Natural Resources for Human Health
eISSN: 2583-1194

Original Research

Received 15 Aug 2026
Revised 13 Sep 2026
Accepted 01 Oct 2026

Natural Resources for Human Health 2026, Vol. 6 (23s): 1196–1208

KEYWORDS:
Policy compliance; technical competence; work quality; firm performance; maritime safety; maritime operations.

How Policy Compliance and Technical Competence Drive Firm Performance: The Mediating Role of Work Quality in Maritime Operations

Irwan Bahrudin[1], Syaiful Arifin[2], Harmono[3], Bambang Supriadi[4]

[1,2,3,4]Universitas Merdeka Malang, Indonesia

ABSTRACT: The shipping industry faces increasing demands for regulatory compliance, operational reliability, safety, and organizational efficiency. This study examines the relationships between Policy Compliance, Technical Competence, and perceived Firm Performance, with Work Quality as a mediating variable. A quantitative explanatory approach using a cross-sectional survey was conducted among 150 operational personnel at PT Meratus Line Surabaya, comprising 105 shipboard and 45 shore-based personnel selected through census sampling. Data were collected using structured questionnaires and analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4. The findings revealed positive and significant relationships between Policy Compliance, Technical Competence, Work Quality, and perceived Firm Performance. Work Quality significantly mediated the relationship between Policy Compliance and perceived Firm Performance ($\beta = 0.134$; $p = 0.004$) and between Technical Competence and perceived Firm Performance ($\beta = 0.201$; $p = 0.001$), indicating complementary partial mediation. The model explained 69.9% of the variance in Work Quality and 72.0% of the variance in perceived Firm Performance. These findings highlight Work Quality as an important operational mechanism linking regulatory compliance and technical capabilities with perceived organizational performance. The study emphasizes integrating policy implementation, competency development, and work quality monitoring to support effective maritime operations.

1. INTRODUCTION

Maritime transportation plays a strategic role in supporting international trade and the sustainability of global supply chains. Shipping company performance is determined not only by cost efficiency and productivity, but also by operational reliability, schedule adherence, safety, and service quality. Previous studies have examined performance dynamics in the hospitality and tourism sectors (Supriadi, 2025) and safety-related considerations in tourism decision-making (Sunardi et al., 2026), providing broader service-sector perspectives. Maritime operations require coordination between technical systems, organizational procedures, and personnel capabilities. Xu et al. (2023) emphasize the importance of safety risk management in maritime transportation, while Hsieh et al. (2024) highlight the relevance of human-centered approaches to maritime safety.

In line with the Sociotechnical Systems Theory perspective (Trist & Bamforth, 1951), operational effectiveness needs to be understood through the interrelationships between work arrangements, human capabilities, and technical systems. Therefore, understanding organizational factors related to firm performance is crucial, particularly in the shipping environment, which has high regulatory demands and operational risks.

Policy compliance is a crucial aspect of shipping company operational governance. Compliance with regulations, standard operating procedures (SOPs), audits, and reporting obligations is essential to support consistent work execution and risk control. Lai et al. (2013) demonstrated that managing environmental compliance in the shipping industry is linked to company

performance. However, policy compliance cannot be viewed solely as fulfilling administrative requirements, as its implementation is linked to daily operational activities.

From an Institutional Theory perspective, rules and standards form the framework for organizational behavior, but their operational benefits depend on how these provisions are implemented in work practices. Therefore, the relationship between Policy Compliance and Firm Performance needs to be examined not only through its direct influence but also through the quality of the resulting work.

In addition to policy compliance, technical competence is a crucial resource for shipping companies in navigating the complexities of technical work. Personnel competence encompasses the ability to perform tasks, diagnose problems, operate systems, and coordinate within a dynamic work environment. Fan and Yang (2023) emphasize the importance of seafarer competence in the evolving human-machine interaction system, while Ghosh and Emad (2025) identify the challenges of developing a competency framework for the needs of future seafarers.

From a Resource-Based View perspective, technical competence can be understood as an internal resource that supports an organization's ability to carry out operational activities effectively. However, possessing competence does not automatically result in improved organizational performance if that ability is not translated into accurate, timely, and coordinated work execution. Therefore, an explanation of the mechanisms linking Technical Competence to Firm Performance is necessary.

Previous research has provided an empirical basis for the relationship between compliance, competence, quality, and organizational performance, but using different conceptual focuses and mechanisms. Lai et al. (2013) examined environmental compliance and shipping company performance, while Nong et al. (2024) analyzed competence and job-competence fit in explaining performance in logistics companies through mechanisms involving employee performance and job satisfaction. Meanwhile, Jum'a and Mansour (2023) demonstrated that service quality acts as a mediator in the relationship between total quality management practices and the financial performance of container shipping companies.

