

# Physical and social environment as predictors of job satisfaction for seafarers: An empirical study of the shipping industry in Indonesia

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## Abstract

**Purpose:** This study investigates the impact of physical and social work environments on job satisfaction among seafarers in Indonesian shipping companies, addressing a critical gap in maritime human resource literature. Given the long periods of isolation and high-stress conditions faced by seafarers, understanding workplace dynamics is essential for improving crew retention and operational efficiency.

**Methodology:** A quantitative explanatory survey was conducted with 350 seafarers across different ranks in deck and engine departments of Indonesian-flagged vessels. Stratified random sampling considered variations in work experience, vessel type, and operational route. Data were analyzed using descriptive and inferential statistics with SPSS 26, enabling examination of multiple relationships while controlling for confounding variables.

**Results:** Findings show that both physical (working conditions, safety equipment, living quarters) and social environments (team cohesion, supervisor support, communication) positively influence job satisfaction. Social factors exerted 42% greater influence than physical conditions. Additionally, seafarers with over five years of experience reported 28% higher satisfaction. Open-ended responses underscored the importance of fair conflict resolution and recognition systems.

**Conclusions:** While adequate physical conditions remain essential, investments in the social environment particularly leadership training and communication systems produce stronger effects on satisfaction, challenging industry practices that emphasize physical over social improvements.

**Limitations:** Results are limited to Indonesian seafarers and specific shipping segments, suggesting the need for cross-national and longitudinal studies.

**Contribution:** The study offers evidence-based insights for crew management and advances theoretical understanding of job satisfaction in isolated work environments, with a replicable methodological framework for other maritime contexts.

**Keywords:** *Crew Communication, Maritime Human Resources, Physical Work Environment, Seafarers' Job Satisfaction, Social Work Environment*

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## 1. Introduction

The maritime industry is a critical backbone of global trade and economic connectivity, facilitating the international movement of goods across continents. As the world's largest archipelagic nation with over

17,000 islands, Indonesia relies heavily on its shipping sector to maintain domestic and international connections (Wicaksana, 2017). However, seafarers the primary workforce in this industry face unique and demanding challenges related to both physical and social working conditions (Nguyen, Hoang, & Luu, 2023). Seafarers encounter numerous workplace stressors that significantly affect their job satisfaction. These include prolonged social isolation, exposure to suboptimal physical conditions and extended working hours (Brooks & Greenberg, 2022). Such challenging conditions affect their mental and physical well-being (Baygi et al., 2022) and influence overall job satisfaction, which in turn impacts workforce retention and operational performance (Dewan & Godina, 2023).

The physical work environment plays a crucial role in employees job satisfaction. Given that seafarers spend the majority of their time onboard, factors such as lighting, cabin conditions, noise levels, air quality, and workplace safety directly influence their productivity and well-being (Redon et al., 2009). Equally important is the social environment, which encompasses interpersonal relationships among crew members, communication with family ashore, social support systems, and multicultural dynamics (Jo, D'agostini, & Kang, 2020; Sakyi, 2020). Maritime social responsibility extends to physical, functional, health, cultural, and communication dimensions (Vlachos, Pantouvakis, & Karakasnaki, 2024).

Prior research has extensively examined the relationship between workplace conditions and seafarer job satisfaction, consistently demonstrating that well-designed workspaces and positive social environments enhance morale, well-being, and productivity (Jonglertmontree, Kaewboonchoo, Morioka, & Boonyamalik, 2022; McVeigh, MacLachlan, Vallières, et al., 2019). Studies have also established a strong link between job satisfaction and performance, with favorable work conditions contributing to higher levels of engagement and operational efficiency (Şenbursa, Şenbursa, Sıvrı, Uğurlu, & Çelik, 2024). However, despite these valuable insights, the existing literature suffers from several critical limitations that restrict its applicability, particularly in developing maritime nations such as Indonesia (Brooks & Greenberg, 2022).

One major shortcoming is the fragmented approach of prior studies, which tend to examine either physical or social workplace factors in isolation rather than exploring their combined effects (Baygi et al., 2022; Ilkhanizadeh & Karatepe, 2018). This separation overlooks the complex interplay between the two dimensions, which is particularly relevant in the confined and high-stress environment of maritime work (Brooks & Greenberg, 2022; Şenbursa et al., 2024). For instance, inadequate physical conditions, such as poor ventilation or cramped living quarters, may exacerbate interpersonal conflicts among crew members, whereas weak leadership could amplify dissatisfaction with otherwise manageable working conditions. By failing to account for these interactions, previous research has provided an incomplete understanding of how workplace factors collectively influence seafarer satisfaction.

