PROCUREMENT ACTOR INDEPENDENCE, E-PROCUREMENT, AND FRAUD PREVENTION: ORGANIZATIONAL COMMITMENT AS A MODERATOR

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Abstract:
Purpose - This study examines how Procurement Actor Independence and E-Procurement are associated with Fraud Prevention, with Organizational Commitment as a moderating variable.
Methods - An explanatory quantitative design was employed using survey data from 148 procurement officials of the Palembang City Government, Indonesia, analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM).
Findings - Procurement Actor Independence shows a significant positive association with Fraud Prevention, whereas the direct association between E-Procurement and Fraud Prevention is positive but non-significant, indicating that digital systems alone are insufficient to ensure effective control. Organizational Commitment moderates both relationships, corresponding to a weaker association for structural independence and a stronger association for digital transparency as commitment increases.
Research Implications - Fraud Prevention effectiveness is associated with the integration of structural autonomy, technological transparency, institutional ethical commitment, and governance capacity within decentralized public procurement systems.
Originality - The study advances an integrated governance perspective in which sustainable procurement governance depends on aligning structural control, technological transparency, and ethical commitment to improve accountability, transparency, and integrity in public sector procurement practices.

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INTRODUCTION

Government procurement is a central instrument of public governance, yet it remains one of the sectors most vulnerable to corruption globally (Waxenecker & Prell, 2024). Tender manipulation, bribery, and collusion have been associated with significant financial losses and declining public trust in government institutions

(Alsamarraie & Ghazali, 2023). In Indonesia, the procurement of goods and services at the local government level accounts for a substantial share of corruption cases. In Palembang City, procurement governance remains vulnerable due to weaknesses in procurement oversight and the complexity of decentralized procurement activities across local government agencies. This condition is reflected in the issuance of a revised procurement circular by the Mayor of Palembang in 2025 to strengthen procurement responsibilities and review mechanisms (Pemerintah Kota Palembang, 2025). These conditions reflect persistent weaknesses in procurement integrity, bureaucratic oversight, and internal control mechanisms, particularly within decentralized administrative settings such as Palembang City, which operates as the administrative hub of South Sumatra. Within such environments, power asymmetries and discretionary authority are often exploited when monitoring systems are insufficient (Mussari et al., 2025).

Effective public procurement governance is generally expected to be achieved through the implementation of transparency, accountability, and independence principles (Periansya et al., 2023; Suardi et al., 2025). The autonomy of procurement entities from political interference and conflicts of interest has been regarded as essential for preventing abuse of authority (Patakyová, 2019; Waxenecker & Prell, 2024). Nevertheless, formal governance structures have not consistently translated into effective Fraud Prevention outcomes, as procurement decisions remain exposed to opportunistic behavior and moral hazard when oversight mechanisms are weak (Mussari et al., 2025).

Digital transformation has been promoted through the adoption of E-Procurement systems to enhance efficiency, transparency, and traceability by reducing direct interaction between suppliers and procurement actors through digital audit trails and publicly accessible information (Chen et al., 2022; Khorana et al., 2024), with corruption risks shown to decline when such systems are supported by effective risk management and institutional capacity (Chawala & Maagi, 2025; Mohamed et al., 2025), including improved market access and protection against fraud in the Indonesian context (Puspita & Gultom, 2024). However, technological safeguards alone have not guaranteed Fraud Prevention effectiveness, as digital systems remain dependent on organizational culture, leadership commitment, and user compliance (Intauno et al., 2024), underscoring that digital governance mechanisms are intrinsically linked to ethical conduct and institutional commitment. Organizational Commitment itself has been identified as a critical factor shaping ethical compliance and behavioral discipline in public organizations, associated with adherence to professional standards and stronger Fraud Prevention outcomes (Niveditha & Padhy, 2024; Rifai & Mardijuwono, 2020), while independence among procurement actors has similarly been linked to objective decision-making and resistance to undue influence (Bhagat & Jha, 2024; Kissi et al., 2025). Although public organizations commonly implement internal control systems, risk-based auditing, and anti-corruption policies supported by transparent and innovative systems, their effectiveness depends on monitoring capacity and ethical enforcement (Silalahi et al., 2023; Tavone et al., 2025), with E-Procurement systems aligned to good governance principles further shown to reduce corruption exposure (Suardi et al., 2025).

Despite these advances, prior studies largely examine technological controls, governance mechanisms, or behavioral factors in isolation, resulting in limited theoretical integration across structural, behavioral, and digital governance perspectives. Empirical findings also remain inconsistent, as some studies report that E-Procurement improves transparency and reduces corruption risk (Chen et al., 2022; Puspita & Gultom, 2024; Suardi et al., 2025), while others find digital systems alone insufficient to prevent fraud due to institutional limitations, implementation gaps, and user compliance issues (Intauno et al., 2024; Dewata et al., 2026). Few studies have examined Organizational Commitment as a moderating mechanism linking procurement governance and Fraud Prevention in decentralized local government contexts (Rifai & Mardijuwono, 2020), and prior research has not sufficiently explained why E-Procurement often fails to translate transparency into measurable fraud reduction (Intauno et al., 2024), whether structural autonomy and ethical commitment act as complementary or substitutive safeguards, or how Organizational Commitment may jointly condition structural and technological controls (Rifai & Mardijuwono, 2020). An integrated explanation that specifies these conditions therefore remains underdeveloped, and it is this mechanism that the present study establishes by examining the direct effects of procurement actor independence and E-Procurement on Fraud Prevention in the Palembang City Government, alongside the moderating role of Organizational Commitment in shaping these relationships, to explain how structural autonomy, digital governance, and institutional commitment jointly influence Fraud Prevention effectiveness within decentralized public sector procurement.

