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Scientific Paradigms in Managerial Decision-Making: Enhancing Strategic Accuracy in Maritime Leadership

[1]Martinus Siagian, [1]Mohamad Iqbal. F., [1]Mohhamad Ezra P., [1]Muhammad Verrell C.P., *[1]Nadifa Salsabila H., [1]Nira L. C. S.
[1]Maritime Institute, Sekolah Tinggi Ilmu Pelayaran Jakarta, North Jakarta, Indonesia

Address: Jl. Marunda Makmur Cilincing, Jakarta Utara 14150, Indonesia
Corresponding author: nadifashal@gmail.com

Abstract*. The maritime industry operates in a complex, rapidly evolving global environment where decision-making accuracy is critical for operational efficiency, sustainability, and risk mitigation. Traditionally, maritime leadership has relied heavily on experience-based decision-making, often leading to cognitive biases and strategic inefficiencies. This study examines the role of scientific paradigms in managerial decision-making, emphasizing how structured epistemological reasoning enhances strategic accuracy and reduces decision-making errors. This research provides original value by addressing the limited integration of structured decision-making models in maritime leadership, which has been largely overlooked in previous studies. While scientific reasoning has transformed decision-making in industries such as finance and healthcare, its application in maritime management remains underdeveloped. The study explores the following research questions: To what extent do scientific paradigms influence managerial decision-making in maritime leadership? How can structured reasoning reduce bias and improve decision accuracy? Using a qualitative approach, semi-structured interviews were conducted with maritime experts, lecturers, and postgraduate students, followed by thematic analysis and comparative evaluation. Results indicate that structured decision frameworks significantly improve managerial effectiveness, yet barriers such as industry conservatism and limited competency development hinder widespread adoption. The study concludes that integrating scientific reasoning into maritime leadership training programs can enhance decision accuracy, promote evidence-based management, and ensure sustainable strategic planning.*

Keywords*: Maritime Leadership, Scientific Paradigms, Decision-Making Accuracy, Epistemological Reasoning, Evidence-Based Management*

1. INTRODUCTION

In the rapidly evolving landscape of global business and industrial management, decision-making is a crucial determinant of success, efficiency, and sustainability. Nowhere is this more critical than in maritime leadership and management, where decisions impact international trade, environmental sustainability, regulatory compliance, and technological advancements (Plaza-Hernández et al., 2021). Traditionally, managerial decision-making in maritime industries has relied heavily on experience, intuition, and historical practices. However, in an era of increasing complexity, digital transformation, and global economic fluctuations, reliance solely on intuition-based leadership models exposes businesses to strategic errors, cognitive biases, and inefficiencies. The integration of a scientific paradigm into managerial decision-making offers a promising avenue to improve strategic accuracy, minimize errors, and create a robust decision-making framework that aligns with evidence-based practices. This study investigates the role of the philosophy of science in managerial decision-making, emphasizing that decisions should be guided not only by experience but also by structured scientific reasoning to ensure long-term sustainability and efficiency.

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Managerial decision-making has traditionally been viewed as an art rather than a science, with leadership being shaped by subjective experience, industry norms, and reactionary decision-making (Theotokas et al., 2014; Ubaidillah et al., 2020). However, in recent years, industries such as finance, healthcare, and technology have increasingly adopted scientific models of decision-making—incorporating logical analysis, statistical validation, and structured reasoning to minimize risk and enhance strategic success. The maritime sector, despite its central role in global commerce, remains relatively slow in adopting these scientific paradigms. Leadership in maritime transportation continues to prioritize experience-based decision-making over empirical reasoning, often leading to inefficiencies in logistics management, risk assessment, sustainability efforts, and technological innovation (Fang et al., 2019; Godet et al., 2024). Given the dynamic challenges facing the maritime industry—including digitalization, environmental regulations, and global market fluctuations—there is an urgent need to transition from intuitive decision-making to scientifically grounded managerial strategies.

The central research problem addressed in this study is the lack of a structured scientific approach to managerial decision-making in maritime leadership. The question at the heart of this study is: To what extent do scientific paradigms influence managerial decision-making in maritime leadership, and how can an epistemological framework help in reducing biases and strategic errors? While traditional management practices offer valuable experience-based insights, they often fail to account for cognitive biases, incomplete information, and flawed heuristics that lead to inefficient decision-making. This research aims to fill this gap by examining how scientific reasoning, epistemological models, and structured analytical approaches can contribute to improved managerial decision-making in maritime leadership.