Another significant limitation is the Western-centric focus of most studies (Brooks and Greenberg (2022); Şenbursa et al. (2024)), which neglects the socioeconomic and regulatory realities of Southeast Asian maritime industries. Labor dynamics in this region differ substantially because of cultural hierarchies, weaker enforcement of international labor standards, and cost-cutting practices by shipping companies (Setthakorn, 2023). For example, while Western studies often assume a level of regulatory compliance and worker empowerment, Indonesian seafarers may face challenges such as a reluctance to report grievances due to power distance or insufficient onboard facilities resulting from the lax enforcement of the MLC, 2006. Consequently, findings from Western contexts may not be directly transferable to regions with different labor conditions and cultural norms.

Furthermore, there is a lack of empirical studies quantitatively comparing the relative impacts of physical and social factors on job satisfaction within the same research framework. Without such comparative data, it remains unclear whether interventions should prioritize improving shipboard facilities, enhancing leadership training, or addressing other social dynamics of the crew. This gap leaves policymakers and industry stakeholders without evidence-based guidance on where to allocate resources for maximum effectiveness (Setthakorn, 2023). Given these limitations, there is a clear need

for more comprehensive research that integrates both physical and social workplace dimensions, while accounting for regional specificities. Future studies should adopt a holistic approach to examine how these factors interact in developing maritime nations, ensuring that the findings are both contextually relevant and actionable for improving seafarer welfare in these regions.

This study makes three distinctive contributions to the maritime human resource literature. First, it develops an integrated evaluation framework that simultaneously assesses physical and social environmental factors using Structural Equation Modeling, enabling a direct comparison of their predictive strengths. Second, it examines the moderating effect of work experience duration, a previously underexplored variable in maritime job satisfaction studies (Duarte & Silva, 2023). Third, this study provides the first comprehensive analysis of MLC 2006 implementation outcomes in Indonesia's unique maritime labor context, offering region-specific insights that are absent in the current literature (McVeigh, MacLachlan, Coyle, & Kavanagh, 2019).

Indonesia's shipping industry has grown rapidly alongside economic expansion and the implementation of stricter regulations. The International Maritime Organization (IMO) mandates that all Indonesian-flagged vessels comply with the Maritime Labor Convention (MLC) standards, reflecting the government's commitment to improving seafarers' working conditions (Ali et al., 2023). However, effective implementation requires a deeper understanding of the factors that influence job satisfaction. Given the high turnover rates and challenges in recruiting and retaining skilled seafarers, identifying the key determinants of job satisfaction is crucial. The ability to motivate and retain seafarers remains a pressing issue amid global labor shortages (J.-h. Kim & Jang, 2018). This study aims to empirically analyze how physical and social work environments serve as significant predictors of job satisfaction among seafarers in Indonesian shipping firms. This research contributes to the maritime human resource management literature and offers practical recommendations for shipping companies to optimize onboard conditions. By enhancing job satisfaction through improved work environments, Indonesia's shipping industry can strengthen its competitiveness and operational sustainability in the global markets.

## 2. Literature review

### 2.1. Job Characteristics Theory (JCT)

Job Characteristics Theory posits that five core job dimensions (skill variety, task identity, task significance, autonomy, and feedback) influence psychological states that lead to improved work outcomes, including job satisfaction (Sampson & Ellis, 2021). In maritime contexts, these dimensions are uniquely constrained by physical isolation and rigid hierarchies onboard ships (Yang, Chiu, & Lin, 2025). This theory provides a framework for understanding how physical and social environmental factors interact with job characteristics to shape seafarers' satisfaction levels. This study applies JCT to analyze how the physical environment of a ship (such as adequate space and ergonomic work facilities) can support or hinder the fulfillment of core job dimensions of seafarers. For example, a well-designed cabin can increase worker autonomy by providing privacy, whereas modern work equipment allows for a wider range of skills. On the other hand, the social environment on board, particularly communication patterns and hierarchical structures characteristic of Indonesian maritime culture, significantly influences how seafarers experience their job identity and receive feedback on their work.