These findings demonstrate that the mediation approach has been used in logistics and maritime research. However, service quality, which focuses on service assessment, is conceptually distinct from work quality, which emphasizes accuracy, thoroughness, timeliness, error control, and coordination in task execution. This distinction suggests the need for a more specific examination of work quality mechanisms.

Based on the development of this literature, the analytical gap in this research lies in the inadequate integrated explanation of how Policy Compliance and Technical Competence relate to Firm Performance through Work Quality within a single maritime operational framework. Compliance studies emphasize compliance with regulations, while competency studies highlight personnel capabilities, and quality studies focus more on service quality or organizational outcomes. Consequently, the role of Work Quality as a connecting mechanism between procedural aspects, human capabilities, and firm performance has not received adequate explanation in the reviewed literature.

This gap is important because adherence to procedures and mastery of technical skills are distinct conditions from the actual quality of work performance. Therefore, examining work quality as a mediating variable allows research to explain the direct and indirect relationships between these two factors and firm performance without assuming that work quality is the sole mechanism at play.

Based on these gaps, this study aims to analyze the influence of Policy Compliance and Technical Competence on Firm Performance, both directly and through Work Quality as a mediating variable, on operational personnel at PT Meratus Line Surabaya. The study uses Sociotechnical Systems Theory as the main foundation to explain the relationship between procedural aspects and human capabilities with the quality of work implementation and organizational outcomes. Institutional Theory supports the explanation of the role of compliance with organizational regulations, while the Resource-Based View provides a conceptual basis for the importance of technical competence as an internal resource.

The theoretical contribution of this research lies in testing an integrated model that positions Work Quality as a shared operational mechanism for the relationship between Policy Compliance and Technical Competence and Firm Performance. Practically, this research is expected to provide an understanding of the importance of aligning policy compliance, competency development, and improving work quality in shipping operational management. Firm Performance is measured based on

respondents' perceptions of company performance, so the resulting relationship is interpreted according to the limitations of the cross-sectional research design.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

2.1 Theoretical Foundation

This study adopts Sociotechnical Systems Theory (STS) as its primary theoretical foundation to explain the relationships among Policy Compliance, Technical Competence, Work Quality, and Firm Performance. STS emphasizes that organizational effectiveness depends on the alignment between social and technical subsystems, including personnel capabilities, organizational procedures, and operational processes (Trist & Bamforth, 1951). In maritime operations, this alignment is essential for maintaining operational reliability, safety, and organizational performance (Fan & Yang, 2023; Hsieh et al., 2024).

Institutional Theory explains how formal regulations and organizational standards shape operational practices (Scott, 2014). Accordingly, Policy Compliance refers to adherence to regulations, standard operating procedures (SOPs), audits, and reporting requirements that promote consistency and reduce operational deviations (Lai et al., 2013). Meanwhile, the Resource-Based View (RBV) positions Technical Competence as an internal organizational resource comprising technical knowledge, diagnostic skills, problem-solving abilities, and operational coordination capabilities (Barney, 1991; Ghosh & Emad, 2025). Thus, Policy Compliance emphasizes adherence to established requirements, whereas Technical Competence reflects personnel capabilities to perform operational tasks effectively.

Work Quality is conceptually distinct from these two constructs because it reflects the quality of actual task execution, including accuracy, precision, timeliness, error minimization, and coordination. While Policy Compliance establishes procedural standards and Technical Competence provides the capabilities required to perform tasks, Work Quality represents how effectively these elements are translated into operational practices. From a sociotechnical perspective, compliance and competence are expected to improve Work Quality, which subsequently supports Firm Performance through greater operational reliability, efficiency, productivity, and safety (Kuo & Chen, 2021; Jum'a & Mansour, 2023).

Integrating STS, Institutional Theory, and RBV provides a theoretical basis for examining both direct and indirect relationships among the constructs. Specifically, Work Quality is proposed as an operational mediating mechanism linking Policy Compliance and Technical Competence to Firm Performance. The theoretical contribution of this study lies in examining these relationships within an integrated maritime operational framework, while recognizing that Firm Performance reflects employees' perceptions of organizational outcomes rather than independently measured company-level performance.

2.2 Policy Compliance, Firm Performance, and Work Quality

Policy Compliance reflects the consistent application of standard operating procedures (SOPs), regulations, reporting obligations, and audit mechanisms in organizational activities. In the maritime industry, compliance is necessary to control risk, reduce procedural deviations, and maintain operational reliability. Knapp and Franses (2023) examine the effectiveness of regulatory frameworks in relation to maritime safety and environmental outcomes, while Wang et al. (2026) discuss corporate compliance with evolving marine environmental regulations. Kalubanga and Mbekeka (2024) also demonstrate the relevance of compliance with government and corporate policies for reverse logistics practices and organizational environmental performance. Although these studies use different performance measures, their findings provide a basis for understanding compliance as a factor related to organizational outcomes. Based on Institutional Theory, consistent implementation of formal provisions is expected to strengthen process order and reduce operational uncertainty, potentially improving firm performance.