To address this issue, this study is structured around the following research objectives: (1) To analyze how maritime leaders balance experience and scientific reasoning in decision-making processes, (2) To examine the philosophical assumptions that guide managerial decision-making in maritime business, (3) To investigate the role of epistemological literacy in reducing bias and improving strategic accuracy, and (4) To assess the barriers to integrating structured decision-making models in maritime leadership. These objectives are designed to provide a comprehensive understanding of how scientific paradigms can improve leadership approaches in maritime business and decision-making strategies.

The rationale and motivation for this study stem from the increasing complexity of maritime operations and the need for a decision-making framework that integrates both experience-based insights and structured scientific reasoning. The maritime industry operates

in a highly volatile, uncertain, complex, and ambiguous (VUCA) environment, where decisions must be made under regulatory pressure, economic constraints, and technological disruptions. The absence of structured decision-making models increases the likelihood of strategic miscalculations, inefficient resource allocation, and resistance to innovation. By introducing a philosophical scientific approach to decision-making, this study contributes to a growing body of research that advocates for evidence-based leadership and rational decision-making models in maritime business.

This research is conducted using a qualitative approach, incorporating descriptive analysis and thematic interpretation of expert insights, academic perspectives, and student reflections. A total of five to six respondents are engaged in this study, including maritime industry experts, lecturers in applied management, and postgraduate students specializing in marketing, innovation, and leadership. Data collection consists of semi-structured interviews, document analysis, and comparative assessments of real-world decision-making scenarios. Thematic analysis is used to categorize data into key themes, focusing on competency development, barriers to structured reasoning, and sustainability in scientific decision-making. Cross-group comparative analysis identifies differences and similarities in perspectives among experts, lecturers, and students, highlighting how various levels of experience and academic training influence perceptions of managerial decision-making (Burns, 2014; Bush, 2020). The findings are synthesized into a structured epistemological framework, providing a conceptual model for integrating scientific reasoning into maritime leadership training and professional development programs.

The conceptual framework guiding this research is built on three primary variables:

- Independent Variable: The Scientific Paradigm in Decision-Making (positivist, constructivist, or hybrid models).
- Mediating Variable: The Leadership and Management Approach (experience-based vs. structured reasoning-based decision-making).
- Dependent Variable: The Effectiveness of Managerial Decision-Making in Maritime Business.

This framework is designed to assess how different philosophical paradigms influence leadership strategies, examining whether managers who employ structured, epistemological reasoning make more effective decisions compared to those who rely solely on intuition and experience. By analyzing the interaction between scientific reasoning and leadership behavior, this study seeks to establish best practices for evidence-based managerial decision-making in maritime leadership.

One of the most significant implications of this research is its potential impact on maritime education and leadership training programs. If maritime decision-makers adopt a structured scientific approach to decision-making, it will improve strategic accuracy, enhance efficiency, and reduce risks associated with cognitive biases and flawed heuristics. Furthermore, by incorporating epistemological training into maritime education curricula, future maritime leaders can develop the necessary analytical skills to critically assess information, validate data, and apply structured reasoning to decision-making challenges.

This study seeks to redefine managerial decision-making in maritime leadership by advocating for a structured, scientifically grounded approach to leadership strategy. The maritime industry, despite being a global driver of commerce and trade, remains heavily dependent on experience-based leadership models, which often lack structured reasoning and empirical validation. By integrating scientific paradigms into managerial decision-making, this research contributes to the development of an epistemological framework that enhances leadership effectiveness, reduces strategic errors, and fosters a culture of evidence-based decision-making in maritime business. As the industry continues to adapt to global economic shifts, technological advancements, and regulatory transformations, the adoption of structured decision-making models will become increasingly essential for sustainable and effective leadership. This research, therefore, provides a foundation for future studies, policy recommendations, and practical implementation strategies aimed at enhancing epistemological literacy and improving decision-making frameworks in maritime management.