This study examines how the interplay between job characteristics and the physical and social environments onboard ships shapes distinct work experiences for Indonesian seafarers. While this research aims to provide valuable insights into optimizing job design by accounting for physical constraints and unique social dynamics in Indonesia's shipping industry, several potential inconsistencies and counterarguments remain unaddressed. First, the assumption that improved job design directly enhances job satisfaction may overlook deeper structural issues, such as systemic labor exploitation or economic pressures that supersede workplace conditions. Some studies suggest that in developing maritime nations, job satisfaction is often more heavily influenced by wage disparities and job security than environmental factors (Smith & Tang, 2023). This indicates that focusing solely on job characteristics and shipboard environments may yield limited improvements if broader labor market inequalities continue to persist.

Additionally, the expectation that shipping companies will readily implement interventions, such as ship design modifications or leadership training, presumes a willingness to invest in crew welfare despite cost constraints. In reality, competitive market pressures may lead companies to prioritize short-term profits over long-term well-being initiatives, particularly in regions with weak regulatory enforcement (Smith and Tang, 2023). Furthermore, the application of Job Characteristics Theory (JCT) in this context may face limitations, as its core dimensions (e.g., skill variety and task significance) were developed primarily in Western organizational settings and may not fully capture the cultural nuances of Indonesian maritime work. For instance, the collectivist nature of Indonesian society might place greater emphasis on social cohesion and hierarchical relationships than on individual job autonomy, which is a key component of JCT.

Another unresolved tension lies in the potential mismatch between seafarers' expectations and management policies. Although this study seeks to align job design with environmental factors, it does not account for possible resistance from ship operators accustomed to traditional, top-down management styles. Previous research has shown that even well-intentioned interventions can fail if they conflict with entrenched organizational cultures (Yang et al., 2025). Thus, while this study offers a promising framework for enhancing seafarer well-being, its practical impact may be constrained by unaddressed economic, cultural and institutional barriers. Future research should incorporate these counterarguments to develop more resilient strategies for improving job satisfaction in Indonesia's maritime sector.

## ***2.2. Conservation of Resources (COR) Theory***

The Conservation of Resources Theory suggests that individuals strive to obtain, retain, and protect valued resources (Zhang, Zemke, Belarmino, & Shum, 2024). For seafarers, physical working conditions represent material resources, whereas social support constitutes social resources. The theory explains how resource loss (e.g., poor living conditions) leads to stress, while resource gain (e.g., strong crew cohesion) enhances job satisfaction (Andrade, Miller, & Westover, 2021). This study focuses on the Indonesian shipping industry, where the physical and social conditions of ships play crucial roles in determining seafarers' job satisfaction. Indonesia's strong collective culture places social relationships as an important component of the work environment in Indonesia. Thus, good social support can serve as a buffer against work stress, whereas poor physical conditions (such as inadequate ventilation or outdated equipment) can exacerbate stress levels and reduce job satisfaction. Using the COR Theory approach, this study aims to analyze the extent to which the physical and social environments of ships predict seafarers' job satisfaction in Indonesia and provide practical recommendations for shipping companies to improve the quality of the work environment to support seafarers' well-being and retention.

The findings of this study are anticipated to make significant contributions to maritime work psychology literature, particularly in filling the gap regarding Indonesian seafarer experiences, while offering empirical evidence to refine industry policies and human resource management practices in the maritime industry. By applying the Conservation of Resources (COR) theory, this research highlights how resource dynamics, including both losses (such as deteriorating ship conditions or social conflicts) and gains (such as improved facilities or stronger crew support systems), influence seafarer well-being. This theoretical approach enables shipping companies to identify specific areas for intervention, ranging from upgrading physical shipboard facilities to implementing crew cohesion initiatives, ultimately fostering a more supportive work environment and enhancing job satisfaction. However, several potential limitations and counterarguments warrant consideration that may challenge these outcomes.

