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Determination of Fleet Performance Through Crew Job Satisfaction at Crude Oil Export Terminal Companies

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Abstract: This study was motivated by persistent challenges in maritime human resource management at crude oil export terminal companies, including suboptimal crew management, a lack of transparency in payroll systems, and ineffective compliance management. These issues have negatively affected crew job satisfaction and fleet performance. The study aimed to examine the effects of crew management, payroll systems, and compliance management on fleet performance through crew job satisfaction as a mediating variable at Nembe Crude Oil Terminal Limited, Nigeria. A quantitative research approach with a causal survey design was employed. The study population consisted of 155 crew members working across the company's operational fleet, while the sample was selected using a purposive sampling technique. Primary data were collected through structured questionnaires using a five-point Likert scale and supported by company documentation. Data were analyzed using Structural Equation Modeling–Partial Least Squares (SEM-PLS) with SmartPLS 4.0 software, including outer model, inner model, and bootstrapping analyses. The findings revealed that crew management, payroll systems, and compliance management each have a positive and significant effect on both crew job satisfaction and fleet performance. Furthermore, crew job satisfaction significantly enhances fleet performance and successfully mediates the relationships between the three independent variables and fleet performance. These findings indicate that improving crew management practices, ensuring transparent and fair payroll systems, and strengthening compliance with international maritime regulations contribute to higher crew job satisfaction, which ultimately enhances operational effectiveness and fleet performance. The study concludes that crew job satisfaction is a strategic factor in improving fleet performance within crude oil export terminal companies. Therefore, management is recommended to strengthen crew management practices, improve payroll transparency and timeliness, and reinforce compliance culture through continuous training and supervision to achieve sustainable operational excellence and long-term fleet performance.

Keywords: Crew Management, Payroll System, Compliance Management, Crew Job Satisfaction, Fleet Performance, SEM-PLS.

INTRODUCTION

Nembe Crude Oil Terminal Limited (NCOT), located in the Niger Delta, Nigeria, is one of the country's major crude oil export terminals and plays a strategic role in supporting national oil production targets. The terminal has been operated by Aiteo Eastern Exploration & Production Ltd. since its acquisition from Shell Petroleum Development Company (SPDC) in 2014. The acquisition included the 97-kilometer Nembe Creek Trunk Line (NCTL), with a

transportation capacity of approximately 150,000 barrels per day, together with the crude oil export terminal. Following the acquisition, Aiteo, in partnership with the Nigerian National Petroleum Corporation (NNPC), transformed NCOT into one of Nigeria's key crude oil export hubs. The terminal currently has a storage capacity of approximately 2 million barrels and is capable of handling large crude carriers ranging from AFRAMAX to Very Large Crude Carriers (VLCCs). Its operational fleet consists of crude oil tankers, bunker vessels, Floating Storage and Offloading (FSO) units, Anchor Handling Tug Supply (AHTS) vessels, Landing Craft Tankers (LCTs), and multipurpose vessels, employing hundreds of crew members across navigation, engineering, deck, and catering departments. Consequently, maintaining high fleet performance is essential to ensure operational continuity, safety, and competitiveness within the international oil and gas industry.

Despite its strategic importance, NCOT continues to face several operational challenges that threaten fleet performance and operational resilience. One of the most significant issues concerns crew management, including delayed crew rotations, competency gaps, and a high turnover rate. These conditions contribute to crew fatigue, declining morale, and an increased likelihood of human error, all of which negatively affect vessel operational reliability. Payroll management also presents substantial challenges. Administrative delays, non-transparent foreign currency conversions, and the absence of detailed payroll information—particularly regarding tax, insurance, and other deductions—have generated dissatisfaction and distrust among crew members, ultimately increasing employee turnover. Furthermore, compliance with international maritime regulations remains a persistent concern. External audits conducted under the International Safety Management (ISM) Code and the Maritime Labour Convention (MLC) 2006 frequently identify minor non-conformities related to expired certificates, incomplete documentation, and delayed reporting processes, largely due to limited administrative resources and insufficient crew awareness of international regulatory requirements.

Crew job satisfaction has emerged as a critical factor in enhancing fleet performance within maritime organizations. Crew members who perceive fair crew management practices, transparent payroll systems, objective performance evaluations, and effective compliance management are more likely to demonstrate higher motivation, stronger organizational commitment, and improved operational performance. Increased job satisfaction contributes to lower turnover intentions, reduced human error, enhanced teamwork, and greater operational efficiency, thereby strengthening fleet resilience. Therefore, improving crew rotation systems, enhancing payroll transparency, and reinforcing compliance management are expected to create a more supportive working environment that ultimately improves fleet operational performance. In addition to these internal challenges, NCOT also operates under significant external pressures, including security instability in the Niger Delta and fluctuations in global crude oil prices, both of which further complicate crew management and fleet operations.

Achieving sustainable fleet performance therefore requires a comprehensive and integrated management approach that simultaneously addresses human resource management, compensation systems, and regulatory compliance. Effective crew management ensures that recruitment, training, competency development, and crew rotation are conducted in accordance with international standards, thereby minimizing operational risks and improving vessel efficiency. Likewise, a transparent and equitable payroll system promotes employee trust, financial security, and organizational commitment. Meanwhile, effective compliance management, particularly regarding international regulations such as the ISM Code and MLC 2006, strengthens safety culture and operational discipline throughout the organization. When these managerial dimensions function synergistically, they create a positive working environment that enhances crew job satisfaction and ultimately improves overall fleet performance.

