

The Strategic Impact in Relocation of Indonesian Capital City Related to the Development of Human Resource in Maritime Sector and Quality of Maritime Education and Training

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Abstract— The relocation of Indonesia's capital to Ibu Kota Nusantara (IKN) presents a strategic opportunity to boost the maritime sector, particularly in human resource development and Maritime Education and Training (MET). This paper explores the impact of the relocation on maritime infrastructure, workforce demands, and educational institutions. Findings indicate that the relocation will expedite port expansions and establish research hubs for maritime innovation, positioning IKN as a key center for maritime growth. Despite these prospects, challenges remain in addressing the gap between the supply and demand of skilled seafarers, worsened by pandemic disruptions. International collaboration and the Pentahelix approach, which integrates academia, government, and industry, are essential to enhancing MET programs and aligning with global standards as Indonesia moves toward its 2045 vision of Net Zero Emissions.

Keywords—Capital Relocation, Maritime Human Resource Development, Maritime Education and Training (MET), Infrastructure Development

I. Introduction

The relocation of Indonesia's capital to Ibu Kota Nusantara (IKN) presents a significant opportunity for the development of various sectors, including maritime education and human resource development. As Indonesia moves its administrative heart from Jakarta to Nusantara, located on Kalimantan Island, this shift offers a unique chance to realign and enhance the country's maritime infrastructure and capabilities. The capital relocation is more than a mere geographical shift; it is a strategic move aimed at supporting long-term economic growth, population distribution, and sustainable development goals.

Given Indonesia's archipelagic nature, maritime industries play a vital role in its economy and national identity. However, the country faces numerous challenges, including a shortage of skilled maritime professionals, limited research on maritime technology, and outdated infrastructure. Addressing these challenges is crucial, especially as the nation looks to enhance its competitiveness on the global stage.

This paper examines the strategic impact of relocating the capital on the enhancement of maritime human resources and

the quality of maritime education and training (MET) in Indonesia. It explores the potential benefits of the capital relocation, focusing on economic growth, infrastructure development, and the creation of a skilled maritime workforce to meet the demands of a rapidly evolving industry. Furthermore, the relocation presents an opportunity to establish new research hubs dedicated to maritime innovation and safety, bolstering Indonesia's position as a key player in global maritime affairs.

II. Methodology

This study employs qualitative approaches to analyze the strategic impact of Indonesia's capital relocation on maritime human resource development and the quality of Maritime Education and Training (MET). The following stages outline the methods used in this research:

1. Literature Review and Secondary Data Analysis
 Data and information were gathered from various secondary sources such as reports from the Indonesian Central Bureau of Statistics (BPS), data from the Ministry of Transportation, and reports from the Samarinda Port Authority and East Kalimantan region. The data include domestic sea transport statistics, economic growth in East Kalimantan, maritime infrastructure, and maritime accidents in Indonesia from 2017 to 2023. These secondary data provide a comprehensive view of the current conditions in Indonesia's maritime sector and its potential after the capital relocation.
2. Maritime Infrastructure Development Analysis
 To assess the impact of capital relocation on maritime infrastructure, this study analyzes data on the number of special terminals, ports, and companies involved in maritime transport management within the Nusantara Capital Region (IKN). The analysis also includes projections of economic growth, particularly from the mining sector, and its contribution to the Gross Domestic Product (GDP) of East Kalimantan.

