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A MULTI-REGIONAL STUDY OF MENTAL HEALTH OF SHIP CREW AND ITS IMPLICATIONS FOR MARITIME POLICY

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Abstract
Seafarers' mental health is a crucial issue often overlooked in maritime policy, even though work stress at sea has direct implications for shipping safety. Previous studies have focused more on the technical aspects of ship safety, while the psychological dimensions of crew members have not been comprehensively integrated into maritime safety systems. This gap creates an urgent need to examine the factors influencing crew members' mental health and how maritime policies can mediate the improvement of seafarers' psychological well-being. This study aims to analyze the relationship between the Maritime Safety Index, the Ship's Work Environment, Regional Characteristics of Operation, Maritime Policy, and Crew Member Mental Health. The method used is a mixed-method sequential explanatory approach, with a quantitative predominance (n = 309 respondents in Batam, Jakarta, and Surabaya) which is further deepened through in-depth interviews with 24 crew members. Quantitative data analysis uses Partial Least Squares Structural Equation Modeling (PLS-SEM). The results show that the Maritime Safety Index (T = 3.285; p = 0.001), Regional Characteristics of Operation (T = 2.801; p = 0.005), and Maritime Policy (T = 2.909; p = 0.004) have a significant effect on seafarers' mental health, while the influence of the Work Environment becomes significant through the mediating role of policy (T = 2.410; p = 0.016). Qualitatively, 79% of respondents experience stress due to long working hours and 67% of maritime accidents are related to fatigue. This study emphasizes the need for human-centered maritime policy reform as a strategy to strengthen the safety culture and sustainability of the shipping sector.
Keywords: Mental Health**,** Ship safety**,** Merchant Ship**,** Government policy**,** Sailor

INTRODUCTION

The merchant shipping industry is the backbone of global trade, with over 90% of the world's goods transported by sea. Behind this logistical efficiency, merchant ship crews play a crucial role as the driving force behind ship operations[1]. The mental and physical health of ship crew requires special attention. Sailors on duty as ship crew are the spearhead of the company. Life at sea for seafarers is inherently harsh. Their work demands operating ships in highly unstable environments with various natural and weather changes. While the physical health of seafarers is important and needs to be protected, mental health is even more vulnerable due to its hidden nature, under-detection, and lack of structural recognition in maritime policy. Continuously inadequate rest significantly impacts mental health. Seafarers are also required to stay at the workplace for long periods. These conditions present a much more challenging work environment than workers on land. Limited social interaction among fellow crew members and work pressures while at sea and during loading and unloading operations can trigger burnout. The impact of these conditions is that seafarer accidents are approximately four times higher than accidents for workers on land. Workplace accidents due to mental health disorders among seafarers are highly detrimental to both the crew and the company. A study conducted to examine the psychological health of seafarers identified three categories of causes of psychological disorders [2].

Irregular sleep patterns, unavoidable stress, and lack of social communication are the main causes of mental disorders. Workplace stress is listed as one of the most significant workplace health hazards for seafarers on board ships. Psychological health disorders tend to be related to psychological and social issues related to personal and work life [3]. A study found that seafarers tend to hide psychological problems for fear of being perceived as weak or losing their jobs. This condition results in psychological disorders developing silently, leading to delays in treatment [4]. The risk of self-harm, interpersonal conflict, and even workplace accidents increases. A study on fatigue and stress found that 49.79% of respondents admitted they had never been diagnosed with stress, and 52.04% had never been diagnosed with fatigue. Sixty-one percent of respondents believed that tests related to fatigue and stress diagnosis were necessary [5]. Based on the study's findings, assessments of mental health, stress, and fatigue are essential to improving safety culture. One study revealed that fatigue and drowsiness are caused

by poor sleep quality. When ship maneuvering begins, loading and unloading operations continue, and preparations for departure require extra overtime, reducing rest periods.

High workloads, and long working hours during navigation and cargo handling operations further deteriorate mental health. [6]. Over the years, chronic fatigue, stress-related issues, and other health problems are major contributing factors to accidents. Accidents result from errors made by crew members experiencing fatigue and stress. Seafarers' mental health suffers more than their physical health while on duty on board. Crew members work in isolated conditions, with long working hours of up to 12–16 hours per day, high operational pressure, and limited social interaction. This situation triggers chronic stress, long-term anxiety, and symptoms of depression. Physical disorders such as injuries or muscle fatigue are usually acute, immediately visible, and can be treated medically. Empirical data shows that the risk of occupational accidents among seafarers is four times higher than that of land-based workers, with 67% of maritime accidents involving fatigue and stress [7]. This phenomenon has serious implications, not only for the well-being of individual crew members, but also for shipping safety, work productivity, and the sustainability of the maritime industry as a whole.