Although previous studies have investigated various determinants of maritime operational performance, significant research gaps remain. Studies on crew management have primarily focused on operational efficiency, maritime safety, and regulatory compliance (Grebennyk et al., 2019; Xu, 2023), without comprehensively examining their influence on fleet performance through crew job satisfaction as a mediating variable. Similarly, research on payroll systems has concentrated mainly on payroll accuracy, financial stability, and administrative effectiveness (Lokugama, 2021; Pinello et al., 2018; Rosita, 2025), while little attention has been given to the relationship between payroll transparency, crew job satisfaction, and fleet performance. Furthermore, compliance management research has largely emphasized adherence to maritime regulations such as the ISM Code and the Ballast Water Management Convention (Mamahit et al., 2013; Sulaiman et al., 2018; Bhatia et al., 2024), without integrating the psychological dimension of crew job satisfaction into the analytical framework. Likewise, studies investigating crew job satisfaction have generally focused on work environment, burnout, organizational support, and career development (Pantouvakis et al., 2023; Fredes-Collarte et al., 2024; Rumopa et al., 2025), rather than simultaneously examining the combined effects of crew management, payroll systems, and compliance management.

Based on these theoretical and empirical gaps, this study proposes an integrated framework to investigate the determinants of fleet performance through crew job satisfaction within the context of an oil export terminal. Specifically, the research examines the effects of Crew Management, Payroll System, and Compliance Management on Fleet Performance, with Crew Job Satisfaction serving as a mediating variable at Nembe Crude Oil Terminal Limited, Nigeria. By integrating human resource management, compensation management, and regulatory compliance into a single conceptual model, this study extends existing maritime management literature and provides practical insights for improving operational effectiveness, organizational sustainability, and competitive advantage in the offshore oil and gas industry. The findings are expected to contribute to both academic development and managerial decision-making by demonstrating how integrated human resource practices can strengthen fleet resilience and long-term operational performance in one of Nigeria's most strategically important crude oil export terminals.

METHOD

The research process, commenced with a preliminary study and an extensive literature review to identify theoretical foundations and empirical gaps related to maritime human resource management and fleet performance. Based on these findings, the research problem was formulated to examine the effects of Crew Management, Payroll System, and Compliance Management on Crew Job Satisfaction and Fleet Performance at Nembe Crude Oil Terminal Limited (NCOT), Nigeria. The subsequent stages included defining and delimiting the research problem, developing the conceptual framework and hypotheses, designing the research instrument, and conducting field observations and data collection to establish an integrated model explaining the relationships among the research variables.

The population of this study comprised all active crew members employed by Nembe Crude Oil Terminal Limited in 2025, totaling 155 personnel distributed across several fleet categories, including crude oil tankers, bunker vessels, Floating Storage and Offloading (FSO) units, Anchor Handling Tug Supply (AHTS) vessels, Landing Craft Tankers (LCTs), and multipurpose vessels. Since each fleet category possesses different operational responsibilities and job characteristics, stratified random sampling was employed to ensure proportional representation of every fleet group and to improve the accuracy and objectivity of the findings (Sugiyono, 2019). However, because the total population was relatively small and fully accessible, all 155 crew members were included as research respondents (census sampling), thereby maximizing data representativeness, minimizing sampling error, and

providing a comprehensive understanding of the relationships among crew management, payroll systems, compliance management, crew job satisfaction, and fleet performance (Cooper & Schindler, 2021; Sekaran & Bougie, 2020).

The collected data were analyzed using Structural Equation Modeling–Partial Least Squares (SEM-PLS) with the assistance of SmartPLS 4.0. This analytical technique was selected because it is capable of simultaneously examining complex causal relationships among multiple latent constructs while evaluating both direct and indirect effects through mediating variables. SEM-PLS is particularly suitable for predictive and exploratory research involving latent variables measured by multiple indicators, such as Crew Management, Payroll System, Compliance Management, Crew Job Satisfaction, and Fleet Performance. Furthermore, the analysis consisted of evaluating the measurement model (outer model) to assess construct validity and reliability, evaluating the structural model (inner model) to determine the explanatory power of the proposed model, and conducting bootstrapping procedures to test the significance of the hypothesized relationships (Hair et al., 2019).

RESULTS AND DISCUSSION

Result

Outer Model Analysis

a. Convergent Validity

Convergent validity was evaluated by examining the outer loading values of each indicator. According to Hair et al. (2022), an indicator is considered valid when its loading factor exceeds 0.70. The results of the convergent validity test are presented in Table 1

Table 1. Convergent Validity Test Results

Variable	Indicator	Loading Factor	Result
Crew Management (X1)	X1.1 – X1.8	0.768 – 0.889	Valid
Payroll System (X2)	X2.1 – X2.18	0.722 – 0.871	Valid
Compliance Management (X3)	X3.1 – X3.6	0.877 – 0.932	Valid
Crew Job Satisfaction (Z)	Z1 – Z8	0.850 – 0.942	Valid
Fleet Performance (Y)	Y1 – Y8	0.853 – 0.902	Valid

The SmartPLS output demonstrates that all 48 indicators have loading factor values exceeding the minimum threshold of 0.70, indicating satisfactory convergent validity. Therefore, all indicators are considered valid and adequately represent their respective latent constructs. Since every indicator satisfies the recommended criteria, the measurement model is suitable for further analysis.

