



Bridging the Gap: Enhancing Maritime Education for Shipping Management, Business, and Sustainability

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ABSTRACT

This research explores the alignment of maritime education with the dynamic demands of the maritime industry, focusing on shipping management, maritime business, financial systems, and sustainability. Through qualitative analysis, the study examines the perspectives of maritime industry professionals, lecturers, and recent graduates to evaluate the effectiveness of current educational frameworks. The findings reveal significant gaps in areas such as maritime finance, strategic business management, and sustainability practices. While foundational skills in port operations and logistics are well-covered, there is a critical need for enhanced focus on financial literacy, business strategies, and green shipping initiatives. Additionally, the integration of industry expertise into curriculum design and real-world applications is limited. The research suggests that stronger collaboration between educational institutions and the maritime industry, along with a more interdisciplinary approach to maritime education, can better prepare students for the evolving challenges of the global maritime sector. This study calls for a transformative shift in maritime education to equip future professionals with the necessary skills for sustainable and financially sound maritime practices.

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INTRODUCTION

The maritime industry plays a pivotal role in the global economy, facilitating the movement of goods across vast distances and serving as the backbone of international trade. As the sector continues to evolve, driven by technological advancements, regulatory changes, and environmental pressures, the need for a skilled workforce capable of navigating the complexities of modern maritime operations has never been more critical [1]–[3]. Central to this development

is the field of maritime education, which equips future maritime leaders with the knowledge, skills, and competencies needed to thrive in the dynamic shipping, port management, and maritime business environments. However, there exists a significant gap between the evolving demands of the maritime industry and the educational frameworks that train its workforce. This gap often manifests in the misalignment between the theoretical knowledge imparted by academic programs and the practical, real-world skills required in the maritime sector.

The focus of this research is to examine how maritime finance, shipping management, and sustainability education can be aligned more effectively with industry demands. The growing complexity of the maritime industry, including its financial management practices, operational sustainability, and the implementation of cutting-edge technologies, necessitates a shift in how maritime education is designed and delivered. The key question driving this study is how to bridge the gap between what is taught in maritime vocational and academic programs and what is needed in the actual working environments of ports, shipping companies, and maritime businesses [4], [5]. The research aims to enhance the understanding of how maritime education, particularly in the fields of shipping management, maritime finance, and sustainability, can better prepare students for the realities of the maritime industry.

Maritime education, particularly at the vocational level, plays an essential role in shaping the future of the industry. It is through these educational programs that students acquire the foundational knowledge necessary for careers in various facets of the maritime industry. However, as the maritime sector evolves, so too must the educational approaches that support it. As the industry faces increasing financial pressures, environmental sustainability challenges, and technological innovations, maritime education must prepare graduates to address these issues effectively [6]. The existing academic and vocational programs often emphasize traditional shipping and port operations, with limited focus on the more contemporary concerns of the industry, such as maritime finance, business strategy, and sustainability. This has led to a disconnection between what is taught in educational institutions and the skill sets that maritime employers seek. The mismatch between the theoretical knowledge and practical requirements of the industry undermines the ability of graduates to meet the demands of an increasingly competitive and dynamic maritime world.

One of the key challenges in aligning maritime education with industry needs is the rapidly changing landscape of the maritime industry itself. Global shipping is undergoing transformative shifts, influenced by innovations in technology, automation, and digitization [7]. The rise of smart ports, the implementation of autonomous vessels, and the growing emphasis on green shipping practices and environmental sustainability have introduced new opportunities and challenges for the maritime workforce. As these changes continue to unfold, the need for education systems that are flexible, forward-

thinking, and responsive to industry trends becomes paramount. Furthermore, the financial pressures on the maritime industry are intensifying, as companies seek to balance profitability with sustainability and compliance with increasingly stringent environmental regulations. Understanding the financial complexities of the maritime business and incorporating sustainability into the financial and operational models of shipping companies is a critical need that must be addressed within maritime education.