The contribution of this research lies in advancing an integrated governance model that positions Organizational Commitment as a pivotal mechanism linking behavioral autonomy and digital control systems to Fraud Prevention effectiveness. This study is among the first to show that Organizational Commitment exerts two opposing conditioning effects, substituting for structural autonomy (Rifai & Mardijuwono, 2020) while activating technological control (Chen et al., 2022; Suardi et al., 2025), thereby reframing Fraud Prevention as a matter of how governance controls interact rather than how many are present. Specifically, strong commitment may reduce dependence on formal structural autonomy where ethical values are already internalized by procurement actors, while within E-Procurement systems it enhances the effectiveness of digital transparency and procedural compliance by reinforcing ethical behavior and institutional alignment. By synthesizing structural control logic with digital governance and behavioral perspectives, the study moves beyond fragmented approaches, empirically integrating these perspectives into a coherent model tested within a decentralized public sector context rather than introducing a new standalone theory.

THEORETICAL REVIEW

Agency Theory and Fraud Pentagon Theory

Agency Theory is recognized as the foundational theoretical framework for understanding governance relationships within public procurement systems. Conflicts are understood to arise when authority is delegated by principals to agents under conditions of information asymmetry and divergent interests (Jensen &

Meckling, 1976). In public procurement governance, procurement actors are positioned as agents entrusted with decision-making authority while being required to uphold accountability and transparency standards. When independence is weakened, vulnerability to political interference, bureaucratic pressure, and personal interests is increased, thereby heightening exposure to opportunistic behavior and moral hazard (Mussari et al., 2025; Waxenecker & Prell, 2024). Procurement Actor Independence is therefore conceptualized as a behavioral control mechanism through which objectivity is safeguarded and agency conflicts are mitigated (Patakyová, 2019).

While structural monitoring mechanisms are emphasized within Agency Theory, behavioral and psychological drivers of fraudulent conduct are explained through Fraud Pentagon Theory, in which fraud emerges when pressure, opportunity, rationalization, competence, and arrogance converge (Horwath, 2011; Rustiarini et al., 2019). The Pentagon extends the earlier Fraud Triangle (pressure, opportunity, rationalization) and Fraud Diamond (which added capability) with the competence and arrogance dimensions (Vousinas, 2019), and is adopted here because public-procurement fraud is frequently perpetrated by senior officials whose positional authority and technical mastery of procedures enable them to override formal controls, behavioral drivers the simpler frameworks do not fully capture in a decentralized government setting. Within procurement systems, opportunity structures are shaped by institutional transparency and monitoring effectiveness, and weak oversight facilitates rationalization and competence-based manipulation, increasing fraud exposure (Alsamarraie & Ghazali, 2023; Dewata et al., 2026). Integrating Agency Theory and Fraud Pentagon Theory thus provides a multi-level explanation of Fraud Prevention in which structural controls and behavioral drivers are addressed simultaneously (Silalahi et al., 2023; Suardi et al., 2025).

Procurement Actor Independence and Fraud Prevention

Procurement Actor Independence constitutes a fundamental structural safeguard within public procurement governance. When autonomy from political intervention and conflicts of interest is preserved, decision-making processes are insulated from external pressure, thereby strengthening accountability and transparency (Patakyová, 2019). The reinforcement of governance structures and oversight mechanisms constrains discretionary abuse and limits moral hazard (Mussari et al., 2025). Institutional independence has consequently been associated with higher integrity standards and lower corruption risk in public sector contexts (Alsamarraie & Ghazali, 2023; Bhagat & Jha, 2024).

Agency Theory posits that opportunistic behavior emerges when authority is delegated by principals to agents under conditions of information asymmetry (Jensen & Meckling, 1976); independence reduces this asymmetry by restricting undue influence and narrowing the scope for concealed decision-making, functioning as a behavioral control mechanism through which procurement actors act in alignment with institutional objectives rather than personal or political interests, thereby curtailing opportunities for hidden actions and collusion. Within the Fraud Pentagon framework, fraud materializes when opportunity converges with pressure, rationalization, competence, and arrogance (Horwath, 2011; Rustiarini et al., 2019), and structural independence constrains discretionary abuse by strengthening procedural objectivity, transparency, and accountability. Through the combined logic

of agency alignment, opportunity reduction, and increased detection probability, Procurement Actor Independence is expected to enhance Fraud Prevention effectiveness in public procurement systems.

H1: Procurement Actor Independence is positively associated with Fraud Prevention in public procurement.

E-Procurement and Fraud Prevention

E-Procurement systems are defined as institutional mechanisms through which transparency, traceability, and accountability in procurement transactions are enhanced (Chen et al., 2022). Direct interaction between suppliers and procurement actors is reduced through digital platforms, and traceable audit trails are generated to strengthen monitoring capacity (Zahra et al., 2021). From the Fraud Pentagon perspective, opportunity structures are constrained when digital transparency mechanisms are implemented (Horwath, 2011; Rustiarini et al., 2019).