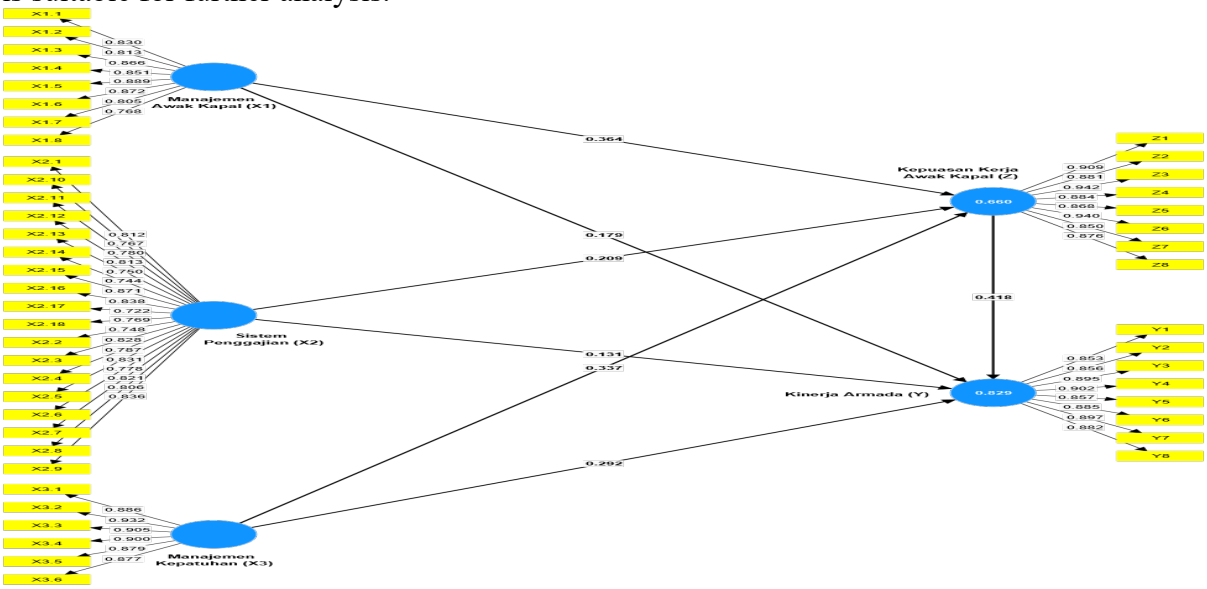

Figure 1. Outer Model (PLS Algorithm)

Based on the SmartPLS algorithm presented in Figure 1, all measurement indicators exhibit standardized loading values above 0.70, confirming that each indicator significantly contributes to its corresponding latent construct. Consequently, the measurement model demonstrates adequate convergent validity, indicating that both the measurement model and the structural model are appropriate for subsequent hypothesis testing.

b. ***Discriminant Validity and Construct Reliability***

Discriminant validity was assessed using the Average Variance Extracted (AVE), while construct reliability was evaluated using Cronbach's Alpha and Composite Reliability (CR). The results are presented in Table 2

Table 2. Discriminant Validity and Construct Reliability

Variable	AVE	Cronbach's Alpha	Composite Reliability	Criteria	Result
Crew Management (X1)	0.702	0.939	0.940	AVE > 0.50; CA & CR > 0.70	Valid & Reliable
Payroll System (X2)	0.633	0.966	0.968	AVE > 0.50; CA & CR > 0.70	Valid & Reliable
Compliance Management (X3)	0.804	0.951	0.953	AVE > 0.50; CA & CR > 0.70	Valid & Reliable
Crew Job Satisfaction (Z)	0.800	0.964	0.965	AVE > 0.50; CA & CR > 0.70	Valid & Reliable
Fleet Performance (Y)	0.772	0.958	0.958	AVE > 0.50; CA & CR > 0.70	Valid & Reliable

As shown in Table2, all latent constructs have AVE values greater than 0.50, confirming satisfactory discriminant validity. Furthermore, the Cronbach's Alpha and Composite Reliability values for all variables exceed the recommended threshold of 0.70, indicating excellent internal consistency and construct reliability. Therefore, all constructs are considered both valid and reliable, demonstrating that the measurement model satisfies the required psychometric properties.

c. Fornell–Larcker Criterion

The Fornell–Larcker Criterion was employed as an additional assessment of discriminant validity. This criterion requires that the square root of each construct's AVE be greater than its correlations with other constructs. The results are presented in Table 3

Table 3. Fornell–Larcker Criterion

Variables	Crew Job Satisfaction (Z)	Fleet Performance (Y)	Crew Management (X1)	Compliance Management (X3)	Payroll System (X2)
Crew Job Satisfaction (Z)	0.894				
Fleet Performance (Y)	0.854	0.879			
Crew Management (X1)	0.762	0.811	0.838		
Compliance Management (X3)	0.744	0.819	0.791	0.897	
Payroll System (X2)	0.628	0.671	0.627	0.564	0.795

The Fornell–Larcker results indicate that the square root of the AVE (diagonal values shown in bold) for each construct is greater than its correlations with all other constructs. These findings confirm that each latent variable shares more variance with its own indicators than with other constructs in the model. Consequently, the measurement model satisfies the Fornell–Larcker criterion, providing strong evidence of discriminant validity.

d. Cross-Loadings

The cross-loading analysis was performed to further assess discriminant validity by comparing the loading of each indicator on its own construct with its loadings on other constructs. The results indicate that every indicator has the highest loading on its intended latent variable compared with the remaining constructs. This demonstrates that all indicators appropriately represent their respective constructs and possess satisfactory discriminant validity. Therefore, the measurement model fulfills all recommended validity and reliability requirements and is appropriate for subsequent structural model analysis and hypothesis testing.