Various international studies have shown that stress, anxiety, depression, and even suicide are common among seafarers. However, in Indonesia and many other developing maritime nations, attention to crew mental health issues remains minimal. Maritime policies tend to focus more on technical aspects and physical work safety, while psychosocial aspects receive insufficient attention [8]. Fatigue due to heavy work and lifestyle on board reduces cognitive function, increasing the risk of mental disorders and increasing the safety of sailing [9]. The mental health of ship crew and maritime safety are interrelated. Chronic stress and sleep disorders, including insomnia and night shift disorder, which are common among ship crew members, lead to severe fatigue. Fatigue itself has been identified by the International Maritime Organization (IMO) as a major cause of human error in maritime accidents. Referring to the various issues outlined in the background, several issues will be uncovered through this research. Internal and external factors can trigger changes in the mental health of ship crew members. The influence of ship crew mental health is crucial to maritime safety, including the safety of the ship, cargo, and the ship's crew itself [10]. Maritime Safety Culture, and Maritime Psychological Capital in the relationship between Human Factors Management, and Sustainable Maritime Safety by considering the variation of maritime operational conditions are important and related components [11].

This study aims to analyze the factors influencing the mental health of merchant ship crew members, their adaptation patterns, and the challenges they face in accessing psychological support. The results are expected to provide a scientific basis for developing maritime policies that are more responsive to mental health issues. The resulting scientific overview is comprehensive regarding the actual mental health of merchant ship crew members, including the causal factors, forms of psychological stress, and individual adaptation strategies that develop in the maritime work environment. The findings can identify gaps between the psychosocial needs of ship crew members and the available support from shipping companies, government institutions, and the international maritime community. Policymakers can formulate a policy that mental health is an integral part of the safety and sustainability of shipping. This will lead to a more humane, holistic maritime policy oriented towards the long-term well-being of seafarers. Overall, this study is expected to be not only an academic contribution but also practical in shaping a new direction for maritime policy that is more equitable and responsive to seafarers' psychological well-being. The novelty of this study lies in its methodology and heterogeneous respondents.

METHODS

This research adopts a descriptive approach. *mixed-method sequential explanatory* with quantitative dominance reinforced by qualitative data. The combination of methods deepens understanding of the phenomena being studied. The systematic stages of the research procedure are carried out by following the flowchart in **Figure 1**.