H1: Policy Compliance has a positive effect on Firm Performance.

In addition to its relationship to Firm Performance, Policy Compliance is expected to improve Work Quality through consistent application of work standards. SOPs, regulations, reporting, and audits provide guidelines for personnel to maintain accuracy, thoroughness, and coordination in task execution. Kalubanga and Mbekeka (2024) provide evidence that operational practices can be linked to the implementation of organizational policies, while Kuo and Chen (2021) demonstrate the relevance of integrating social and technical aspects in shipping operational practices. Knapp and Franses (2023) also provide context regarding the importance of regulatory frameworks for managing maritime activities. Although these studies do not directly measure Work Quality, the literature supports the argument that formal rules need to be translated into consistent work

practices. From a sociotechnical perspective, the alignment between organizational procedures and task execution is expected to improve work quality by reducing errors and operational deviations.

H3: Policy Compliance has a positive effect on Work Quality.

2.3 Technical Competence, Firm Performance, and Work Quality

Technical Competence encompasses mastery of technical procedures, coordination skills, diagnostic skills, and the ability to solve operational problems. Based on the RBV, competency is an internal resource that has the potential to create value when applied effectively. In the shipping industry, technical competency enables personnel to identify disruptions, determine corrective actions, and maintain operational continuity. Pekdas et al. (2024) emphasize the importance of evaluating maritime professional competency, while Lehtimäki and Teperi (2026) develop behavioral indicators to assess crew competency. Barasa et al. (2025) demonstrate a positive relationship between personnel competency and safety climate in Indonesian shipping companies, while Veltsin et al. (2025) identify the importance of human factors in maritime safety management. Although these studies do not directly examine Firm Performance, the literature demonstrates the relevance of competency in operational systems that demand reliability and safety. Therefore, Technical Competence is expected to positively influence Firm Performance through personnel's ability to maintain operational effectiveness.

H2: Technical Competence has a positive effect on Firm Performance.

Technical Competence is also expected to improve Work Quality because personnel abilities determine the accuracy of procedure implementation and the effectiveness of task completion. Workers who master technical and diagnostic skills are expected to be better able to identify errors, resolve disruptions, and maintain work timeliness. Lehtimäki and Teperi (2025) discuss the importance of human factors support for crew performance, while Dimitrakiev and Milev (2025) examine the factors that influence personnel performance on board. Pekdas et al. (2024) and Lehtimäki and Teperi (2026) also emphasize the importance of competency assessments that reflect the demands of maritime work. From the perspective of Sociotechnical Systems Theory, the match between human capabilities and operational system requirements is the basis for quality work execution. Thus, Technical Competence is expected to improve Work Quality through skill application, accurate decision-making, and operational problem-solving.

H4: Technical Competence has a positive effect on Work Quality.

2.4 Work Quality and Firm Performance

Work Quality reflects the accuracy of task execution, precision, timeliness, error control, and work coordination. In maritime operations, good work quality has the potential to reduce rework, delays, and process disruptions, thus supporting productivity, cost efficiency, safety, and company reliability. Thai and Jie (2018) examined the relationship between total quality management practices and supply chain integration and Firm Performance in a container shipping company. Charlampowicz (2025) discussed the role of customer knowledge in improving service quality at container terminals, while Hu et al. (2023) analyzed the efficiency of a maritime transportation company. Mouschoutzi and Ponis' (2022) study on maritime spare parts logistics management also provides context for the importance of asset reliability and operational processes. Although Work Quality is conceptually distinct from service quality, quality management practices, and company efficiency, these studies provide a basis for understanding the relevance of process quality to organizational outcomes. From a sociotechnical perspective, Work Quality represents the quality of interactions between personnel, procedures, and work systems that are expected to support the achievement of Firm Performance.

H5: Work Quality has a positive effect on Firm Performance.