Inner Model Analysis

a. R-Square (R^2) Test

The coefficient of determination (R^2) was used to evaluate the proportion of variance in the endogenous constructs explained by the exogenous variables. The results are presented in Table 4.

Table 4. Coefficient of Determination (R^2)

Endogenous Variable	R^2	Adjusted R^2
Crew Job Satisfaction (Z)	0.660	0.656
Fleet Performance (Y)	0.829	0.827

As shown in Table 4, the R^2 value of Crew Job Satisfaction (Z) is 0.660, indicating that 66.0% of the variance in crew job satisfaction is explained by Crew Management, Payroll System, and Compliance Management, while the remaining 34.0% is explained by other variables outside the research model. According to Hair et al. (2022), this value represents a substantial level of explanatory power, suggesting that the three exogenous variables make a strong contribution to improving crew job satisfaction.

Similarly, the R^2 value for Fleet Performance (Y) is 0.829, meaning that 82.9% of the variance in fleet performance is explained by Crew Management, Payroll System, Compliance Management, and Crew Job Satisfaction, whereas 17.1% is attributable to factors not included in the model. This result indicates that the proposed structural model has very strong explanatory power, demonstrating that the selected variables are major determinants of fleet performance at Nembe Crude Oil Terminal Limited.

b. Predictive Relevance (Q^2)

The Stone–Geisser Q^2 value was calculated to evaluate the predictive relevance of the structural model using the following equation:

$$Q^2 = 1 – (1 – 0{,}660)(1 – 0{,}829)$$
$$Q^2 = 1 – (0{,}340 \times 0{,}171)$$
$$Q^2 = 1 – 0{,}058$$
$$Q^2 = 0{,}942$$

The resulting Q^2 value of 0.942 is substantially greater than zero and very close to one, indicating excellent predictive relevance. This finding suggests that the structural model is capable of explaining approximately 94.2% of the combined variation in the endogenous constructs, while only 5.8% is explained by factors outside the model. Therefore, the proposed model possesses strong predictive capability and is appropriate for hypothesis testing.

c. Goodness of Fit (GoF)

The Goodness of Fit assessment was conducted to evaluate the overall suitability of the measurement and structural models. The results are summarized in Table 5.

Table 5. Goodness of Fit Statistics

Fit Index	Saturated Model	Estimated Model
SRMR	0.056	0.056
d_ULS	3.700	3.700
d_G	6.110	6.110
Chi-square	5421.816	5421.816
NFI	0.671	0.671

The results indicate that the Standardized Root Mean Square Residual (SRMR) is 0.056, which is below the recommended threshold of 0.08, indicating an acceptable model fit. The Normed Fit Index (NFI) is 0.671, suggesting a moderate overall fit, although it does not reach the ideal benchmark of 0.90. In PLS-SEM, however, SRMR is considered a more important model fit criterion than NFI. Overall, the fit statistics indicate that the structural model provides an acceptable representation of the empirical data and is suitable for subsequent hypothesis testing.

d. Hypothesis Testing

Hypothesis testing was conducted using the bootstrapping procedure in SmartPLS 4.0. The significance of each structural relationship was evaluated using the path coefficient (Original Sample), t-statistic, and p-value. Following Sarstedt et al. (2021), a hypothesis is considered statistically significant when t-statistic > 1.65 for a one-tailed test and p-value < 0.05.

Table 6. Direct Effects an Indirect Analysis

Hypothesis	Structural Path	β	t-value	p-value	Result
H1	Crew Management (X1) → Crew Job Satisfaction (Z)	0.364	2.318	0.010	Supported
H2	Payroll System (X2) → Crew Job Satisfaction (Z)	0.209	2.458	0.007	Supported
H3	Compliance Management (X3) → Crew Job Satisfaction (Z)	0.337	1.835	0.034	Supported
H4	Crew Management (X1) → Fleet Performance (Y)	0.179	2.228	0.013	Supported
H5	Payroll System (X2) → Fleet Performance (Y)	0.131	2.452	0.007	Supported
H6	Compliance Management (X3) → Fleet Performance (Y)	0.292	3.631	<0.001	Supported
H7	Crew Job Satisfaction (Z) → Fleet Performance (Y)	0.418	5.062	<0.001	Supported
H8	Crew Management (X1) → Crew Job Satisfaction (Z) → Fleet Performance (Y)	0.152	1.939	0.027	Supported
H9	Payroll System (X2) → Crew Job Satisfaction (Z) → Fleet Performance (Y)	0.087	2.318	0.010	Supported
H10	Compliance Management (X3) → Crew Job Satisfaction (Z) → Fleet Performance (Y)	0.141	2.063	0.020	Supported