2. RESEARCH METHOD

This research employs a qualitative approach with a descriptive analysis framework to explore the role of scientific paradigms in managerial decision-making in maritime leadership. The study aims to assess the extent to which structured epistemological reasoning contributes to decision-making accuracy while addressing cognitive biases and strategic inefficiencies commonly found in intuition-driven leadership models. To achieve this, the study carefully selects respondents who provide critical insights into how scientific reasoning is integrated, resisted, or underutilized in maritime management strategies. The population and sample are drawn from three key groups: maritime industry experts, lecturers in applied management, and postgraduate students specializing in marketing, innovation, and leadership. The total number of respondents ranges between five and six participants, ensuring a manageable yet diverse pool of perspectives that reflect both practical industry experience and academic insights into managerial decision-making.

The selection of maritime industry experts is based on their direct involvement in decision-making processes within shipping, port operations, and maritime business management. These professionals offer practical insights into the effectiveness of traditional decision-making models and the extent to which scientific reasoning is incorporated into leadership strategies (Manning & Curtis, 2019; Vogel & Masal, 2015). The lecturers in applied management contribute theoretical perspectives by evaluating how decision-making frameworks are taught in business and leadership programs. Their input provides critical insights into the gaps between academic training and industry expectations regarding evidence-based decision-making. Lastly, the postgraduate students are included to represent the next generation of maritime leaders, exploring their exposure to epistemological reasoning in decision-making and their perception of the industry's openness to structured scientific methodologies. Their perspectives offer insights into emerging trends in leadership approaches and the potential for future shifts toward structured managerial decision-making frameworks.

The research utilizes a semi-structured interview guide as the primary research instrument, designed to capture in-depth insights into how decision-making is conceptualized within maritime leadership. The dependent variable in this study is the effectiveness of managerial decision-making in maritime business, which is influenced by independent variables such as leadership paradigms, exposure to epistemological frameworks, and industry attitudes toward structured reasoning. Several key indicators are examined to assess the extent to which respondents recognize and apply scientific methodologies in their managerial roles. One of the primary indicators focuses on how decision-makers evaluate and validate the reliability of information before making strategic choices. Another indicator examines the extent to which experience-based decision-making is prioritized over empirical data and logical analysis. Additional indicators include leadership adaptability, the presence of structured training in decision-making methodologies, and industry openness to adopting evidence-based frameworks in managerial practices.

In addition to interviews, document analysis is used as a supporting instrument, reviewing maritime industry reports, strategic decision-making case studies, and regulatory frameworks that influence managerial approaches. This secondary data provides contextual background to the primary findings, ensuring that qualitative insights from interviews are grounded in real-world industry trends. The integration of both primary and secondary data strengthens the reliability of the study, allowing for a more comprehensive exploration of epistemological influences on maritime decision-making.

The data collection process follows a structured yet flexible approach, ensuring that critical themes emerge organically from respondent discussions while maintaining methodological rigor (Creswell & Clark, 2011; Padgett, 2016; Saldana, 2014). Each interview is conducted individually to allow participants to reflect on their personal experiences, perspectives, and leadership philosophies. The interview framework is designed to explore how decision-makers conceptualize the role of scientific reasoning in leadership, their experiences with evidence-based decision-making, and the challenges they face in integrating epistemological reasoning into their managerial roles. Experts are asked about real-world decision-making scenarios where structured reasoning played a role in preventing strategic errors or improving business efficiency. Lecturers provide insights into how managerial decision-making is framed in academic discourse and the extent to which scientific paradigms are incorporated into leadership education. Postgraduate students share perspectives on how prepared they feel in applying structured reasoning to business decisions and whether the industry aligns with the principles taught in academic settings.

Following data collection, a comprehensive thematic analysis is conducted to categorize key insights into competency development, barriers to structured reasoning, and the sustainability of scientific approaches in decision-making. The first stage of analysis involves identifying patterns in the responses related to how decision-making frameworks are understood, applied, or challenged in maritime leadership. Themes such as bias reduction, empirical validation of decisions, and the prioritization of experience over structured reasoning are extracted and examined. The second stage consists of cross-group comparative analysis, where perspectives from industry experts, lecturers, and students are compared to identify commonalities and distinctions in how scientific paradigms influence decision-making practices. This comparison helps to determine whether gaps exist between academic training and industry practice, whether leadership attitudes toward evidence-based decision-making vary across generations, and whether structured reasoning is actively integrated into managerial strategies or remains an underutilized approach.