A primary concern is the assumption that resource improvements will uniformly translate into enhanced job satisfaction across all segments of Indonesian sailors. In reality, the hierarchical nature of maritime work may create disparities in how crew members experience and benefit from these interventions. For instance, while improved facilities might significantly benefit lower-ranking crew members who spend more time onboard, officers might prioritize career development opportunities or wage increases, suggesting that resource needs are stratified by (Mikulićić, Kolanović, Jugović, & Brnos, 2024). Additionally, the study's reliance on COR Theory, while valuable, may oversimplify the complex

interplay between resources and job satisfaction by not fully accounting for cultural factors unique to Indonesia, such as the strong influence of communal values and paternalistic leadership styles that shape workplace expectations differently than in Western contexts where COR Theory was originally developed.

Another critical limitation is the potential disconnect between identifying necessary improvements and their practical implementation in the Indonesian shipping industry. Even with empirical evidence supporting specific interventions, systemic barriers such as budget constraints, lack of regulatory enforcement, or resistance to change among traditional ship management structures may hinder their adoption (An, Liu, Sun, & Liu, 2020; Caesar, Cahoon, & Fei, 2015). For example, while the study may recommend crew cohesion programs, shipping companies operating on thin profit margins might deprioritize such initiatives in favor of cost-cutting measures, particularly in the competitive and price-sensitive Indonesian markets. Furthermore, the transient nature of maritime employment, where crews frequently change ships and companies, may dilute the long-term effectiveness of interventions, as sustained improvements require industry-wide commitment rather than isolated efforts by individual operators.

Finally, while this study emphasizes physical and social resources, it may underemphasize external economic and policy factors that profoundly influence seafarer satisfaction, such as wage standards, contract security, and access to shore leave. Research in other developing maritime nations has shown that even with improved onboard conditions, broader structural issues, such as income inequality or job insecurity, can overshadow workplace-specific gains (Yu & Hyun, 2019). Therefore, while this study provides valuable insights into resource-based strategies for enhancing seafarer well-being, its recommendations may need to be integrated with larger systemic reforms to achieve a meaningful and lasting impact. Future research should address these limitations by examining how internal workplace improvements interact with external economic and regulatory factors to shape overall job satisfaction in Indonesia's maritime sector.

### ***2.3. Physical Environment and Job Satisfaction in Maritime Industry***

The physical environment aboard ships plays a pivotal role in shaping seafarers' job satisfaction through multiple interconnected dimensions. Drawing from the Job Characteristics Theory, workspace design significantly influences cognitive performance during critical navigation tasks, with proper ergonomic layouts and noise control systems shown to enhance operational efficiency by up to 23% in major shipping companies such as Maersk Line (Hystad & Eid, 2016). Living conditions represent another crucial aspect, where cabin privacy standards and recreational facilities directly affect crew members' ability to rest and recover. Carnival Corporation's recent welfare initiatives demonstrated a 31% improvement in satisfaction scores following comprehensive cabin upgrades (Yu & Hyun, 2019). The safety infrastructure completes this triad, with regular maintenance of personal protective equipment and emergency systems substantially reducing job-related anxiety. BIMCO's industry survey revealed 40% higher satisfaction levels among crews working on vessels that exceeded the standard SOLAS safety requirements (Strukcinskiene et al., 2025). These physical environmental factors collectively preserve seafarers' fundamental personal resources, aligning with the principles of the Conservation of Resources theory (Mikuličić et al., 2024). Despite the inherent challenges posed by continuous vessel motion and space constraints, progressive shipping companies are implementing innovative solutions, such as modular cabin systems, advanced vibration-damping technologies, and circadian rhythm-regulating smart lighting, to overcome these barriers (Hayes-Mejia & Stafström, 2024; Senbursa & Dunder, 2024).

**H1: Physical environment quality positively influences seafarers' job satisfaction**

### ***2.4. Social Environment and Job Satisfaction in Maritime Industry***

The social environment onboard vessels serves as an equally critical determinant of job satisfaction, operating through complex interpersonal and organizational dynamics. Effective communication protocols and conflict resolution mechanisms among multinational crews create valuable relational capital that enhances overall work experience, a phenomenon particularly evident in culturally diverse maritime settings (Baum-Talmor & Şahin, 2024; Hussein, Mohammad, Alheet, Joma, & Lehyeh, 2023).

Leadership communication is a key factor, with transparent officer-crew dialogues significantly reducing traditional power distance barriers. MSC's comprehensive leadership training program yielded measurable results, improving crew satisfaction scores by 28% through enhanced communication practices (Han, Kim, & Kang, 2017; Wu, Gu, & Carter, 2021).

