

The Effect of Communication, Compliance, and Work Discipline on Performance: Moderating Role of Work Ethic

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Abstract: The performance of pilotage services is commonly assessed based on systematic service-time indicators. However, achieving the prescribed service time does not necessarily indicate the absence of operational issues related to pilot work behaviour. The present study complements the existing literature by extending the assessment to behavioural factors, including communication, compliance, and work discipline. Furthermore, work ethic is believed to moderate the relationship between these work behaviour factors and performance. Therefore, this study aims to examine the effects of communication, compliance, work discipline, and work ethic on pilot performance, as well as the moderating role of work ethic in these relationships. Pilot performance is assessed using external perceptions, responses from 177 masters of vessels collected through an online questionnaire. This study employs a quantitative method and utilizes PLS-SEM. The findings of this study indicated that communication and compliance do not significantly affect performance. Meanwhile, work discipline and work ethic significantly affect performance. Furthermore, work ethic does not significantly moderate the effect of communication and compliance on performance but significantly moderates the effect of work discipline on performance.

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INTRODUCTION

Pilotage service performance is commonly evaluated based on approach time, which is systematically measured. However, evidence suggests that, despite achieving those standards, work-related behavioural issues persist and may affect the performance of the pilotage service as a whole. Such issues may include poor coordination, ineffective communication, insufficient attention to the vessel's operational needs, and delayed boarding beyond the prescribed schedule. According to the pilotage-related information presented in the annual report of the port authority office (KSOP) of Belawan (Kantor Kesyahbandaran dan Otoritas Pelabuhan Utama Belawan, 2024), pilotage performance is primarily evaluated using approach time and also reports several operational constraints involving pilots. Furthermore, based on investigation reports published by the National Transportation Safety Committee (Komite Nasional Keselamatan Transportasi [KNKT]), several maritime accidents occurred at various ports in which pilot-related issues were identified as contributing factors, either directly or indirectly (Komite Nasional Keselamatan Transportasi [KNKT], 2023). These findings highlight the importance of



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pilots' work behaviours as an aspect of pilots' performance. Therefore, the present study complements the existing literature on the human resource management perspective by examining how work-related behaviours affect pilots' performance.

In this study, pilots' performance is evaluated based on the perceptions of masters of vessels, who are the direct users of pilotage services. Oraith et al. (2021) and Demirci et al. (2022) involved masters in evaluating pilot performance by assessing technical skills, communication, coordination, teamwork, and compliance with navigation regulations. Previous research primarily focused on pilots' technical and communication competencies. However, the roles of compliance and work discipline have received limited empirical attention as determinants of pilot performance. This study extends the assessment to broader behavioural dimensions, including compliance with local pilotage procedures and maritime regulations, as well as work discipline in the proper use of operational equipment. Thus, this study aims to examine pilots' performance, particularly as influenced by communication, compliance, and work discipline. Furthermore, this study also assesses work ethic as a moderator of the relationship between these work behaviours and performance. In addition, although the moderating role of work ethic remains under-researched, to the best of the author's knowledge, limited empirical evidence has examined its moderating role in the relationship between communication and performance, and between compliance and performance. Studies evaluating pilot performance from the ship master's perspective in the context of Belawan Port remain limited. Therefore, this study contributes to the existing literature by providing additional empirical evidence on these relationships.

LITERATURE REVIEW

This study adopts an organizational behaviour perspective by examining how pilots' work behaviours, including communication, compliance, and work discipline, contribute to their performance. These behaviours are observable during pilotage operations. Meanwhile, work ethic reflects the moral values and attitudes that shape work behaviour. Work ethic may reinforce the relationship between work behaviours and pilots' performance by influencing how those behaviours are demonstrated and perceived by masters.

Communication in this study refers to the interpersonal communication that explains the exchange of information and meaning that facilitates mutual understanding, coordination, and cooperation among individuals in carrying out related activities. The effectiveness of this communication enables the minimization of misunderstanding and supports problem-solving, thereby contributing to improved performance. Some empirical studies have examined the effect of communication on employee performance. Studies by Ulfah Arini (2025), Gintings (2023), and Kalogiannidis (2020) consistently reported that communication significantly affects performance, whereas Ainani and Simon (2024), Prasetyo et al. (2023), and Marliza et al. (2022) found no significant relationship. Those inconsistent findings suggest further research.

Compliance refers to the extent to which employees adhere to organizational rules, procedures, and policies. It plays a fundamental role in protecting both individuals and the overall work system. Accordingly, this study conceptualizes compliance using safety behaviour dimensions that comprise adherence to regulations and procedures, active participation and initiatives, and concern for the work environment. Beyond preventing rules and safety violations, compliance fosters a positive safety culture, thereby supporting employee performance. Previous studies by Wibowo et al. (2026) and Cherubet et al. (2023) demonstrated that the relationship between compliance and employee performance is significant. In contrast, Febriyanti and Almasdi (2025) and

Rahman et al. (2024) failed to demonstrate that the relationship between both variables is significant. Therefore, further empirical study is needed to clarify the relationship in different organizational contexts.

Work discipline is influenced by several factors, including punctuality and the proper use of equipment Handoko (as cited in Asgaruddin, 2023). The implementation of work discipline plays an important role in achieving individual performance; good work discipline encourages employees to perform effectively, thereby contributing to employee performance. Following this conceptualization, several studies examined the effect of work discipline on employee performance. Herminingsih and Wiyoto (2025), Bastian et al. (2024), and Riyandi and Lo (2024) showed that work discipline has a significant effect on employee performance. However, Alifuddin et al. (2026), Diansyah and Juliani (2022), and Razak et al. (2024) revealed that work discipline has no significant effect on performance. Consequently, further related research needs to be conducted.