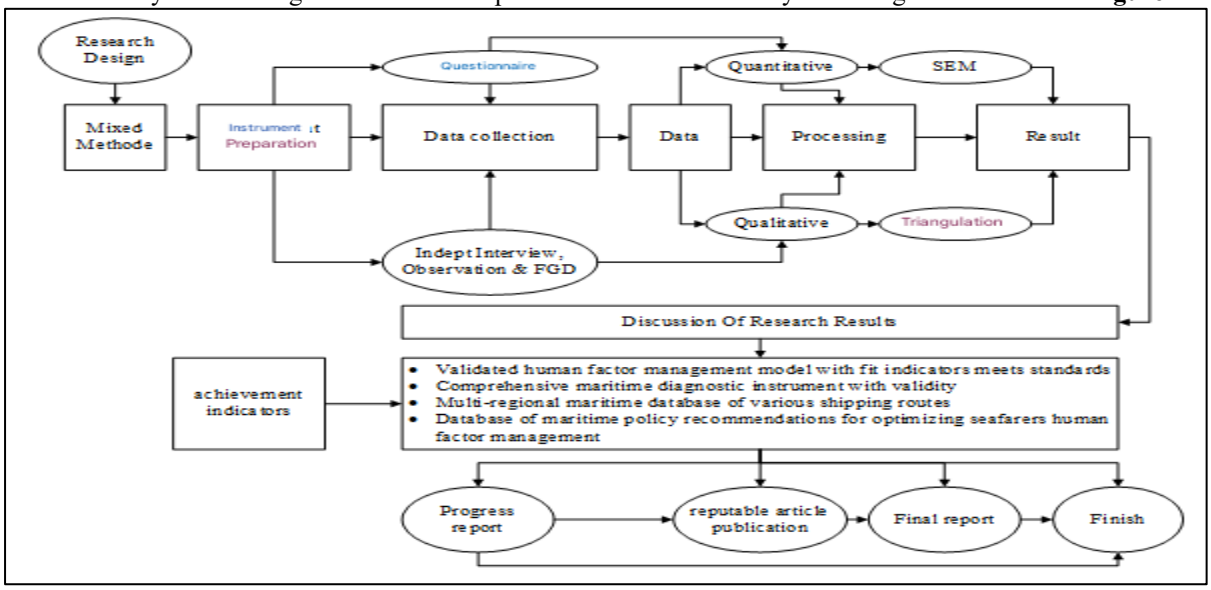

Figure 1. Research Flow Stages

Based on the research flow on **Figure 1** as described above, after the research design and approach method have been determined, the next step is to prepare the instruments needed for data collection. This research approach method combines quantitative and qualitative methods sequentially to complement and strengthen the research findings [12]. The context of the implementation of quantitative methods is used first, followed by qualitative methods to explain, deepen, or further interpret the statistical results found [13]. The use of this methodology as a sequential and concurrent design, in order to provide a practical strategy for synthesizing data to produce holistic insights [14]. The instrument was developed based on theories and variables developed to address the research questions. The variables were used to address the influence of crew mental health on the safety index. The research results will be used as input for determining maritime policy. The established research variables are presented in the form of a conceptual framework **Figure 2**.

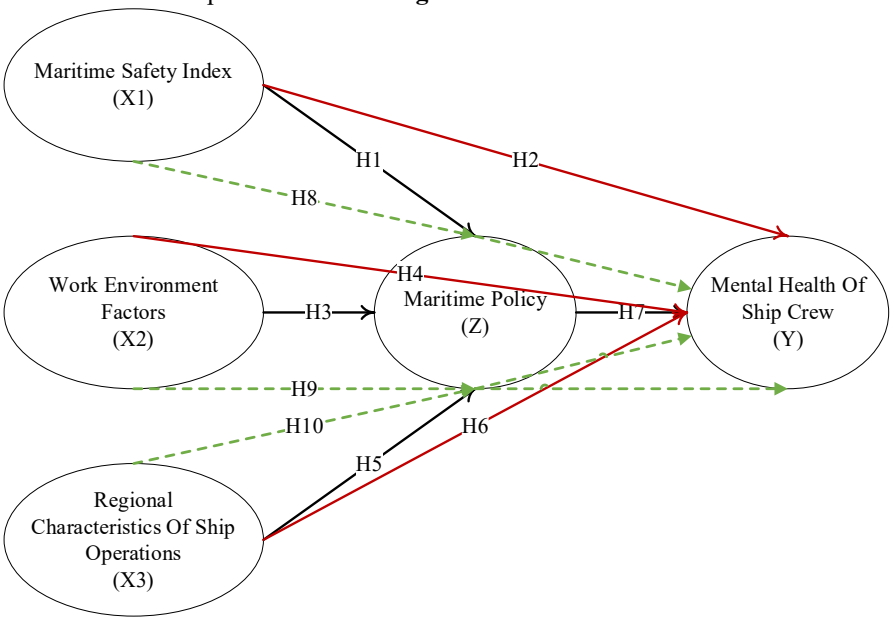

Figure 2. Conceptual Framework

Based on the conceptual framework on **Figure 2** there are three variables whose relationships and influences were studied in this research. The maritime safety index, work environment, and regional characteristics as independent variables (X) are described as influencing psychological states. Psychological states consist of stress levels, anxiety and depression, mental fatigue, and social support [15]. These psychological factors are considered to have a significant impact on mental health, which in turn impacts performance quality. Identifying factors that influence crew mental health is part of human factors management. This approach has been extensively researched to find the right formulation for managing health in every dynamically changing aspect of life [16]. Support activities are carried out for individuals or groups in facing climate change as human factor management in maintaining mental health with evidence-based interventions [17]. Crew mental health is directly influenced by the safety index, work environment, and regional operational characteristics. Regulations related to determining crew mental health policies as a mediating variable (Z) are expected to moderate changes in mental health on the safety index. *International Labour Organization (ILO),* through the Maritime Labour Convention 2006 (MLC 2006) committed all seafarers to decent, safe, and healthy working and living conditions. The scope of improvement includes the highest degree of physical, mental, and social well-being for workers in all jobs at sea. The extent to which the convention is complied with by all stakeholders in implementing each rule to improve the physical and mental well-being of seafarers. The implementation of these rules is the responsibility of maritime stakeholders as a form of mediation towards the mental health of the crew as the dependent variable (Y) in this study. Human aspects, the safety index covers all aspects related to equipment, the environment, and management of emergency response [18].