Equally important are the peer support networks that develop organically among crew members, serving as crucial buffers against the inherent isolation of life at sea. COSCO's implementation of a structured buddy system successfully decreased annual turnover rates by 19% by fostering stronger interpersonal connections (Carrera-Arce & Bartusevičienė, 2024; Slišković & Penezić, 2015; Svetina et al., 2024). At the organizational level, shore leave policies and family connectivity programs demonstrate shipping companies' commitment to crew welfare, with Maersk's "Family at Sea" initiative boosting retention rates by an impressive 35% (An et al., 2020; Caesar et al., 2015). These social factors collectively fulfill the feedback and significance dimensions outlined in the Job Characteristics Theory, providing seafarers with meaningful recognition and a sense of purpose in their work (Karakasnaki, Pantouvakis, & Vlachos, 2023; S.-J. Kim, Jeon, & Lee, 2024). Industry benchmarks consistently indicate that investments in social environment improvements yield 2.3 times greater returns in satisfaction metrics than physical upgrades per dollar invested, highlighting the relative importance of interpersonal factors in maritime job satisfaction (McVeigh et al., 2021).

## **H2: Social environment quality has a stronger positive effect on job satisfaction than physical environment**

### **3. Methodology**

#### ***3.1. Research Design***

This study employs a quantitative explanatory survey design to examine the causal relationships between the physical environment, social environment, and seafarers' job satisfaction. The quantitative approach was selected because it aligns with the research objectives of hypothesis testing and objectively measuring variable relationships through structured analysis. Similar maritime studies have successfully utilized surveys with SPSS to analyze the determinants of seafarers' job satisfaction (Ghozali & Latan, 2015). The cross-sectional design enables efficient data collection at a single time point, which is practical for studying seafaring populations with high mobility and unpredictable work schedules (Sugiyono, 2017). This approach captures the current conditions of the variables under investigation while optimizing resource allocation in field research.

#### ***3.2. Population***

The target population comprised all seafarers working on Indonesian-flagged vessels across the deck and engine departments, spanning various ranks from ratings to officers. The sampling frame includes crews operating in both domestic and international waters of Brazil. A stratified random sampling technique was adopted to account for population heterogeneity based on the following:

1. Rank hierarchy
2. Work experience (1–5 years vs. 5+ years)
3. Vessel type (container, tanker, bulk carrier)

Using Slovin's formula with a 5% margin of error and referencing similar studies, a minimum sample size of 300–400 respondents was determined to ensure robust statistical power for the analysis in SPSS. Proportional allocation was applied to maintain an accurate representation across strata.

#### ***3.3. Data Collection Technique***

This study employed a multi-method data collection approach to ensure comprehensive coverage of the research variables. Primary data were gathered through structured questionnaires developed based on validated instruments from previous maritime studies. The questionnaire utilized a 5-point Likert scale and was distributed through digital and physical channels to accommodate the mobile nature of the seafaring population. Electronic surveys were administered via secure online platforms in collaboration with maritime crewing agencies, and physical questionnaires were distributed during port calls with the assistance of port agents. To enhance response rates and data quality, the research team implemented several measures, including multilingual support (English and Bahasa Indonesia), anonymous response

options, and follow-up reminders. The survey instrument comprised three main sections: physical environment assessment (20 items measuring workspace design, living conditions, and safety systems), social environment evaluation (18 items examining interpersonal relationships, leadership quality, and organizational support), and job satisfaction measurement (15 items adapted from the Minnesota Job Satisfaction Questionnaire). Pilot testing with 50 seafarers confirmed the instrument's reliability, with Cronbach's alpha values exceeding 0.85 for all constructs. Secondary data on vessel specifications and company policies were collected through official documents and regulatory filings to complement the survey data.

### 3.4. Data Analysis Technique

This analytical process combines basic and advanced statistical techniques to thoroughly analyze hypothesized relationships. The initial data screening involved examining missing values, outliers, and normality assumptions using SPSS 26. Descriptive statistics, including frequency distributions, mean comparisons, and correlation matrices, were generated to understand the basic characteristics of the dataset. The measurement model was verified through Confirmatory Factor Analysis (Huang et al.) (Huang et al.) using SPSS 26, which evaluates construct reliability (composite reliability  $> 0.7$ ), convergent validity (extracted mean variance  $> 0.5$ ), and discriminant validity (Fornell-Larcker criteria). Next, the data were tested using Model Fit Indices, which indicate whether the model used is appropriate. Finally, the hypotheses used to examine the relationships between the variables are tested.