Work ethic is regarded as a cultural norm that encourages individuals to take personal responsibility and accountability for their work, based on the belief that work possesses intrinsic value. This study describes work ethic through several dimensions, including truthfulness, self-control, cooperation, responsibility, and safety (Aldulaimi, 2020). Those dimensions were selected because they comprehensively capture pilots' ethical work and can be readily observed. Previous studies have consistently shown that employees with a stronger work ethic tend to exhibit higher performance. Setyorini and Hwihanus (2024), Setiabudi et al. (2024), and Andansari and Mujanah (2024) indicated that work ethic significantly affects performance, while Nugroho et al. (2026), Damayanti et al. (2026), and Haryati et al. (2023) established that work ethic does not significantly affect performance. Given these varying results, subsequent studies should examine that relationship.

Performance is generally defined as the outcomes or achievements attained by individuals in carrying out their assigned responsibilities. In service organizations, employee performance appraisal plays a crucial role in improving individual and organizational performance. According to Panggabean (2021), performance information may be obtained from multiple sources, including supervisors, peers, self-assessment, subordinates, and customers. Customers are particularly valuable because they directly observe employees throughout the service delivery process and are therefore able to evaluate service-related work behaviours. In this study, pilots' performance is evaluated by masters of vessels as service recipients; the performance indicator should represent behaviours that are directly observable during pilotage service. The SERVPERF dimensions provide such observable aspects of service delivery and are therefore adapted to operationalize pilots' performance. Accordingly, pilots' performance is assessed through tangibles, reliability, responsiveness, assurance, and empathy.

Theoretically, work ethic may moderate the relationship between work behaviours and performance. Previous empirical studies showed different results in assessing the moderating effect of the relationship between work discipline and employee performance using work ethic as a moderator. Mustamu et al. (2026) and Sari and Saifuddin (2022) found that work ethic as a moderator significantly moderates the relationship between work discipline and employee performance, while Intanulqoir and Fitriyani (2025) and Husain et al. (2024) revealed that work ethic as a moderator does not significantly moderate this relationship. However, empirical evidence regarding the moderating role of work ethic in the relationship between communication and performance and also

between compliance and performance remains unavailable. By filling these unexplored relationships, the hypotheses are proposed.

The conceptual framework of this study is illustrated in Figure 1.

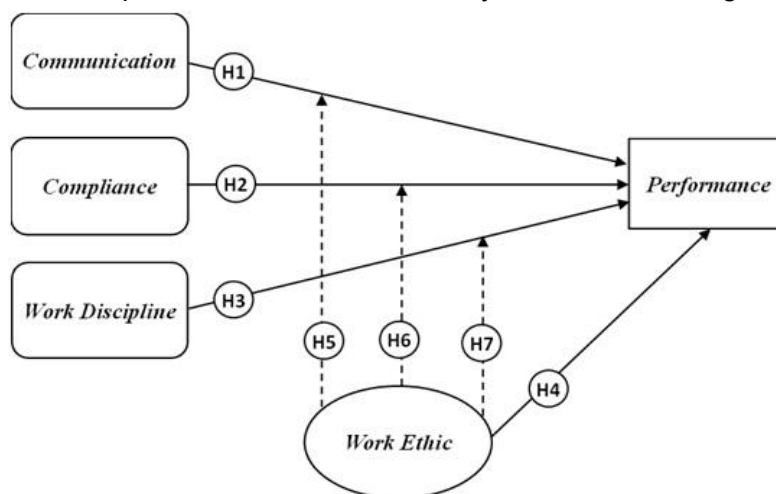


Figure 1. Conceptual Model

Source: Developed by the author (2026)

Based on the literature review and the conceptual framework shown in Figure 1, the following hypotheses are proposed to address the research objectives:

Hypothesis 1 (H1): Communication significantly affects performance.

Hypothesis 2 (H2): Compliance significantly affects performance.

Hypothesis 3 (H3): Work discipline significantly affects performance.

Hypothesis 4 (H4): Work ethic significantly affects performance

Hypothesis 5 (H5): Work ethic significantly moderates the effect of communication on performance.

Hypothesis 6 (H6): Work ethic significantly moderates the effect of compliance on performance

Hypothesis 7 (H7): Work ethic significantly moderates the effect of work discipline on performance

METHODS

The present study employed a quantitative research approach with a survey design. The research object was pilots' performance, and the research subjects, as respondents, were masters of vessels receiving pilotage services, who provided an external perspective on pilots' performance. The study was conducted at Port Belawan. The required minimum sample size was initially estimated using Slovin's formula with a 5% margin of error, resulting in 177 respondents. A total of 177 valid responses were obtained; this also satisfied the sample size recommendation in PLS-SEM by Hair et al. (2017), which requires at least 113 respondents for a model with four predictors, a statistical power of 80%, a significance level of 5%, and under the conservative assumption of detecting a minimum R^2 of 0,10. Data were collected using a structured online questionnaire distributed by shipping agency operators. Potential respondents were identified by the researchers based on daily vessel movement records and their estimated berthing schedules. After the vessel berthed, the corresponding shipping agency was contacted solely to forward the questionnaire link to the ship's masters. The unit of analysis was an individual pilot service encounter, in which each master evaluated the performance of the pilot assigned to the vessel based on the pilotage service

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received. The questionnaire comprised 17 measurement items across five constructs: communication (4 items), compliance (3 items), work discipline (2 items), work ethic (3 items), and performance (5 items). The measurement items used a five-point Likert scale.

The data were analyzed using Partial Least Squares Structural Equation Modelling (PLS-SEM) in SmartPLS version 4.1.1.6. This method is appropriate for models involving latent variables with multiple indicators, supporting predictive-oriented research, and enabling the estimation of complex relationships, including moderation effects. Moreover, PLS-SEM does not require distributional assumptions and is robust to non-normal data distributions. PLS-SEM model assessment follows the general guidelines proposed by Hair et al. (2017), initially focusing on the measurement model evaluation, which evaluates the reliability and validity of the variables, followed by the structural model evaluation, which enables the researcher to determine the model's predictive capability. Based on the conceptual definitions of the variables and their causal logic, the model is specified as a reflective measurement model.