The population of this study comprised all seafarers sailing domestically and internationally. The sample of respondents for data collection was determined from three ports with busy international shipping routes: Batam, Jakarta, and Surabaya. The total number of respondents was 309, with 275 men and 34 women. The selection of international ports allowed for a more heterogeneous sample of respondents with cross-national backgrounds. Data collection included a questionnaire for quantitative purposes and structured in-depth interviews for qualitative purposes. The quantitative design proved effective in assessing measurable results, while the qualitative design offered in-depth insights into social dynamics. Data collection was carried out through the distribution of questionnaires to respondents selected using purposive sampling techniques, to crew members who met the criteria [19]. The criteria used were crew members engaged in international voyages with at least 3 years of work experience. The quantitative data collection instrument, a questionnaire, was created using a Likert Scale of 1–5. The stress levels of the crew were measured using *Perceived Stress Scale (PSS).* This instrument is a psychological tool designed to assess the level of stress felt by an individual [20]. Stress is assessed based on situations in their lives where they feel pressured, out of control, or burdened. The anxiety and depression likely

experienced by crew members are measured using instruments. *Hospital Anxiety and Depression Scale (HADS) or DASS-21*. These anxiety symptoms are measured without looking at the physical pain experienced by the patient [21]. Mental fatigue is a condition in which individuals experience symptoms such as forgetting names, losing concentration, or making mistakes in speaking. The psychological condition of burnout, characterized by fatigue, a cynical attitude toward work, and decreased work effectiveness, can be measured using instruments. *Maslach Burnout Inventory (MBI)* [22]. The social support felt by a person can be measured using *Social Support Questionnaire (SSQ)*. The SSQ instrument was developed based on the concept that social support plays an important role in reducing stress and improving mental health [23]. Instruments for measuring independent and moderating variables were not specifically designed, unlike psychological and mental health measures. Quantitative data from respondents will be analyzed using Smart PLS version 4.

After quantitative data collection was completed through questionnaires, respondents were also interviewed for confirmation as part of the qualitative data collection process. This method involved dialogue with respondents to ensure they understood the questions and were able to answer consciously. Interviews were used to clarify respondents' answers after they completed the questionnaire. The interviews were conducted using guidelines created and presented on **Table 1**.

Table 1. Interview Guidelines

Aspect	Core Questions	Objective
Working conditions	How do working conditions on ships affect your mental health?	Identifying work stress factors in the maritime environment.
Psychological pressure	What form of psychological stress do you most often experience while on duty?	Explain the main sources of stress and anxiety.
Fatigue and stress	Have you ever experienced mental fatigue during a cruise?	Exploring firsthand experiences related to fatigue and chronic stress.
Adaptation strategy	How do you manage stress and maintain emotional balance?	Knowing the coping mechanisms of ship crews.
Social support	How big a role do coworkers and superiors play in helping maintain your mental health?	Assessing the influence of social support on psychological stability.
Institutional support	Does the company provide facilities or policies to support seafarers' mental health?	Evaluating the effectiveness of institutional support.
Policy awareness	Are you aware of any government policies or regulations regarding seafarers' mental health?	Confirming the level of awareness of maritime policies.
Security implications	In your opinion, what is the relationship between mental health and maritime safety?	Linking psychological aspects to ship operational safety.

Description of the topic asked on **Table 1** the above provides guidelines for developing more specific and in-depth interview questions. Direct psychological experiences on board were explored in depth as a form of direct confirmation. Quantitative studies of seafarers have shown that family conflict and work stress negatively impact seafarer performance [24]. These findings need to be qualitatively confirmed through interviews to gain more comprehensive information and validate the results. Anxiety, worry, and negative thoughts are symptoms of mental health issues. These mental states need to be explored qualitatively through direct questioning. Such an approach should be a strategy for maritime companies to improve seafarer job satisfaction by creating a supportive work culture [25]. Support is provided by prioritizing a psychologically healthy social life and paying attention to the onboard environment to maintain mental health. The social support model required by crew members can be explored through interviews and qualitatively summarized.

RESULTS AND DISCUSSION

The results of the data analysis were obtained through a mixed-method sequential explanatory approach with a quantitative predominance. The analysis was conducted to examine the relationship between the research variables, namely the Maritime Safety Index, Ship Work Environment, Regional Operational Characteristics, Maritime Policy, and Crew Mental Health. The quantitative results were obtained through testing the structural model using the method *Partial Least Square Structural Equation Modeling (PLS-SEM). This* analysis is then deepened through qualitative findings from in-depth interviews. The results are presented systematically to illustrate the direct and indirect influences between variables, while also linking the empirical findings to relevant theories and previous research. This discussion is expected to provide a comprehensive understanding of the dynamics of crew mental health in the context of maritime safety and policy in Indonesia.