3. Maritime Human Resources Demand and Supply Analysis The study also involves an analysis of the supply and demand for human resources in Indonesia's maritime sector, specifically focusing on the need for seafarers based on the existing fleet. Data from the United Nations Conference on Trade and Development (UNCTAD) and the Ministry of Transportation are used to project future manpower requirements for officers, engineers, and ratings.
4. Pentahelix Approach In improving maritime education within the IKN region, the Pentahelix approach is applied, involving stakeholders such as academia, government, communities, businesses, and the media. Each component of the Pentahelix contributes to the sustainable development of maritime education and training, including implementing safety standards, conducting research and development of maritime technologies, and raising awareness of maritime safety policies.
5. Bilateral Cooperation and Green Shipping Technology Implementation The study also explores bilateral cooperation with countries such as South Korea in developing maritime technologies, including autonomous ships and the implementation of green shipping practices. This cooperation is expected to support Indonesia's goal of achieving Net Zero Emissions in the maritime sector by 2045.
6. Maritime Accident and Human Factor Analysis Maritime accident data from the Indonesian National Transportation Safety Committee (KNKT) from 2017 to 2023 are analyzed to understand the contribution of human factors to these accidents. The categories of analysis include unsafe acts, preconditions for unsafe acts, inadequate supervision, and organizational influences. This analysis is crucial in identifying key areas for improvement in maritime education and training.
7. Data Collection via Questionnaire The research incorporates a questionnaire to gather insights into respondents' views on how Indonesia's capital relocation might influence the maritime sector. This tool enables the collection of perspectives from diverse stakeholder groups, including government officials, business representatives, community members, and media personnel. Respondents provided their opinions on various statements using a 5-point Likert scale. This scale ranges from "1" for "Strongly Disagree" to "5" for "Strongly Agree." Topics covered in the questionnaire include:
 - a. The anticipated impact of relocating the capital on maritime infrastructure quality.
 - b. Expected economic growth effects and improvements in Maritime Education and Training (MET) resulting from the relocation.
 - c. The importance of enhancing human resource competencies in the maritime field to support sustainability targets, such as achieving Net Zero Emissions by 2045.

The data collected from the questionnaire facilitates an understanding of stakeholder perspectives regarding the projected impacts of capital relocation on different maritime sector aspects. It also helps identify specific areas that may require targeted human resource and infrastructure development within the new capital region, Nusantara (IKN).

8. Descriptive and Qualitative Response Analysis The questionnaire responses will undergo descriptive analysis to uncover patterns in stakeholder feedback. An open-response section is included to allow participants to express suggestions, critiques, and personal insights on the development of the maritime sector in IKN. These qualitative responses will be thematically analyzed to pinpoint critical insights and strategic suggestions for advancing MET and maritime human resource capabilities.

III. Discussion

The relocation of Indonesia's capital to Ibu Kota Nusantara (IKN) brings about strategic opportunities, especially in the maritime sector. This discussion focuses on the impact of the relocation on maritime infrastructure, human resource development, education, and sustainability, backed by data from the presentation.

1. Demographic Profile

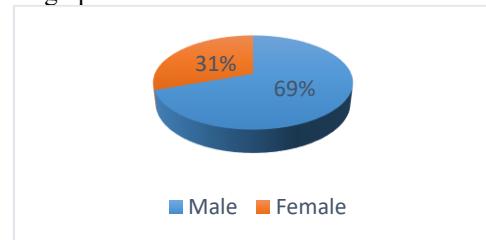


Fig 1. Demographic Profile

Based on demographic data from the questionnaire, a significant portion of respondents are male, comprising about 69% of the total, while females represent 31%. This ratio indicates a higher engagement from males, which is reflective of the current workforce composition in Indonesia's maritime industry. This demographic insight suggests that male perspectives dominate the findings, providing an understanding of the prevailing viewpoints within the sector.

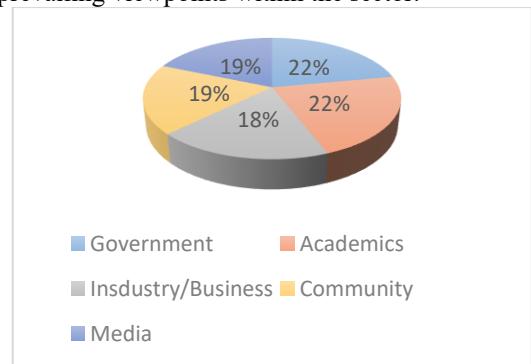


Fig 2. Stakeholder representation

Stakeholder representation is balanced, with Government and Academics each comprising 22%

of respondents, Industry/Business and Community at 19% each, and Media at 18%. This diversity ensures that the findings reflect a range of perspectives across the maritime sector, primarily influenced by younger and male viewpoints, which are essential for understanding the sector's current and future dynamics.