Discussion

Effect of Crew Management on Crew Job Satisfaction

The hypothesis testing results indicate that Crew Management has a positive and significant effect on Crew Job Satisfaction, with a path coefficient (β) of 0.364, a t-value of

2.318, and a p-value of 0.010, thereby supporting H1. These findings demonstrate that improvements in crew management practices significantly enhance the job satisfaction of crew members at Nembe Crude Oil Terminal Limited. Effective crew management, including competency-based crew assignment, appropriate work scheduling, career development, fair performance evaluation, and effective communication, creates a supportive working environment that enables crew members to perform their duties efficiently. Well-organized crew management also reduces role ambiguity, strengthens teamwork, and improves employees' confidence in the organization, ultimately leading to higher job satisfaction.

This finding is consistent with previous studies emphasizing the importance of human resource management in maritime organizations. Grebennyk et al. (2019) argued that shipping company efficiency largely depends on effective crew management and human resource practices. Likewise, Xu (2023) highlighted that modern ship management requires professional crew administration to support operational leadership and organizational effectiveness. Kumar et al. (2017) further reported that effective performance management systems increase employee motivation and job satisfaction, while Zaey et al. (2021) found that proper job management and professional development significantly improve crew satisfaction. Similarly, Rumopa et al. (2025) concluded that career development opportunities and a supportive working environment positively influence seafarers' job satisfaction. Therefore, the present findings reinforce the view that effective crew management is a strategic factor in improving employee satisfaction within the maritime industry.

Effect of Payroll System on Crew Job Satisfaction

The results of the hypothesis test reveal that the Payroll System has a positive and significant effect on Crew Job Satisfaction, with a path coefficient (β) of 0.209, a t-value of 2.458, and a p-value of 0.007, supporting H2. This result indicates that a transparent, fair, and timely payroll system contributes significantly to increasing crew members' job satisfaction. A well-managed payroll system provides financial security, recognizes employees' contributions, and strengthens trust between crew members and the company. In the maritime industry, where crew members often work under demanding operational conditions, accurate salary payments, operational allowances, bonuses, and transparent payroll information become essential determinants of employee satisfaction and organizational commitment.

The findings support previous empirical evidence regarding compensation management in maritime organizations. Lokugama (2021) reported that effective payroll information systems improve payment accuracy and human resource management efficiency in port operations. Rosita (2025) found that an effective payroll delegation system contributes to financial stability for seafarers while improving organizational financial management. Similarly, Pinello et al. (2018) demonstrated that appropriate remuneration systems enhance crew welfare and work effectiveness. Kumar et al. (2017) also concluded that fair financial rewards significantly increase employee motivation and job satisfaction, while Pantouvakis et al. (2023) emphasized that organizational support, particularly financial well-being, is one of the strongest predictors of crew job satisfaction. These findings confirm that compensation management represents a critical component of employee satisfaction in maritime organizations.

Effect of Compliance Management on Crew Job Satisfaction

The hypothesis testing results show that Compliance Management has a positive and significant effect on Crew Job Satisfaction, with a path coefficient (β) of 0.337, a t-value of 1.835, and a p-value of 0.034, thereby supporting H3. These findings suggest that effective compliance management contributes to creating a safer and more secure working environment, ultimately improving crew members' job satisfaction. Compliance with international maritime regulations, safety procedures, working-hour requirements, and

operational standards provides legal protection, operational certainty, and psychological security for crew members. Consequently, employees experience greater confidence in their working environment and demonstrate higher levels of job satisfaction and organizational commitment.

The present findings are consistent with previous maritime safety and compliance studies. Bhatia et al. (2024) emphasized that compliance with work and rest hour regulations is essential for maintaining crew safety and well-being. Mamahit et al. (2013) reported that proper implementation of the International Safety Management (ISM) Code positively influences crew safety behavior and operational compliance. Likewise, Sulaiman et al. (2018) found that implementing international ballast water management regulations strengthens operational compliance among ship crews. Ghosh and Rubly (2017) further demonstrated that compliance training improves crew perceptions of safety regulations, while Rahmad et al. (2024) concluded that adherence to maritime safety regulations significantly reduces workplace accidents and improves occupational safety. Collectively, these studies support the present finding that effective compliance management enhances crew job satisfaction by fostering a safe, disciplined, and well-regulated working environment.

Effect of Crew Management on Fleet Performance

The hypothesis testing results indicate that Crew Management has a positive and significant effect on Fleet Performance, with a path coefficient (β) of 0.179, a t-value of 2.228, and a p-value of 0.013, thereby supporting H4. This finding demonstrates that effective crew management contributes directly to improving fleet performance at Nembe Crude Oil Terminal Limited. Proper crew planning, competency-based assignment, continuous training, effective supervision, and clear communication enable crew members to perform their duties efficiently while minimizing operational errors. Well-managed human resources also improve coordination among departments, strengthen operational discipline, and enhance vessel readiness, all of which contribute to better fleet operational performance.