2.5 The Mediating Role of Work Quality

Policy Compliance is thought to be related to Firm Performance through Work Quality because the benefits of compliance depend not only on the existence of rules but also on the quality of their implementation in the workplace. Institutional Theory explains how regulatory demands shape organizational practices, while Sociotechnical Systems Theory provides a basis for understanding how formal procedures are implemented through interactions between people and operational systems (Zucker, 1987; Kuo & Chen, 2021). Kalubanga and Mbekeka (2024) examined the relationship between policy compliance and environmental performance through reverse logistics practices, providing an empirical example of the relevance of process

mechanisms in the relationship between compliance and organizational outcomes. Knapp and Franses (2023) also emphasized the importance of an effective regulatory framework in managing maritime activities. Based on these arguments, consistent implementation of SOPs, regulations, reporting, and audits is expected to improve Work Quality, which in turn supports Firm Performance by reducing errors and increasing process reliability. Therefore, Work Quality is positioned as a mediator linking Policy Compliance and Firm Performance.

H6: Work Quality positively mediates the relationship between Policy Compliance and Firm Performance.

Technical Competence is also thought to be related to Firm Performance through Work Quality. According to the RBV, competency is an internal resource that has the potential to generate organizational value, but its benefits depend on the application of these capabilities in operational activities. The sociotechnical perspective explains that technical knowledge and skills need to be aligned with procedures and work system requirements to produce high-quality task execution (Kuo & Chen, 2021). Barasa et al. (2025) demonstrated the relevance of personnel competency to safety climate, while Lehtimäki and Teperi (2025, 2026) emphasized the importance of human factors and behavioral indicators of competence in crew activities. Veltsin et al. (2025) also identified the role of various human factors in maritime safety systems. Although these studies did not directly test the mediation of Work Quality, overall, they provide a conceptual basis that personnel capabilities need to be realized in effective work execution. Thus, Work Quality is thought to be a mechanism linking Technical Competence to Firm Performance through task execution accuracy, error control, and operational coordination.

H7: Work Quality positively mediates the relationship between Technical Competence and Firm Performance.

Based on the theoretical basis and development of the hypothesis, the conceptual framework of the research is presented in Figure 1.

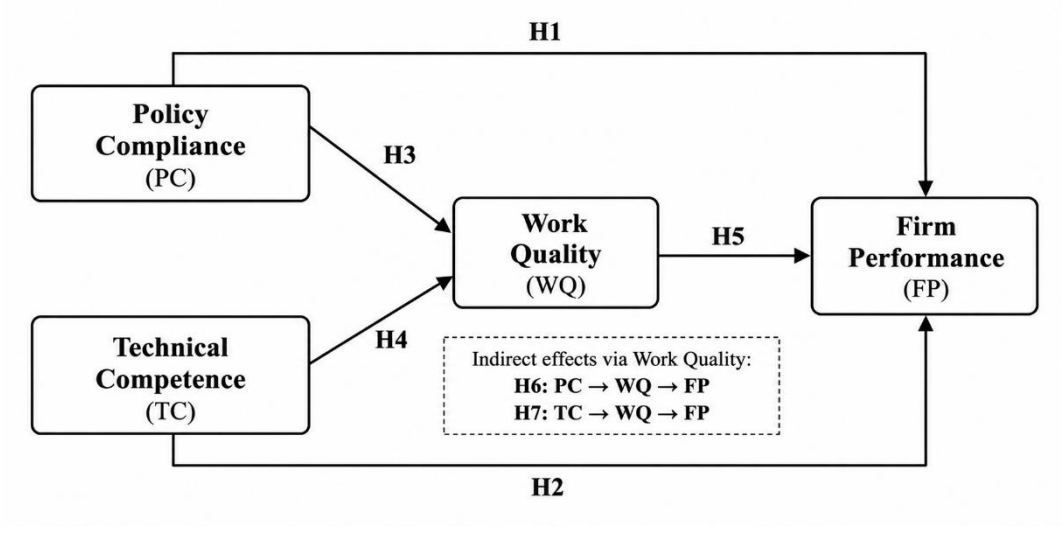


Figure 1. Conceptual Framework

3. MATERIALS AND METHODS

3.1 Research Design

This study uses a quantitative approach with an explanatory research design to examine the relationship between Policy Compliance, Technical Competence, Work Quality, and Firm Performance at PT Meratus Line Surabaya. Data collection was conducted through a cross-sectional survey, which measures all variables over a single observation period. This design is used to examine direct and indirect relationships developed based on the research's theoretical framework. The research context includes ship operational activities as well as land-based operational and technical functions, which require the application of regulations, mastery of competencies, and consistent work quality.

3.2 Population and Sample

The study population comprised 150 operational personnel of PT Meratus Line Surabaya who were directly involved in maritime operations, regulatory compliance, and technical activities. The population consisted of 105 shipboard personnel (70%), including deck officers and engine crew from seven ships, and 45 shore-based personnel (30%), comprising managerial and operational staff. A census sampling technique was employed because all 150 members of the defined target population were included in the study. All questionnaires were completed and considered valid for analysis, resulting in a 100% response rate.