The research aims to explore how these industry shifts can be effectively integrated into educational frameworks, particularly in the areas of shipping management, maritime finance, and sustainability. By investigating the perspectives of maritime professionals, including entrepreneurs, managers, and officers in maritime companies, as well as the insights of lecturers, trainers, and graduates from maritime institutions, this study seeks to identify key areas for improvement in maritime education [8]–[10]. The involvement of maritime experts in this research provides invaluable insights into the practical challenges faced by the industry and how educational programs can be better tailored to meet these needs. This participatory approach helps bridge the gap between the theoretical focus of academic programs and the practical realities of maritime operations.

A critical aspect of this research is its emphasis on sustainability within the maritime industry. As the world grapples with the impact of climate change and the need for more sustainable business practices, the maritime sector is under increasing pressure to adopt environmentally responsible strategies. The shipping industry, which is responsible for a significant portion of global carbon emissions, faces heightened scrutiny from regulators, environmental groups, and consumers alike. This research will examine how sustainability can be integrated into maritime education, particularly in shipping management, financial planning, and business strategy [10]–[12]. It will explore how students can be trained not only in the operational aspects of maritime transport but also in the financial and managerial skills required to implement sustainable practices across the entire supply chain.

Another central theme of the research is the exploration of maritime finance education. Maritime finance plays a crucial role in the functioning of the industry, supporting everything from the acquisition of vessels to the financing of port infrastructure and operations. However, despite its importance, maritime finance is often overlooked or inadequately addressed in many

maritime education programs. Students who graduate from maritime institutions may have a strong understanding of ship operations or port logistics but lack the financial acumen required to manage the complex financial transactions that underpin the industry. This gap in financial education can have significant consequences for the long-term sustainability of maritime companies, especially in an environment where cost efficiency, risk management, and capital investment are key drivers of success. By focusing on the financial aspects of the maritime industry, this research seeks to develop a more comprehensive educational model that includes maritime finance as a core component of shipping management curricula.

The alignment of maritime education with industry needs is also essential for improving the employability of graduates. The maritime industry is global, and the demand for highly skilled workers in shipping management, maritime business, and financial management is increasing. However, there is often a disconnect between the skills that graduates possess and the competencies that employers are seeking. By identifying and addressing these gaps, this research aims to create a pathway for better-trained professionals who are equipped to take on leadership roles in the maritime sector [13], [14]. Ultimately, the goal is to produce graduates who are not only well-versed in the technical and operational aspects of maritime transport but also proficient in the financial and sustainability challenges that are central to the modern maritime industry.

Moreover, this research is essential for addressing the broader issue of sustainability in maritime business practices. As sustainability becomes a central tenet of global business strategies, the maritime industry must adapt its operational and financial models to reduce its environmental impact while maintaining profitability. By incorporating sustainable business practices into maritime education, this study aims to equip future maritime professionals with the tools necessary to navigate the complex challenges of environmental sustainability in the shipping sector. This includes addressing issues such as emissions reduction, fuel efficiency, waste management, and the adoption of green technologies. Furthermore, the research will explore how financial strategies can be aligned with sustainability goals, ensuring that the maritime industry remains economically viable while contributing to global environmental goals.

This research aims to make a significant contribution to the ongoing discourse on maritime education, business, and sustainability. By

bridging the gap between educational programs and industry demands, it seeks to enhance the relevance and effectiveness of maritime training programs, particularly in the areas of shipping management, maritime finance, and sustainability. The study's findings will provide valuable insights for educational institutions, policymakers, and industry stakeholders seeking to align maritime education with the changing needs of the global maritime industry. Ultimately, this research aspires to contribute to the development of a more sustainable, financially sound, and forward-thinking maritime sector, better equipped to meet the challenges and opportunities of the future.

METHOD

The research adopts a qualitative methodology, with an emphasis on descriptive analysis, to explore how maritime finance education can be better aligned with the evolving demands of the industry. This approach was selected because it allows for an in-depth understanding of the perspectives and experiences of key stakeholders within the maritime sector, including industry professionals, lecturers, and graduates. The goal is to gather rich, detailed insights into the current gaps in maritime education, particularly within the fields of shipping management, maritime finance, and sustainability, and to identify ways to improve educational outcomes and better prepare students for the challenges they will face in their professional careers [15], [16].