Instrument Test Results

Before conducting data analysis, the initial stage of the research was to conduct instrument testing to ensure the validity and reliability of the measuring instrument used. This research used a descriptive approach *mixed-method sequential explanatory* with quantitative dominance to understand the relationship between the Maritime Safety

Index, Ship Work Environment, Regional Characteristics of Operation, Maritime Policy, and Crew Mental Health. The quantitative stage was carried out by testing the structural model using the method *Partial Least Squares Structural Equation Modeling (PLS-SEM)* to identify the direct and indirect influences between variables. These quantitative results provide an empirical picture of the extent to which safety factors, the work environment, and policies influence the psychological condition of crew members.

The qualitative phase was then conducted through in-depth interviews to enrich the understanding of the statistical findings. This approach allowed researchers to explore the subjective experiences of crew members, including their perceptions of safety policies and work challenges at sea. The integration of both approaches resulted in a more comprehensive understanding of the dynamics of crew mental health in the Indonesian maritime context. The results of this study are expected not only to strengthen the theoretical basis for the relationship between safety and mental well-being but also provide practical contributions to the formulation of maritime policies that are more humane, sustainable, and oriented towards crew welfare. The results of the instrument test using SEM PLS measurements are presented in **Figure 3**.

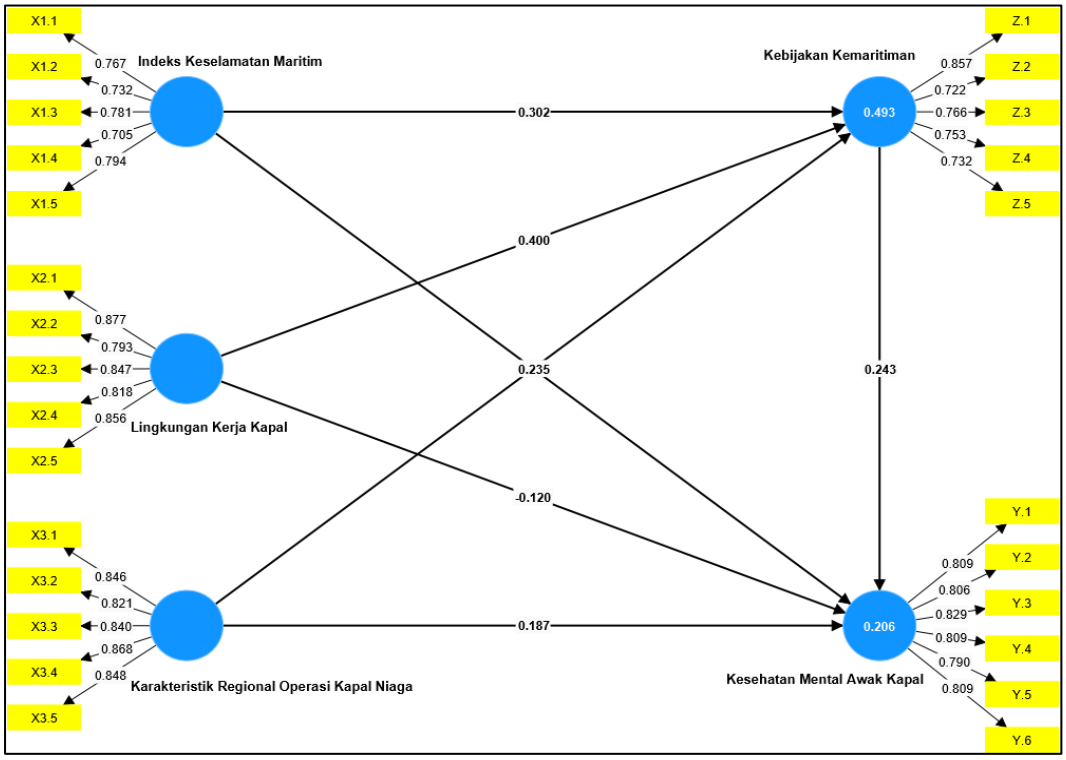

Figure 3.SEM PLS Measurement Results

The results of the structural model analysis on **Figure 3** using Partial Least Squares Structural Equation Modeling (PLS-SEM) showed a significant relationship between research variables. The effect of X1 on Z of 0.302 indicates that improving safety aspects can create a more conducive work environment and support crew productivity. Furthermore, X2 has a positive effect on Z (0.235) and Y (0.243), indicating that geographical conditions and ship operational characteristics also influence the work climate and direction of maritime policy. Ship Work Environment (Z) has the strongest influence on Maritime Policy (Y) with a value of 0.493, which confirms that the quality of the work environment is a key factor in forming policies that are more adaptive, participatory, and responsive to the needs of crew. Overall, these quantitative results confirm that safety, work environment, and maritime policy interact in determining operational quality and welfare in the Indonesian maritime sector.