These findings are consistent with previous studies highlighting the importance of crew management in maritime operations. Grebennyk et al. (2019) reported that shipping company efficiency is strongly influenced by the quality of crew management and operational coordination. Similarly, Xu (2023) emphasized that modern ship management requires effective crew administration to ensure safe and efficient vessel operations. Fan and Yang (2023) further demonstrated that human performance management plays a crucial role in improving maritime safety and operational effectiveness. Moreover, Ricardianto et al. (2021) and Manurung et al. (2022) concluded that crew competency, safety training, and operational discipline significantly enhance vessel performance and maritime operational effectiveness. These findings confirm that effective crew management is a strategic determinant of superior fleet performance.

Effect of Payroll System on Fleet Performance

The hypothesis testing results reveal that the Payroll System has a positive and significant effect on Fleet Performance, with a path coefficient (β) of 0.131, a t-value of 2.452, and a p-value of 0.007, supporting H5. This result indicates that a transparent, equitable, and timely payroll system contributes directly to improving fleet performance. Fair compensation encourages crew members to perform their responsibilities with greater commitment, discipline, and accountability. Financial security provided through an effective payroll system enhances employee motivation and reduces work-related stress, enabling crew members to maintain higher operational productivity and support efficient vessel operations.

This finding is supported by previous research on compensation management in the maritime sector. Lokugama (2021) found that an accurate payroll management system improves human resource efficiency in port operations. Likewise, Rosita (2025) reported that

an effective payroll delegation system strengthens financial stability and enhances crew management performance. Pinello et al. (2018) demonstrated that appropriate remuneration systems positively influence crew welfare and operational effectiveness. Furthermore, Kumar et al. (2017) concluded that fair financial rewards significantly improve employee motivation and productivity, while Vlachos et al. (2023) emphasized that organizational support for employee welfare contributes to higher work performance in maritime organizations. These studies reinforce the importance of payroll management as a driver of operational excellence and fleet performance.

Effect of Compliance Management on Fleet Performance

The hypothesis testing results indicate that Compliance Management has a positive and significant effect on Fleet Performance, with a path coefficient (β) of 0.292, a t-value of 3.631, and a p-value < 0.001, thereby supporting H6. The findings demonstrate that effective compliance management substantially improves fleet operational performance by ensuring adherence to international maritime regulations, operational procedures, and safety standards. Compliance with regulations such as the International Safety Management (ISM) Code, SOLAS, and other international conventions minimizes operational disruptions, reduces accident risks, and strengthens the reliability of vessel operations. Consequently, compliance management contributes directly to safer, more efficient, and more sustainable fleet operations.

These findings are consistent with previous maritime studies emphasizing the strategic role of regulatory compliance. Bhatia et al. (2024) reported that compliance with work and rest hour regulations is essential for maintaining operational safety and efficiency. Mamahit et al. (2013) found that adherence to the ISM Code significantly improves crew safety behavior and operational compliance. Likewise, Sulaiman et al. (2018) demonstrated that implementing international ballast water management regulations enhances operational compliance across maritime organizations. Ricardianto et al. (2021) further concluded that compliance with SOLAS standards improves navigational safety and operational quality, while Rahmad et al. (2024) found that compliance with maritime safety regulations significantly reduces accident risks and enhances operational effectiveness. These findings confirm that compliance management is a critical organizational capability for achieving superior fleet performance.

Effect of Crew Job Satisfaction on Fleet Performance

The hypothesis testing results demonstrate that Crew Job Satisfaction has a positive and significant effect on Fleet Performance, with a path coefficient (β) of 0.418, a t-value of 5.062, and a p-value < 0.001, supporting H7. Among all direct relationships examined in this study, this represents the strongest effect on fleet performance. The findings indicate that crew members who are satisfied with their working conditions, organizational support, compensation, and career opportunities are more motivated to perform their duties effectively. Higher job satisfaction enhances teamwork, operational discipline, responsibility, and commitment, thereby improving overall fleet operational performance.

The present findings are strongly supported by previous empirical studies. Mantiri and Sandroto (2023) found that social connectedness and work passion significantly improve employee performance through increased job satisfaction. Similarly, Rumopa et al. (2025) reported that career development opportunities enhance crew job satisfaction while improving employee retention. Fredes-Collarte et al. (2024) demonstrated that job satisfaction is closely associated with psychological well-being and work quality. Furthermore, Pantouvakis et al. (2023) identified organizational support and team cohesion as major determinants of seafarers' job satisfaction, while Vlachos et al. (2023) concluded that organizational support and service quality significantly improve both job satisfaction and employee performance in

the maritime industry. Collectively, these studies reinforce the present findings that crew job satisfaction serves as a fundamental determinant of sustainable fleet performance.

The Effect of Crew Management on Fleet Performance through Crew Job Satisfaction

The mediation analysis indicates that Crew Job Satisfaction significantly mediates the relationship between Crew Management and Fleet Performance, with an indirect effect coefficient (β) of 0.152, a t-value of 1.939, and a p-value of 0.027, thereby supporting H8. These findings suggest that effective crew management not only improves fleet performance directly but also enhances operational outcomes indirectly by increasing crew members' job satisfaction. Professional crew management practices, including competency-based placement, effective communication, career development, and fair work allocation, foster a positive working environment that strengthens employee motivation, commitment, and engagement. As crew members become more satisfied with their working conditions, they demonstrate higher productivity, greater operational discipline, and stronger teamwork, ultimately leading to improved fleet performance.