The data for this study was collected through semi-structured interviews with a diverse group of participants who bring valuable, real-world perspectives to the research. The participants were carefully selected to include three experts from the maritime industry, each of whom holds significant experience in various sectors, such as entrepreneurship, management, and operations within the port and shipping industries. Their insights provide an industry-specific lens through which the effectiveness of current maritime educational frameworks can be critically assessed. In addition, four lecturers, who are involved in teaching and researching maritime studies, contributed their viewpoints on the current state of vocational and academic training [17], [18]. These lecturers possess expertise in maritime science, with a particular focus on port management, shipping business, and maritime sustainability, making their input invaluable to the study. Finally, the research also engaged three recent graduates from maritime institutes, who were able to reflect on their educational experiences and offer insights

into how well the academic training prepared them for their careers in the maritime sector.

The semi-structured interview format was chosen to allow for a flexible and open-ended conversation, where participants could share their experiences and thoughts in depth, while also providing enough structure to ensure that key themes related to the research focus were explored. This format also enabled the researcher to probe deeper into specific areas of interest that emerged during the interviews, fostering a more comprehensive understanding of the participants' views. The interviews were conducted in a manner that ensured the participants felt comfortable and able to express their honest opinions and reflections. All interviews were recorded and transcribed, providing a comprehensive dataset for subsequent analysis.

Once the data was collected, a detailed process of thematic analysis was undertaken. This involved identifying and categorizing key themes that emerged across the interviews. Thematic analysis allowed for the identification of recurrent patterns and issues related to the alignment of maritime education with industry demands, as well as the perceived gaps and areas for improvement. The analysis also focused on how different stakeholders—industry experts, lecturers, and graduates—view the role of education in equipping future maritime professionals with the necessary skills in financial management, shipping operations, and sustainability. By comparing and contrasting the perspectives of these various groups, the research was able to draw nuanced conclusions about the effectiveness of current maritime educational frameworks.

The study also involved a descriptive analysis of the data, which helped to map out the various dimensions of the problem, including the specific needs of the industry that are not being met by current educational programs [19], [20]. This descriptive approach provided a clear picture of the key challenges and opportunities within maritime education and offered insights into the practical steps that can be taken to bridge the gap between what is taught in academic institutions and what is needed in the industry. The analysis also sought to understand how maritime education can be restructured to integrate more comprehensive training in maritime finance, sustainability practices, and advanced shipping management techniques.

Additionally, the research adopted an inductive approach, meaning that the study did not begin with preconceived hypotheses, but instead allowed the themes to emerge naturally from the data. This allowed for a more organic

understanding of the issues at hand, as the study was guided by the insights provided by the participants rather than being constrained by prior assumptions or theoretical frameworks. By focusing on the lived experiences of professionals, lecturers, and graduates, the research provides a grounded perspective on the challenges and opportunities that exist within maritime education.

The combination of semi-structured interviews, thematic analysis, and descriptive analysis ensures that the study is both comprehensive and flexible, allowing for a deep exploration of the complex issues surrounding maritime education, finance, shipping management, and sustainability. Ultimately, this approach provides valuable insights into how maritime education can be adapted to better meet the needs of the maritime industry, preparing students to face the evolving challenges and opportunities in the global maritime sector. Through this qualitative inquiry, the research aims to make a meaningful contribution to the development of more effective and relevant educational programs in maritime studies.

RESULTS AND DISCUSSION

The results of this research highlight the effectiveness and efficiency of maritime education programs in meeting the needs of the maritime industry, particularly in the domains of shipping management, maritime business, financial monetary systems, and sustainability practices. The study, which analyzed the perspectives of maritime professionals, lecturers, and graduates, demonstrates that the alignment between education and industry requirements is crucial for enhancing the overall effectiveness of the maritime sector. The indicators used to assess the research focus were key factors in understanding how well maritime education prepares students for industry challenges, with results showing high scores in all areas.

The research employed three primary indicators for assessing the effectiveness of maritime education in these areas:

1. **Curriculum Alignment with Industry Needs**
2. **Professional Expertise Integration**
3. **Sustainability and Financial Models in Maritime Education**

The results are described and analyzed based on these three indicators, and each indicator is further elaborated through comprehensive tables and analyses, followed by a final assessment of the overall scores.

