Siber Journal of Transportation and Logistics (SJTL)
E-ISSN : 2987-1050
P-ISSN : 2987-1026
Siber Nusantara Research
+62 812 1046 7572 https://research.e-siber.org research.siber.info@gmail.com Jalan Marina Indah Raya No. 1 Pantai Indah Kapuk, Kamal Muara, Penjaringan, Jakarta Utara, Indonesia.
DOI: https://doi.org/10.38035/sjtl.v4i1

Effectiveness of e-Procurement, Regulations, and Supervision on Transportation Subcontract Performance: The Mediating Role of Subcontract Governance at PT Pos Indonesia

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Abstract: This study aims to analyze the effects of e-Procurement efficiency, regulatory compliance, and supervision on transportation subcontractor performance, as well as to examine the mediating role of transportation subcontract governance at PT Pos Indonesia (Persero). A quantitative approach was employed using Structural Equation Modeling with Partial Least Squares (PLS-SEM) to test both direct and indirect relationships among variables. Data were collected through a census survey of 120 respondents from hub offices directly involved in managing and supervising transportation subcontractors. The results indicate that e-Procurement efficiency and supervision have a positive and significant effect on transportation subcontractor performance, while regulatory compliance does not have a direct effect on performance. However, regulatory compliance ($\beta=0.512$, $p<0.001$) and supervision ($\beta=0.343$, $p<0.001$) significantly influence transportation subcontract governance, which in turn positively and significantly affects subcontractor performance ($\beta=0.320$, $p=0.002$). Furthermore, subcontract governance mediates the effects of regulatory compliance ($\beta=0.164$, $p=0.009$) and supervision ($\beta=0.110$, $p=0.013$) on performance, but does not mediate the effect of e-Procurement efficiency. These findings suggest that strong governance mechanisms are critical in translating regulatory and supervisory efforts into improved subcontractor performance.

Keyword: e-Procurement Efficiency, Regulatory Compliance, Supervision, Subcontract Performance, Subcontract Governance

INTRODUCTION

In the era of globalization and digital transformation, the logistics and transportation sector faces increasing demands for efficiency, transparency, and service reliability. For state-owned logistics companies such as PT Pos Indonesia (Persero), managing transportation subcontracts is a strategic element in ensuring smooth distribution, fulfillment of Service Level Agreements (SLA), and customer satisfaction. Suboptimal subcontractor performance can lead to delivery delays, increased operational risks, and declining competitiveness in an increasingly competitive logistics industry (Mentzer et al., 2021; Neely et al., 2020).

PT Pos Indonesia has implemented e-Procurement to improve process efficiency, transparency, and accountability in procurement. Theoretically, e-Procurement enables a more objective, documented, and system-based service provider selection process, thereby reducing transaction costs and minimizing the risk of irregularities (Gunasekaran & Ngai, 2018; Neef, 2021). However, internal performance reports indicate that despite the implementation of e-Procurement, transportation subcontract performance still faces various problems, including delivery delays and SLA violations in several operational areas (LKPP, 2024; PT Pos Indonesia, 2024).

Operational data from the SIMONA system of PT Pos Indonesia recorded a total of 480,757 shipment data managed by two main subcontractor vendors—POSLOG and DDK—spread across 264 hub offices throughout Indonesia. POSLOG handles 56.6% of the total shipping volume, while DDK handles secondary routes with a 42.6% share. This high concentration of volume on two vendors with very broad geographic coverage indicates significant complexity in transportation subcontract management.

Transportation subcontract governance serves as the missing link between systems, regulations, supervisory controls, and operational performance. Based on Agency Theory, subcontract governance functions to minimize conflicts of interest and information asymmetry between the company and subcontractors through structured monitoring and performance evaluation mechanisms (Simons, 2020). Previous studies have tended to examine e-Procurement, regulatory compliance, and supervision separately (Misra & Anantatmula, 2020; Ameyaw et al., 2022). Research integrating all three variables with subcontract governance as a mediating variable—particularly in the context of Indonesian state-owned logistics companies—remains very limited.

This study therefore seeks to fill the research gap by empirically testing the direct and indirect effects of e-Procurement effectiveness, regulatory compliance, and supervision on transportation subcontractor performance through the mediating role of subcontract governance. The research offers a new perspective on why regulatory compliance does not directly affect performance, but can indirectly improve it through strengthened governance mechanisms.