These findings are supported by previous maritime management studies. Grebennyk et al. (2019) emphasized that effective crew management is fundamental to improving shipping operational efficiency. Similarly, Xu (2023) highlighted that modern vessel management depends heavily on professional crew administration to achieve operational excellence. Zaey et al. (2021) found that effective work organization and crew rotation systems significantly improve crew job satisfaction, while Mantiri and Sandroto (2023) demonstrated that social connectedness and work engagement strengthen employee satisfaction and performance. Furthermore, Rumopa et al. (2025) concluded that career development and supportive working environments positively influence job satisfaction, which subsequently contributes to improved organizational performance. These studies reinforce the mediating role of crew job satisfaction in translating effective crew management into higher fleet performance.

The Effect of Payroll System on Fleet Performance through Crew Job Satisfaction

The mediation analysis reveals that Crew Job Satisfaction significantly mediates the relationship between the Payroll System and Fleet Performance, with an indirect effect coefficient (β) of 0.087, a t-value of 2.318, and a p-value of 0.010, supporting H9. This finding indicates that an effective payroll system contributes to improved fleet performance not only through its direct influence but also by enhancing crew members' job satisfaction. Transparent, equitable, and timely salary payments provide financial security and reinforce employees' perceptions of fairness, thereby increasing motivation, organizational commitment, and work engagement. As crew members become more satisfied with the company's compensation practices, they are more likely to perform their duties responsibly and efficiently, leading to higher fleet operational performance.

The results are consistent with previous research emphasizing the strategic role of compensation in employee performance. Lokugama (2021) found that effective payroll systems improve human resource management efficiency in port organizations. Rosita (2025) reported that payroll delegation systems contribute to financial stability and better crew management. Likewise, Pinello et al. (2018) demonstrated that appropriate remuneration systems enhance both crew welfare and operational effectiveness. Kumar et al. (2017) concluded that fair financial rewards significantly improve employee motivation and job satisfaction, while Pantouvakis et al. (2023) highlighted that organizational support for employee welfare is a major determinant of job satisfaction and work performance in maritime organizations. These findings confirm that crew job satisfaction serves as an important mechanism through which payroll management improves fleet performance.

The Effect of Compliance Management on Fleet Performance through Crew Job Satisfaction

The mediation analysis demonstrates that Crew Job Satisfaction significantly mediates the relationship between Compliance Management and Fleet Performance, with an indirect effect coefficient (β) of 0.141, a t-value of 2.063, and a p-value of 0.020, thereby supporting H10. These findings indicate that effective compliance management enhances fleet performance indirectly by increasing crew members' job satisfaction. Compliance with international maritime regulations, safety procedures, and operational standards creates a secure, disciplined, and well-regulated working environment where crew members feel protected and supported. Such conditions improve psychological well-being, reduce work-related stress, and encourage greater commitment to organizational objectives, ultimately strengthening fleet operational performance.

These findings are supported by several previous studies in maritime safety and organizational behavior. Bhatia et al. (2024) reported that compliance with work and rest hour regulations is essential for maintaining operational safety and crew well-being. Mamahit et al. (2013) demonstrated that compliance with the International Safety Management (ISM) Code positively influences safety behavior and operational performance. Ghosh and Rubly (2017) further found that compliance training improves crew perceptions of safety regulations and organizational support. Similarly, Rahmad et al. (2024) concluded that adherence to maritime safety regulations significantly reduces accident risks and enhances operational effectiveness. Moreover, Fredes-Collarte et al. (2024) emphasized that safe and supportive working conditions positively affect employees' job satisfaction and work performance. Collectively, these studies support the present findings by confirming that crew job satisfaction functions as a critical mediating mechanism through which compliance management contributes to sustainable fleet performance in the maritime industry.

CONCLUSION

The findings of this study demonstrate that Crew Management, Payroll System, and Compliance Management each have a positive and significant direct effect on Crew Job Satisfaction at Nembe Crude Oil Terminal Limited, Nigeria. Effective crew management practices, including competency-based placement, training, safety management, and career development, contribute to creating a supportive working environment that enhances crew members' motivation and job satisfaction. Likewise, a fair, transparent, and timely payroll system provides financial security and strengthens employees' trust and organizational commitment, thereby improving their overall job satisfaction. In addition, effective compliance management, particularly through adherence to international safety regulations and operational procedures, creates a safe and well-organized working environment that further increases crew job satisfaction. These findings confirm that improving human resource management, compensation systems, and regulatory compliance is essential for fostering a satisfied and motivated maritime workforce.

The study also confirms that Crew Management, Payroll System, Compliance Management, and Crew Job Satisfaction have positive and significant direct effects on Fleet Performance. Effective crew management improves operational coordination, technical competency, and workforce readiness, resulting in higher fleet operational efficiency. Similarly, an equitable payroll system enhances employee motivation and work commitment, contributing directly to better operational performance. Compliance with maritime safety regulations and operational standards minimizes operational risks, strengthens safety culture, and supports sustainable fleet operations. Furthermore, Crew Job Satisfaction emerged as the strongest direct predictor of Fleet Performance, indicating that satisfied crew members demonstrate higher productivity, stronger organizational commitment, better teamwork, and

greater operational discipline, all of which contribute significantly to improving fleet performance.

