

Linking Psychological Capital to Safety and Well-Being of Seafarers in the Maritime Industry: A Conceptual Framework

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ABSTRACT

The maritime industry remains a critical enabler of global trade, yet seafarers continue to experience psychological stressors that impact their safety and well-being. This study investigates the influence of psychological capital (PsyCap)—comprising self-efficacy, optimism, hope, and resilience—on maritime safety and the well-being of seafarers. Drawing upon Positive Organizational Behavior Theory, Job Demands-Resources (JD-R) Theory, and Social Support Theory, this study integrates job satisfaction and social support as mediating variables, and training and development programs as a moderator. The research adopts a quantitative, cross-sectional design involving active seafarers from multiple shipping sectors, utilizing a structured questionnaire validated through prior studies (Bergheim et al., 2015; McVeigh et al., 2019). Data will be analyzed using Structural Equation Modeling (SEM-PLS) to test hypotheses regarding the relationships between psychological capital, mediators, and safety outcomes. The findings are expected to reveal that high PsyCap enhances safety behavior and well-being indirectly through job satisfaction and social support, while continuous training strengthens these effects. This study contributes to maritime psychology by extending PsyCap theory into a high-risk occupational context and offers practical insights for maritime organizations and policymakers in enhancing human performance and reducing risk at sea.

Keywords: Psychological Capital, Seafarers, Maritime Safety, Well-being, Job Satisfaction, Training and Development

1.0 INTRODUCTION

The maritime industry forms the backbone of global commerce, with over 90% of world trade transported by sea (Şenbursa et al., 2024). Despite its critical role, seafaring is among the most demanding professions, often characterized by extended periods of isolation, long working hours, and exposure to unpredictable environmental hazards. These conditions pose significant risks to seafarers' physical safety and psychological well-being (Slišković, 2020). In recent years, there has been a growing recognition of the importance of psychological factors in influencing the safety practices and overall well-being of seafarers.

Seafaring is a challenging occupation that exposes individuals to various stressors, including long periods of isolation, demanding work conditions, and potential safety hazards at sea. Understanding how psychological resources such as self-efficacy, optimism, hope, and resilience can enhance the attitudes and behaviours of seafarers is crucial for promoting their safety and well-being in this unique work environment. These factors, combined with the inherent risks and hazards of working at sea, contribute to the complex and often stressful environment in which seafarers operate. As a result, ensuring the safety and well-being of seafarers has become a growing concern within the maritime industry.

Research in the field of occupational health and safety has increasingly focused on the role of psychological factors in influencing work-related outcomes, including safety behaviours, job performance, and overall well-being. Psychological capital, defined as the positive psychological resources of self-efficacy, optimism, hope, and resilience, has emerged as a key construct in understanding how individuals cope with challenges and thrive in demanding work environments. Recent studies have underscored that seafarers frequently experience stress, burnout, and depression due to prolonged separation from family, poor communication infrastructure, and limited access to mental health resources (Pauksztat et al., 2022). Such challenges directly influence operational safety and decision-making, making the human factor central to maritime risk management (Ismail et al., 2024). Consequently, understanding the psychological determinants of safety and well-being has become a pressing concern within the industry.

1.1 Problem Statement

Although significant investments have been made in ship technology, regulatory compliance, and safety management systems (e.g., ISM Code), human and psychological factors continue to contribute to the majority of maritime accidents (Fan et al., 2023). Karas (2023) reports persistent gaps in addressing seafarers' mental health, citing stress, fatigue, and isolation as major causes of accidents and reduced productivity. Psychological capital (PsyCap)—a construct encompassing self-efficacy, hope, optimism, and resilience—has been shown to enhance employee performance and coping strategies (Luthans et al., 2007; Bergheim et al., 2015). However, its application within the maritime context remains underexplored.

The purpose of this study is to investigate the influence of psychological capital on maritime safety and the well-being of seafarers, incorporating job satisfaction and social support as mediating factors, and training and development programs as a moderating variable. The study seeks to address how psychological resources shape safety behavior and well-being outcomes among maritime professionals operating in high-risk and isolated environments.

1.2 Research Objectives

1. To assess the relationship between psychological capital and maritime safety among seafarers.
2. To examine the mediating effects of job satisfaction and social support on this relationship.
3. To evaluate the moderating role of training and development in enhancing well-being.