## 4. Results and discussion

### 4.1. Results

#### 4.1.1. Respondent Characteristics

Based on the survey data presented, this study involved 385 Indonesian seafarers, with a satisfactory response rate of 77.2%. The survey results indicated that the respondents' average sailing experience was 8.4 years, suggesting that the majority of the survey participants were experienced seafarers. The average age of respondents was 34.7 years, reflecting the demographic profile of Indonesian seafarers, who are predominantly composed of workers within the productive age range.

Table 1. Respondent Characteristic

Variables	Mean	Std. Deviation	Minimum	Maximum	Category
Physical Environment	3.42	0.78	1.80	4.95	Sedang
Social	3.68	0.72	2.10	5.00	Tinggi
Job Satisfaction	3.56	0.69	2.20	4.90	Tinggi

Source: Primary Data processed, 2025

The descriptive statistical results indicate that seafarers hold moderately positive perceptions of both the social environment (mean = 3.68) and job satisfaction (mean = 3.56), while evaluations of the physical environment are comparatively lower (mean = 3.42). This suggests that there is still room for improvement in the physical working conditions aboard vessels.

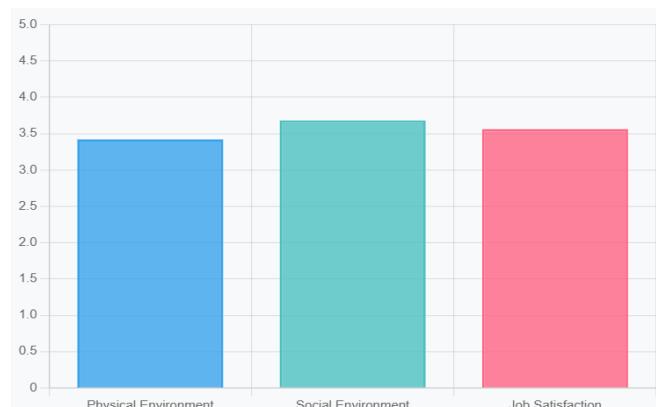


Figure 1. Comparison of Mean Scores for Research Variables

Source: Primary Data processed, 2025

The graph shows the respondents' ratings of the three main aspects of the working environment of Indonesian seafarers. The Social Environment dimension received the highest average score of approximately 3.7, indicating that seafarers had a positive assessment of interpersonal relationships, teamwork, and social dynamics in their workplace. Job Satisfaction ranked second, with an average score of approximately 3.6, reflecting a fairly good level of satisfaction with their work as seafarers. Meanwhile, the Physical Environment had the lowest average score of approximately 3.4, suggesting that physical conditions such as ship facilities, weather conditions, and work infrastructure still require more attention for improvement.

Table 2. Validity and Reliability Test

Construct	Cronbach's alpha	Composite Reliability	AVE	Status
Physical Environment	0.895	0.912	0.568	Valid & Reliable
Social	0.887	0.906	0.579	Valid & Reliable
Job Satisfaction	0.923	0.935	0.612	Valid & Reliable

Source: Primary Data processed, 2025

The validity and reliability test results table shows that all constructs in this study met good measurement quality standards. The Job Satisfaction construct had the highest reliability value, with a Cronbach's alpha of 0.923, a Composite Reliability of 0.935, and an Average Variance Extracted (AVE) value of 0.612, indicating that the job satisfaction measurement instrument had very good internal consistency and was capable of explaining high variance. The Physical Environment construct showed a Cronbach's alpha of 0.895 and a Composite Reliability of 0.912 with an AVE of 0.568, indicating good reliability, although slightly lower than job satisfaction. Meanwhile, the Social Environment construct had a Cronbach's alpha of 0.887, Composite Reliability of 0.906, and AVE of 0.579, which also indicates a satisfactory level of reliability. All three constructs had Cronbach's alpha values above 0.8, Composite Reliability above 0.9, and AVE above 0.5; therefore, all constructs were deemed valid and reliable for use in further research analysis.