Finally, the mediation analysis demonstrates that Crew Job Satisfaction significantly mediates the relationships between Crew Management, Payroll System, and Compliance Management and Fleet Performance. These findings indicate that improvements in crew management, compensation practices, and compliance systems generate greater improvements in fleet performance when they simultaneously increase crew members' job satisfaction. Thus, Crew Job Satisfaction functions as a strategic mechanism through which organizational policies and management practices are translated into superior operational outcomes. Overall, the study concludes that an integrated approach combining effective crew management, transparent payroll systems, and robust compliance management is essential for enhancing crew job satisfaction and achieving sustainable fleet performance at Nembe Crude Oil Terminal Limited, Nigeria.

REFERENCE

Bhatia, B. S., Carrera-Arce, M., Baumler, R., & Grech, M. R. (2024). *Seafarers vs. Port State Control: Decoding Work/rest compliance data disparity*. *Marine Policy, 163*, 106105. https://doi.org/10.1016/j.marpol.2024.106105

Cooper, D. R., & Schindler, P. S. (2021). *Metode penelitian bisnis*. Salemba Empat.

Fan, S., & Yang, Z. (2023). *Towards objective human performance measurement for maritime safety: A new psychophysiological data-driven machine learning method*. *Reliability Engineering & System Safety, 233*, 109103. https://doi.org/10.1016/j.ress.2023.109103

Fredes-Collarte, D., Olivares-Faúndez, V., Sánchez-García, J. C., & Peralta Montecinos, J. (2024). *Work satisfaction and its relationship with burnout and its consequences, using a structural model, in air cabin crew members*. *Sustainability, 16*(22). https://doi.org/10.3390/su16229619

Grebennyk, N., Navrozova, Y., Danchenko, O., & Jakubek, P. (2019). *Methodical approaches to the management of the crewing company efficiency*. *Economic Annals-XXI, 177*(5–6), 114–125. https://doi.org/10.21003/ea.V177-10

Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). *When to use and how to report the results of PLS-SEM*. *European Business Review, 31*(1), 2–24. https://doi.org/10.1108/EBR-11-2018-0203

Hair, J. F., Sarstedt, M., Ringle, C. M., Sharma, P. N., & Liengaard, B. D. (2024). *Going beyond the untold facts in PLS–SEM and moving forward*. *European Journal of Marketing, 58*(13), 81–106. https://doi.org/10.1108/EJM-08-2023-0645

Kumar, M., Shirley, N., & Singh, G. D. (2017). *A research paper on performance appraisal and employee's motivation onboard cruise ship industries*. *International Journal of Enhanced Research in Management & Computer Applications, 6*(8), 88–95.

Lokugama, K. J. (2021). *Management information system–Human resource & payroll for Sri Lanka Ports Authority*. *International Journal of Engineering and Management Research, 11*(2), 212–217. https://doi.org/10.31033/ijemr.11.2.30

Mamahit, D. A., Daryanto, H. K., Sumarwan, U., & Yusuf, E. Z. (2013). *Behavior analysis of the ship crew to the International Safety Management (ISM) Code in Indonesia*. *International Journal of Management and Sustainability, 2*(2), 14–27. https://doi.org/10.18488/journal.11/2013.2.2/11.2.14.27

Mantiri, S. M., & Sandroto, C. W. (2023). *The role of belongingness for cabin crew: Between work passion and job satisfaction*. *Review of Management and Entrepreneurship, 7*(1), 131–150. https://doi.org/10.37715/rme.v7i1.3687

Pinello, D., Gee, J., & Polymeros, K. (2018). *An unconventional approach to estimating crew remuneration in fisheries*. *Marine Policy, 87*, 226–233. https://doi.org/10.1016/j.marpol.2017.08.031

Rosita, N. D. (2017). *Efektivitas sistem delegasi gaji awak kapal*. *Jurnal Saintek Maritim, 16*(2), 175–181.

Rumopa, M., Baharuddin, B., Halik, J. B., & Lambe, K. H. P. (2025). *Improving ship crew job satisfaction: The role of work environment and career development*. *RIGGS: Journal of Artificial Intelligence and Digital Business, 4*(2), 1304–1315. https://doi.org/10.31004/riggs.v4i2.665

Sarstedt, M., Hair, J. F., Cheah, J. H., Ting, H., Vaithilingam, S., & Ringle, C. M. (2019). *Predictive model assessment in PLS-SEM: Guidelines for using PLSpredict*. *European Journal of Marketing, 53*(11), 2322–2347. https://doi.org/10.1108/EJM-02-2019-0189

Sekaran, U., & Bougie, R. (2020). *Research methods for business: A skill-building approach* (7th ed.). John Wiley & Sons.

Sugiyono. (2019). *Metode penelitian pendidikan: Pendekatan kuantitatif, kualitatif, kombinasi, R&D dan penelitian pendidikan*. Alfabeta.

Sulaiman, A. A. S. H. M. R. N. A. F. (2018). *The compliance of ship's crew toward the International Convention implementation for the control and management of ship's ballast water and sediment in offshore Port of Taboneo*. *OMNI-Akuatika, 14*(1), 62–68.

Xu, J. (2023). *Issues in modern ship management and strategies for ship captains*. *Academic Journal of Management and Social Sciences, 4*(3), 81–85. https://doi.org/10.54097/ajmss.v4i3.13018