The relationship between the Ship Work Environment (Z) and Crew Mental Health (Y) shows a negative direction with a coefficient of -0.120, although the effect is relatively weak. This finding indicates that demanding working conditions, operational pressure, and stress due to uncertain sea situations still have the potential to reduce the psychological well-being of crew members. Maritime Policy has a positive effect on Mental Health (0.206), indicating that policies that support safety, humane working hours, and crew welfare can strengthen their mental stability. This finding shows that psychosocial factors in the maritime work environment need to receive the same level of attention as technical aspects and operational safety. The integration of these findings supports the view that crew mental health is the result of a complex interaction between policies, safety culture, and daily working conditions. Thus, improving mental health is not sufficient through individual interventions alone, but must be through systemic reforms that include improvements to policies, the work environment, and a more humane and sustainable safety culture in the Indonesian maritime sector.

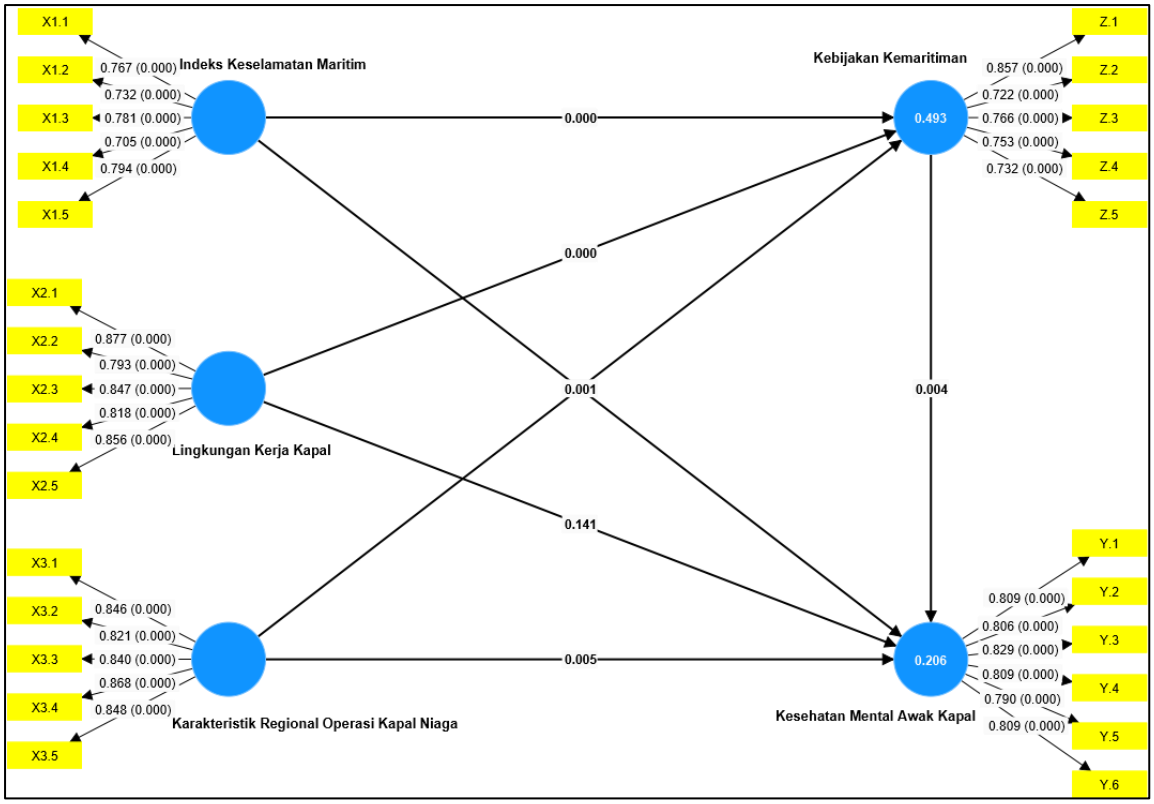

Figure 4. Hypothesis Test Measurement Results with Bootstrapping

On **Figure 4** the figure above displays the results of structural model testing using the Partial Least Squares – Structural Equation Modeling (PLS-SEM) method with a bootstrapping procedure. This analysis aims to test the causal relationship between latent constructs based on previously formulated hypotheses. Each path in the model describes the direction and strength of influence between variables, as measured by the path coefficient and its significance level (p-value). A positive coefficient value indicates a unidirectional relationship, while the p-value is used to determine whether the relationship is statistically significant ($p < 0.05$). A complete description of the hypothesis testing is outlined below.