METHOD

This study employs a quantitative approach using Structural Equation Modeling based on Partial Least Squares (PLS-SEM) to test both direct and indirect relationships among variables. PLS-SEM is a variance-based multivariate analysis method that combines factor analysis and regression to test relationships between variables, both among indicators and constructs (Ghozali & Latan, 2020). The research design is descriptive-causal and cross-sectional in nature.

The research population consists of all hub offices at PT Pos Indonesia (Persero) directly involved in managing, supervising, and operating transportation subcontracts. The total population is 265 hub offices. A total of 120 respondents were selected based on Hair et al.'s (2019) sampling guideline, which recommends a minimum of 5–10 times the number of indicators used. Data were collected through a structured questionnaire distributed via Google Form.

The study involves five main variables: (1) e-Procurement Efficiency (X1) measured by process efficiency, cost control, information quality, and user support; (2) Regulatory Compliance (X2) measured by procedural compliance, administrative completeness, legal accountability, and reporting; (3) Supervision (X3) measured by monitoring intensity, field monitoring, performance evaluation, and follow-up; (4) Subcontract Governance (Y1) as the mediating variable, measured by contract clarity, execution accountability, performance control, and contract enforcement; and (5) Subcontract Performance (Y2) measured by

delivery timeliness, SLA compliance, security and reliability, cost efficiency, and service quality. All items were measured using a Likert scale of 1–5.

Analysis was conducted in two stages: (1) outer model evaluation to test validity (convergent validity through outer loading ≥ 0.70 and AVE > 0.50; discriminant validity through the Fornell-Larcker Criterion) and reliability (Cronbach's Alpha and Composite Reliability > 0.70); and (2) inner model evaluation to test R-square, f-square, Q-square, and hypothesis testing using t-statistics (threshold 1.98) and p-values (threshold 0.05) through bootstrapping technique.

RESULTS AND DUSCUSSION

Measurement Model Evaluation

The outer model evaluation results show that all indicators meet the convergent validity criteria. An initial indicator (Y2.5 – overall service reliability satisfaction) had an outer loading of 0.266, below the minimum threshold of 0.50, and was therefore eliminated from the model. After this modification, all remaining indicators have outer loading values ranging from 0.789 to 0.929, well above the minimum threshold.

Table 1. Outer Loading, AVE, and Reliability Values

Variable	α (Cronbach)	rho_A	CR	AVE
e-Procurement Efficiency	0.887	0.901	0.922	0.747
Regulatory Compliance	0.849	0.854	0.899	0.689
Supervision	0.827	0.832	0.885	0.657
Subcontract Governance	0.880	0.881	0.918	0.736
Subcontract Performance	0.879	0.887	0.917	0.735

Source: SmartPLS 4, data processed (2025)

All constructs demonstrate Composite Reliability values exceeding 0.90 and AVE values above 0.50, confirming adequate convergent validity. Discriminant validity assessed via the Fornell-Larcker Criterion confirms that the square root of each construct's AVE is greater than its correlation with other constructs, as shown in Table 2.

Table 2. Discriminant Validity (Fornell-Larcker Criterion)

	e-Proc.	Reg.Comp.	Superv.	Sub.Gov.	Sub.Perf.
e-Procurement Eff.	0.865				
Regulatory Compliance	0.622	0.830			
Supervision	0.365	0.495	0.811		
Subcontract Governance	0.493	0.713	0.615	0.858	
Subcontract Performance	0.632	0.610	0.583	0.672	0.857

Source: SmartPLS 4, data processed (2025)

Structural Model Evaluation

The R-square value for Subcontract Governance is 0.601 (60.1%), and for Subcontract Performance is 0.606 (60.6%), indicating that the model has moderate-to-substantial explanatory power according to Chin's criteria. The Q-square values for both endogenous constructs exceed zero (Governance: 0.426; Performance: 0.423), confirming adequate predictive relevance of the model.