RESULTS AND DISCUSSION

The respondent background information consists of demographic (age and nationality) and professional characteristics (latest certificate of competency and tenure).

Table 1. Respondent Characteristics

Characteristics		Category	Frequency (n)	Percentage (%)
<i>Demographic</i>				
Age		<30 years	11	6
		30-40 years	39	22
		41-50 years	73	41
		51-60 years	48	27
		>60 years	6	4
Nationality		Indonesia	148	84
		Others	29	16
<i>Professional</i>				
Latest certificate of competency	ANT I (Deck officer class-I)		110	62
	ANT II (Deck officer class-II)		24	13
	ANT III (Deck officer class-III)		24	14
	ANT IV (Deck officer class-IV)		19	11
Tenure		<5 years	28	16
		5-10 years	54	31
		11-15 years	18	10
		>15 years	77	43

Source: Primary data processed by the author (2026)

The respondent characteristics are summarized in Table 1, showing that demographically, the majority of respondents were aged 41-50 years (41%) and were mostly Indonesian nationals (84%). Professionally, most held deck officer class-I (62%) and had more than 15 years of seafaring experience (43%). Overall, the respondents' profile represents a professionally qualified, experienced, and mature workforce.

Data Distribution

Even though PLS-SEM does not require the data to be normally distributed, it is important to ensure that the data are not extremely nonnormal before conducting PLS-SEM analysis, as extreme nonnormality may inflate standard errors obtained from bootstrapping, thus decreasing the probability that some relationships will be assessed as significant. Skewness and kurtosis of each indicator are used to assess data

normality; values within ± 2 indicate an acceptable approximation to normality. The rule of thumb indicates the absence of serious nonnormality: absolute skewness < 2 and kurtosis < 7 (Alzahrani et al., 2024). The results of skewness and kurtosis values for all 17 indicators in this study showed no evidence of extreme non-normality and are appropriate for reliable bootstrapping estimation in PLS-SEM.

Evaluation of Measurement Model (Outer Model)

The measurement model examines the relationships between variables and their indicators to establish reliability and validity by evaluating indicator reliability, internal consistency reliability, convergent validity, and discriminant validity.

Table 2. Reliability and Convergent Validity Results

Variable	Indicators	Indicator Reliability	Internal Consistency Reliability		Convergent Validity
		Outer Loadings	Cronbach's Alpha	Composite Reliability	AVE
		$>0,7$	$>0,7$	$>0,7$	$>0,5$
Work Ethic (M)	M1	0.941	0.933	0.937	0.882
	M2	0.930			
	M3	0.946			
Communication (X1)	X1.1	0.874	0.936	0.943	0.839
	X1.2	0.934			
	X1.3	0.911			
	X1.4	0.942			
Compliance (X2)	X2.1	0.942	0.929	0.931	0.876
	X2.2	0.939			
	X2.3	0.927			
Work Discipline (X3)	X3.1	0.941	0.885	0.892	0.897
	X3.2	0.953			
Performance (Y)	Y1	0.878	0.954	0.956	0.845
	Y2	0.910			
	Y3	0.904			
	Y4	0.947			
	Y5	0.954			

Source: Author's calculation based on primary data (2026)

As presented in Table 2, outer loadings exceed the minimum requirement of 0.7, indicating that all indicators have adequate reliability. Cronbach's alpha and composite reliability of each construct are higher than 0.7, showing that the indicators consistently measure their respective latent variables. Collectively, these results confirm that both the indicators and the variables satisfy reliability criteria. Convergent validity of the variables met the required criteria when the AVE values satisfied the recommended threshold above 0.5. The results showed that all AVE values were above 0.5, indicating the variables have high levels of convergent validity.

Discriminant validity evaluates whether each latent variable is empirically distinct from other variables. Traditionally, researchers have relied on two measures of discriminant validity: cross-loadings and the Fornell-Larcker criterion. However, the heterotrait-monotrait ratio (HTMT) is a more reliable criterion.

The initial discriminant validity assessment indicated insufficient discriminant validity. The cross-loadings results indicated that indicator Y3 did not exhibit the highest loading with its corresponding construct Y, considering a potential issue with discriminant validity. Furthermore, the HTMT assessment, using a threshold of 0.90, revealed that HTMT values between constructs Y and M, X2 and X1, and X3 and X2 exceeded 0.90. However, discriminant validity should ultimately be assessed using HTMT inference, whereby the confidence interval HTMT statistics should not include 1. The HTMT

inference results confirmed that discriminant validity was not established between constructs Y and M and between X2 and X1, as their confidence intervals include 1. Based on the HTMT inference results, the measurement model was revised by removing indicators Y3, X1.3, and X2.3 to improve discriminant validity. The revised HTMT inference results showed that all confidence intervals excluded 1, confirming that discriminant validity was established for all constructs, as presented in the following table.

Table 3. Revised Assessment Discriminant Validity Results

Cross-Loadings					
Indicators	Work Ethic (M)	Communication (X1)	Compliance (X2)	Work Discipline (X3)	Performance (Y)
M1	0.941	0.691	0.712	0.750	0.859
M2	0.931	0.662	0.713	0.728	0.841
M3	0.945	0.721	0.737	0.735	0.839
X1.1	0.584	0.894	0.665	0.599	0.586
X1.2	0.692	0.945	0.756	0.747	0.645
X1.4	0.755	0.940	0.842	0.791	0.715
X2.1	0.763	0.806	0.964	0.796	0.720
X2.2	0.710	0.767	0.958	0.781	0.666
X3.1	0.702	0.700	0.736	0.942	0.715
X3.2	0.782	0.764	0.816	0.952	0.784
Y1	0.791	0.653	0.626	0.715	0.907
Y2	0.806	0.634	0.634	0.734	0.922
Y4	0.853	0.668	0.707	0.735	0.942
Y5	0.896	0.663	0.716	0.765	0.950
Fornell-Larcker Criterion					
	M	X1	X2	X3	Y
M	0.939				
X1	0.736	0.927			
X2	0.767	0.819	0.961		
X3	0.785	0.775	0.821	0.947	
Y	0.901	0.704	0.722	0.793	0.930
HTMT Result					
	M	X1.	X2.	X3.	Y
X1.	0.790				
	CI				
X2.	0.829	0.886			
	CI	CI [0.797;0.986]			
X3.	0.862	0.851	0.909		
	CI	CI [0.748;0.962]	CI [0.828;0.983]		
Y	0.956	0.751	0.772	0.864	
	CI [0.913;	CI [0.648;0.865]	CI [0.635;0.889]	CI [0.767;0.948]	

