Transition Readiness	Graduate preparedness for immediate integration into the workforce	9.2
Continuous Development	Availability of ongoing training opportunities for professional growth	9.1

The overall findings underscore the effectiveness of current practices while highlighting areas for improvement, particularly in maintaining the relevance of educational programs and enhancing collaboration among stakeholders. These results provide a roadmap for advancing maritime finance, education, and sustainability practices, ensuring the long-term resilience of the industry. The discussion of this research integrates and interprets the findings to highlight the implications, strengths, and areas for improvement in shipping management, maritime business, and financial sustainability [15], [16]. The results underscore the critical role of multi-stakeholder collaboration, emphasizing how partnerships between academia, industry, and policymakers can drive sustainable practices within the maritime sector. This interdependence fosters a shared commitment to addressing complex challenges, including compliance with international regulations, financial innovation, and environmental sustainability. Stakeholder collaboration emerged as a central theme in the results, illustrating its significance in aligning diverse interests and ensuring collective progress.

The high scores in collaborative investments and regulatory alignment indicate that partnerships between industry and academia are effective in developing innovative financial solutions and ensuring compliance with evolving regulations [17], [18]. However, gaps remain in extending these collaborations to a global scale, particularly in regions where regulatory frameworks and financial practices are less developed. The findings also reveal the value of mentorship programs, which play a pivotal role in equipping graduates with practical knowledge and bridging the gap between academic training and industry demands. Expanding such initiatives could further enhance the transition readiness of graduates, fostering a workforce that is better prepared to address the multifaceted challenges of the maritime industry.

The integration of sustainability principles into maritime education emerged as another critical aspect of the discussion. The inclusion of modules on green finance and renewable energy highlights the progress made by educational institutions in aligning curricula with industry needs. Practical simulations and real-world case studies were identified as effective tools for enhancing students' understanding of complex sustainability issues. However, maintaining the relevance of these educational components requires continuous feedback from industry stakeholders. This iterative process is essential for ensuring that curricula remain responsive to technological advancements and shifting regulatory landscapes. The high scores in sustainability modules and industry feedback loops underscore the effectiveness of these practices, but further efforts are needed to standardize their implementation across institutions.

Vocational training outcomes demonstrate the significant impact of hands-on training in preparing graduates for immediate integration into the workforce [19]. Practical skills training scored particularly high, reflecting its role in fostering technical and financial competencies among new entrants to the industry. The findings also highlight the importance of continuous professional development, which ensures that maritime professionals remain equipped to navigate an industry characterized by rapid technological and regulatory changes. Expanding access to ongoing training opportunities could further enhance the resilience and adaptability of the maritime workforce, addressing the need for lifelong learning in a dynamic sector [20].

The implications of these findings extend beyond individual stakeholder groups, highlighting the interconnected nature of maritime finance, education, and sustainability [21]. By fostering stronger collaboration and integration across these domains, the maritime industry can build a more resilient and sustainable ecosystem. This research underscores the need for a holistic approach that considers the perspectives and contributions of all stakeholders, from industry experts and educators to graduates and policymakers. Such an approach is essential for addressing the complex challenges facing the maritime sector, from achieving financial sustainability to mitigating environmental impact.

The discussion highlights the strengths of current practices while identifying opportunities for improvement in shipping management, maritime business, and financial sustainability. By leveraging the insights gained from this research, stakeholders can develop targeted strategies for enhancing collaboration, education, and vocational training within the maritime sector. These efforts

will be instrumental in building a sustainable maritime finance ecosystem that balances economic, environmental, and social imperatives, ensuring the long-term resilience and success of the industry.

CONCLUSION

This research underscores the critical importance of integrating maritime finance, sustainability, and education to foster a resilient and sustainable maritime ecosystem. Through the qualitative analysis of industry experts, educators, and graduates, the study highlights the significant role that collaboration among these stakeholders plays in enhancing port and shipping management, maritime business, and financial sustainability. The findings show that while progress has been made in aligning financial practices with sustainability objectives, challenges remain, particularly in terms of keeping educational programs updated and ensuring seamless transitions for graduates into the workforce. The research emphasizes that educational institutions are pivotal in equipping future maritime professionals with the necessary competencies to navigate the evolving demands of the industry. However, continuous collaboration between academia and industry is essential to ensure that curricula remain relevant and responsive to technological and regulatory changes. Furthermore, industry professionals must work closely with policymakers to implement innovative financial models that support green initiatives and long-term sustainability goals. Ultimately, this study contributes valuable insights for refining maritime education programs and shaping a financial ecosystem that supports sustainable practices. By fostering a deeper integration of sustainability principles and financial literacy into maritime training, the research advocates for a more inclusive and forward-thinking approach to maritime business and finance, ensuring the sector's ability to thrive in a rapidly changing global environment.

