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Work Motivation, Competence, and Behavior on Port Labor Performance and Welfare at Sunda Kelapa Traditional Port

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Abstract

Purpose: This study examines the effects of work competency, motivation, and behavior on the performance and welfare of Loading and Unloading Manpower (TKBM) at Sunda Kelapa Traditional Port, Jakarta, with TKBM performance as an intervening variable.
Research Methodology: A quantitative survey of all port workers was conducted using observation, questionnaires, and interviews, and analyzed with Partial Least Squares Structural Equation Modeling (PLS-SEM) using SmartPLS. Measurement validity and reliability were confirmed using outer loadings, Cronbach's alpha (α), composite reliability (CR), and Average Variance Extracted (AVE). Structural model hypotheses were tested via bootstrapping ($t > 1.96$, $\alpha = 0.05$).
Results: After removing one invalid indicator, all remaining indicators were valid and reliable ($\alpha = 0.913$–0.937; CR = 0.929–0.947; AVE = 0.586–0.640). All six direct-effect hypotheses were supported. Work competency significantly influenced motivation ($\beta = 0.634$), behavior ($\beta = 0.443$), and performance ($\beta = 0.269$). Motivation ($\beta = 0.350$) and behavior ($\beta = 0.451$) significantly affected TKBM performance, which in turn strongly determined welfare ($\beta = 0.887$). TKBM performance explained 81.1% of its variance, while welfare was explained 78.4% by performance.
Conclusions: Work competency is the primary driver of TKBM performance, influencing motivation, behavior, and performance simultaneously. TKBM performance is the key determinant of worker welfare, highlighting performance improvement as the critical path to enhancing welfare.
Limitations: The study was limited to Sunda Kelapa Traditional Port and used a cross-sectional design, restricting causal inference and generalizability.
Contributions: The study provides empirical evidence on determinants of TKBM performance and welfare in Indonesian traditional ports, contributing to literature on port labor human resource management in conventional shipping.

Keywords: *Loading and Unloading Labor, Work Competency, Work Motivation, Port Labor Performance, PLS-SEM*

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1. Introduction

Sunda Kelapa Port, Jakarta's historic traditional port, has served as an inter-island shipping hub since the 12th century and continues to operate as the principal loading and unloading facility for conventional goods—including wood, basic necessities, grocery items, and building materials—transported by traditional Phinisi and Bugis Schooner vessels between Java and the outer islands (Geminius & Odang, 2022;

Handayani, 2019). Unlike container ports that rely on mechanized crane systems, Sunda Kelapa operates primarily through manual conventional loading and unloading activities, making the physical capacity, technical skills, motivational state, and behavioral compliance of Loading and Unloading Manpower (TKBM—*Tenaga Kerja Bongkar Muat*) the direct determinants of port operational performance and efficiency (Krisnawati et al., 2019; Pohan & Hasibuan, 2021; Sapriana, 2021).

Despite its historical and economic significance, Sunda Kelapa Port and its TKBM workforce face persistent human resource management challenges that constrain both operational performance and workers' welfare (Affiat et al., 2021; Tabah et al., 2020). First, measurable technical skills in loading and unloading procedures remain underdeveloped among workers, creating safety risks and operational inefficiencies (Hadi, 2016; Rahayu, 2020). Second, work motivation is insufficient, particularly in teamwork contexts, reflecting unmet welfare needs and limited institutional recognition of workers' contributions. Third, behavioral compliance is inconsistent, particularly regarding Personal Protective Equipment (PPE) use and adherence to loading and unloading safety procedures, creating occupational safety risks that are well documented in Indonesian port labor research (Sangaji et al., 2018; Yanuari, 2019). Fourth, the performance-based wage system, where earnings depend on the volume of goods transported, creates economic precarity that undermines long-term welfare stability for TKBM families (Septikache et al., 2024; Yani & Apriady, 2018).

The academic literature on TKBM human resource management is limited. Research has focused on broader port operational performance metrics (berth output, ship output, and gang output) and port service quality rather than on the individual-level HRM determinants of worker performance and welfare. Studies directly examining the relationship between TKBM competency, motivation, behavior, and welfare outcomes are particularly limited, a gap this study directly addresses. The novel contribution of this study is to simultaneously model these antecedent variables through an integrated PLS-SEM structural framework with TKBM performance as the mediating mechanism between the antecedent variables and welfare outcomes (Mulatsih et al., 2018).