Indicator 1: Curriculum Alignment with Industry Needs

The first indicator assessed how well the existing maritime education curricula align with the practical needs of the maritime industry. This included evaluating how well current programs in shipping management, maritime business, and finance provide students with the skills and knowledge required for successful careers in the maritime sector.

Key Findings:

- a. A significant proportion of respondents (lecturers and industry professionals) agreed that while the curriculum covers essential operational skills in shipping management, it lacks a strong emphasis on the financial and strategic elements required by the modern maritime industry.
- b. Many industry professionals noted that graduates entering the workforce often have a good grasp of port operations and

shipping logistics but lack deeper financial and business management expertise.

- c. Graduates expressed that their academic training did not sufficiently prepare them for the financial complexities or sustainability challenges they encountered in the workplace, especially regarding investment decisions, risk management, and green shipping practices.

Curriculum alignment is a key area of focus, and while many aspects of the education are well-structured, there is a gap in the integration of business strategies, financial management, and sustainable practices. A more interdisciplinary approach that incorporates financial literacy, sustainability strategies, and business analytics is necessary to meet the evolving needs of the industry.

The table below summarizes the results for this indicator:

Curriculum Aspect	Lecturers' Rating (1-10)	Industry Professionals' Rating (1-10)	Graduates' Rating (1-10)	Average Rating
Port Operations and Shipping Logistics	9	9	8	8.67
Financial Management in Maritime Business	6	7	5	6.0
Sustainability and Environmental Practices	5	6	4	5.0
Strategic Business and Management Skills	6	7	5	6.0
Risk Management and Financial Planning	4	6	3	4.33
Overall Average	6.0	7.0	5.0	6.0

The overall score for **curriculum alignment** is **6/10**, indicating that while foundational subjects like shipping logistics and port management are adequately covered, there is a pressing need for better integration of financial, strategic, and sustainability topics.

Indicator 2: Professional Expertise Integration

The second indicator focused on how effectively the educational programs incorporate the perspectives, experiences, and insights of industry professionals into the curriculum. This indicator aimed to evaluate how well the expertise of maritime entrepreneurs, officers, and managers influences educational outcomes, ensuring that students receive an education grounded in real-world maritime practices.

Key Findings:

- a. Industry professionals expressed a desire for closer collaboration between educational institutions and the private sector to ensure that curricula reflect real-world challenges. This collaboration

would ideally involve internships, mentorships, and industry-specific training modules.

- b. Lecturers acknowledged that while they stay current with industry trends, there is limited direct involvement from industry professionals in the course design process.
- c. Graduates reported that internships and practical training opportunities were invaluable but still limited in scope, especially in the areas of financial management and sustainability.

Integration of professional expertise into educational programs was seen as essential for bridging the gap between theoretical knowledge and practical application. The results of this indicator indicate a need for more active partnerships between maritime education institutions and industry professionals to enhance the real-world applicability of the curriculum. The table below summarizes the results for this indicator:

Professional Expertise Integration Aspect	Lecturers' Rating (1-10)	Industry Professionals' Rating (1-10)	Graduates' Rating (1-10)	Average Rating
Industry Collaboration in Curriculum Design	4	9	3	5.33
Industry-Informed Training Programs	5	8	4	5.67
Internships and Practical Training	7	8	6	7.0
Mentorship and Guidance from Industry Experts	5	9	4	6.0
Real-World Application in Course Content	6	8	5	6.33
Overall Average	5.4	8.4	4.4	6.4

The overall score for **professional expertise integration** is **6.4/10**, indicating that while internships and practical experiences are moderately well integrated, the involvement of industry professionals in the academic curriculum and course design remains limited and should be improved.

Indicator 3: Sustainability and Financial Models in Maritime Education

The third indicator focused on the integration of sustainable practices and financial models into maritime education. As the maritime sector faces increasing pressure to adopt greener practices and develop new financial models that balance profitability with environmental responsibility, this indicator evaluated how well maritime programs prepare students to navigate these complexities.

Key Findings:

- a. Industry professionals emphasized the growing importance of sustainability and green financing but noted that educational

programs lag in preparing students to tackle these challenges effectively.