From an Agency Theory standpoint, information asymmetry constitutes a central source of opportunistic behavior in delegated governance relationships (Jensen & Meckling, 1976). E-Procurement reduces this asymmetry by standardizing procedures, documenting transactions in real time, and enabling ex post verification. Through embedded digital workflows, discretionary opacity is narrowed and hidden actions become more observable, thereby aligning agent behavior more closely with principal interests.

Improved operational efficiency and reduced corruption exposure have been associated with E-Procurement implementation in public sector contexts (Kerr & Khorana, 2021; Puspita & Gultom, 2024; Zahra et al., 2021). However, technological controls are regarded as institutional instruments whose effectiveness depends on organizational capacity and ethical reinforcement (Intauno et al., 2024).

E-Procurement should therefore be understood not as a substitute for traditional internal controls but as an embedded control mechanism within the broader public sector accounting and governance architecture. Digital platforms function simultaneously as preventive controls, by restricting unauthorized procedural deviations, and as detective controls, by generating systematic audit trails that facilitate oversight and accountability. E-Procurement enhances transparency and traceability through digital audit mechanisms that strengthen monitoring effectiveness and reduce opportunities for opportunistic behavior.

Nevertheless, behavioral adaptation remains theoretically possible, as actors may attempt to exploit residual system loopholes or engage in collusion outside digital platforms. The effectiveness of E-Procurement is therefore understood as reducing, rather than completely eliminating, opportunity structures. Even so, the structural constraints imposed by digital standardization are expected to significantly limit discretionary manipulation compared to manual procurement environments. It should be noted, however, that the empirical evidence on this relationship is mixed. Several studies report that the adoption of E-Procurement does not, on its own, produce significant reductions in fraud or corruption, owing to implementation gaps, limited institutional readiness, and weak user compliance (Ariani & Setyaningrum, 2023; Intauno et al., 2024; Dewata et al., 2026). These findings suggest that a non-significant direct effect of E-Procurement is theoretically plausible and motivate the examination of Organizational Commitment as a conditioning factor. Within this

integrated theoretical logic, E-Procurement is expected to contribute positively to Fraud Prevention by reducing information asymmetry, constraining opportunity structures, embedding preventive and detective controls, and increasing perceived detection probability.

H2: E-Procurement is positively associated with Fraud Prevention in public procurement.

Organizational Commitment as a Moderating Variable

Organizational Commitment is conceptualized as a normative alignment mechanism through which institutional values are internalized and translated into disciplined organizational behavior (Niveditha & Padhy, 2024). Unlike structural governance instruments, commitment is not designed as a direct procedural control; rather, it is manifested as an internalized value system through which formal rules, autonomy safeguards, and digital mechanisms are interpreted and enacted within organizational contexts.

Within Agency Theory, monitoring structures and independence safeguards are established to constrain opportunistic behavior arising from conflicts between principals and agents (Jensen & Meckling, 1976). Organizational Commitment functions as a normative governance mechanism through which institutional values and behavioral discipline strengthen the effectiveness of structural governance controls in Fraud Prevention. Beyond this conditioning role, Organizational Commitment is also expected to be directly associated with Fraud Prevention. From an Agency Theory perspective, committed agents internalize principal objectives and therefore require less external monitoring to act with integrity, which lowers the propensity for opportunistic conduct. From a Fraud Pentagon perspective, strong commitment weakens the rationalization vertex, namely the cognitive justification that enables individuals to neutralize the ethical implications of fraud, so that highly committed procurement actors are less able to rationalize misconduct even where opportunity exists. Empirically, Organizational Commitment has been linked to ethical compliance, professional discipline, and anti-fraud behavior in public organizations (Niveditha & Padhy, 2024; Rifai & Mardijuwono, 2020), providing the theoretical basis for hypothesizing a direct anti-fraud association in addition to its moderating role. In the absence of normative alignment, formal autonomy may still allow moral hazard to persist despite procedural safeguards. Organizational Commitment is therefore theorized not only as a reinforcement mechanism through which institutional values strengthen behavioral discipline, but also as a substitution mechanism in which strong ethical internalization may reduce dependence on formal structural autonomy in preventing opportunistic behavior (Rifai & Mardijuwono, 2020).

Similarly, within the Fraud Pentagon framework, fraud risk is understood to emerge not only from opportunity structures but also from rationalization and behavioral capability (Horwath, 2011; Rustiarini et al., 2019). Organizational Commitment also conditions the effectiveness of E-Procurement systems by reinforcing ethical compliance and institutional alignment within digital governance processes. Although opportunity structures are constrained through E-Procurement systems that enhance transparency and traceability (Chen et al., 2022), rationalization processes may continue when ethical climates are insufficiently institutionalized

(Alsamarraie & Ghazali, 2023). The effectiveness of digital governance mechanisms is therefore conditioned by Organizational Commitment, through which rationalization tendencies are constrained and ethical self-regulation is reinforced (Bhagat & Jha, 2024).