The final stage of analysis is narrative synthesis, where the findings are structured into a cohesive interpretation of how epistemological reasoning enhances or is hindered in maritime managerial decision-making. This synthesis incorporates both theoretical implications and practical applications, demonstrating how a structured scientific approach can be embedded into decision-making frameworks to improve risk assessment, strategic planning, and operational efficiency. The results highlight key takeaways for both academic institutions and industry professionals, providing recommendations on how to integrate epistemological

literacy into leadership development programs and how structured reasoning models can be adapted to real-world maritime management contexts.

The study ultimately provides a framework for understanding the relationship between scientific reasoning and managerial decision-making effectiveness in maritime leadership. By analyzing how decision-makers navigate complex challenges using a blend of experience and structured reasoning, the research identifies both strengths and weaknesses in current decision-making models. The insights gained from industry experts, lecturers, and students contribute to a broader understanding of how decision-making frameworks can be improved by integrating epistemological literacy, structured reasoning, and evidence-based analysis into maritime leadership training and management strategies.

This methodological approach ensures that the study captures a nuanced perspective on the role of philosophy in managerial decision-making, reinforcing the importance of scientifically grounded strategies in mitigating risks, reducing biases, and improving strategic accuracy. The findings provide valuable contributions to both academic research and industry practice, paving the way for more structured, rational, and data-driven decision-making approaches in maritime leadership and business management.

3. RESULTS AND ANALYSIS

The findings of this study provide a comprehensive evaluation of the role of scientific paradigms in managerial decision-making in maritime leadership. The results indicate that integrating structured epistemological reasoning significantly improves decision-making effectiveness, reduces cognitive biases, and enhances strategic accuracy. However, challenges remain in fully embedding structured decision-making models into maritime leadership due to industry conservatism, over-reliance on intuition-based leadership, and limited competency development in scientific reasoning. By analyzing insights from experts, lecturers, and postgraduate students, this research identifies both the strengths and limitations of existing decision-making frameworks, providing a data-driven approach to understanding how epistemological literacy can shape maritime leadership strategies.

One of the most critical findings is the importance of scientific reasoning in maritime decision-making, which received an overall score of 8.0. Experts emphasize that maritime leaders who integrate structured epistemological reasoning into their decision-making processes are better equipped to reduce cognitive biases and strategic errors. While experience-based decision-making remains valuable, relying solely on intuition can lead to flawed strategic choices, misinterpretation of data, and reactionary leadership styles. Lecturers advocate for a

stronger integration of structured reasoning models in leadership training, ensuring that future maritime professionals adopt evidence-based strategies. Postgraduate students, however, express concern that industry leaders remain hesitant to move away from experience-based models, slowing the adoption of scientific paradigms in managerial decision-making.

The effectiveness of structured decision frameworks in maritime leadership was another key indicator, receiving an overall score of 8.3, the highest among all evaluated criteria. Lecturers strongly support structured frameworks, emphasizing that decision-making based on logical reasoning and scientific models leads to higher accuracy, efficiency, and adaptability in leadership strategies. Experts also acknowledge that structured frameworks help ensure consistency in decision-making and improve organizational performance. However, postgraduate students argue that despite the theoretical benefits, many maritime businesses lack formalized models for implementing structured decision-making, leaving decisions largely up to intuition and experience.

The study also reveals that reducing bias in managerial decisions remains a major challenge, with an overall score of 6.7, the lowest among the evaluated indicators. While the integration of scientific paradigms has been shown to mitigate cognitive biases, barriers such as industry resistance to change, reliance on traditional decision-making methods, and limited training in epistemological literacy hinder its adoption. Experts recognize the dangers of biased decision-making, particularly in areas such as risk assessment, crisis management, and strategic forecasting. Lecturers highlight the need for structured decision-making models that reduce the influence of personal biases, ensuring that leaders base their decisions on empirical evidence rather than subjective judgment. Postgraduate students, however, express frustration that despite their exposure to scientific reasoning in academic settings, real-world industry applications remain inconsistent and underdeveloped.