Source: Author's calculation based on primary data (2026)

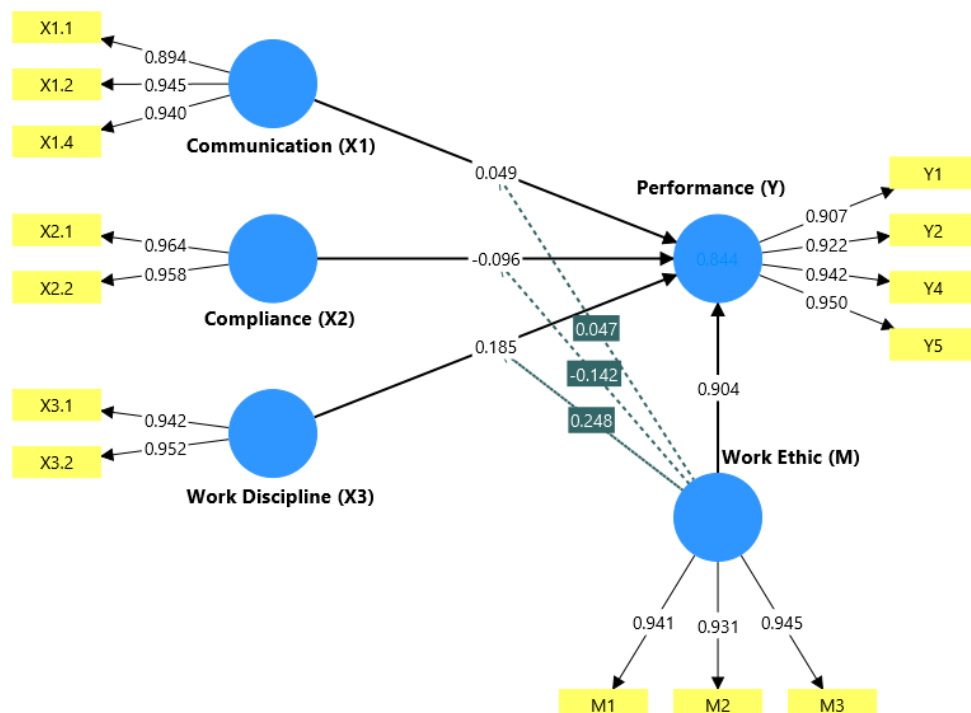
The re-estimated discriminant validity results in Table 3 show HTMT 0.956 for HTMT_{0.90}(Y, M) and 0.909 for HTMT_{0.90}(X3, X2), all exceeding 0.90. However, the HTMT inference results show that neither confidence interval included 1: Y-M CI_{0.90}[0.913;0.993] and X2-X3 CI_{0.90}[0.828;0.983], suggesting that the variables are empirically distinct. The studies of Kai et al. (2026), Kowalkowska et al. (2023), and Gonzalez et al. (2022) similarly demonstrate adequate discriminant validity, as the confidence intervals do not include 1 even when HTMT values are above 0.90. Collectively, the results provide evidence of satisfactory discriminant validity.

Table 4. Results Summary for Measurement Model Assessment

Variable	Indicators	Indicator Reliability	Internal Consistency Reliability		Convergent Validity	Discriminant Validity	
		Outer Loadings	Cronbach's Alpha	Composite Reliability	AVE	Cross Loadings & Fornell-Larcker Criterion	HTMT Statistic HTMT confidence interval does not include 1
		>0,7	>0,7	>0,7	>0,5		
Work Ethic M	M1	0.941					
	M2	0.931	0.933	0.937	0.882	Yes	Yes
	M3	0.945					
Communication X1	X1.1	0.894					
	X1.2	0.945	0.918	0.927	0.859	Yes	Yes
	X1.4	0.940					
Compliance X2	X2.1	0.964					
	X2.2	0.958	0.917	0.921	0.923	Yes	Yes
Work Discipline X3	X3.1	0.942					
	X3.2	0.952	0.885	0.890	0.897	Yes	Yes
Performance Y	Y1	0.907					
	Y2	0.922	0.948	0.950	0.865	Yes	Yes
	Y4	0.942					
	Y5	0.950					

Source: Author's calculation based on primary data (2026)

The measurement model is also re-estimated to reassess reliability and convergent validity. Table 4 summarizes the results of the final measurement model assessment. As can be seen, all evaluation criteria have been met, confirming the measure's reliability and validity.

**Figure 2. Final PLS-SEM Path Diagram**

Source: Author's calculation based on primary data (2026)

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Figure 2 illustrates the final PLS-SEM path diagram after the removal of indicators Y3, X1.3, and X2.3. The model was used for the subsequent structural model assessment and hypothesis testing.

Structural Model Evaluation (Inner Model)

Once measurement model evaluations are confirmed to be reliable and valid, the structural model is assessed. This involves examining the model's predictive capabilities and the relationship between the variables.