Accordingly, Organizational Commitment is positioned as a moderating variable rather than a direct antecedent because its primary function lies in conditioning the translation of structural and technological controls into behavioral outcomes. From an Agency Theory perspective, structural autonomy functions as a safeguard that compensates for the absence of trust (Jensen & Meckling, 1976); when committed agents have already internalized principal objectives, the need for such autonomy declines, explaining the negative interaction in H4 (Rifai & Mardijuwono, 2020). The reverse holds for technological control, as E-Procurement narrows information asymmetry only when agents respond to the signals it produces (Jensen & Meckling, 1976) and, while it restricts opportunity, leaves rationalization untouched (Horwath, 2011; Rustiarini et al., 2019); Organizational Commitment supplies the ethical restraint the system lacks (Alsamarraie & Ghazali, 2023; Bhagat & Jha, 2024), explaining the positive interaction in H5. The opposing signs of the two interactions thus emerge from one coherent theoretical logic, in which high commitment reduces reliance on formal independence as ethical values become internalized, so that Fraud Prevention effectiveness is enhanced when structural autonomy and digital transparency operate within a context of strong institutional value internalisation.

H3: Organizational Commitment is positively associated with Fraud Prevention in public procurement.

H4: Organizational Commitment negatively moderates the association between Procurement Actor Independence and Fraud Prevention, corresponding to a weaker association as commitment increases.

H5: Organizational Commitment positively moderates the association between E-Procurement and Fraud Prevention, corresponding to a stronger association as commitment increases.

Fraud prevention is conceptualized as the outcome of interactions among procurement actor independence, E-Procurement implementation, and Organizational Commitment within decentralized public procurement governance. Procurement Actor Independence and E-Procurement are positioned as structural and technological governance controls that directly influence Fraud Prevention effectiveness, while Organizational Commitment functions both as a direct governance factor and as a moderating construct that conditions the effectiveness of these controls through ethical alignment and institutional value internalization. The proposed model integrates five hypothesized relationships into a single coherent framework. Procurement Actor Independence (H1) and E-Procurement (H2) are theorized as structural and technological controls that directly influence Fraud Prevention, while Organizational Commitment (H3) operates as a normative governance factor with a direct anti-fraud effect. Beyond these direct paths, Organizational Commitment is hypothesized to moderate the two structural relationships in opposite directions, substituting for Procurement Actor Independence (H4), such that the marginal value of structural autonomy declines as ethical commitment increases, and activating E-Procurement (H5), such that the

preventive potential of the digital system is realized only when commitment is strong. This dual conditioning logic, substituting structural autonomy while activating technological control, constitutes the study's central theoretical contribution.

RESEARCH METHODS

An explanatory quantitative design was employed to examine relationships between Procurement Actor Independence, E-Procurement, and Fraud Prevention, with Organizational Commitment positioned as a moderating variable. Given that the study adopts a cross-sectional and correlational design, the estimated relationships reflect statistical associations rather than causal effects (Hair et al., 2022). Causal interpretation is therefore avoided throughout the analysis.

The model was developed by integrating Agency Theory (Jensen & Meckling, 1976) and Fraud Pentagon Theory (Horwath, 2011) to explain how behavioral autonomy and digital control mechanisms are associated with Fraud Prevention effectiveness in public procurement governance. Agency Theory was used to provide the rationale for actor independence based on control mechanisms, while Fraud Pentagon Theory was used to emphasize ethical and behavioral drivers of fraud risk.

The population comprised Palembang City Government employees directly involved in public procurement activities, including Budget Users, Technical Activity Implementing Officers, finance staff, and Planning Division and the Goods and Services Procurement Working Group. A saturated sampling technique was applied in which all 154 eligible procurement personnel were included as research respondents. This sample size met the minimum requirement for PLS-SEM estimation, which recommends at least ten times the largest number of structural paths directed at a construct (Hair et al., 2022). Data were collected in October 2025 using a structured questionnaire measured on a five-point Likert scale ranging from strongly disagree to strongly agree.

The instrument was developed based on Agency Theory (Jensen & Meckling, 1976) and Fraud Pentagon Theory (Horwath, 2011), and items were adapted from prior empirical studies. The questionnaires were distributed both directly and through Google Forms, resulting in 148 questionnaires that were valid and eligible for data analysis. The six remaining questionnaires were excluded during data screening because of incomplete responses, yielding a usable response rate of 96.1 percent. Prior to full deployment, the instrument was pilot-tested to assess item validity and reliability and was refined accordingly before wide distribution. In terms of respondent composition, the sampling frame comprised Budget Users (32), Technical Activity Implementing Officers (32), finance staff (32), and Planning Division and Procurement Working Group members (58), thereby capturing the principal hierarchical roles involved in procurement decision-making. The distribution of respondents across these roles supports the representativeness of the sample, and potential perceptual heterogeneity across roles was further addressed statistically through Harman's single-factor test and full-collinearity assessment.

The use of a saturated (census) technique is appropriate because officials holding formal procurement authority constitute a small and fully enumerable population. Including the entire group eliminates sampling error within the frame and satisfies the ten times rule recommended for PLS-SEM estimation (Hair et al., 2022).

Accordingly, the design permits inference to this specific population and supports analytic rather than statistical generalization toward settings that share comparable institutional characteristics (Mussari et al., 2025; Waxenecker & Prell, 2024). Any extension to other jurisdictions should be regarded as a matter for future replication.