Both shipboard and shore-based personnel were included to capture perspectives from different operational functions within the same organization. Their responses were analyzed collectively to examine the proposed relationships among Policy Compliance, Technical Competence, Work Quality, and Firm Performance. Consequently, the findings represent the combined perceptions of the two personnel groups rather than separate group-specific effects. Although the census approach ensured complete coverage of the defined population, the generalizability of the findings remains limited to the organizational context of PT Meratus Line Surabaya.

3.3 Research Instruments and Measurement

The research instrument was adapted from previous studies and maritime operational standards to the context of PT Meratus Line Surabaya. The questionnaire comprised 44 items measuring four constructs: Policy Compliance (8 items), Technical Competence (8 items), Work Quality (12 items), and Firm Performance (16 items). All items were measured using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Policy Compliance assessed regulatory and procedural adherence, while Technical Competence measured technical skills and operational capabilities. Work Quality evaluated task accuracy, timeliness, error minimization, and coordination. Firm Performance was operationalized as employees' perceptions of organizational performance, encompassing operational availability, reliability, cost efficiency, productivity, safety, and customer satisfaction, rather than independently verified company-level performance indicators. The measurement dimensions and supporting references are presented in Table 1, while reliability and validity assessment procedures are described in Section 3.5.

Table 1. Measurement Constructs and Research Instruments

Construct	Measurement Dimensions	Items	Sources
Policy Compliance	Regulatory compliance; SOP compliance; compliance audits; reporting compliance	8	Bendez & Bacheler (2024); IMO (2024)
Technical Competence	Technical skills; diagnostic ability; communication and coordination; work procedure implementation	8	Ghosh et al. (2024); Shi et al. (2024)
Work Quality	SOP execution accuracy; work precision; timeliness; error minimization; effective coordination	12	Dahl et al. (2009); Koopmans et al. (2014)
Firm Performance	Operational availability; MTBF; MTTR; schedule reliability; cost efficiency; productivity; safety; customer satisfaction	16	Wall et al. (2004); Gong et al. (2019)
Total	**21 dimensions**	**44**	

Note: *Firm Performance was measured using respondents' perceptions.*

3.4 Data Collection Procedure

Primary data was collected through the distribution of structured questionnaires to respondents who met the research criteria through organizational channels. Respondents were provided with an explanation of the research objectives, while anonymity of responses was maintained to support open assessments of policy implementation, technical competence, work quality, and company performance. All responses that met the data processing requirements were used as the basis for quantitative analysis.

3.5 Data Analysis

Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4. The measurement model was evaluated using outer loadings, Cronbach's alpha, composite reliability (CR), average variance extracted (AVE), the Fornell–Larcker criterion, and the heterotrait–monotrait ratio (HTMT). The structural model was assessed using variance inflation factors (VIF), coefficients of determination (R^2), effect sizes (f^2), and path coefficients. Bootstrapping with 5,000 subsamples was performed to examine the significance of direct and indirect effects using t-statistics, p-values, and 95% confidence intervals. Mediation was assessed through specific indirect effects, with complementary partial mediation identified when both direct and indirect effects were statistically significant and had the same direction. The explanatory power of the model was evaluated using R^2 values for Work Quality and Firm Performance.

4. RESULTS AND DISCUSSION

4.1 Respondent Profile

This study involved 150 respondents from PT Meratus Line Surabaya who worked in both ship and land-based operations. The respondents were predominantly male (96%), with 4% being female. Based on length of service, 33% had more than ten years of experience, 30% less than two years, 23% two to five years, and 14% six to ten years.

4.2 Measurement Model Assessment

The measurement model evaluation results showed that all constructs met the criteria for internal reliability and convergent validity. Outer loadings ranged from 0.804 to 0.919, composite reliability (CR) from 0.919 to 0.949, Cronbach's alpha from 0.883 to 0.939, and average variance extracted (AVE) from 0.700 to 0.779. These results indicate that the indicators have an adequate contribution in measuring their respective constructs. A summary of the evaluation results is presented in Table 2.

Table 2. Measurement Model Assessment

Construct	Outer Loading	AVE	CR	Cronbach's α
Policy Compliance	0.856–0.904	0.779	0.934	0.905
Technical Competence	0.820–0.888	0.740	0.919	0.883
Work Quality	0.814–0.919	0.777	0.946	0.928
Firm Performance	0.804–0.876	0.700	0.949	0.939

Discriminant validity was evaluated using the Fornell–Larcker criterion and the heterotrait–monotrait ratio (HTMT). The Fornell–Larcker results showed that the square root of the AVE of each construct was higher than its correlation with other constructs. All HTMT estimates were also below the 0.90 threshold, with a range of 0.816–0.880. However, examination of the two-sided 95% bias-corrected confidence intervals showed that five of the six construct pairs had upper bounds of the intervals exceeding 0.90, particularly Technical Competence–Work Quality (0.941) and Work Quality–Firm Performance (0.917). Although all intervals did not include the value 1, these results indicate that the evidence for discriminant validity based on point estimates and examination of confidence intervals against the 0.90 threshold is not entirely consistent. Therefore, discriminant validity is considered to have limitations that need to be considered in interpreting structural relationships. The complete results are presented in Table 3.