Table 5. Results Summary for Structural Model Assessment

	VIF	f-square	R-square	R-square adjusted	Q ² Value Performance (Y)
Communication (X1) → Performance (Y)	3.488	0.001			
Compliance (X2) → Performance (Y)	4.349	0.007			
Work Discipline (X3) → Performance (Y)	3.925	0.097	0.832	0.828	0.815
Work ethic (M) → Performance (Y)	3.073	1.066			

Source: Author's calculation based on primary data (2026)

According to Hair et al. (2017), before evaluating the structural model, collinearity among the predictor constructs needs to be assessed, as excessive collinearity may bias the estimation of path coefficients. Each VIF value should be lower than 5. As presented in Table 5, VIF values are below 5 for all predictor constructs, indicating that collinearity was not a critical problem. Therefore, the structural model can be conducted without concerns regarding collinearity.

The coefficient of determination (R^2) is evaluated to assess the explanatory power of the structural model, reflecting the extent to which the endogenous construct is explained by its predictor constructs. The threshold R^2 values of 0.25, 0.5, and 0.75 represent small, medium, and substantial. As reported in Table 5, the R^2 value is 0.832, indicating that the proposed model explains 83.2% of the variance in pilot performance through the combined effects of communication, compliance, work discipline, and work ethic. The adjusted R^2 value is 0.828, which is marginally lower than the corresponding R^2 value, indicating that the model maintains robust explanatory power after accounting for the number of predictor constructs.

The effect size complements the evaluation of R^2 by assessing the substantive contribution of each exogenous construct to the endogenous construct. This measure is referred to as the f^2 effect size. Guidelines for assessing f^2 values of 0.35, 0.15, and 0.02 are described as large, medium, and small effects, while values of f^2 below 0.02 indicate that there is no effect. The following results in Table 5 demonstrate that work discipline and work ethic make a substantial contribution to explaining the variance in pilot performance, with each f^2 value exceeding 0.35. However, the f^2 values for communication and compliance are below 0.02, suggesting no effect on performance.

In addition, since the endogenous construct is specified with a reflective measurement model, predictive relevance was evaluated using the Q^2 value, which reflects the model's predictive relevance for endogenous constructs. When the Q^2 value is greater than 0, it indicates that the exogenous constructs have predictive relevance for the endogenous construct. Table 5 shows a Q^2 value of 0.815, which means the Q^2 Value for the endogenous construct was over 0; hence, predictive relevance was established. This finding implies that the proposed structural model is exceptionally robust and highly capable of predicting pilot performance.

Table 6. The Results of Direct Effect Path Coefficients

Direct Effect	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values	Interval Confidence		Result
						Lower	Upper	
Communication (X1) → Performance (Y)	0.020	0.016	0.091	0.216	0.829	-0.153	0.218	Not Supported
Compliance (X2) → Performance (Y)	-0.071	-0.063	0.111	0.642	0.521	-0.282	0.150	Not Supported
Work Discipline (X3) → Performance (Y)	0.253	0.253	0.110	2.295	0.022	0.036	0.471	Supported
Work ethic (M) → Performance (Y)	0.742	0.738	0.076	9.742	0.000	0.552	0.858	Supported

Source: Author's calculation based on primary data (2026)

Following Hair et al. (2017), the structural model analysis should be initially executed without the moderator; moderation analysis follows as a complementary analysis, given that the direct effect becomes a simple effect and is interpreted differently in the moderation model. The significance of the hypothesized relationship is evaluated through bootstrapping. Using a two-tailed test at the 5% significance level, path coefficients are considered significant when the t-value exceeds the critical value of 1.96, the p-value is below 0.05, and the confidence interval excludes 0. Table 6 shows direct effect path coefficients between the variables. The findings are as follows:

The results showed H1 was not supported, as the effect of communication on performance was not statistically significant; the associated p-value was 0.829 (p-value>0.05), the t-value was 0.216 (t-value<1.96), and the confidence interval included 0. Communication is embedded in every vessel movement during pilotage operation, making it a relatively standardized operational routine. Under such conditions, communication may function as a baseline operational requirement rather than a sufficient condition to explain differences in employee performance. The present study was consistent with the studies by Ainani and Simon (2024) and Prasetyo et al. (2023), which found that communication does not affect employee performance.

H2 was not supported, as the effect of compliance on performance was not statistically significant, with a p-value of 0.521 (p-value>0.05), a t-value of 0.642 (t-value<1.96), and the confidence interval included 0. In this study, compliance behaviour is operationalized as a pilot's ability to understand and comply with maritime regulations comprehensively, which represents a fundamental requirement for ensuring navigational safety. As such, it is likely to be consistently demonstrated across pilots. This relatively homogeneous level of compliance may limit its ability to distinguish variations in pilot performance. This finding aligns with the research by Febriyanti and Almasdi (2025) and Rahman et al. (2024), who found that compliance is insignificant on employee performance.

Work discipline was shown to have a statistically significant effect on performance. The corresponding p-value was 0.022 (p-value<0.05), the t-value was 2.295 (t-value>1.96), and the confidence interval excluded 0; therefore, H3 was supported. Work discipline enforces behavioural consistency in performing operational tasks. When pilots consistently adhere to the service schedule and properly utilize operational equipment, they are more likely to perform effectively and efficiently. This study showed that work discipline plays an essential role in supporting operational effectiveness, which ultimately contributes to improving pilot performance. Comparable results were reported by

Herminingsih and Wiyoto (2025), Bastian et al. (2024), and Riyandi and Lo (2024), which stated that work discipline has a significant effect on employee performance.

Work ethic was also shown to have a statistically significant effect on performance. The corresponding p-value was 0.000 ($p\text{-value} < 0.05$), the t-value was 9.742 ($t\text{-value} > 1.96$), and the confidence interval excluded 0; therefore, H4 was supported. From a behavioural perspective, work ethic may enhance performance by providing an internal value system that directs employees' attitudes and behaviour in the workplace. Values such as integrity, responsibility, professionalism, and dedication encourage pilots to perform their duties with more commitment and consistency, thereby contributing to higher pilot performance. Consistent with previous studies by Setyorini and Hwihanus (2024) and Setiabudi et al. (2024), who showed that work ethic significantly affects employee performance.