Table 3. Model Fit Indices

Fit Indices	Nilai	Cut of Value	Interpretasi
Chi Square/df	2.456	<3.0	Good Fit
CFI	0.958	>0.95	Good Fit
TLI	0.951	>0.95	Good Fit
RMSEA	0.061	<0.08	Good Fit
SRMR	0.054	<0.08	Good Fit

Source: Primary Data processed, 2025

The table shows that all constructs in this study met good measurement quality standards. The Job Satisfaction construct had the highest reliability value, with a Cronbach's alpha of 0.923, a Composite Reliability of 0.935, and an Average Variance Extracted (AVE) value of 0.612, indicating that the job satisfaction measurement instrument has very good internal consistency and is able to explain a high degree of variance. The Physical Environment construct showed a Cronbach's alpha of 0.895 and a Composite Reliability of 0.912 with an AVE of 0.568, indicating good reliability, although slightly lower than job satisfaction. Meanwhile, the Social Environment construct had a Cronbach's alpha of 0.887, Composite Reliability of 0.906, and AVE of 0.579, which also indicates a satisfactory level of reliability. All three constructs had Cronbach's alpha values above 0.8, Composite Reliability above 0.9, and AVE above 0.5; therefore, all constructs were deemed valid and reliable for use in further research analysis.

Table 4. Hypothesis Test

Hipotesis	Path	Coefficient	t-value	P-value	Conclusion
H1	Physical environment→ job satisfaction	0.342	6.847	0.000	Accepted
H2	Social environment→ job satisfaction	0.486	9.234	0.000	Accepted

Source: Primary Data processed, 2025

First, Hypothesis 1 (H1) is supported, as the analysis reveals that the physical environment exerts a statistically significant positive effect on job satisfaction ( $\beta = 0.342$ ,  $*p* < 0.001$ ). This indicates that for every one-unit improvement in the quality of the physical work environment, such as better ship facilities, safer working conditions, or improved onboard infrastructure, seafarers' job satisfaction is expected to increase by 0.342 units. While this effect is meaningful, it is relatively moderate compared to the other factors.

Second, Hypothesis 2 (H2) is also supported, with the social environment demonstrating an even stronger positive impact on job satisfaction ( $\beta = 0.486$ ,  $*p* < 0.001$ ). This suggests that interpersonal relationships, teamwork dynamics, and overall social cohesion in the workplace play a more substantial role in enhancing job satisfaction than physical conditions. Specifically, a one-unit enhancement in the social environment leads to a 0.486-unit increase in job satisfaction, highlighting the critical importance of a supportive and collaborative work atmosphere for seafarers.

#### 4.2. Discussion

##### 4.2.1. Correlation Between Work Experience and Seafarers' Job Satisfaction

The results show a significant positive correlation between seafarers' length of work experience and their job satisfaction levels. Seafarers with longer experience exhibit higher job satisfaction than their less experienced counterparts. This phenomenon can be explained from several interrelated psychological and professional perspectives (Kyambade & Namatovu, 2025; Mehra & Narwal, 2025). Experienced seafarers have developed superior adaptability to the unique challenges of maritime professions. They have endured various difficult situations at sea, from extreme weather to high operational pressure, giving them greater confidence in performing their duties (Alkhadra, Khawaldeh, & Aldehayyat, 2023; Azila-Gbettor, Atatsi, Tulasi, & Ayimey, 2024; Hayati & Caniago, 2025). Years of experience at sea also allow them to develop effective coping strategies for handling the inherent stress and isolation of maritime work. Additionally, senior seafarers generally hold higher-ranking positions onboard, granting them greater autonomy, more challenging responsibilities, and better compensation than their junior counterparts.

The temporal aspect also plays an important role in shaping experienced seafarers' job satisfaction. They have witnessed the evolution of the maritime industry and can appreciate improvements in working conditions, technology and safety regulations. This historical perspective provides students with a deeper appreciation of the industry's progress. Furthermore, experienced seafarers have built strong professional networks with fellow crew members and industry stakeholders, contributing to their sense of belonging and social support.