2. Maritime Infrastructure Development

The shift of the capital to East Kalimantan is expected to significantly boost maritime infrastructure. According to the presentation, the region already has 7 port business entities, 7 special terminals, 35 terminals for personal use, and 174 shipping companies. The establishment of IKN offers further potential for infrastructure expansion, including modernized port facilities and maritime logistics systems. This is critical given the growing demand for sea transport; in 2024, the number of domestic sea transport goods by departure port is expected to rise, driven by increasing maritime trade.

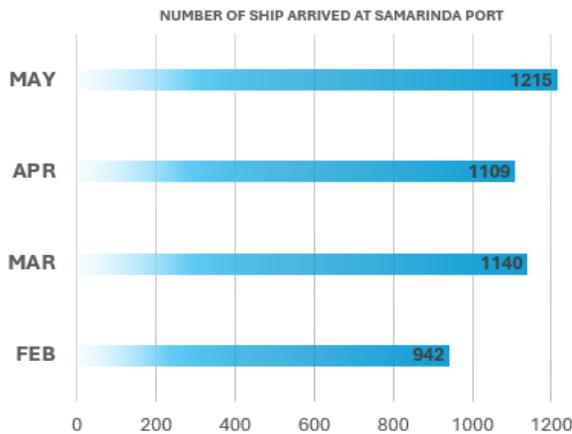


Fig 3. Number of Ship Arrived at Samarinda Port

Source : Samarinda Port Authority, 2024

Additionally, the Samarinda Port Authority reported a steady increase in the number of ships arriving, with 942 vessels in February, 1140 in March, and 1215 in May 2024. This growth illustrates the importance of expanding port capacity and enhancing operational efficiency. The development of LNG bunkering facilities is another crucial aspect of infrastructure that will support Indonesia's long-term vision of becoming a global maritime hub.

3. Questionnaire Data Representation

The questionnaire results offer insights into stakeholder views on the impact of the capital relocation on the maritime sector. The stacked bar chart displays responses across different answer categories Strongly Agree, Agree, Neutral, Disagree, and Strongly Disagree for each statement from H1 to H10.

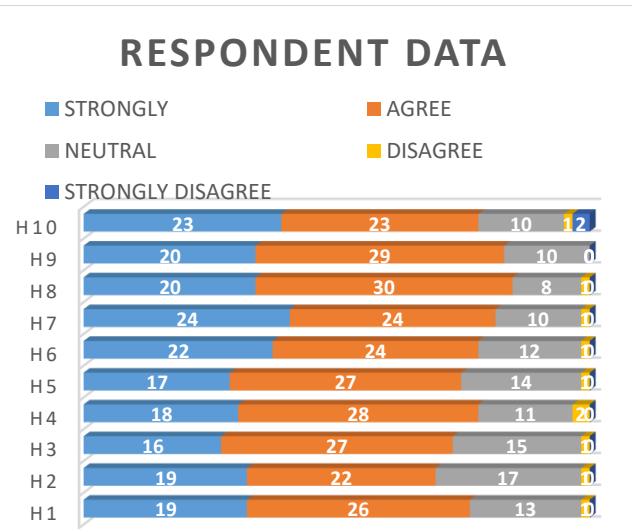


Fig 4. Respondent Data

The chart shows that most respondents tend to Strongly Agree or Agree with several key aspects, such as the enhancement of maritime infrastructure and the development of human resources in the Nusantara Capital Region (IKN). For instance, question H7 regarding the relocation's impact on maritime infrastructure received predominantly positive feedback, with most responses falling under Strongly Agree and Agree. This trend underscores the optimism stakeholders have about the potential enhancements in infrastructure and workforce development due to the capital relocation.