Moderation Analysis

The path coefficients of the interaction term are used to examine the moderating effects. As shown in Table 7. The results are as follows:

Table 7 Path Coefficients Moderation Effects

Moderation Effect	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values	Interval Confidence		Result
						Lower	Upper	
Communication (X1) x Work Ethic (M) → Performance (Y)	0.047	0.045	0.119	0.396	0.692	-0.180	0.269	Not Supported
Compliance (X2) x Work Ethic (M) → Performance (Y)	-0.142	-0.159	0.110	1.287	0.198	-0.358	0.088	Not Supported
Work Discipline (X3) x Work Ethic (M) → Performance (Y)	0.248	0.246	0.117	2.114	0.035	0.048	0.520	Supported

Source: Author's calculation based on primary data (2026)

The empirical result indicated that work ethic was not statistically significant in moderating the effect of communication on performance, with a p-value of 0.692 ($p\text{-value} > 0.05$), a t-value of 0.396 ($t\text{-value} < 1.96$), and a confidence interval that included 0; therefore, H5 was not supported. To the best of our knowledge, no previous empirical study has specifically examined work ethic as a moderator for the communication-performance relationship. During pilotage operations, communication supports coordination between the pilot and the masters to ensure safe vessel movements. The effectiveness of such communication alone may not be sufficient to improve performance unless the pilots' willingness to act responsibly and professionally.

Referring to the results, work ethic was also not statistically significant in moderating the effect of compliance on performance, with a p-value of 0.198 ($p\text{-value} > 0.05$), a t-value of 1.287 ($t\text{-value} < 1.96$), and a confidence interval that crossed 0, suggesting H6 was not supported. The existing literature provides no empirical evidence regarding the moderating role of work ethic in the compliance-performance relationship. Theoretically, work ethic was proposed to act as a boundary condition in the compliance-performance relationship. Employees with stronger integrity, professionalism, and responsibility are expected to implement organizational rules and procedures more consistently. However, in the context of pilots, compliance reflects adherence to

mandatory maritime regulations and pilotage procedures. Nevertheless, the findings suggest that this moderating role is not supported.

Conversely, Work ethic was statistically significant in moderating the effect of work discipline on performance, with a p-value below 0.05, a t-value exceeding 1.96, and a confidence interval that excluded 0, indicating H7 was supported. The result demonstrates that work discipline, reflected in punctuality and the proper use of work equipment, contributes more effectively to performance when supported by a strong work ethic characterized by honesty, cooperation, responsibility, and safety. Conversely, a low level of work ethic attenuates this relationship. Within pilotage services, this finding emphasizes that work discipline is more likely to enhance pilot performance when guided by well-internalized ethical principles. Empirically, this finding aligns with the studies by Mustamu et al. (2026) and Sari and Saifuddin (2022), both of which found that the effect of work discipline on performance is stronger when work ethic is high. Work ethic.

Given that the moderating effect of work ethic on the relationship between work discipline and performance was found to be statistically significant, the following simple slope plot is presented to facilitate the visual interpretation of the direction and nature of the moderating effect.

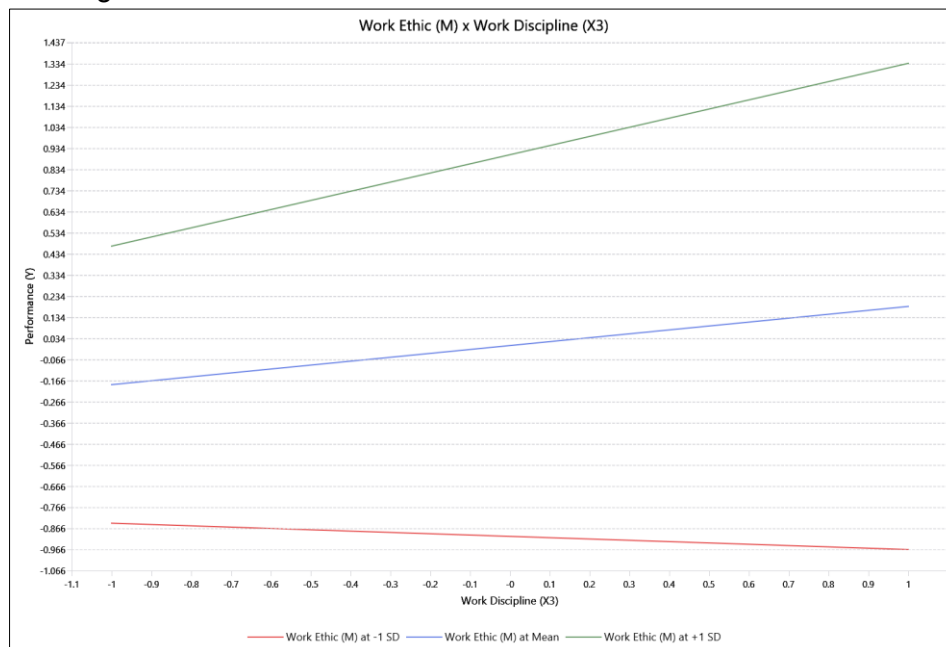


Figure 3. Simple Slope Plot

Source: Author's calculation based on primary data (2026)

As illustrated in Figure 3, the green line represents a high level of work ethic (Work Ethic (M) at + 1 SD). It shows the steepest upward slope, indicating that pilots with positive work discipline are more likely to achieve optimal performance when they also possess a strong work ethic. The blue line represents the mean level of work ethic (Work Ethic (M) at Mean). It exhibits a moderate upward slope, indicating that enhanced work discipline is associated with higher pilot performance when work ethic is at its average level. Conversely, the red line represents a low level of work ethic (Work Ethic (M) at -1 SD). It exhibits a slight downward slope, indicating that the positive effect of work discipline on pilot performance weakens when pilots possess a low level of work ethic.

Importantly, beyond its statistical significance and simple slope analysis, the interaction effect exhibited a large effect size, with an f-square of 0.059 (specifically, $f^2 \geq 0,025$), highlighting that the moderating role of work ethic in the relationship between

work discipline and performance is not only statistically significant but also practically meaningful.