Table 3. Discriminant Validity Assessment

Panel A. Fornell–Larcker Criterion				
Construct	**PC**	**TC**	**WQ**	**FP**
Policy Compliance	0.883	—	—	—
Technical Competence	0.739	0.860	—	—
Work Quality	0.754	0.801	0.881	—
Firm Performance	0.759	0.776	0.800	0.837
Panel B. Heterotrait–Monotrait Ratio (HTMT)				
Construct	**PC**	**TC**	**WQ**	**FP**
Policy Compliance	—	—	—	—

Technical Competence	0.823	—	—	—
Work Quality	0.820	0.880	—	—
Firm Performance	0.816	0.847	0.856	—
Panel C. HTMT Bias-Corrected Confidence Intervals (95%)				
Construct Pair	**HTMT**	**Lower 2.5%**	**Upper 97.5%**	
PC–TC	0.823	0.692	0.908	
PC–WQ	0.820	0.693	0.901	
TC–WQ	0.880	0.800	0.941	
PC–FP	0.816	0.716	0.888	
TC–FP	0.847	0.754	0.910	
WQ–FP	0.856	0.776	0.917	

Note: Diagonal values in Panel A represent the square roots of AVE. PC = Policy Compliance; TC = Technical Competence; WQ = Work Quality; FP = Firm Performance.

4.3 Structural Model Assessment

The structural model assessment showed that all variance inflation factor (VIF) values were below 5, indicating no critical multicollinearity concerns. The model explained 69.9% of the variance in Work Quality ($R^2 = 0.699$) and 72.0% of the variance in perceived Firm Performance ($R^2 = 0.720$), demonstrating substantial explanatory power within the study context. The remaining variance was attributable to factors not captured by the model. Technical Competence exhibited the largest effect size on Work Quality ($f^2 = 0.436$), highlighting its relative contribution to the model's explanatory capacity (Table 4).

Table 4. Structural Model Assessment

Endogenous Construct	Predictor	VIF	f^2
Work Quality	Policy Compliance	2.203	0.193
Work Quality	Technical Competence	2.203	0.436
Firm Performance	Policy Compliance	2.627	0.103
Firm Performance	Technical Competence	3.163	0.084
Firm Performance	Work Quality	3.327	0.149

Note: R^2 for Work Quality = 0.699; R^2 for Firm Performance = 0.720.

4.4 Direct Effects and Hypothesis Testing

Bootstrapping results show that all direct relationships have positive and statistically significant coefficients. Technical Competence has the largest path coefficient on Work Quality, while the direct coefficients of Policy Compliance and Technical Competence on Firm Performance are relatively comparable. All 95% bootstrap confidence intervals do not include zero, thus supporting H1–H5 (Table 5).

Table 5. Direct Effects and Hypothesis Testing

Hypothesis	Relationship	β	t-value	p-value	95% CI	Decision
H1	PC → FP	0.273	3.249	0.001	[0.107, 0.426]	Supported
H2	TC → FP	0.274	2.870	0.004	[0.083, 0.457]	Supported
H3	PC → WQ	0.358	4.097	<0.001	[0.194, 0.531]	Supported
H4	TC → WQ	0.536	6.430	<0.001	[0.370, 0.702]	Supported
H5	WQ → FP	0.375	4.248	<0.001	[0.213, 0.536]	Supported

4.5 Indirect Effects and Mediation Analysis

Bootstrapping with 5,000 subsamples confirmed that Work Quality significantly mediated the relationships between Policy Compliance and Firm Performance ($\beta = 0.134$; $t = 2.874$; $p = 0.004$; 95% CI [0.062, 0.242]) and between Technical Competence and Firm Performance ($\beta = 0.201$; $t = 3.401$; $p = 0.001$; 95% CI [0.107, 0.333]). Both confidence intervals excluded zero, confirming significant indirect effects. Since the corresponding direct effects were also positive and significant, both

relationships demonstrated complementary partial mediation, supporting H6 and H7. The indirect effect of Technical Competence was numerically greater than that of Policy Compliance, although the statistical significance of this difference was not tested (Table 6).