##### 4.2.2. Dominance of Social Environment in Predicting Job Satisfaction

A highly significant finding of this study is that the social environment has a more dominant influence than the physical environment in predicting seafarers' job satisfaction. This provides important insights into the factors that truly determine seafarers' psychological and professional well-being while performing their duties (Hamed, Hussain, Jani, Sabri, & Rusli, 2023; Kundori & Suganjar, 2025; Widiatmaka et al., 2023). The onboard social environment encompasses various complex interpersonal dimensions, including crew relationship quality, senior officers' leadership styles, effective communication, and teamwork climate. In the isolated context of a ship at sea for extended periods, the quality of social interaction becomes a crucial factor in determining whether work experiences are positive or negative. Seafarers working in a supportive social environment characterized by mutual

respect, open communication, and teamwork tend to report significantly higher job satisfaction (Karakasnaki et al., 2023; S.-J. Kim et al., 2024; McVeigh et al., 2021).

Healthy team dynamics onboard create a vital emotional support system for seafarers to cope with stress. When facing heavy operational challenges or extreme weather, supportive colleagues and empathetic leadership can significantly reduce stress levels and enhance psychological resilience. Conversely, interpersonal conflicts, poor communication, or authoritarian leadership can create a toxic work environment, the effects of which are amplified in the confined space of a ship over months (An et al., 2020; Caesar et al., 2015; Carrera-Arce & Bartusevičienė, 2024; Slišković & Penezić, 2015; Svetina et al., 2024). Although the social environment is more dominant, this does not mean that the physical environment plays no role in seafarers' job satisfaction. Ship conditions, including accommodation quality, recreational facilities, ventilation systems, noise levels, and workspace ergonomics, contribute to overall well-being. However, the study showed that seafarers are more tolerant of physical limitations if they are in a positive social environment.

This can be explained by psychological resilience theory, which states that strong social support helps individuals cope with or adapt to suboptimal physical conditions. Seafarers with good coworker relationships often find creative ways to overcome spatial or facility limitations and tend to focus on the positive aspects of their work experience. Conversely, even with excellent physical facilities, seafarers in poor social environments experience low job satisfaction. These findings have practical implications, suggesting that shipping companies must balance attention to both work environment aspects while prioritizing social environment quality through team-building programs, communication training, and improved social support systems.

## 5. Conclusions

### 5.1. Conclusion

This study establishes that both physical and social environments serve as significant predictors of job satisfaction among Indonesian shipping industry seafarers. The findings demonstrate that the social environment ( $\beta = 0.486$ ) exerts a stronger influence than the physical environment ( $\beta = 0.342$ ), highlighting the dominant role of interpersonal relationships, social support, and communication in shaping seafarers' job satisfaction. The theoretical contribution lies in validating the job demands-resources model within maritime contexts, particularly emphasizing how social resources outweigh physical resources in isolated work environments. These results underscore the critical importance of work environment quality in enhancing satisfaction, productivity, and employee retention in shipping organizations. Strategic investments in conducive physical environment design can yield long-term organizational benefits through improved performance and employee satisfaction, whereas prioritizing social environment development may deliver even greater returns.

### 5.2. Limitations

This study has several limitations. First, the study focused exclusively on Indonesian seafarers, potentially limiting its generalizability to other maritime labor markets. Second, the cross-sectional design prevented the establishment of causal relationships or the observation of longitudinal effects. Third, reliance on self-reported satisfaction measures may have introduced response bias. Fourth, the study examined only two environmental factors, while other potential influences, such as organizational policies or compensation structures, were not considered. Fifth, the sample may not fully represent all segments of Indonesia's diverse maritime workforce. Finally, the quantitative approach may have missed nuanced contextual factors that qualitative methods can uncover.

### 5.3. Suggestions

Future research should expand geographically to include comparative studies across different maritime labor markets. Longitudinal designs would help track how environmental factors affect satisfaction over the course of a career. Mixed-methods approaches that combine surveys with in-depth interviews could provide richer insights into seafarers' lived experiences. Researchers should investigate additional environmental factors, such as organizational culture and leadership styles. Future studies could also explore how digital connectivity affects social environment perceptions in modern shipping. For the

industry, we recommend developing comprehensive environmental improvement programs that balance physical upgrades with social dimension enhancements, such as team-building and communication training. Academic institutions should collaborate with shipping companies to create tailored training modules that address both environmental aspects. Finally, regulatory bodies should consider incorporating these findings into updated maritime labor standards.

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