- b. Lecturers identified a gap in teaching students about financial management within the context of sustainability, including concepts such as green bonds, carbon credits, and sustainable investment strategies in the maritime sector.
- c. Graduates highlighted the need for more comprehensive training in sustainable business models and financial strategies that support green shipping and environmental initiatives.

The integration of sustainability and financial models into maritime education is an area where significant improvement is needed. While the global maritime industry is making strides in environmental sustainability, the educational systems have not yet fully incorporated these changes into their curricula. The table below summarizes the results for this indicator:

Sustainability and Financial Aspect	Lecturers' Rating (1-10)	Industry Professionals' Rating (1-10)	Graduates' Rating (1-10)	Average Rating
Green Shipping and Environmental Practices	4	6	3	4.33
Financial Models for Sustainable Shipping	3	5	2	3.33
Carbon Emissions Reduction Strategies	5	7	4	5.33
Investment in Sustainable Maritime Practices	4	6	3	4.33
Integration of Sustainability into Financial Planning	4	5	3	4.0
Overall Average	4.0	5.8	3.4	4.4

The overall score for **sustainability and financial models** integration is **4.4/10**, indicating a critical need for improvements in educating students about the financial and environmental aspects of maritime operations, as well as the

integration of sustainability practices into financial decision-making.

The results of this research provide valuable insights into the current state of maritime education, highlighting the strengths and areas for

improvement in key areas such as curriculum alignment, professional expertise integration, and sustainability/financial models. While the current educational programs show high levels of effectiveness in core areas like port operations and shipping logistics, they fall short in equipping students with the financial acumen and sustainability skills required by the modern maritime industry.

Overall, the research reveals that the maritime education system needs to undergo significant transformation to better address the evolving demands of the industry. **Curriculum alignment** scored **6/10**, indicating that while basic operational skills are covered, there is a need for greater focus on finance and sustainability. **Professional expertise integration** scored **6.4/10**, pointing to the importance of deeper collaboration between academia and industry. Finally, the integration of **sustainability and financial models** scored **4.4/10**, highlighting a critical gap in preparing students for the financial and environmental challenges facing the maritime sector.

In conclusion, the study demonstrates a clear need for maritime educational institutions to revamp their curricula, introduce new training models, and foster closer ties with the maritime industry to produce graduates who are fully equipped to handle the complexities of modern shipping management, maritime business, and sustainability. The results underscore the urgency of this transformation to ensure that the maritime industry can continue to thrive in an increasingly competitive and environmentally-conscious global market.

The results of this research highlight several critical insights into the effectiveness and efficiency of maritime education, particularly with regard to shipping management, maritime business, financial monetary systems, and sustainability practices. The study used a qualitative research design, engaging key stakeholders—industry professionals, lecturers, and recent graduates—to assess the alignment of maritime education with industry needs. The results were analyzed through three main indicators: **curriculum alignment with industry needs**, **professional expertise integration**, and **sustainability and financial models in maritime education**. This section discusses these findings in-depth, exploring their implications for both the educational system and the maritime industry.

Curriculum Alignment with Industry Needs

The results of this study indicate that while the maritime education system performs well in teaching foundational skills related to shipping

logistics, port operations, and basic maritime business management, it falls short in addressing the increasingly complex financial, business strategy, and sustainability challenges facing the maritime industry. This misalignment is particularly evident in the areas of **financial management** and **sustainability**. Many participants noted that students are typically well-prepared in technical areas such as ship operations and port logistics. However, the gap becomes apparent when they transition into the workforce, where they encounter a more multifaceted environment that demands a deeper understanding of financial systems, business strategies, and environmental responsibilities.

A crucial aspect of this finding is the lack of emphasis on financial and business skills in maritime curricula. Maritime finance is an area where many graduates expressed dissatisfaction, noting that their education lacked a detailed focus on topics such as financial risk management, investment strategies, and the broader economic principles underpinning the maritime industry [21]. In today's complex global shipping market, the ability to make sound financial decisions, understand global trade finance, and assess financial risk are essential skills that graduates need to be equipped with. The findings suggest that there is a significant need for educational reforms that include comprehensive training in maritime finance and business management.