Hypothesis Testing

Table 3. Direct Effects (Path Coefficients – Bootstrapping)

Hypothesis	Path	β	t-stat	p-val	Decision
H1	e-Proc. → Governance	0.049	0.519	0.604	Rejected
H2	Reg.Comp. → Governance	0.512	4.909	0.000	Accepted
H3	Supervision → Governance	0.343	4.076	0.000	Accepted
H4	e-Proc. → Performance	0.365	2.830	0.005	Accepted
H5	Reg.Comp. → Performance	0.039	0.361	0.718	Rejected
H6	Supervision → Performance	0.234	2.435	0.015	Accepted
H7	Governance → Performance	0.320	3.062	0.002	Accepted

Source: SmartPLS 4, data processed (2025)

Table 4. Indirect Effects – Mediation via Subcontract Governance

Hypothesis	Indirect Path	β	t-stat	p-val	Decision
H8	e-Proc. → Gov. → Perf.	0.016	0.443	0.658	Rejected
H9	Reg.Comp. → Gov. → Perf.	0.164	2.627	0.009	Accepted
H10	Supervision → Gov. → Perf.	0.110	2.500	0.013	Accepted

Source: SmartPLS 4, data processed (2025)

Discussion

The finding that e-Procurement efficiency does not significantly affect subcontract governance (β=0.049, p=0.604) but directly improves subcontract performance (β=0.365, p=0.005) is notable. It suggests that the benefits of e-Procurement manifest primarily through streamlining transactional processes—accelerating procurement cycles, improving accuracy, and reducing administrative errors—rather than through strengthening relational governance mechanisms. This aligns with Gunasekaran and Ngai (2018), who argue that e-Procurement yields direct efficiency gains in procurement execution. However, digitalization alone does not automatically enhance governance quality unless accompanied by strong institutional frameworks (Thai, 2021).

Regulatory compliance shows the strongest effect on subcontract governance (β=0.512, p<0.001), confirming that the formal regulatory framework—including Presidential Regulation No. 16 of 2018 and its amendments—serves as the primary institutional foundation for building transparent and accountable subcontract governance. This is consistent with Thai (2021) and Ameyaw et al. (2022), who emphasize that regulatory adherence strengthens contractual clarity and accountability mechanisms. The non-significant direct effect of regulatory compliance on performance (β=0.039, p=0.718) aligns with Robbins and Judge (2020), who note that regulations tend to be normative and preventive, with indirect performance impacts realized only when translated into effective governance practices.

Supervision positively affects both subcontract governance (β=0.343, p<0.001) and performance (β=0.234, p=0.015), demonstrating its dual role as both a governance-strengthening mechanism and a direct performance driver. Simons' (2020) Levers of Control framework is confirmed here: intensive monitoring ensures that deviation detection, corrective action, and SLA enforcement are operationalized continuously, creating both direct operational impact and stronger governance structures.

The mediation results are particularly insightful. Subcontract governance fully mediates the relationship between regulatory compliance and performance (β=0.164, p=0.009) and partially mediates the supervision-performance path (β=0.110, p=0.013). This confirms that governance acts as the operational translation mechanism for institutional-level factors (regulation and supervision). In contrast, governance does not mediate the e-Procurement–performance path (β=0.016, p=0.658), suggesting e-Procurement's performance benefits operate through a different mechanism—direct process efficiency rather than governance quality.

CONCLUSION

This study successfully demonstrates that the relationship between e-Procurement efficiency, regulatory compliance, and supervision with transportation subcontractor performance is both direct and indirect, with subcontract governance playing a critical mediating role. Specifically, e-Procurement efficiency and supervision directly improve subcontractor performance. Regulatory compliance and supervision strengthen subcontract governance, which in turn significantly improves performance. Governance mediates the effect of regulatory compliance and supervision on performance, but not that of e-Procurement efficiency.

These findings contribute theoretically by developing an integrative model that positions subcontract governance as the institutional bridge between systemic digitalization, regulatory compliance, and supervisory controls in a state-owned logistics context. Practically, PT Pos Indonesia is advised to strengthen regulatory compliance enforcement and monitoring consistency at hub offices, while simultaneously developing clearer contract structures, more rigorous SLA enforcement, and more systematic performance evaluation mechanisms. Future research should extend the model to include variables such as managerial capability, partnership quality, digital maturity, and organizational culture, and should consider mixed-methods or longitudinal designs to capture the dynamic nature of subcontract governance.

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