This study pursues four research objectives: (1) to examine the effects of work competency on work motivation and work behavior; (2) to examine the direct effects of work competency, motivation, and behavior on TKBM performance; (3) to examine the effect of TKBM performance on worker welfare; and (4) to assess the significance of indirect (mediated) pathways from competency to performance to welfare.

2. Literature Review

2.1 Work Competency

Competency is the work ability of each individual, which includes aspects of knowledge, skills, and work attitudes aligned with established performance standards (Rahayu, 2020). Shet et al. (2019) and Siagian (2017) defines competency as a person's observable ability encompassing knowledge, skills, and attitudes in completing a job or task in accordance with set performance standards, with the capacity to drive personal motivation and mastery of work. In the port context, TKBM competency encompasses technical knowledge of loading and unloading procedures, equipment operation skills, safety protocol adherence, and interpersonal coordination (Arokodare et al., 2023; Sanusi et al., 2020). Work competency serves as the foundational upstream driver of the performance system, influencing both motivational energy (through capability confidence) and the behavioral patterns that determine performance outcomes (Alfian et al., 2024; Bantilan et al., 2024; Martini et al., 2020).

H_1: Work competency has a significantly positive effect on work motivation.

H_2: Work competency has a significant positive direct effect on TKBM performance.

H_3: Work competency significantly and positively affects work behavior.

2.2 Work Motivation

Work motivation is the provision of driving forces that create enthusiasm for work, enabling employees to cooperate effectively and exert their capabilities toward achieving goals (Magdalena et al., 2022; Udodiugwu et al., 2024). Eladira et al. (2024) and Yanuari (2019) identified motivation as the driver of willingness to work according to desired standards—high motivation generates high performance, while motivation without supporting discipline can interfere with productivity. In the context of Sunda Kelapa Port, TKBM work motivation is influenced by the clarity of task expectations, wage-performance link, peer recognition in cooperative teams, and institutional support provided by the TKBM cooperative and port management (Hairul et al., 2024; Syafrizal et al., 2024).

H_4: Work motivation has a significantly positive effect on TKBM performance.

2.3 Work Behavior

Work behavior in the port context encompasses task compliance behaviors (adherence to loading and unloading procedures), safety behaviors (PPE use and equipment handling compliance), and cooperative behaviors (team coordination in conventional loading operations) (Ngaliman et al., 2023; Rosadi & Barus, 2022). Behavioral non-compliance, particularly regarding PPE and work safety protocols, is among the most frequently documented performance and safety risk factors at Indonesian traditional ports (Magdalena et al., 2022; Sangaji et al., 2018; Yanuari, 2019). Disciplined work behavior reduces accident rates, improves operational efficiency, and contributes directly to TKBM performance quality by minimizing errors and injuries that interrupt loading and unloading workflows (Ichdan, 2024; Kurbani et al., 2023).

H_5: Work behavior significantly and positively affects TKBM performance.

2.4 TKBM Performance and Worker Welfare

TKBM performance encompasses the quantity and quality of loading and unloading activities completed within specified time standards, reflecting both individual productivity and collective team efficiency (Wibowo, 2012). TKBM welfare refers to the fulfillment of physical and spiritual needs that enable workers to meet the basic necessities of a prosperous life, including the adequacy of income, food, clothing, housing, health, education, and a safe working environment (Fernando & Surjandari, 2022; Supandri et al., 2024). Under the Sunda Kelapa Port's performance-based wage system, TKBM performance and welfare are structurally linked: higher loading and unloading throughput generates higher wages, which, in turn, enables higher welfare standard achievement. Thus, TKBM performance functions as the primary mediating mechanism through which competency, motivation, and behavioral investments translate into welfare outcomes (Piri et al., 2023; Suryadi & Saputra, 2022).

H_6: TKBM performance has a significantly positive effect on TKBM welfare.

3. Methodology

3.1 Research Design

This study employed a quantitative survey research design with a descriptive-verifiable orientation, appropriate for testing hypothesized causal relationships among latent variables representing work competency, motivation, behavior, TKBM performance, and welfare. PLS-SEM with SmartPLS was selected as the analytical method because the model is exploratory and theory-extending for an understudied population, the structural model contains multiple endogenous latent variables requiring simultaneous path estimation, and PLS-SEM performs robustly with small-to-moderate samples and non-normal data

distributions (Hair et al., 2017).