4. Human Resource Development in the Maritime Sector

Table 1 Merchant Fleet and Seafarer Needs in 2021 and 2023 (Ministry of Transport, 2024)

Merchant Fleet	2012	2023	% incr.	Seafarer Needed (Based on 2023 fleet)	
				Per ship, 4 off, 4 eng, 12 rat, tug 3 off, 3 eng, 5 rat	
Oil tanker	460	714	55	Off: 2,856 Eng: 2,856 Rat: 8,568 Tot: 14,280	
Bulk carriers	62	160	158	Off: 640 Eng: 640 Rat: 1,920 Tot: 3,200	
General cargo	1,916	2,347	22	Off: 9,388 Eng: 9,388 Rat: 28,164 Tot: 46,940	
Container	175	219	25	Off: 876 Eng: 876 Rat: 2,628 Tot: 4,380	
Other type (Tug etc)	3,347	7,982	138	Off: 23,946 Eng: 23,946 Rat: 39,910 Tot: 87,802	
Total	5,960	11,422	91	Off: 37,706 Eng: 37,706 Rat: 81,190 Tot: 156,602	

The relocation also provides an avenue to improve maritime human resource development. Data from the presentation shows that there is a significant demand for seafarers, with the number of merchant ships in Indonesia increasing from 5960 in 2012 to 11,422 in 2023, nearly doubling the demand for officers, engineers, and ratings. This creates a challenge for Maritime Education and Training (MET) institutions, particularly in producing sufficient graduates to meet industry needs.

The shift to polytechnic-based MET education, which began in 2019, has been a critical move towards professionalizing the workforce. However, disruptions caused by the pandemic and changes in government funding have reduced graduate

numbers. In 2019, for example, 3569 cadets graduated from government MET institutions, but this number dropped to 2348 in 2022. As the capital relocates, there is an opportunity to establish new research and training hubs in IKN, focusing on maritime innovation and addressing the shortage of skilled maritime professionals.

Collaboration with international partners, such as South Korea, could be instrumental in integrating advanced technologies and improving the quality of maritime education. Korea's expertise in green shipping and maritime autonomous surface ships (MASS) provides a model that Indonesia can adopt to enhance its maritime workforce capabilities.

Stakeholder Perspectives on MET and Its Impact on Local Communities :

Overall, there is a positive outlook on the development of MET in IKN, with expectations that it will contribute to local economic growth and create more job opportunities. The establishment of educational and training facilities in the maritime sector is seen as a strategic step toward equitable access to education and skills in the region.

However, some challenges must still be addressed to meet international standards. Government readiness, through effective policy support and efficient administration, is crucial for the success of this initiative. Additionally, maintaining integrity and transparency during the infrastructure development process is a key concern, as stakeholders emphasize the importance of a corruption-free environment to ensure the broader public good.

5. The Pentahelix Approach in Maritime Education

The application of the Pentahelix approach, which involves collaboration among academia, government, communities, businesses, and media, is essential in enhancing MET. Each stakeholder plays a vital role in shaping a robust maritime education system. For instance, academic institutions like SUPM Negeri Pontianak, PIP Balikpapan, and Politeknik Negeri Samarinda are essential in providing training, while the government ensures proper regulation and policy-making to meet international standards.

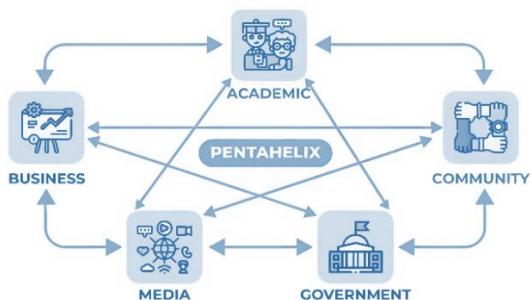


Fig 5. Pentahelix

Source : Directorate General Sea Transportation, 2024

The business sector is another critical player. The presence of 174 shipping companies and their collaboration with MET institutions can ensure that education and training programs align with industry

needs, especially in areas such as maritime safety, operations, and logistics. This collaborative framework ensures that Indonesia's maritime sector can produce competent professionals ready to meet the challenges of the global maritime industry.