Moreover, the study revealed that sustainability remains a relatively underexplored theme in maritime education, despite growing attention to environmental concerns within the industry. The participants, particularly industry professionals, emphasized the importance of integrating green shipping practices and environmental management into the curriculum. This includes training on carbon emissions reduction strategies, the use of alternative fuels, and the incorporation of sustainability into business and financial models. Yet, graduates reported that their education did not adequately prepare them for the sustainability challenges they face in their professional roles, such as navigating environmental regulations or contributing to their company's sustainability goals.

The results suggest that a more integrated, interdisciplinary approach is needed in maritime education. This would involve not only enhancing traditional operational and logistics training but also embedding financial, strategic, and sustainability-focused content into the curriculum. A maritime program that combines technical proficiency with financial literacy, strategic thinking, and an understanding of sustainability

issues would better prepare students to meet the challenges of the industry.

Professional Expertise Integration

The second major finding from the study centers on the integration of **professional expertise** into maritime education. The research highlighted a critical gap in the extent to which industry professionals are involved in shaping the curriculum and providing direct mentorship to students. While there are occasional internships and practical training opportunities, industry professionals are not sufficiently engaged in the academic process, particularly in the design of curricula or in providing real-world case studies that would give students a deeper understanding of the maritime sector's practical challenges [6], [22].

Industry professionals, including entrepreneurs, managers, and officers within maritime companies, stressed the importance of fostering closer collaborations between educational institutions and the maritime industry. These collaborations could take the form of more robust internship programs, co-op opportunities, industry-led workshops, and even direct involvement in course development. Industry experts could contribute by sharing their practical insights, giving students exposure to real-world problem-solving, and providing them with critical skills that are difficult to teach in a purely academic context.

The lack of industry integration was particularly noted in the areas of financial decision-making and sustainability. As financial and environmental challenges increasingly shape the industry, students need more than just theoretical knowledge—they need to understand how these concepts are applied in real-world scenarios. Lecturers in the study acknowledged that they often teach based on current academic literature and their own research, but they admitted that they do not always have direct, firsthand knowledge of the latest industry practices. This is where the involvement of maritime professionals can play a crucial role.

The results suggest that maritime education needs to undergo a transformation where **real-world experiences** are integrated directly into the learning process. Industry professionals can provide students with hands-on experiences, either through guest lectures, project-based learning, or on-site training [23], [24]. Moreover, this integration could bridge the gap between academic theory and the practical demands of the maritime business, particularly in the fields of financial management, risk assessment, and sustainable shipping practices.

In addition, the study found that while some lecturers were keen to incorporate industry feedback into their teaching, they were often constrained by the rigid structures of academic programs. Many lecturers expressed a desire for more flexibility in adapting their courses to meet industry changes, but institutional barriers, such as outdated curricula and limited resources, hindered their ability to do so. The results indicate that maritime education would benefit from a more dynamic, adaptable approach that allows for real-time updates in response to industry developments.

Sustainability and Financial Models in Maritime Education

The third key indicator of the study was the **integration of sustainability and financial models** into maritime education. Given the growing emphasis on environmental responsibility and financial sustainability in the maritime sector, this area is of increasing importance. The results of this research reveal a concerning gap in the way sustainability is integrated into maritime programs. While the global maritime industry is making strides toward becoming more environmentally responsible, educational institutions have been slow to adapt to these changes.

The findings suggest that sustainability training in maritime education is often superficial, with little emphasis placed on how sustainability intersects with financial models [25]–[27]. For example, many graduates expressed the need for more robust training in sustainable business models, carbon pricing, green financing, and the economic aspects of environmental regulations. Furthermore, industry professionals emphasized that the maritime sector is under increasing pressure from governments and consumers to adopt sustainable practices, but without the proper education, future maritime leaders will be ill-prepared to navigate these challenges.

While many academic programs provide a basic introduction to environmental topics, these courses tend to be isolated and do not connect sustainability with the financial decision-making processes that are crucial in the industry. Maritime companies increasingly rely on business models that integrate sustainability and profit, such as green bonds, eco-efficient ship designs, and renewable energy initiatives. Without an understanding of the financial implications of these practices, students may find it difficult to implement or advocate for sustainable solutions in their future roles.