3.2 Population and Sample

The study population comprised all conventional port loading and unloading workers (TKBM) at the Sunda Kelapa Traditional Port in Jakarta. A census (saturated sample) approach was applied, incorporating all available workers as respondents, consistent with the small and well-defined population. Data were collected in 2021 through direct observation of loading and unloading activities, structured questionnaire distribution, and in-person interviews with TKBM workers and cooperative management personnel.

3.3 Measurement Instruments

All five constructs were measured using multi-item Likert scales (1 = Strongly Disagree to 5 = Strongly Agree). Work Competency (X1, 10 items) covered knowledge of loading procedures, equipment operation, PPE compliance, safety protocol adherence, and inter-team coordination skills, drawing on (Siagian, 2017) and (Rahayu, 2020). Work Motivation (X2, 10 items) covered intrinsic and extrinsic motivation dimensions, including task enthusiasm, cooperative willingness, wage satisfaction, and institutional recognition, adapted from (Magdalena et al., 2022). Work Behavior (X3, 10 items) covered task compliance, safety behavior, cooperative behavior, and operational discipline, adapted from (Sangaji et al., 2018) and (Yanuari, 2019). The TKBM Performance (Y, 10 items) covered loading and unloading throughput quantity, task completion timeliness, error rate, and cooperative team productivity, adapted from (Wibowo, 2012). TKBM Welfare (Z, 10 items) covered income adequacy, housing quality, food security, health access, education access for children, and workplace safety, and was adapted from (Supandri et al., 2024).

3.4 PLS-SEM Analysis

The two-step assessment procedure proposed by (Hair et al., 2017) was applied. Step 1 (Measurement Model): outer loadings were assessed (threshold > 0.60), and indicators below the threshold were removed. Composite reliability (CR > 0.70), Cronbach's alpha ($\alpha > 0.70$), and AVE (> 0.50) confirmed construct reliability and convergent validity. Step 2 (Structural Model): Path coefficients (β), t-statistics, and p-values derived from bootstrapping assessed hypothesis significance. R^2 values quantify the explained variance of each endogenous construct. Specific indirect effects assessed the significance of the mediated pathways through TKBM performance.

4. Results and Discussion

4.1 Results

4.1.1 Measurement Model Assessment

In the initial measurement model, indicator X1.03 (work competency item 3) recorded an outer loading of 0.577, which was below the 0.60 validity threshold, and was eliminated from the model. Following elimination, all remaining 49 indicators across all five constructs recorded outer loadings exceeding 0.60 (range: 0.610–0.856), confirming their validity as construct measurement items. Table 1 presents the construct reliability and convergent validity results after the elimination of indicators.

Table 1. Construct Reliability and Convergent Validity (N after elimination)

Construct	Items	Cronbach's α	Composite Reliability	AVE	Valid?
X1 = Work Competency	9 (1 eliminated)	0.913	0.929	0.592	✓
X2 = Work Motivation	10	0.937	0.947	0.640	✓
X3 = Work Behavior	10	0.928	0.939	0.607	✓
Y = TKBM Performance	10	0.921	0.934	0.587	✓
Z = TKBM Welfare	10	0.921	0.934	0.586	✓

Note: All CR $>$ 0.70; All $\alpha > 0.70$; All AVE $>$ 0.50.

Source: SmartPLS Output (2021).

Based on Table 1, all five constructs substantially exceeded the minimum reliability thresholds: Cronbach's alpha (range: 0.913–0.937) and composite reliability (range: 0.929–0.947) were both in the excellent range. All AVE values exceeded 0.50 (range: 0.586–0.640), confirming that each construct accounted for more than half of its indicators' variance. Work Motivation achieved the highest reliability levels (α = 0.937; CR = 0.947; AVE = 0.640), reflecting particularly high internal consistency in its motivation measurement items.

4.1.2 Structural Model: Direct Effects

Table 2. Path Coefficients and Direct Effect Hypothesis Tests

Hyp.	Path	β (O)	STDEV	t-stat.	p-val.	Decision
H1	X1 (Competency) → X2 (Motivation)	0.634	0.068	9.376	.000	Supported
H3	X1 (Competency) → X3 (Behavior)	0.443	0.111	4.001	.000	Supported
H2	X1 (Competency) → Y (Performance)	0.269	0.078	3.468	.001	Supported
H4	X2 (Motivation) → Y (Performance)	0.350	0.069	5.039	.000	Supported
H5	X3 (Behavior) → Y (Performance)	0.451	0.075	6.031	.000	Supported
H6	Y (Performance) → Z (Welfare)	0.887	0.023	38.869	.000	Supported

Note: t-table = 1.96 (α = 0.05). All hypotheses were confirmed to be significant.