6. Challenges and Solutions in Maritime Accident Reduction

Maritime safety remains a pressing issue in Indonesia, with human factors contributing significantly to accidents. Data from the Indonesian National Transportation Safety Committee (KNKT) indicates that from 2017 to 2023, human error accounted for 46.4% of maritime accidents, including collisions, groundings, and fires. Unsafe acts and inadequate supervision were major contributing factors, as seen in accidents such as the TB Cahaya I/Bg MJS 2001, which collided with a bridge pillar due to human error.

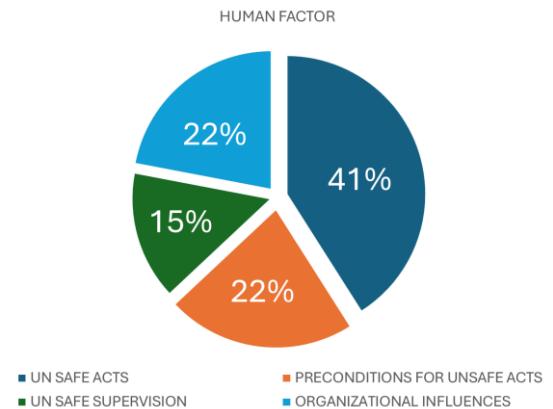


Fig 6. Distribution of Human Factor Contributions to Accidents/Incidents

Source : Transportation Safety Committee, 2023

Addressing these issues requires a renewed focus on maritime training, particularly in areas like decision-making under pressure and adherence to safety protocols. The development of a Maritime Research Center in IKN, as proposed, would play a crucial role in advancing safety technology and training methodologies. This center could focus on integrating simulation-based training, which provides a realistic, risk-free environment for seafarers to hone their skills and prevent accidents.

7. Green Shipping and Sustainability

The relocation of the capital also provides a platform for Indonesia to accelerate its adoption of green shipping practices. The presentation highlights Indonesia's initial steps towards reducing its maritime carbon footprint, including discussions on LNG fuel adoption and the development of smart ports. However, the infrastructure for LNG bunkering is still in its infancy, with only plans to implement LNG bunkering facilities in major ports. By learning from South Korea's Green Ship-K policy, which offers financial incentives for eco-friendly ship construction, Indonesia can make substantial progress in this area.

Achieving Net Zero Emissions in the maritime sector by 2045 is a significant challenge, but the capital relocation offers a fresh start. By focusing on green shipping technology and enhancing maritime education with sustainability in mind, Indonesia can become a leader in the environmentally sustainable shipping industry.

IV. Conclusion

The questionnaire results reveal a strong consensus among stakeholders on the positive impact of the capital relocation to the new capital (IKN) on maritime sector development, including infrastructure improvement and enhanced Maritime Education and Training (MET) quality. This aligns with the urgent need to address the high frequency of ship accidents in Indonesia, which led to 651 casualties from 2017 to 2023. The data underscores that MET reform is critical to advancing maritime safety and reducing accident risks.

In light of the Indonesia Emas 2045 vision, establishing a Maritime Research Center at IKN focused on cutting-edge technology and innovation emerges as an essential step. The center would drive initiatives aimed at reducing carbon emissions and enhancing operational safety, supporting Indonesia's commitment to Net Zero Emissions. The collaboration with South Korea offers a strategic partnership to:

- Reduce carbon emissions within the maritime sector.
- Improve safety and operational efficiency at sea.
- Strengthen Indonesia's global competitiveness in the maritime industry.

Moving forward, the development of MET and a research center with a focus on sustainability will not only enhance safety but also contribute to a robust and environmentally-friendly maritime ecosystem. Such advancements will be integral to supporting Indonesia's vision of Net Zero Emissions by 2045, making the maritime sector a key player in achieving the Indonesia Emas 2045 goals.

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