1.3 Rationale and Significance

Previous research demonstrates that individuals with high PsyCap display greater optimism, adaptability, and resilience in adverse conditions (Halberstadt et al., 2021). In seafaring contexts, this translates into improved safety compliance and emotional stability. Moreover, job satisfaction and social support have been linked to stronger safety cultures and reduced stress (McVeigh et al., 2019). By integrating these psychological constructs, this study advances an evidence-based framework for promoting sustainable maritime safety and human performance.

Ultimately, this research contributes both theoretically and practically by contextualizing psychological capital within maritime operations, an area that has received limited scholarly attention despite its strategic importance to global trade.

2.0 LITERATURE REVIEW

2.1 Underpinning Theories - Relationships between Emerging Technologies and Operational Excellence

The study is grounded in Positive Organizational Behavior Theory (Luthans et al., 2007), which emphasizes the role of positive psychological resources which are self-efficacy, hope, optimism, and resilience in enhancing performance. Job Demands–Resources (JD-R) Theory (Bakker & Demerouti, 2017) further explains how job resources like training and social support buffer stress and improve well-being. Social Support Theory (Cohen & Wills, 1985) highlights how interpersonal connections mitigate stress and promote health, aligning with the maritime context where isolation is common.

2.2 Relationship between Psychological Capital and Seafarers' Well-Being

The maritime industry presents unique challenges and stressors for seafarers, highlighting the importance of psychological capital (PsyCap) in enhancing their well-being and job performance. Psychological capital, which includes self-efficacy, optimism, hope, and resilience, is crucial for bolstering seafarers' coping mechanisms and overall psychological well-being (Campos, 2023). Seafarers with higher levels of psychological capital are better equipped to navigate the demands of maritime life, maintain motivation, and perform effectively in challenging situations (Campos, 2023). Furthermore, psychological capital acts as a protective factor against stress, burnout, and mental health issues among seafarers, emphasizing its significance in fostering a positive work environment and ensuring the resilience of maritime personnel (Campos, 2023).

PsyCap has been shown to predict job performance, motivation, and safety behavior across industries (Peng et al., 2022). In maritime settings, seafarers with high PsyCap demonstrate improved coping, safety compliance, and reduced accident proneness (Bergheim et al., 2015). Optimism and self-efficacy enhance confidence in following procedures, while resilience helps seafarers recover from stressful incidents (McVeigh et al., 2019).

Thus, the following hypothesis is formulated.

H1: *Psychological capital positively influences maritime safety and well-being.*

2.3 Job Satisfaction as a Mediator in the relationship between psychological capital and seafarers' well-being

Job satisfaction mediates the relationship between psychological capital and well-being (Zhang et al., 2023). Satisfied seafarers exhibit higher motivation and lower stress, contributing to a safer working environment (An et al., 2020). However, low job satisfaction due to isolation or poor leadership can exacerbate mental strain and safety lapses (Koşar, 2021). Research indicates that job satisfaction and social support are key mediating variables that influence the relationship between psychological capital and well-being among seafarers (McVeigh et al., 2019). Factors such as perceived supervisor support and training and development programs can moderate this relationship, highlighting the importance of organizational support in enhancing seafarers' mental health and job satisfaction (Campos, 2023). Understanding the interplay between psychological resources, job satisfaction, social support, and training programs is essential for organizations to implement targeted interventions that promote seafarers' well-being and effectiveness in the maritime sector (McVeigh et al., 2019). Studies have demonstrated the impact of psychological capital on various outcomes, such as depressive symptoms during crises like the COVID-19 pandemic (Huang et al., 2023). Job satisfaction and social support are identified as mediating variables in the framework. Job satisfaction, reflecting contentment and positive feelings towards work, mediates the relationship between psychological capital and seafarers' well-being, impacting their job performance and mental health (Bergheim et al., 2015).

Thus, the following hypothesis is formulated.