Source: SmartPLS Bootstrapping Output (2021).

Table 2 presents the direct effect path coefficients and hypothesis test results of the PLS-SEM bootstrapping procedure. All t-statistics exceed the critical threshold of 1.96 (α = 0.05), confirming all six direct-effect hypotheses.

4.1.3 R-Squared Values

Table 3. Coefficient of Determination (R-Square)

Endogenous Construct	R-Square	R-Square Adjusted
X2 = Work Motivation	0.402	0.396
X3 = Work Behavior	0.196	0.188
Y = TKBM Performance	0.816	0.811
Z = TKBM Welfare	0.787	0.784

Source: SmartPLS Output (2021).

Table 3 shows that the R-Square values indicate varying levels of explanatory power across endogenous constructs in the model. Work Motivation (X2) has an R-Square of 0.402 and Work Behavior (X3)

has 0.196, indicating moderate to weak explanatory power, while TKBM Performance (Y) (0.816) and TKBM Welfare (Z) (0.787) show strong explanatory power. Overall, the model demonstrates good predictive relevance, particularly for performance and welfare outcomes.

4.1.4 Indirect (Mediated) Effects

Table 4 presents the specific indirect effects, confirming TKBM performance as a significant mediating variable.

Table 4. Specific Indirect Effects (via TKBM Performance)

Indirect Path	**β (O)**	**STDEV**	**t-stat.**	**p-value**
X1 → X2 (Motivation) → Y (Performance)	0.222	0.052	4.289	.000
X1 → X3 (Behavior) → Y (Performance)	0.200	0.057	3.474	.001
X1 → Y (Performance) → Z (Welfare)	0.239	0.067	3.544	.000
X2 → Y (Performance) → Z (Welfare)	0.311	0.062	4.987	.000
X3 → Y (Performance) → Z (Welfare)	0.400	0.069	5.831	.000
X1 → X2 → Y → Z (Full chain)	0.197	0.047	4.151	.000
X1 → X3 → Y → Z (Full chain)	0.177	0.053	3.339	.001

Note: All indirect effects were significant at $\alpha = 0.05$ (t > 1.96).
Source: SmartPLS Bootstrapping Output (2021).

Table 4 shows that all specific indirect effects in the model are statistically significant. The results indicate that Work Competency (X1) influences Performance (Y) through both Motivation (X2) and Behavior (X3), and further affects Welfare (Z) through Performance, with significant mediation effects in all pathways. Similarly, Motivation (X2) and Behavior (X3) also have significant indirect effects on Welfare (Z) through Performance. Overall, the findings confirm that TKBM Performance plays a key mediating role in linking the exogenous variables to Welfare outcomes.

4.2 Discussion

4.2.1 Work Competency as the Upstream Performance Driver

Work competency significantly influenced work motivation (H1: $\beta = 0.634$, $t = 9.376$), work behavior (H3: $\beta = 0.443$, $t = 4.001$), and TKBM performance (H2: $\beta = 0.269$, $t = 3.468$), all of which were supported and were highly significant. The very large H1 coefficient ($\beta = 0.634$) confirms that work competency is the dominant upstream driver of work motivation at Sunda Kelapa Port: TKBM workers who possess stronger technical skills, deeper procedural knowledge, and greater occupational confidence demonstrate significantly higher work enthusiasm and task motivation. This finding aligns with the competency-motivation nexus documented by (Rahayu, 2020; Siagian, 2017): capability and motivation are mutually reinforcing, with competency development creating the foundation for genuine motivational engagement, rather than compliance-based effort. The moderate H3 coefficient ($\beta = 0.443$) confirms that competency also shapes behavioral compliance—more competent workers are more likely to adhere to safety protocols, PPE requirements, and cooperative loading procedures, thereby generating fewer behavioral violations.