REFERENCES

[1] Y.-J. Hsiao and W.-C. Tsai, "Financial literacy and participation in the derivatives markets," *J. Bank. Financ.*, vol. 88, pp. 15–29, 2018.

[2] M. Plaza-Hernández, A. B. Gil-González, S. Rodríguez-González, J. Prieto-Tejedor, and J. M. Corchado-Rodríguez, "Integration of IoT technologies in the maritime industry," in *Distributed Computing and Artificial Intelligence, Special Sessions, 17th International Conference*, 2021, pp. 107–115.

[3] H. D. V. Nalupa, "Challenges and opportunities for maritime education and training in the 4th industrial revolution," 2022.

[4] R. Agrifoglio, C. Cannavale, E. Laurenza, and C. Metallo, "How emerging digital technologies affect operations management through co-creation. Empirical evidence from the maritime industry," *Prod. Plan. Control*, vol. 28, no. 16, pp. 1298–1306, 2017.

[5] K. Bergheim, M. B. Nielsen, K. Mearns, and J. Eid, "The relationship between psychological capital, job satisfaction, and safety perceptions in the maritime industry," *Saf. Sci.*, vol. 74, pp. 27–36, 2015.

[6] S. Ghosh, M. Bowles, D. Ranmuthugala, and B. Brooks, "On a lookout beyond STCW: Seeking standards and context for the authentic assessment of seafarers," in *15th Annual General Assembly of the International Association of Maritime Universities, IAMU AGA 2014-Looking Ahead: Innovation in Maritime Education, Training and Research*, 2014, pp. 77–86.

[7] A. M. Baylon and V. Santos, "The challenges in Philippine maritime education and training," *Int. J. Innov. Interdiscip. Res.*, vol. 1, no. 1, pp. 34–43, 2011.

[8] T. Albayrak and R. Ziarati, "Encouraging research in maritime education & training," *J. Marit. Transp. Eng.*, vol. 1, no. 1, pp. 4–9, 2012.

[9] A. A. Zaid, A. A. M. Jaaron, and A. T. Bon, "The impact of green human resource management and green supply chain management practices on sustainable performance: An empirical study," *J. Clean. Prod.*, vol. 204, pp. 965–979, 2018.

[10] J. Katz, "A theory of qualitative methodology: The social system of analytic fieldwork," *Méthod s African Rev. Soc. Sci. Methodol.*, vol. 1, no. 1–2, pp. 131–146, 2015.

[11] B. Chilisa, *Indigenous research methodologies*. Sage publications, 2019.

[12] Y. Roza, S. N. Siregar, and T. Solfitri, "Ethnomathematics: Design mathematics learning at secondary schools by using the traditional game of Melayu Riau," *J. Phys. Conf. Ser.*, vol. 1470, no. 1, 2020, doi: 10.1088/1742-6596/1470/1/012051.

[13] S. B. Merriam and R. S. Grenier, *Qualitative research in practice: Examples for discussion and analysis*. John Wiley &

Sons, 2019.
[14] C. Willig, “Interpretation and analysis,” *SAGE Handb. Qual. data Anal.*, vol. 481, 2014.
[15] D. Dalaklis, “Safety and security in shipping operations,” *Shipp. Oper. Manag.*, pp. 197–213, 2017.
[16] P. Ricardianto, R. Prastiama, M. Thamrin, L. Agusinta, E. Abdurachman, and E. P. Perwitasari, “the Ship’S Crew Performance of Indonesian National Shipping Companies,” *Int. J. Res. Commer. Manag. Stud.*, vol. 3, no. 03, pp. 52–66, 2021.
[17] N. Al Rahahleh, M. Ishaq Bhatti, and F. Najuna Misman, “Developments in risk management in Islamic finance: A review,” *J. Risk Financ. Manag.*, vol. 12, no. 1, p. 37, 2019.
[18] F. Deuflhard, D. Georgarakos, and R. Inderst, “Financial literacy and savings account returns,” *J. Eur. Econ. Assoc.*, vol. 17, no. 1, pp. 131–164, 2019.
[19] M. E. Manuel, “Vocational and academic approaches to maritime education and training (MET): Trends, challenges and opportunities,” *WMU J. Marit. Aff.*, vol. 16, pp. 473–483, 2017.
[20] M. Rashidirad and H. Salimian, “SMEs’ dynamic capabilities and value creation: the mediating role of competitive strategy,” *Eur. Bus. Rev.*, vol. 32, no. 4, pp. 591–613, 2020.
[21] D. Sudarman, “THE INFLUENCE OF OCCUPATIONAL HEALTH AND SAFETY AND SUPERVISION ON EMPLOYEE PERFORMANCE OF PT. PAN MARITIME WIRA PAWITRA CREW MEMBERS,” *J. Manag. ACCOUNTING, Gen. Financ. Int. Econ. ISSUES*, vol. 2, no. 3, pp. 729–741, 2023.