Four latent constructs were examined: Procurement Actor Independence (X_1), E-Procurement (X_2), Organizational Commitment (M), and Fraud Prevention (Y). Procurement Actor Independence (X_1) refers to the autonomy and professional objectivity of procurement actors in carrying out procurement duties free from political intervention, conflicts of interest, and external influence in decision-making processes (KNKG, 2021; Mussari et al., 2025; Waxenecker & Prell, 2024). E-Procurement (X_2) refers to the use of electronic procurement systems to support fraud detection and Fraud Prevention through digital transparency, accountability, monitoring, and control mechanisms in public procurement processes (Indonesia Corruption Watch, 2025; KNKG, 2021). Organizational Commitment (M) refers to employees' emotional attachment, moral responsibility, and integrity-oriented commitment toward the organization that encourage adherence to institutional values, ethical conduct, and anti-fraud behavior within public procurement governance. The construct was developed based on the three-component Organizational Commitment model proposed by Allen and Meyer (1996) and contextualized to the public procurement and Fraud Prevention environment. Fraud Prevention (Y) refers to organizational efforts to prevent and detect fraud through legal compliance, transparency, accountability, internal control, public oversight, and ethical anti-fraud practices in public procurement governance (Periansya et al., 2023; Pope, 2008). All constructs were operationalized as reflective latent variables measured using a five-point Likert scale, with indicators adapted from prior empirical studies and adjusted to the institutional characteristics of public procurement governance within the Palembang City Government context to ensure contextual relevance and measurement consistency. The operational indicators for each construct are presented in Table 1.

Table 1. Operational Definition of Variables

Variable	Indicators	Scale
Procurement Actor Independence (X_1)	1. Freedom from political intervention. 2. Avoidance of conflict of interest. 3. Objectivity and professionalism. 4. Decision-making autonomy.	Five-point Likert Scale
E-Procurement (X_2)	1. Fraud Detection. 2. Fraud Prevention.	Five-point Likert Scale
Organizational Commitment (M)	1. Affective commitment. 2. Normative commitment. 3. Ethical and anti-fraud commitment.	Five-point Likert Scale
Fraud Prevention (Y)	1. Legal and regulatory framework. 2. Transparency in procurement processes. 3. Accountability and internal control mechanisms. 4. Detection and reporting systems. 5. Public oversight and participation. 6. Ethical culture and anti-fraud awareness.	Five-point Likert Scale

Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4.0. Moderation effects were examined using the two-stage approach within SmartPLS, which is recommended for prediction-oriented moderation analysis involving latent interaction terms (Hair et al., 2022). The analysis comprised evaluation of both the measurement model and the structural model. Convergent validity, composite reliability, average variance extracted (AVE), the Fornell–Larcker criterion, and the heterotrait–monotrait ratio (HTMT) were assessed to evaluate measurement quality (Hair et al., 2022). Structural relationships and moderating effects were tested through bootstrapping with 5,000 resamples. Model explanatory power and predictive relevance were evaluated using R^2, Q^2, and f^2, while variance inflation factor (VIF) values were examined to assess multicollinearity. Specifically, the two-stage approach was used to construct the latent interaction terms (X1×M and X2×M): latent variable scores estimated in the first stage were used to generate the product terms in the second stage. This approach is recommended for prediction-oriented moderation analysis in PLS-SEM (Hair et al., 2022). Collinearity was assessed at both the indicator (outer) level and the structural (inner) level. At the structural level, the inner VIF values for the predictors of Fraud Prevention were 2.545 (Independence), 3.526 (E-Procurement), 2.426 (Organizational Commitment), 3.226 (Independence × Commitment), and 2.986 (E-Procurement × Commitment), all below the threshold of 5.0 (Hair et al., 2022), confirming the absence of multicollinearity at the path level.

Common method bias was assessed using procedural and statistical procedures. Respondent anonymity was maintained during data collection. Harman's single-factor test was conducted, and the first unrotated factor accounted for less than 50 percent of the total variance. Full collinearity variance inflation factor values were examined, and values below 3.3 were observed for all constructs.

RESULTS AND DISCUSSION

Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4.0, following the two-step evaluation of the measurement and structural models consisting of measurement model evaluation (outer model) and structural model evaluation (inner model), with the sample of 148 respondents meeting the minimum requirement for PLS-SEM estimation (Hair et al., 2022). The measurement model was assessed through convergent validity, internal consistency reliability, and discriminant validity; as presented in Table 2, all indicators exhibited loading factors above 0.70 and all constructs demonstrated AVE values exceeding 0.50, indicating adequate convergent validity (Hair et al., 2022).

Table 2. Convergent Validity Results (Loading Factor and AVE)

Construct	Indicator	Loading Factor	AVE	Criteria
Procurement Actor Independence (X_1)	X1.1	0.852	0.746	Valid
	X1.2	0.908		Valid
	X1.3	0.792		Valid
	X1.4	0.897		Valid
E-Procurement (X2)	X2.1	0.865	0.792	Valid
	X2.2	0.914		Valid
	M1	0.877	0.692	Valid

Construct	Indicator	Loading Factor	AVE	Criteria
Organizational Commitment (M)	M2	0.737		Valid
	M3	0.874		Valid
Fraud Prevention (Y)	Y1	0.715	0.657	Valid
	Y2	0.833		Valid
	Y3	0.793		Valid
	Y4	0.853		Valid
	Y5	0.802		Valid
	Y6	0.859		Valid

Source: Processed from primary data with SmartPLS 4, 2025

All indicators demonstrated loading factors above 0.70, and all constructs exceeded the AVE threshold of 0.50, indicating adequate convergent validity. The AVE values reported in Table 2 were recalculated and synchronized with the Fornell–Larcker criterion presented in Table 3 to ensure consistency in the measurement model evaluation. As shown in Table 3, the square root of AVE for each construct exceeded its correlations with other constructs, confirming that the discriminant validity requirements were fulfilled. The highest loading factors were observed in the indicators related to procurement autonomy (avoidance of conflict of interest, decision-making autonomy), digital fraud detection and prevention capability, and affective and ethical commitment, indicating that these dimensions strongly represent their respective latent constructs. These findings confirm that the measurement model demonstrates satisfactory indicator reliability and construct validity for further structural model analysis.