Competency development in epistemological reasoning is a crucial factor in ensuring that scientific paradigms are effectively integrated into managerial decision-making, receiving an overall score of 7.3. Lecturers stress that structured epistemological training should be embedded within maritime education, equipping future leaders with the critical thinking skills necessary for evidence-based decision-making. Experts agree that training programs focused on logical reasoning, structured problem-solving, and scientific analysis could significantly improve the quality of managerial decisions in maritime leadership. However, postgraduate students express concerns about the accessibility of such training programs, noting that many maritime organizations still prioritize operational training over cognitive skill development.

The sustainability of evidence-based decision-making in maritime leadership is rated 8.3, reflecting strong agreement that long-term strategic success depends on the integration of structured decision-making frameworks. Experts emphasize that companies that adopt scientific paradigms in decision-making are more resilient, adaptable, and capable of navigating complex industry challenges. Lecturers highlight that sustainability in decision-making requires ongoing professional development, training, and academic-industry collaboration to ensure that maritime leaders remain up to date with the latest developments in structured reasoning and managerial decision science. Postgraduate students are optimistic about the future of structured decision-making in maritime leadership but stress that its sustainability depends on widespread industry adoption and commitment to long-term professional development initiatives.

Table 1: Research Results Based on Indicators, Analysis, and Scoring

Indicator	Expert Score (1-10)	Lecturer Score (1-10)	Postgraduate Student Score (1-10)	Overall Score (1-10)	Analysis
Scientific Reasoning in Maritime Decision-Making	9	8	7	8.0	Experts emphasize that maritime leaders must integrate structured epistemological reasoning into their decision-making to effectively reduce cognitive bias and strategic errors.
Effectiveness of Structured Decision Frameworks	8	9	8	8.3	Lecturers highlight that structured decision frameworks lead to improved efficiency and accuracy in leadership strategies, ensuring that decisions are data-driven rather than intuition-based.
Reduction of Bias in Managerial Decisions	7	7	6	6.7	Findings show that integrating scientific paradigms significantly reduces bias, but adoption is hindered by industry conservatism and reliance on experience-based decision-making.
Competency Development in Epistemological Reasoning	8	7	7	7.3	Competency development remains a key factor, with lecturers advocating for stronger integration of epistemological concepts into maritime leadership education.
Sustainability of Evidence-Based Decision-Making in Maritime Leadership	9	8	8	8.3	Sustainability of evidence-based decision-making depends on the long-term commitment of industry leaders to structured decision-making and ongoing professional development in epistemological literacy.

The cross-group comparative analysis highlights key differences in how experts, lecturers, and postgraduate students perceive epistemological reasoning in maritime leadership. Experts tend to emphasize practical constraints, such as regulatory limitations, financial feasibility, and operational challenges, which affect the implementation of structured decision-making. Lecturers focus on the theoretical integration of scientific paradigms into leadership education, advocating for structured cognitive training programs for maritime professionals. Postgraduate students are more aligned with lecturers in supporting structured decision frameworks but express concerns over industry-wide reluctance to abandon intuition-based decision-making models. These findings suggest that future maritime leadership must bridge the gap between theoretical knowledge and practical application, ensuring that structured decision-making models are both academically rigorous and industry-relevant.

The study concludes that structured epistemological reasoning significantly enhances decision-making effectiveness, improves strategic accuracy, and reduces cognitive biases in maritime leadership. However, successful implementation requires a shift in industry attitudes, increased competency development programs, and a commitment to embedding structured decision-making models within organizational frameworks. Moving forward, academic institutions must work closely with industry leaders to create training programs that promote epistemological literacy and evidence-based decision-making strategies. The findings of this study emphasize that without structured reasoning models, maritime leadership will continue to face challenges in decision accuracy, risk assessment, and long-term sustainability. By adopting a scientific approach to managerial decision-making, maritime organizations can enhance their strategic decision-making capabilities, reduce biases, and foster a culture of evidence-based leadership in a rapidly evolving global industry.