CONCLUSION

The findings indicate that the contribution of work behaviours to performance varies across behavioural dimensions. Work discipline and work ethic were identified as significant factors of performance, whereas communication and compliance were not. Furthermore, work ethic substantially moderated the effectiveness of work discipline in enhancing performance. Pilot work discipline was more effective when accompanied by a stronger work ethic in enhancing performance, while lower levels of work ethic reduced its effectiveness. Therefore, improving pilot performance should not rely solely on a high level of work discipline; it also requires a strong work ethic to optimize performance.

REFERENCES

- Ainani, N., & Simon, Z. Z. (2024). Boosting employee performance: The roles of motivation, work environment, discipline, and communication. *Human Capital and Organizations*, 2(1), 1–12. <https://doi.org/10.58777/hco.v2i1.273>
- Aldulaimi, S. H. (2020). Islamic work ethics: multidimensional constructs and scale validation. *International Journal of Applied Management Science*, 12(3), 186–206. <https://doi.org/10.1504/IJAMS.2020.108073>
- Alifuddin, A., Utami, I., & Lestari, E. P. (2026). The influence of work discipline, work motivation, work ethic, and work environment on employee performance at the kartini open university service center in rembang. *Dinasti International Journal of Economics, Finance & Accounting*, 6(6), 5709–5721. <https://doi.org/10.38035/dijefa.v6i6.5858>
- Alzahrani, N. A., Sheikh Abdullah, S. N. H., Adnan, N., Zainol Ariffin, K. A., Mukred, M., Mohamed, I., & Wahab, S. (2024). Geographic information systems adoption model: A partial least square-structural equation modeling analysis approach. *Heliyon*, 10(15), e35039. <https://doi.org/10.1016/j.heliyon.2024.e35039>
- Andansari, S. E., & Mujanah, S. (2024). The impact of work ethic and performance allowances on employee performance by moderating work motivation in BAPPEDA Provinsi Jawa Timur. *International Journal of Social Science Humanity & Management Research*, 3(01). <https://doi.org/10.58806/ijsshmr.2024.v3i1n13>
- Asgaruddin, A. (2023). Work professionalism through work discipline on employee performance (A literature study human resource management). *Dinasti International Journal of Management Science*, 4(6), 1104–1114. <https://doi.org/10.31933/dijms.v4i6.1943>
- Bastian, B., Syekh, S., & Zahari, M. (2024). The influence of training and discipline on employee performance is governed by work competence at the job training center and productivity jambi province. *Dinasti International Journal of Education Management And Social Science*, 6(2), 948–961. <https://doi.org/10.38035/dijemss.v6i2.3351>
- Cherubet, B., Otsyulah, J., & Mackton, W. S. (2023). The influence of human resource compliance audit on employee performance of public universities in western Kenya. *European Journal of Human Resource Management Studies*, 7(1). <https://doi.org/10.46827/ejhrms.v7i1.1587>
- Damayanti, T. D., Qarni, W., & Atika. (2026). The relationship of work ethic and professionalism to service employee performance. *Almana : Jurnal Manajemen Dan Bisnis*, 10(1), 224–238. <https://doi.org/10.36555/almana.v10i1.3029>
- Demirci, S. M. E., Canımoglu, R., & Elcicek, H. (2022). An evaluation of the effects of human factors on potential ship accidents under pilotage. *Marine Science and Technology Bulletin*, 11(1), 76–87. <https://doi.org/10.33714/masteb.1064311>

- Diansyah, & Juliani, H. (2022). The effect of motivation and work discipline on employee performance with self-efficacy as a moderating variable. *Budapest International Research and Critics Institute-Journal (BIRCI-Journal)*, 5(2), 14759–14773. <https://doi.org/10.33258/birci.v5i2.5353>
- Febriyanti, L., & Almasdi. (2025). Pengaruh kompetensi profesional dan kepatuhan pada sop terhadap kinerja dengan kepuasan kerja sebagai variabel intervening pada pengadilan negeri tanjung pati. *BENEFIT: Journal Of Business, Economics, And Finance*, 3(2), 1133–1148. <https://doi.org/10.70437/benefit.v3i.1377>
- Gintings, A. (2023). Kompetensi komunikasi dan motivasi berprestasi terhadap kinerja pelayanan staf. *JPPI (Jurnal Penelitian Pendidikan Indonesia)*, 9(2), 765. <https://doi.org/10.29210/020232120>
- Gonzalez, C., Agrawal, V., Johansen, D., & Hooker, R. (2022). Green supply chain practices: The role of institutional pressure, market orientation, and managerial commitment. *Cleaner Logistics and Supply Chain*, 5(June). <https://doi.org/10.1016/j.clscn.2022.100067>
- Hair, J. F., Jr., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2017). *A primer on partial least squares structural equation modeling (PLS-SEM)* (2nd ed.). SAGE Publications.
- Haryati, L., Personata, G., & Sugiyarti, G. (2023). Analysis of work ethics and workload on job satisfaction impact on employee performance. *International Journal of Management Research and Economics*, 1(3), 75–90. <https://doi.org/10.54066/ijmre-itb.v1i3.654>
- Herminingsih, A., & Wiyoto, V. (2025). The effects of work environment, work discipline, and work motivation on employee performance. *Eduvest - Journal of Universal Studies*, 5(3), 3043–3055. <https://doi.org/10.59188/eduvest.v5i3.50935>
- Husain, P. N. A., Pramesthi, R. A., & Soeliha, S. (2024). Pengaruh disiplin kerja dan lingkungan kerja terhadap kinerja pada karyawan tetap perumda air minum tirta baluran kabupaten situbondo dengan etos kerja sebagai variabel moderating. *Jurnal Mahasiswa Entrepreneurship (JME)*, 3(2), 256. <https://doi.org/10.36841/jme.v3i2.4792>
- Intanulqoir, A., & Fitriyani, N. E. (2025). The role of Islamic work ethic in moderating the influence of human relations, work environment, and work discipline on employee performance. *Journal of Islamic Economics, Management, and Business (JIEMB)*, 7(1), 65–84. <https://doi.org/10.21580/jiemb.2025.7.1.27454>
- Kai, C., Ping, W., & Xiaomin, J. (2026). AI anxiety and adoption intention in higher education based on an extended TAM-UTAUT and PLS-SEM analysis. *Scientific Reports*, 1–24. <https://doi.org/10.1038/s41598-026-35823-9>
- Kalogiannidis, S. (2020). Impact of effective business communication on employee performance. *European Journal of Business and Management Research*, 5(6). <https://doi.org/10.24018/ejbmr.2020.5.6.631>
- Kantor Kesyahbandaran dan Otoritas Pelabuhan Utama Belawan. (2024). *Laporan Pemanduan Kapal Tahun 2024*.
- Komite Nasional Keselamatan Transportasi. (2023). *Laporan investigasi kecelakaan pelayaran tenggelamnya kapal barang Cantika Persada di zona labuh jangkar Pelabuhan Gresik*. <https://knkt.go.id/en/investigasi>
- Kowalkowska, S. E., Orlak, K., & Stolarski, M. (2023). Work for the prison service: selected health consequences – Investigating the role of personal resources, job demands, work stress, and burnout. *International Journal of Occupational Medicine and Environmental Health*, 36(6), 744–760. <https://doi.org/10.13075/ijomeh.1896.02224>
- Marliza, Y., Nyoto, & Sudarno. (2022). Leadership style, motivation, and communication on organizational commitment and employee Performance in the rokan hulu regional general hospital. *Journal of Applied Business and Technology*, 3(1), 40–55. <https://doi.org/10.35145/jabt.v3i1.87>