Table 3. Results of Discriminant Validity Test (Fornell-Larcker Criterion)

Construct	Fraud Prevention (Y)	Independence (X1)	Organizational Commitment (M)	E-Procurement (X2)
Fraud Prevention (Y)	0.811	-	-	-
Independence (X1)	0.751	0.863	-	-
Organizational Commitment (M)	0.567	0.569	0.832	-
E-Procurement (X2)	0.650	0.716	0.765	0.890

Source: Processed from primary data with SmartPLS 4, 2025

Discriminant validity was further assessed using the Heterotrait–Monotrait (HTMT) ratio presented in Table 4, where values below 0.90 indicate adequate discriminant validity (Hair et al., 2022). All construct pairs remained below this threshold, including the highest pair, Procurement Actor Independence (X1) and E-Procurement (X2), whose HTMT value of 0.887 lies below the conservative 0.90 criterion, thereby satisfying the requirement for discriminant validity. The second-highest pair, Organizational Commitment (M) and E-Procurement (X2), recorded an HTMT value of 0.826, likewise within the acceptable range. This result is consistent with the Fornell–Larcker criterion reported in Table 3, in which the square root of each construct's AVE exceeds its correlations with the other constructs. Bootstrapping with 5,000 resamples further confirmed that all indicator loadings were statistically significant, with bias-corrected 95% confidence intervals excluding zero, supporting the stability of the measurement model. Although these constructs are conceptually proximate because they operate within the same procurement governance

environment, the empirical evidence confirms that all four remain theoretically and statistically distinguishable.

Table 4. Heterotrait-Monotrait (HTMT) Ratio

HTMT ratios	Y	X1	M	X2	M × X1
Fraud Prevention (Y)					
Independence (X1)	0.820				
Organizational Commitment (M)	0.646	0.669			
E-Procurement (X2)	0.784	0.887	0.826		
Organizational Commitment × Independence (X1×M)	0.166	0.157	0.113	0.073	
Organizational Commitment × E-Procurement (X2×M)	0.148	0.068	0.117	0.118	0.785

Source: Processed from primary data with SmartPLS 4, 2025

Internal consistency reliability was assessed using Cronbach's Alpha and Composite Reliability (CR). As reported in Table 5, all constructs achieved values above 0.70, confirming strong internal consistency. These results indicate that the measurement instrument demonstrated satisfactory reliability and validity.

Table 5. Results of Construct Reliability Test

Construct	Cronbach's Alpha (α)	Composite Reliability (CR)	Criteria
Independence (X1)	0.887	0.921	> 0.70
E-Procurement (X2)	0.740	0.884	> 0.70
Organizational Commitment (M)	0.783	0.870	> 0.70
Fraud Prevention (Y)	0.895	0.920	> 0.70

Source: Processed from primary data with SmartPLS 4, 2025

The research instrument meets reliability criteria because all constructs reached Cronbach's Alpha and Composite Reliability values higher than 0.70. The indicators within each construct demonstrate strong internal consistency which enables the model to advance to inner model testing.

The structural model (inner model) examined the associations among constructs and their relationship with Fraud Prevention (Y). As shown in Table 6, all VIF values (2.426–3.526) were below the threshold of 5.0, indicating no multicollinearity (Hair et al., 2022), and f^2 results showed Independence (X1) with a substantive effect size, while E-Procurement (X2) and Organizational Commitment (M) showed relatively small effect sizes.

Table 6. Collinearity Statistics (VIF) and F-Square

Latent Variable / Indicator	VIF	F-Square (f^2)
Independence (X1)	2.545	0.238
E-Procurement (X2)	3.526	0.026
Organizational Commitment (M)	2.426	0.023
Organizational Commitment × Independence (X1×M)	3.226	0.055
Organizational Commitment × E-Procurement (X2×M)	2.986	0.045

Source: Processed from primary data with SmartPLS 4, 2025

As reported in Table 7, the R^2 value of 0.619 indicates that Independence (X1), E-Procurement (X2), Organizational Commitment (M), and their interaction terms explained 61.9 percent of the variance in Fraud Prevention (Y), with an adequate Q^2 of 0.386. Fraud Prevention effectiveness is thus shaped by both direct structural controls and the interaction among governance mechanisms.