4. DISCUSSION

The findings of this study demonstrate that integrating scientific paradigms into managerial decision-making significantly enhances strategic accuracy, reduces cognitive bias, and improves decision-making effectiveness in maritime leadership. While the study reveals strong support for structured decision-making models, it also identifies key barriers to adoption, including industry conservatism, over-reliance on experience-based leadership, and limited competency development in epistemological reasoning. By analyzing perspectives from experts, lecturers, and postgraduate students, this study provides a critical examination of how decision-making frameworks can evolve to incorporate structured epistemological

reasoning, bridging the gap between intuitive leadership and evidence-based strategic management (Tolstyakova & Batyrova, 2020).

A key finding of this study is the importance of scientific reasoning in maritime decision-making, which received an overall score of 8.0. This indicates a broad consensus across respondent groups that structured decision-making enhances managerial effectiveness. Experts emphasize that scientific reasoning allows maritime leaders to make data-driven choices, reducing the likelihood of errors caused by personal biases or intuition-based leadership. Lecturers support this by arguing that structured decision-making should be embedded into maritime education programs, ensuring that future leaders develop a foundation in critical thinking and rational analysis (Albayrak & Ziarati, 2012; Demirel, 2020). Postgraduate students, however, express concern that while scientific reasoning is taught in academic settings, its application in real-world maritime decision-making remains inconsistent. This disconnect between academic training and industry practices suggests that further efforts are needed to bridge the gap between theoretical knowledge and its practical application in leadership roles.

The effectiveness of structured decision frameworks received the highest overall score of 8.3, indicating strong agreement that formalized decision-making models improve efficiency and strategic clarity in maritime leadership. Experts highlight that organizations that implement structured frameworks for managerial decisions tend to exhibit greater operational stability, reduced uncertainty, and improved risk assessment capabilities. Lecturers emphasize that structured decision-making should not replace experiential leadership but rather complement it, ensuring that intuition-based approaches are validated through logical reasoning and empirical data. Postgraduate students acknowledge the benefits of structured frameworks but express frustration over industry reluctance to implement formalized decision-making models, arguing that many maritime organizations continue to rely on outdated leadership strategies that prioritize intuition over evidence-based practices. This finding suggests that a more structured, standardized approach to decision-making must be developed and implemented within maritime management to ensure that leaders are making informed choices based on validated information rather than personal experience alone.

A critical challenge highlighted in the study is the difficulty in reducing bias in managerial decisions, which received the lowest overall score of 6.7. This suggests that while decision-making frameworks can theoretically reduce cognitive biases, industry-wide adoption remains a significant challenge. Experts emphasize that bias in decision-making often stems from ingrained cultural norms, regulatory pressures, and resistance to change, making it

difficult for leaders to transition to structured reasoning models. Lecturers argue that bias reduction requires long-term commitment to structured training programs that reinforce epistemological literacy, critical thinking, and statistical reasoning. However, postgraduate students remain skeptical, highlighting that many decision-makers do not see the necessity of structured reasoning until their intuition-based strategies fail. This indicates a reactive rather than proactive approach to structured decision-making, where organizations only implement scientific reasoning models after facing strategic failures. To address this issue, maritime leadership must proactively integrate epistemological reasoning into their decision-making structures, ensuring that biases are identified and mitigated before they influence critical business decisions (Kim et al., 2021; Pantouvakis & Vlachos, 2020).

Competency development in epistemological reasoning is another key area of concern, receiving an overall score of 7.3. The findings indicate that while competency development is recognized as a critical factor in structured decision-making, training opportunities remain limited within the maritime industry. Experts argue that maritime leadership programs must prioritize the development of structured reasoning skills, ensuring that decision-makers have the necessary tools to assess information, validate sources, and apply logical analysis to managerial decisions. Lecturers support this argument, suggesting that maritime education must evolve to include formalized training in scientific reasoning, critical thinking, and decision science. However, postgraduate students highlight a lack of access to structured training programs, emphasizing that many maritime professionals enter leadership roles without formal exposure to epistemological literacy, limiting their ability to make scientifically grounded decisions. This suggests that competency development must be a priority in maritime leadership training programs, ensuring that decision-makers are equipped with the necessary analytical skills to navigate complex strategic environments.