The Influence of the Maritime Safety Index on Maritime Policy

The results of the study indicate that the Maritime Safety Index has a significant influence on Maritime Policy, with T-statistics = 4.497 (> 1.968) and P-value = 0.000 (< 0.05). This indicates that the better the implementation of safety standards and practices on ships, the more effective the safety policies implemented by companies and maritime authorities. The success of maritime safety policies at the national level is inseparable from the quality of the implementation of safety practices at the operational level of ships. They found that good safety practices on ships trigger the strengthening of regulations and policies that are more adaptive to the risk of maritime accidents.

The Impact of the Maritime Safety Index on the Mental Health of Ship Crews

The results of the study indicate that the Maritime Safety Index significantly impacts the Mental Health of Ship Crews, with a T-statistic of 3.285 (> 1.968) and a P-value of 0.001 (< 0.05). The implementation of adequate safety equipment, consistent SOPs, and regular training can reduce psychological stress among ship crews because they feel safer and more protected. Safety awareness and good communication from the company contribute positively to the mental health of seafarers.

The Influence of the Ship's Working Environment on Maritime Policy

The results of the study indicate that the Ship Work Environment has a significant influence on Maritime Policy, with T-statistics = 5.358 (> 1.968) and P-value = 0.000 (< 0.05). Comfortable working conditions including reasonable working hours, adequate sleeping facilities and harmonious relationships between crew members encourage companies and regulators to enforce safety policies more consistently. Better working conditions (reasonable working hours, adequate accommodation, good communication) encourage companies to implement stricter safety and welfare policies. This finding is in line with studies that highlight the need for organizational support and policy structures to strengthen safety culture on ships.

The Influence of the Ship's Work Environment on the Mental Health of Ship Crews

The results of the study indicate that the Ship Work Environment does not significantly influence the Mental Health of Ship Crews, with a T-statistic = 1.471 (<1.968) and a P-value = 0.141 (>0.05). This means that although working conditions on ships are relatively good, this factor does not directly affect the mental condition of ship crews; there may be other more dominant factors such as operational pressure, work rotation patterns, or company policies. A poor physical work environment can be a major trigger for stress among port workers.

The Influence of Regional Characteristics of Merchant Ship Operations on Maritime Policy

The results of this study indicate that the Regional Characteristics of Merchant Ship Operations have a significant influence on Maritime Policy, with a T-statistic of 2.752 (> 1.968) and a P-value of 0.006 (< 0.05). Factors such as extreme sea conditions, port facilities, and work pressures in specific shipping areas require safety policies that are more adaptive to local risks. Policies must be adaptive to the regional context to be effective; recent studies have emphasized differences in safety needs based on the characteristics of the route/region of operation. This finding is consistent with research linking specific operational conditions with different regulatory and supervisory needs.

The Influence of Regional Characteristics of Merchant Ship Operations on the Mental Health of Ship Crews

The results of the study indicate that the Regional Characteristics of Merchant Ship Operations have a significant effect on the Mental Health of Ship Crews, with T-statistics = 2.801 (> 1.968) and P-value = 0.005 (< 0.05). Extreme sea conditions and psychological stress due to working in high-risk areas increase the stress levels of ship crews. Exposure to extreme sea conditions, bad weather, and long voyage durations have been shown to increase mental stress, in line with empirical studies and reviews that identify operational environmental factors as determinants of seafarer stress and fatigue.

The Impact of Maritime Policy on the Mental Health of Ship Crews

The results of the study indicate that Maritime Policy has a significant effect on Crew Mental Health, with T-statistics = 2.909 (> 1.968) and P-value = 0.004 (< 0.05). Policies that provide counseling services, routine safety supervision, and involve crew in the policy feedback process have been shown to help maintain the psychological condition of crew. Organizational policy support in reducing work stress among seafarers is very important.

The Impact of the Maritime Safety Index on the Mental Health of Ship Crews through Maritime Policy

The results of the study indicate that the Maritime Safety Index significantly influences the Mental Health of Ship Crew through Maritime Policy, with T-statistics = 2.331 (> 1.968) and P-value = 0.020 (< 0.05). The implementation of good safety standards improves the mental well-being of ship crew, especially when reinforced by company policies or authorities that guarantee consistent implementation. A safety culture combined with strong organizational policies has a positive impact on the psychological condition of ship crew working in areas with high operational risks.

The Influence of Ship Work Environment on Crew Mental Health through Maritime Policy

The results of the study indicate that the Ship Work Environment has a significant effect on the Mental Health of Ship Crew through Maritime Policy, with T-statistics = 2.410 (> 1.968) and P-value = 0.016 (< 0.05). Although the direct effect of the work environment on mental health is not significant (see H5), through appropriate policies, such as working hour arrangements, safety training, and work environment monitoring mechanisms can have a positive impact on the mental well-being of ship crew. A good psychosocial environment and social communication are associated with better sleep quality and lower stress levels, which in turn impact the mental health of seafarers.