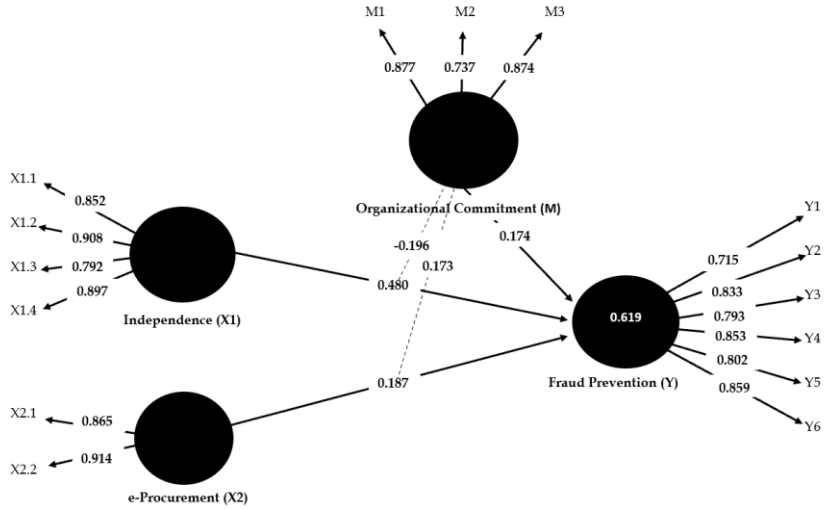
Table 7. R-Square and Q-Square Values

Latent Variable (Endogenous)	R-Square (R^2)	Category	Q-Square (Q^2)
Fraud Prevention (Y)	0.619	Moderately strong	0.386

Source: Processed from primary data with SmartPLS 4, 2025

Figure 1 shows the results of the structural model estimation using SmartPLS 4, illustrating the relationships between latent variables and the moderating effect of Organizational Commitment (M) on the relationship between Independence (X1) and E-Procurement (X2) with Fraud Prevention (Y).

Figure 1. Path Model of Hypothesis Testing



Source: Processed from primary data with SmartPLS 4, 2025

Table 8 presents the structural model results, including the path coefficients, significance levels, and hypothesis-testing outcomes for the five hypothesized relationships.

Table 8. Path Coefficients and Hypothesis Testing Results

Hypothesis	Path	(β)	T-Statistics	P-Values	Result
H1	Independence → Fraud Prevention	0.480	4.701	< 0.001	Significant
H2	E-Procurement → Fraud Prevention	0.187	1.878	0.060	Not Significant
H3	Organizational Commitment → Fraud Prevention	0.147	1.960	0.050	Significant
H4	Independence × Commitment → Fraud Prevention	-0.196	2.533	0.011	Significant
H5	E-Procurement × Commitment → Fraud Prevention	0.173	2.530	0.011	Significant

Source: Processed from primary data with SmartPLS 4, 2025

Independence (X1) showed a positive, significant association with Fraud Prevention (Y) (β = 0.480; p < 0.001), while E-Procurement (X2) showed a positive but non-significant association (β = 0.187; p = 0.060), suggesting digital systems alone are not sufficient to improve fraud prevention. Organizational Commitment showed a

positive, significant direct association (β = 0.147; p = 0.050) and significantly moderated both structural relationships: negatively for Independence (β = -0.196; p = 0.011), corresponding to a weaker association with Fraud Prevention as commitment increases, and positively for E-Procurement (β = 0.173; p = 0.011), corresponding to a stronger association as commitment increases. Together with the two interaction terms, these predictors explained 61.9 percent of the variance in Fraud Prevention (R^2 = 0.619).

To clarify the form of the two moderating effects, a simple-slope analysis was conducted. The conditional effect of each structural predictor on Fraud Prevention was computed at low (−1 SD), mean, and high (+1 SD) levels of Organizational Commitment, as reported in Table 9.

Table 9. Simple Slope Analysis of the Moderating Effects

Level of Organizational Commitment (M)	Simple Slope: Independence (X1) → Fraud Prevention (Y)	Simple Slope: E-Procurement (X2) → Fraud Prevention (Y)
Low (−1 SD)	0.676	0.014
Mean	0.480	0.187
High (+1 SD)	0.284	0.360

Note: Simple slopes computed from the standardized path coefficients (Independence→Y = 0.480; E-Procurement→Y = 0.187; X1×M = −0.196; X2×M = 0.173).

Source: Processed from primary data with SmartPLS 4, 2025.

Table 9 makes the two moderation patterns explicit. For Procurement Actor Independence, the slope declines from 0.676 to 0.284 as commitment rises, confirming a substitution mechanism. For E-Procurement, the slope rises from a near-zero 0.014 to 0.360, confirming an activation mechanism realized only under strong commitment. Together, these patterns show that Organizational Commitment reconfigures, rather than uniformly strengthens, the contribution of structural and technological controls: formal independence adds little where commitment is already strong, whereas E-Procurement delivers value mainly when paired with it. A digital platform should therefore be accompanied by deliberate commitment-building efforts rather than treated as a self-sufficient anti-fraud solution (Intauno et al., 2024; Suardi et al., 2025).

Procurement Actor Independence and Fraud Prevention

The findings indicate that H1 is supported, as Procurement Actor Independence is positively associated with Fraud Prevention, suggesting that greater autonomy and freedom from political interference are linked to greater fraud prevention effectiveness in public procurement. In line with Agency Theory, independent actors reduce principal–agent conflicts and strengthen monitoring capacity (Jensen & Meckling, 1976), while Fraud Pentagon Theory explains that effective control mechanisms limit the abuse of authority (Horwath, 2011), consistent with prior studies showing that institutional independence and professional autonomy are critical to preventing corruption and strengthening public sector integrity (Chen et al., 2022; Periansya et al., 2023; Tavone et al., 2025; Waxenecker & Prell, 2024).