The sustainability of evidence-based decision-making in maritime leadership received an overall score of 8.3, reflecting strong agreement that structured decision-making models contribute to long-term strategic success. Experts emphasize that sustainable decision-making requires continuous professional development, ongoing training, and a commitment to logical reasoning in leadership. Lecturers argue that without sustained efforts to integrate structured reasoning into managerial frameworks, maritime leadership risks stagnating in traditional decision-making models that fail to adapt to industry changes. Postgraduate students, while optimistic about the future of structured decision-making, stress that the sustainability of these models depends on widespread industry adoption and the willingness of leaders to embrace scientific reasoning as a core component of their strategic planning.

A comparative analysis of responses across expert, lecturer, and student groups highlights notable differences in perceptions of structured decision-making. Experts, who operate within industry settings, emphasize practical constraints, such as regulatory limitations, financial feasibility, and operational challenges, that impact decision-making effectiveness. Lecturers, in contrast, focus on the theoretical benefits of scientific paradigms, advocating for a structured epistemological framework that reinforces logical analysis in leadership education. Postgraduate students, while largely supportive of evidence-based decision-making, express frustration over the slow pace of industry adoption, highlighting that many maritime organizations continue to prioritize intuition-based decision-making despite the proven benefits of structured reasoning. This discrepancy suggests that greater collaboration is needed between academia and industry stakeholders to align leadership training programs with real-world business challenges.

The findings of this study suggest that a paradigm shift is necessary in maritime leadership, ensuring that decision-making processes are guided by structured reasoning rather than intuition alone. The study emphasizes that scientific paradigms should not replace experience-based decision-making but should serve as a validation tool, ensuring that intuition-driven decisions are supported by empirical evidence and logical analysis. By combining experiential knowledge with structured reasoning, maritime leaders can develop more robust, resilient decision-making frameworks that enhance strategic accuracy, minimize bias, and improve long-term sustainability.

One of the most significant implications of this study is its potential to reshape maritime education and leadership training programs. If maritime institutions incorporate structured epistemological reasoning into leadership curricula, future decision-makers will be better prepared to navigate the complexities of modern maritime business. Furthermore, industry-wide efforts must be made to integrate structured decision-making frameworks into managerial practices, ensuring that leaders at all levels have access to training programs that reinforce scientific reasoning and evidence-based leadership strategies.

This study provides a comprehensive examination of the role of scientific paradigms in maritime managerial decision-making, highlighting both the strengths and challenges of integrating structured reasoning into leadership strategies. The findings suggest that structured decision-making frameworks significantly improve strategic accuracy, reduce cognitive biases, and enhance decision-making effectiveness. However, barriers such as industry conservatism, lack of structured training, and reliance on intuition-based leadership continue to hinder widespread adoption. Moving forward, greater efforts are needed to develop competency-based

training programs, align academic curricula with industry practices, and foster a culture of evidence-based leadership within maritime business. By adopting a structured scientific approach to managerial decision-making, maritime organizations can enhance operational efficiency, mitigate risks, and build a sustainable leadership framework that is adaptable to future industry challenges.

5. CONCLUSION

This research highlights the critical role of scientific paradigms in managerial decision-making within maritime leadership, demonstrating that structured epistemological reasoning significantly enhances strategic accuracy, reduces cognitive biases, and improves decision-making effectiveness. The findings indicate that while there is strong recognition of the benefits of structured decision-making models, industry-wide adoption remains hindered by conservatism, reliance on intuition-based leadership, and limited competency development in scientific reasoning. Experts emphasize that leaders who integrate structured reasoning into their decision-making processes make more informed, data-driven choices, reducing the risks associated with subjectivity and cognitive biases. Lecturers advocate for embedding epistemological literacy into leadership education, ensuring that future maritime professionals develop the analytical skills necessary for evidence-based decision-making. Postgraduate students, while supportive of structured frameworks, highlight the slow industry adoption of scientific paradigms, suggesting the need for stronger collaboration between academia and industry stakeholders. The study concludes that for maritime leadership to remain adaptive, resilient, and strategically sound, structured decision-making must become a core component of managerial frameworks. By incorporating scientific reasoning into leadership training programs, maritime organizations can enhance decision-making effectiveness, improve risk assessment, and foster a culture of evidence-based leadership. Moving forward, greater efforts are required to integrate structured decision models into professional training, ensuring long-term sustainability and strategic innovation within maritime management.

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