- Mustamu, N., Likewati, W. O., & Anwar, V. (2026). The impact of work discipline and motivation on service performance: Work ethic as a moderator in the agricultural office of tambrau regency. *Jurnal Ilmiah Manajemen Bisnis Dan Inovasi Universitas Sam Ratulangi (JMBI UNSRAT)*, 13(1), 432–442. <https://doi.org/10.35794/jmbi.v13i1.66801>
- Nugroho, I. D., Darmawan, A., & Rachmawati, E. (2026). Analysis of the determinants of employee performance: The role of motivation, work discipline, work ethic, and the physical work environment. *Asian Journal of Management Entrepreneurship and Social Science*, 6(1), 228–255. <https://doi.org/10.63922/ajmesc.v6i01.1534>
- Oraith, H., Blanco-Davis, E., Yang, Z., & Matellini, B. (2021). An evaluation of the effects of human factors on pilotage operations safety. *Journal of Marine Science and Application*, 20(3), 393–409. <https://doi.org/10.1007/s11804-021-00222-1>
- Panggabean, M. S. (2021). *Manajemen Sumber Daya Manusia* (N. Siti & A. Canty, Eds.; 2nd ed.). Universitas Terbuka.
- Prasetyo, Y. T., Perez, J. P. A., Gumasing, Ma. J. J., Persada, S. F., & Nadlifatin, R. (2023). The effects of communication, empathy, encouragement, growth, and rewards on employee performance: A structural equation modeling approach. *Work*, 76(2), 749–758. <https://doi.org/10.3233/WOR-220470>
- Rahman, D. H., Shiddiq, A. H. M., & Farida, I. (2024). The relationship between educational background and sharia compliance on the performance of islamic bank employees in bone regency. *Annual International Conference on Islamic Economics and Business*, 221–230. <https://ir.bankbsi.co.id/>
- Razak, H. M. A., Praja, Y., & Pramesthi, R. A. (2024). Pengaruh reward and punishment, kepemimpinan dan disiplin kerja terhadap kinerja guru melalui motivasi sebagai variabel intervening pada smkn 1 kendit kabupaten situbondo. *Jurnal Mahasiswa Entrepreneurship (JME)*, 3(9), 1653. <https://doi.org/10.36841/jme.v3i9.5196>
- Riyandi, T., & Lo, S. J. (2024). Work stress and discipline on employee performance mediated by OCB. *International Journal of Digital Marketing Science*, 1(2), 101–109. <https://doi.org/10.54099/ijDM>
- Sari, A., & Saifuddin. (2022). The effect of cyberloafing behavior, locus of control, and work discipline on employee performance with islamic work ethic as moderator (Case study at PT Kebon Agung Trangkil Pati Sugar Factory). *Imara: JURNAL Riset EKONOMI ISLAM*, 6(2), 155–167. <https://doi.org/10.31958/imara.v6i2.4627>
- Setiabudi, A., Sukmawati, A., & Jahroh, S. (2024). The impact of islamic work ethic on employee performance the role of knowledge-sharing behavior in indonesia's fast-food companies. *Business Review and Case Studies*. <https://doi.org/10.17358/brcs.5.2.178>
- Setyorini, W., & Hwihanus. (2024). Assessing the effect of work ethic, job satisfaction, and organizational support on employee performance through organizational commitment at PT menthobi mitra lestari pangkalan bun. *International Journal of Science and Society*, 6(2), 630–648. <https://doi.org/10.54783/ijssoc.v6i2.1188>
- Ulfah Arini, D. (2025). The effect of communication and commitment on performance with organizational citizenship behaviour (OCB) as an intervening variable. *Dinasti International Journal of Education Management and Social Science*, 6(3), 2308–2319. <https://doi.org/10.38035/dijemss.v6i3.4068>
- Wibowo, B. P., Lumbanraja, P., & Harahap, R. H. (2026). The effect of soft skills, hard skills, and compliance on employee performance through self-awareness as an intervening variable at the regional personnel and human resource development agency (BKPSDM) of Medan city. *Jurnal Penelitian Ilmu-Ilmu Sosial*, 3(8). <https://doi.org/10.5281/zenodo.19258855>