H2: Job satisfaction mediates the relationship between psychological capital and seafarers' well-being

2.4 Social Support as a Mediator in the relationship between psychological capital and seafarers' well-being

Social support including camaraderie, teamwork, and managerial empathy that serves as a key buffer against psychological distress (Rizvi & Ilyaz, 2024). Social support, encompassing assistance and connections from colleagues and family, mediates the relationship between psychological capital and seafarers' well-being, aiding in managing stress and isolation during voyages (Bergheim et al., 2015). Seafarers reporting strong support networks demonstrate greater well-being and adherence to safety practices (Pauksztat et al., 2022). Therefore, social support is hypothesized to mediate the effect of PsyCap on maritime safety and well-being. The mediating role of perceived social support and the moderating effect of employment pressure further illustrate the complex interrelationships between psychological factors and mental health outcomes (Huang et al., 2023). Additionally, research on workplace bullying has shown that positive psychological capital can mitigate the effects of bullying on burnout among employees, indicating the protective role of psychological resources in adverse work environments (Bae et al., 2021). In the maritime industry, seafarers encounter unique challenges such as social isolation, poor physical conditions, and long work hours, which can affect their mental health and well-being (Brooks & Greenberg, 2022). Factors like workload, safety, social support, and salary contribute to seafarers' perceptions of stress, resilience, and overall well-being (McVeigh et al., 2019).

Thus, the following hypothesis is formulated.

H3: *Social support mediates the relationship between psychological capital and seafarers' well-being*

2.5 Training and Development as a Moderator in the relationship between psychological capital and seafarers' well-being

Training enhances seafarers' competencies, confidence, and adaptability (Dewan et al., 2023). Quality training moderates the PsyCap–well-being relationship by reinforcing resilience and optimism (Yao et al., 2022). Interactive learning technologies such as simulators and VR-based programs strengthen safety awareness and stress management (Muczyński et al., 2025). Training and development programs are highlighted as a moderating variable in the framework. These programs aim to enhance seafarers' skills and competencies, thereby moderating the relationship between psychological capital and seafarers' well-being by improving resilience and job satisfaction (Bergheim et al., 2015). Continuous training initiatives contribute to a culture of learning and improvement in the maritime industry (Bergheim et al., 2015).

Thus, the following hypothesis is formulated.

H4: *Training and development moderates the relationship between psychological capital and seafarers' well-being*

2.6 Research Gaps

Although the literature emphasizes human factors in maritime safety, few studies empirically examine psychological capital as a determinant of safety and well-being using SEM-PLS modelling. Moreover, the combined mediating and moderating effects of job satisfaction, social support, and training have not been tested in maritime contexts involving multicultural crews. This study fills this gap by providing a comprehensive framework linking psychological capital to maritime safety and well-being outcomes.

2.7 The Conceptual Framework

The conceptual framework proposed for this research focuses on the impact of psychological capital on maritime safety and well-being among seafarers in the maritime industry (Figure 1).

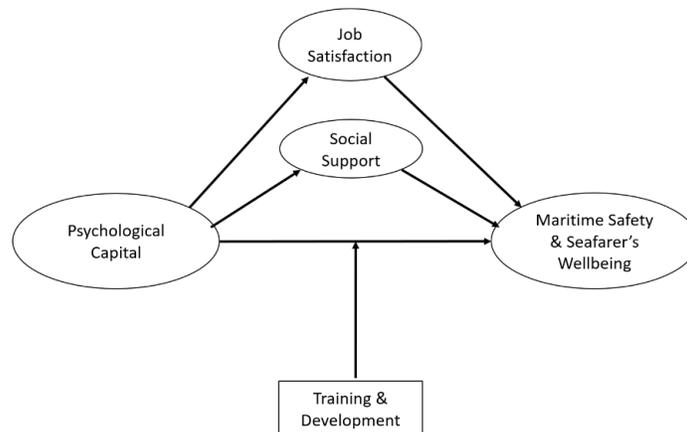


Figure 1: The Conceptual Framework

Psychological capital, which encompasses positive psychological resources such as self-efficacy, optimism, hope, and resilience, plays a crucial role in shaping seafarers' attitudes and behaviors. Seafarers with higher levels of psychological capital tend to demonstrate stronger coping abilities, greater emotional stability, and enhanced mental well-being serving as a protective buffer against stress, fatigue, and burnout. Within the proposed framework, job satisfaction and social support function as mediating variables that link psychological capital to overall well-being. Job satisfaction, which reflects an individual's sense of fulfillment and positive emotional response to work, mediates the influence of psychological capital on well-being by enhancing motivation, engagement, and job performance.

Social support is defined as the emotional, informational, and practical assistance derived from colleagues, supervisors, and family members mediates the relationship between psychological capital and well-being by helping seafarers manage occupational stress, isolation, and the psychological challenges of prolonged voyages. Furthermore, training and development programs serve as a moderating variable in the framework. By strengthening professional competencies, confidence, and adaptability, these programs moderate the relationship between psychological capital and well-being, reinforcing seafarers' resilience, job satisfaction, and overall capacity to perform effectively in demanding maritime environments.