Table 6. Indirect Effects and Mediation Analysis

Hypothesis	Mediation Path	Indirect β	t-value	p-value	95% CI	Decision
H6	PC → WQ → FP	0.134	2.874	0.004	[0.062, 0.242]	Supported
H7	TC → WQ → FP	0.201	3.401	0.001	[0.107, 0.333]	Supported

Note: β = original sample coefficient; CI = 95% bootstrap confidence interval. Statistical significance is assessed at $p < 0.05$.

4.6 Discussion

4.6.1 Policy Compliance and Firm Performance

The results of the study indicate that Policy Compliance has a positive effect on Firm Performance, indicating that compliance with regulations and internal policies is related to the operational effectiveness of shipping companies. Compliance enables organizations to maintain procedural consistency, strengthen risk control, and reduce uncertainty in carrying out work. This finding is relevant to Knapp and Franses (2023), who examined the effectiveness of the maritime regulatory framework, and Kalubanga and Mbekeka (2024), who demonstrated the link between policy compliance and organizational environmental performance. Wang et al. (2026) also highlighted the importance of maritime companies' compliance with evolving environmental regulations. Although these studies used different contexts and performance measures, the results provide a foundation for understanding compliance as part of organizational management. From an Institutional Theory perspective, the findings of this study demonstrate that Policy Compliance is related to Firm Performance when regulatory demands are translated into consistent operational practices, rather than simply fulfilling administrative obligations.

4.6.2 Technical Competence and Firm Performance

Technical Competence has been shown to have a positive effect on Firm Performance, indicating that personnel technical capabilities are related to the achievement of shipping company operational results. Competence enables workers to implement procedures, operate equipment, identify disruptions, and complete tasks according to operational requirements. This finding is supported by contextual evidence from Barasa et al. (2025), who found a positive relationship between crew competence and safety climate in Indonesian shipping companies. Pekdas et al. (2024) emphasize the importance of evaluating maritime professional competence, while Lehtimäki and Teperi (2026) developed a competency assessment approach through crew behavioral indicators. Although these studies did not directly examine Firm Performance, they overall demonstrate the relevance of personnel capabilities in maritime operational systems. Based on the Resource-Based View, these results reinforce the understanding that Technical Competence is an internal resource related to Firm Performance through its application in organizational activities.

4.6.3 Policy Compliance and Technical Competence as Determinants of Work Quality

The results of the study indicate that Policy Compliance and Technical Competence have a positive effect on Work Quality, with a stronger relationship between Technical Competence and Work Quality. This finding indicates that the quality of work execution is related to both compliance with standards and the ability of personnel to implement those standards. Policy Compliance provides guidelines that support consistency and control of work, while Technical Competence enables accurate and effective task execution. Barasa et al. (2025) demonstrated the importance of competence and training in shaping the safety climate in Indonesian shipping companies, while Pekdas et al. (2024) emphasized the need for evaluating the competence of maritime professionals. Although safety climate and Work Quality are distinct constructs, these studies provide contextual support for the importance of human capabilities in operational environments that demand precision and adherence to procedures.

From the perspective of Sociotechnical Systems Theory, Work Quality is related to the interaction between human capabilities, organizational procedures, and technical systems. A stronger relationship between Technical Competence and the ability to apply knowledge and skills is strongly associated with work quality in this research model. This finding is relevant to Lehtimäki and Teperi (2025), who discussed human factors in supporting crew performance, and Dimitrakiev and Milev (2025), who

examined factors influencing personnel performance on board. Kuo and Chen (2021) also provide a conceptual foundation for the application of Sociotechnical Systems Theory in the operational practices of container shipping companies. Therefore, this study expands on this discussion by simultaneously examining Policy Compliance and Technical Competence as factors related to Work Quality. Both variables have different but complementary functions in explaining the quality of work execution.

4.6.4 Work Quality and Firm Performance

The positive influence of Work Quality on Firm Performance indicates that the quality of work execution is a relevant operational aspect in explaining shipping company performance. Accuracy of task execution, process reliability, work consistency, and error control are related to an organization's ability to maintain smooth operational activities. This finding is conceptually related to Charlampowicz (2025), who identified the importance of quality human resources, professional behavior, and customer knowledge in improving service quality at container terminals. Thai and Jie (2018) also demonstrated the relevance of quality management practices and supply chain integration to Firm Performance in container shipping companies. However, service quality and quality management practices are not identical to Work Quality as measured in this study. Therefore, the contribution of this study lies in examining Work Quality as the quality of work execution that is directly related to Firm Performance based on respondents' perceptions, thus complementing the literature that emphasizes service quality and process management at the organizational level.