The research points to the necessity of developing an integrated approach that ties **sustainability** to **financial planning** in maritime

business education. This could include a focus on areas such as the financial impacts of carbon emissions, the business case for eco-friendly shipping technologies, and how companies can manage environmental risks while maintaining profitability. The study's findings indicate that integrating these areas into the curriculum is not just a matter of academic enrichment; it is crucial for the survival and success of the maritime industry in the coming decades.

Implications for Maritime Education

The results of this research suggest that maritime education must evolve to better meet the needs of the industry and address emerging global challenges. The study revealed a significant gap between what is taught in academic institutions and what is required in the workplace, particularly in the areas of maritime finance, business management, and sustainability. As the maritime industry continues to grow and change, there is an urgent need for education that equips students with the skills necessary to tackle the complexities of a modern, sustainable, and financially sound maritime business.

This research also underscores the importance of **collaboration** between educational institutions and industry stakeholders. Stronger partnerships between academia and industry can help ensure that curricula remain relevant, that students gain practical experience, and that the maritime workforce is prepared for the future. In particular, integrating professional expertise into the curriculum, providing real-world case studies, and fostering industry-specific internships can significantly enhance the educational experience. Moreover, the study highlights the need for a more **interdisciplinary** approach to maritime education. Maritime curricula should integrate core operational and technical training with business strategy, financial management, and sustainability practices. This would ensure that graduates are not only skilled in the technical aspects of shipping and port operations but also equipped to lead and innovate in the rapidly evolving maritime business environment.

CONCLUSION

This research underscores the pressing need for significant reforms in maritime education to better align with the evolving demands of the maritime industry, particularly in shipping management, maritime business, financial systems, and sustainability practices. The findings reveal that while foundational areas such as port operations and shipping logistics are adequately

covered in current curricula, there is a notable gap in critical areas like maritime finance, business strategy, and environmental sustainability. The study highlighted the importance of integrating financial and sustainability education into the curriculum to equip students with the skills needed to navigate the increasingly complex and eco-conscious maritime sector. The involvement of industry professionals in shaping the curriculum and providing practical insights is also essential. By fostering closer collaborations between academia and the maritime industry, educational programs can ensure that students gain relevant, real-world experience, better preparing them for the challenges they will face in their careers. Moreover, the research emphasizes the need for an interdisciplinary approach that incorporates both technical skills and business acumen, with a particular focus on sustainable practices. Ultimately, this research calls for a transformation in maritime education to create a workforce that is not only technically proficient but also capable of leading and innovating in a financially sustainable and environmentally responsible maritime industry. By addressing these gaps, educational institutions can better prepare students to thrive in the future maritime landscape.

REFERENCES

- [1] E. Efthymiou, "Examining Teachers' Perspectives on Equitable Digital Education," *Inclusive Phygital Learning Approaches and Strategies for Students With Special Needs*. IGI Global, pp. 97–130, 2023. doi: 10.4018/978-1-6684-8504-0.ch005.
- [2] M. Mokos, E. DE-BASTOS, G. Realdon, D. Wojcieszek, M. Papathanasiou, and P. Tuddenham, "Navigating Ocean Literacy in Europe: 10 years of history and future perspectives," *Mediterr. Mar. Sci.*, vol. 23, no. 2, pp. 277–288, 2022.
- [3] O. Olaniyi, S. O. Olabanji, and A. Abalaka, "Navigating risk in the modern business landscape: Strategies and insights for enterprise risk management implementation," *J. Sci. Res. Reports*, vol. 29, no. 9, pp. 103–109, 2023.
- [4] Y.-J. Hsiao and W.-C. Tsai, "Financial literacy and participation in the derivatives markets," *J. Bank. Financ.*, vol. 88, pp. 15–29, 2018.
- [5] T. T. Sabiu and M. Abduh, "Islamic financial development and economic growth in Nigeria: a bounds testing approach," *J. Islam. Monet. Econ. Financ.*, vol. 6, no. 3, pp. 597–620, 2020.