3.0 RESEARCH METHODOLOGY

3.1 Research Design

This study adopts a quantitative, cross-sectional survey design to empirically examine the hypothesized relationships among psychological capital, job satisfaction, social support, training and development, and maritime safety and well-being. A quantitative approach is appropriate as it enables hypothesis testing, objective measurement, and statistical generalization through standardized instruments (Creswell & Creswell, 2018).

3.2 Population and Sampling

The target population comprises seafarers employed on Malaysian-registered vessels and international shipping liners operating within Southeast Asia. To ensure adequate representation across occupational roles, a stratified random sampling technique will be employed, covering deck, engine, and catering departments. The proposed sample size of approximately 300 respondents is consistent with the SEM-PLS guideline recommended by Hair et al. (2021), which suggests a minimum observation-to-parameter ratio of 10:1 for robust model estimation.

3.3 Instrument Design and Measurement of Variables

Data will be collected using a structured questionnaire comprising six sections, designed to capture demographic characteristics and key study constructs. All measurement items will be assessed using a 5-point Likert scale, ranging from 1 (*Strongly Disagree*) to 5 (*Strongly Agree*). The questionnaire items are adapted from well-established and validated instruments to ensure content validity. A pilot study involving 30 seafarers will be conducted to assess internal consistency, with

Cronbach’s alpha values of 0.80 or higher considered acceptable. Table 1 summarizes the constructs and measurement instruments used in this study as follows:

Table 1 : Measurement of Variables

Construct	Measurement Instrument	Source
Demographic Profile	Age, rank, tenure, department	Self-developed
Psychological Capital	PCQ-24 scale	Luthans et al. (2007)
Job Satisfaction	Job Satisfaction Survey (JSS)	Spector (1997)
Social Support	Multidimensional Scale of Perceived Social Support	Zimet et al. (1988)
Training and Development	Adapted scale	Yao et al. (2022)
Maritime Safety and Well-being	Safety and well-being indicators	Bergheim et al. (2015); McVeigh et al. (2019)

3.4 Data Collection Procedure

Data will be collected through both online and printed questionnaires, distributed with the assistance of shipping companies and maritime unions. Prior to participation, respondents will be provided with an informed consent statement, emphasizing voluntary participation, anonymity, and confidentiality of responses. No personally identifiable information will be collected.

3.5 Data Analysis

The collected data will be analyzed using SmartPLS version 4.0, following a two-stage analytical procedure. In the first stage, the measurement model will be evaluated to assess internal consistency reliability (Cronbach’s alpha and composite reliability), convergent validity (average variance extracted, $AVE \geq 0.50$), and discriminant validity using the Fornell–Larcker criterion. In the second stage, the structural model will be examined through bootstrapping with 5,000 resamples to test the significance of path coefficients at $p < 0.05$. Mediation effects will be assessed following the procedure proposed by Baron and Kenny (1986), while moderation effects will be analyzed using interaction terms within the PLS-SEM framework.

3.6 Ethical Considerations

Ethical clearance will be obtained from the university’s ethics committee. Anonymity, voluntary participation, and secure data handling will be upheld following the Declaration of Helsinki (World Medical Association, 2025).

4.0 CONCLUSION

This study aims to deepen understanding of how psychological capital influences maritime safety and seafarer well-being, incorporating mediating and moderating mechanisms that account for human, social, and organizational dimensions. By applying validated psychological and organizational theories to the maritime sector, the research bridges an existing gap between human factors and safety management systems.

Empirical validation through SEM-PLS is expected to demonstrate that high levels of PsyCap enhance seafarers' optimism, resilience, and safety compliance—factors crucial for reducing human error and accident rates. Mediating effects of job satisfaction and social support will clarify how individual attitudes and team cohesion foster both psychological and operational resilience. Moreover, training and development are anticipated to strengthen these relationships, highlighting their strategic role in cultivating a safety-oriented culture.

The findings will provide actionable insights for maritime organizations and policymakers to develop holistic interventions—combining mental health initiatives, professional training, and supportive leadership—to enhance both well-being and operational excellence. Ultimately, fostering psychological capital among seafarers represents not only an ethical responsibility but also a critical determinant of sustainable maritime performance in an increasingly demanding global industry.

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