The Influence of Regional Characteristics of Merchant Ship Operations on Crew Mental Health through Maritime Policy

The results of the study indicate that the Regional Characteristics of Merchant Ship Operations have a significant effect on Crew Mental Health through Maritime Policy, with T-statistics = 1.972 (> 1.968) and P-value = 0.049 (< 0.05). Policies that are adaptive to regional risks, such as improving port facilities, training for extreme sea conditions, and emergency procedures can reduce the negative impact of high-risk work environments on crew mental health. Policies that are adaptive to regional risks (training for extreme conditions, emergency procedures, supporting facilities at ports) can reduce the negative impact of operational conditions on mental health.

In-depth Interview Results Analysis

In-depth interviews were conducted with 24 crew members selected from a total of 309 quantitative respondents, with a distribution: 8 people from Batam Port, 9 people from Tanjung Priok Port (Jakarta), and 7 people from Tanjung Perak Port (Surabaya). Informant selection was carried out purposively based on the criteria of minimum work experience of 3 years and involvement in international shipping. Most respondents (19 out of 24 people) stated that long working hours and irregular rest periods were the main triggers of stress and mental fatigue. This finding supports the quantitative results which show that the Ship Work Environment (Z) has a negative effect on Mental Health (Y) with a coefficient of -0.120, although not statistically significant. Respondents complained about excessive operational workload during port maneuvers, loading and unloading, and ship maneuvering. A navigation officer stated:

“Sometimes we work 16 hours a day without enough rest, especially when the weather is bad, everyone is tense.”

Twenty-one of the 24 respondents admitted to experiencing psychological stress in the form of anxiety and isolation due to the lack of social contact and the pressure of responsibility. Some attributed this to the fear of losing their jobs if they complained of stress. This is consistent with the quantitative results where Regional Operational Characteristics (X3) significantly influenced Mental Health (Y) with a T value of 2.801 (p = 0.005), indicating that extreme sailing conditions contribute to seafarers' mental stress.

Most crew members used individual coping strategies, such as listening to music, light exercise, or praying. However, only 5 out of 24 reported receiving stress management training from their company. This finding confirms the need for institutional support, as indicated by the quantitative model: Maritime Policy (Y) had a

positive effect on Mental Health with a coefficient of 0.206 (p = 0.004). This means that company policy interventions were shown to be important mediators of crew mental well-being.

Sixteen informants assessed that social support from coworkers was very helpful in maintaining emotional stability, especially when facing work pressure. However, support from superiors was still considered minimal. This strengthens the finding that social factors can mitigate the negative effects of the work environment on mental health, in accordance with the results of the mediation path where Ship Work Environment → Maritime Policy → Mental Health was significant (T = 2.410; p = 0.016). Social support on board serves as a protective mechanism.

Only 7 of the 24 seafarers were aware of the 2006 Maritime Labour Convention (MLC) regulations and national policies related to seafarers' mental well-being. The majority assessed that companies place more emphasis on technical aspects than on psychological well-being. This statement aligns with the quantitative results showing that the Maritime Safety Index → Maritime Policy → Mental Health was significant (T = 2.331; p = 0.020). This means that effective policies act as a bridge between the physical safety and psychological well-being of crew members.

All respondents agreed that psychological disorders such as stress, anxiety, and insomnia directly reduce work focus and increase the risk of accidents. Several cases of "human error" were reported to occur due to mental fatigue, not just technical fatigue. These interviews reinforced the quantitative results, which showed that the Maritime Safety Index had a direct and significant impact on Mental Health (T = 3.285; p = 0.001). This indicates that a good safety system has positive implications for seafarers' psychological well-being.

CONCLUSION

This study confirms that the Maritime Safety Index, Regional Characteristics of Operation, and Maritime Policy have a significant influence on the mental health of seafarers, both directly and indirectly. The results of the quantitative analysis show a positive influence between safety and policy on seafarers' psychological stability (T = 3.285; P = 0.001 and T = 2.909; P = 0.004), while the ship's work environment has an impact through adaptive policies (T = 2.410; P = 0.016). Qualitative data supports these findings: 79% of seafarers experience stress due to long working hours, 67% of maritime accidents are related to fatigue factors, and only 5 of 24 respondents received stress management training. Social support from colleagues acts as a protective factor against psychological distress. Overall, this study confirms that mental health is an integral element of maritime safety. Maritime policy needs to be directed towards a holistic and humane approach, integrating technical aspects of safety with the psychological well-being of seafarers to realize a sustainable maritime safety culture that is oriented towards human well-being.

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