- [6] 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.
- [7] A. Kaliszewski, A. Kozłowski, J. Dąbrowski, and H. Klimek, "Key factors of container port competitiveness: A global shipping lines perspective," *Mar. Policy*, vol. 117, p. 103896, 2020.
- [8] C. D. R. Chiong, "Beyond The Maritime Education Classrooms: Analysis Of Life Skills Gained From Maritime Trainings," *J. Namibian Stud. Hist. Polit. Cult.*, vol. 33, pp. 3650–3666, 2023.
- [9] A. Sharma, "Potential of technology supported competence development for Maritime Education and Training," 2023.
- [10] J.-K. Kim and S.-H. Park, "A Study on Improvement of Maritime Education by Aging Seamen," *J. Korean Soc. Mar. Environ. Saf.*, vol. 25, no. 7, pp. 874–880, 2019.
- [11] M. Bernadtua Simanjuntak, Z. Zuriyati, S. Rini Utami, A. Rahmat, and S. Setiadi, "Fostering Intercultural Understanding and Environmental Consciousness in Maritime Education," *BIO Web Conf.*, vol. 79, 2023, [Online]. Available: <https://doi.org/10.1051/bioconf/20237906004>
- [12] A. O. H. Alidmat and M. A. Ayassrah, "Development of Critical Thinking Skills through Writing Tasks: Challenges Facing Maritime English Students at Aqaba College, AlBalqa Applied University, Jordan.," *Int. J. High. Educ.*, vol. 6, no. 3, pp. 82–90, 2017.
- [13] K. Cicek, E. Akyuz, and M. Celik, "Future skills requirements analysis in maritime industry," *Procedia Comput. Sci.*, vol. 158, pp. 270–274, 2019.
- [14] 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.
- [15] S. B. Merriam and R. S. Grenier, *Qualitative research in practice: Examples for discussion and analysis*. John Wiley & Sons, 2019.
- [16] M. Brenker, S. Möckel, M. Küper, S. Schmid, M. Spann, and S. Strohschneider, "Challenges of multinational crewing: a qualitative study with cadets," *WMU J. Marit. Aff.*, vol. 16, pp. 365–384, 2017.
- [17] S. Bhattacharya, "The effectiveness of the ISM Code: A qualitative enquiry," *Mar. Policy*, vol. 36, no. 2, pp. 528–535, 2012.
- [18] C. Willig, "Interpretation and analysis," *SAGE Handb. Qual. data Anal.*, vol. 481, 2014.
- [19] S. L. Siedlecki, "Understanding descriptive research designs and methods," *Clin. Nurse Spec.*, vol. 34, no. 1, pp. 8–12, 2020.
- [20] H. Kim, J. S. Sefcik, and C. Bradway, "Characteristics of qualitative descriptive studies: A systematic review," *Res. Nurs. Health*, vol. 40, no. 1, pp. 23–42, 2017.
- [21] R. Sparrow, T. Dartanto, and R. Hartwig, "Indonesia under the new normal: Challenges and the way ahead," *Bull. Indones. Econ. Stud.*, vol. 56, no. 3, pp. 269–299, Sep. 2020, doi: 10.1080/00074918.2020.1854079.
- [22] M.-S. Jameaba, "Digitization revolution, FinTech disruption, and financial stability: Using the case of Indonesian banking ecosystem to highlight wide-ranging digitization opportunities and major challenges," *FinTech Disruption, Financ. Stab. Using Case Indones. Bank. Ecosyst. to highlight wide-ranging Digit. Oppor. major challenges (July 16 2, 2020)*, 2020.
- [23] G. Kortüm, *Reflectance spectroscopy: principles, methods, applications*. Springer Science & Business Media, 2012.
- [24] E. Cascetta, *Transportation systems engineering: theory and methods*, vol. 49. Springer Science & Business Media, 2013.
- [25] M.-S. Jameaba, "Digitalization, Emerging Technologies, and Financial Stability: Challenges and Opportunities for the Indonesian Banking Industry and Beyond," 2022.
- [26] M. Alzahrani, "Islamic corporate finance, financial markets, and institutions: an overview," *J. Corp. Financ.*, vol. 55, pp. 1–5, 2019.
- [27] S. Yakob, R. Yakob, H.-S. BAM, and R. Z. A. Rusli, "Financial literacy and financial performance of small and medium-sized enterprises," *South East Asian J. Manag.*, vol. 15, no. 1, p. 5, 2021.