4.2.2 Work Motivation, Work Behavior, and TKBM Performance

Work behavior (H5: $\beta = 0.451$, $t = 6.031$) and work motivation (H4: $\beta = 0.350$, $t = 5.039$) significantly and positively influenced TKBM performance, with work behavior exhibiting a stronger direct effect. This pattern is theoretically noteworthy: in the Sunda Kelapa conventional port context—where manual physical labor under safety-constrained conditions is the primary performance determinant—behavioral compliance (PPE use, procedure adherence, cooperative task coordination) may have a more immediate

and direct performance impact than motivation alone. Sangaji et al. (2018) and Diah Tresiana (2018) documented the safety and performance costs of unsafe TKBM behaviors; the present study's H5 finding confirms these behavioral dimensions as the most significant performance drivers among the individual-level antecedents. The combined explanation of 81.1% of TKBM performance variance by competency, motivation, and behavior ($R^2 = 0.811$) establishes these three human capital dimensions as highly comprehensive predictors of port laborer performance.

4.2.3 TKBM Performance and Worker Welfare

TKBM performance has a very strong and highly significant effect on TKBM welfare (H6: $\beta = 0.887$, $t = 38.869$, $p < 0.001$), which is the largest path coefficient in the entire model and among the strongest single-path effects documented in the Indonesian port labor literature. The near-unity coefficient (0.887) reflecting the R^2 of 0.784 (78.4% of welfare variance explained by performance) is explained by the wage structure at Sunda Kelapa: under the performance-based TKBM tariff system, earnings are directly proportional to loading and unloading throughput. Higher-performing workers who complete more tonnage earn substantially higher wages, which translates directly into welfare improvements across income, food security, housing, and health access dimensions. This structural wage-performance-welfare linkage makes TKBM performance not merely a productivity metric but the primary welfare generation mechanism for port workers and their families, confirming Supandri et al. (2024) documentation of the welfare-productivity connection in Indonesian maritime transport labor.

4.2.4 Indirect Effects: The Performance Mediation Chain

All seven indirect effect pathways through TKBM performance were statistically significant, confirming that the model's mediation architecture functioned as theoretically predicted. The largest indirect welfare effect was from work behavior through performance ($\beta = 0.400$), followed by work motivation through performance ($\beta = 0.311$). These indirect effects substantially amplify the total welfare impact of motivation and behavior investments: the total effects of work behavior on welfare ($\beta = 0.400$, indirect) and work motivation ($\beta = 0.311$, indirect) are both operationally meaningful, confirming that HR interventions targeting behavioral compliance and motivational enhancement generate welfare improvements not only through direct performance gains but also through the structural wage multiplication effect of higher TKBM performance. The full chain from work competency through motivation through performance to welfare ($\beta = 0.197$) and through behavior to performance to welfare ($\beta = 0.177$) further confirms that competency development investments generate second- and third-order welfare benefits by activating the complete motivation–behavior–performance–welfare pathway.

5. Conclusions

This study examined the effects of work competency, work motivation, and work behavior on TKBM performance and welfare at Sunda Kelapa Traditional Port, Jakarta, using PLS-SEM analysis. Six principal conclusions were drawn. First, work competency significantly and positively influenced work motivation (H1: $\beta = 0.634$, $p < 0.001$), confirming that TKBM workers with stronger procedural knowledge and technical skills demonstrate higher enthusiasm and task motivation. Second, work competency significantly and directly influenced TKBM performance (H2: $\beta = 0.269$, $p = 0.001$). Third, work competency significantly and positively influenced work behavior (H3: $\beta = 0.443$, $p < 0.001$), confirming that behavioral compliance with safety and operational protocols is developed through competency building. Fourth, work motivation significantly and positively influenced TKBM performance (H4: $\beta = 0.350$, $p < 0.001$). Fifth, work behavior is the strongest direct predictor of TKBM performance (H5: $\beta = 0.451$, $p < 0.001$), with all three antecedents jointly explaining 81.1% of the variance in TKBM performance. Sixth, TKBM performance has an exceptionally strong direct effect on worker welfare (H6: $\beta = 0.887$, $p < 0.001$), explaining 78.4% of the welfare variance, confirming that under the

performance-based wage system, TKBM performance improvement is the primary welfare generation mechanism. All seven indirect effect pathways through TKBM performance were statistically significant, establishing performance as a critical mediating variable in the competency–motivation–behavior → welfare chain.

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Author Contributions

AS was responsible for the conceptualization of the study and interpretation of the research data. YI was responsible for data collection, field observations, and analysis of cargo handling processes in airline operations. PCS contributed to the literature review, research methodology design, manuscript preparation, participated in reviewing and finalizing the manuscript.

Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this study. This research was conducted independently, and no financial or personal relationships influenced the results or interpretation of the findings.

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