4.6.5 The Mediating Role of Work Quality

The main finding of this study is that Work Quality significantly mediates the relationship between Policy Compliance and Technical Competence with Firm Performance through a complementary partial mediation pattern. These results indicate that both variables have a direct relationship with Firm Performance as well as an indirect relationship through Work Quality. Conceptually, Policy Compliance provides a procedural framework that guides operational activities, while Technical Competence enables personnel to apply knowledge and skills to produce quality work. This explanation relates to Kalubanga and Mbekeka (2024), who examined policy compliance, reverse logistics practices, and environmental performance, and Barasa et al. (2025), who demonstrated the relevance of competency to safety climate. Although the two studies did not test identical mediation models, their findings provide context regarding the importance of operational practices and human capabilities in the relationship between organizational factors and work outcomes.

The indirect effect of Technical Competence through Work Quality is numerically greater than that of Policy Compliance. This difference suggests a tendency for Work Quality to be a relatively stronger connecting pathway for technical competence in this research model, but cannot be stated as a statistically significant difference without specific testing. This finding can be understood through the studies of Lehtimäki and Teperi (2026) on crew competence and Veltsin et al. (2025) on human factors in maritime safety. The main contribution of this research lies in the integrated examination of the relationship between Policy Compliance and Technical Competence with Firm Performance through Work Quality. By placing the quality of work execution as a mediator, this study complements the literature discussing regulatory compliance, human competence, and operational outcomes through a different analytical focus. Work Quality thus provides an explanation of the process mechanism linking regulatory factors and human capabilities with Firm Performance in the context of shipping companies.

4.7 Theoretical and Practical Implications

Theoretically, this study extends the understanding of how Policy Compliance and Technical Competence are associated with Firm Performance through Work Quality. Drawing on Institutional Theory, the Resource-Based View, and Sociotechnical Systems Theory, the findings position Work Quality as an operational mechanism linking regulatory adherence and personnel capabilities with perceived organizational performance. The complementary partial mediation findings suggest that procedural compliance and technical competence are associated with Firm Performance both directly and indirectly through the quality of work execution.

Practically, shipping companies should integrate regulatory compliance, technical competency development, and systematic work quality monitoring. Management can strengthen standardized operating procedures, conduct periodic competency assessments, provide continuous technical training, and monitor task accuracy, timeliness, error rates, and operational coordination. These measures can help translate regulatory requirements and personnel capabilities into consistent work practices, potentially supporting operational reliability, efficiency, safety, and perceived Firm Performance. Such recommendations should be implemented and evaluated using objective operational indicators to establish their effectiveness.

4.8 Limitations and Future Research

This study has several limitations. First, the research was conducted within a single shipping company, limiting the generalizability of the findings to other maritime organizations. Second, the cross-sectional design restricts causal interpretation, while the use of self-reported questionnaire data from the same respondents, including perceived Firm Performance, may introduce common method bias. Third, although all HTMT point estimates were below 0.90, the upper bounds of the 95% bias-corrected confidence intervals exceeded 0.90 for five of the six construct pairs, indicating that discriminant validity requires further examination. Future studies should involve multiple shipping companies, adopt longitudinal research designs, incorporate objective operational performance indicators, and refine measurement instruments to strengthen discriminant validity and the robustness of the findings.

5. CONCLUSION

This study concludes that Policy Compliance and Technical Competence are positively and significantly associated with perceived Firm Performance, both directly and indirectly through Work Quality at PT Meratus Line Surabaya. Work Quality demonstrates complementary partial mediation, indicating that the quality of work execution represents an important mechanism linking regulatory compliance and technical capabilities with perceived organizational performance. These findings highlight the importance of translating procedural adherence and technical competence into accurate, timely, and coordinated work practices.

The main contribution of this study lies in integrating regulatory, human resource, and operational perspectives through the mediating role of Work Quality in maritime operations. Practically, the findings suggest that shipping companies should strengthen SOP implementation, technical competency development, and work quality monitoring. However, the findings should be interpreted within the limitations of a single-company, cross-sectional survey using perceptual measures of Firm Performance.

ACKNOWLEDGEMENTS

The authors express their gratitude to the Ministry of Higher Education, Science, and Technology of the Republic of Indonesia for the financial support provided through a research grant. The authors also extend their sincere appreciation to Universitas Merdeka Malang for its institutional support.

AUTHOR CONTRIBUTIONS

Irwan Bahrudin: Conceptualization, Methodology, Investigation, Data Curation, Formal Analysis, Writing—Original Draft.

Syaiful Arifin: Conceptualization, Methodology, Validation, Supervision, Writing—Review & Editing.

Harmono: Supervision, Validation, Resources, Project Administration, Writing—Review & Editing.

Bambang Supriadi: Supervision, Validation, Writing—Review & Editing.

All authors have read and approved the final version of the manuscript.

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