Among the independence indicators, avoidance of conflict of interest (loading = 0.908) and decision-making autonomy (loading = 0.897) demonstrated the strongest loadings, indicating that impartial decision-making and freedom from interference represent the primary structural condition associated with fraud prevention outcomes, reflecting the empirical conditions within the Palembang City Government,

where decentralized procurement activities require stronger institutional oversight and protection from political intervention. From an Agency Theory perspective, reducing political intervention constrains hidden actions and mitigates information asymmetry (Jensen & Meckling, 1976), stabilizing the alignment between principal objectives and agent behavior and reducing opportunistic deviation.

Within the Fraud Pentagon framework, fraud risk materializes when opportunity converges with pressure, rationalization, competence, and arrogance (Horwath, 2011; Rustiarini et al., 2019); independence weakens the opportunity dimension by reducing informal intervention and conflicts of interest, positioning actor independence, consistent with prior evidence (Chen et al., 2022; Tavone et al., 2025; Waxenecker & Prell, 2024), as an empirically supported structural mechanism that modifies opportunity structures and strengthens behavioral constraints within public procurement governance.

E-Procurement and Fraud Prevention

The results indicate that H2 is not supported, as E-Procurement shows no significant association with Fraud Prevention, although the association is marginal ($\beta = 0.187$; $p = 0.060$) and would reach significance at the 10% level, suggesting a positive trend rather than a complete absence of association. As shown in the moderation analysis (H5), this latent association becomes substantively meaningful under strong Organizational Commitment. From the standpoint of Agency Theory, monitoring mechanisms operate effectively only when agent behavior aligns with principal objectives (Jensen & Meckling, 1976), while Fraud Pentagon Theory clarifies that lowering opportunity does not by itself remove the rationalization and capability drivers of fraud (Horwath, 2011). This pattern echoes earlier findings that digital procurement reforms may not yield measurable integrity gains without adequate institutional readiness and ethical culture (Ariani & Setyaningrum, 2023; Suardi et al., 2025).

Fraud detection (loading = 0.865) and fraud prevention (loading = 0.914) indicators loaded strongly on the E-Procurement construct, yet the absence of a significant structural association suggests that these mechanisms do not automatically translate into improved fraud prevention. Three mechanisms explain this pattern. E-Procurement mainly restricts discretion at the documentation and tendering stage, leaving fraud risk to persist upstream in specification and budgeting and downstream in contract supervision. Its audit trails curb opportunity but leave rationalization and capability untouched (Horwath, 2011), deterring misconduct only where actively reviewed rather than merely generated. Its preventive potential is realized only under strong ethical commitment, consistent with evidence that digital reform succeeds only with adequate institutional readiness (Intauno et al., 2024). This finding should not be overgeneralized beyond the single decentralized city government studied.

Organizational Commitment and Fraud Prevention

The results indicate that H3 is supported, as Organizational Commitment is positively associated with Fraud Prevention. This finding suggests that stronger emotional attachment, moral responsibility, and ethical alignment within public institutions are linked to more effective fraud prevention practices. From an Agency Theory perspective, organizational commitment is associated with stronger behavioral alignment between institutional objectives and procurement actors,

corresponding to lower opportunistic behavior and governance deviation (Jensen & Meckling, 1976). Within the Fraud Pentagon framework, strong organizational commitment is associated with weaker rationalization and stronger ethical restraint in procurement activities (Horwath, 2011). The significant positive coefficient therefore indicates that internalized institutional values and ethical responsibility are directly associated with stronger fraud prevention effectiveness in public procurement governance. It should be noted, however, that this direct association lies exactly at the boundary of the conventional significance threshold ($\beta = 0.147$; $p = 0.050$). The finding should therefore be interpreted with caution as suggestive rather than conclusive evidence, and its robustness warrants confirmation in larger samples. This caveat is also consistent with the close conceptual proximity between Organizational Commitment and E-Procurement discussed in the measurement-model evaluation.

Organizational Commitment as a Moderating Variable

The results indicate that Organizational Commitment significantly moderates the association between Procurement Actor Independence and Fraud Prevention, supporting H4. The negative interaction coefficient shows that the positive association between independence and fraud prevention becomes weaker as commitment increases, reflecting a substitution mechanism between structural and normative controls in which strong ethical internalization is linked to reduced reliance on formal autonomy as the primary safeguard against opportunistic behavior. The strongest loadings were observed for indicators of affective commitment (loading = 0.877) and ethical and anti-fraud commitment (loading = 0.874), indicating that behavioral alignment is maintained through value internalization rather than structural insulation alone. From an Agency Theory perspective, independence constrains principal–agent conflicts by limiting hidden actions (Jensen & Meckling, 1976), yet when agents internalize organizational objectives through strong commitment, behavioral alignment can occur even without maximal structural autonomy. Within the Fraud Pentagon framework, high commitment is associated with weaker rationalization and reduced behavioral permissiveness (Horwath, 2011), extending the theory by showing that fraud's behavioral drivers are normatively, not only structurally, constrained.

Organizational Commitment is also associated with a stronger relationship between E-Procurement and Fraud Prevention, supporting H5, with the positive interaction coefficient reflecting a complementarity mechanism in which digital transparency becomes more effective under strong ethical alignment, consistent with Agency Theory's premise that monitoring systems function effectively when incentives align with organizational objectives (Jensen & Meckling, 1976) and Fraud Pentagon Theory's emphasis that opportunity reduction must be paired with ethical restraint (Horwath, 2011). Because the direct association of E-Procurement is not significant (H2), commitment functions as an activating condition rather than an amplifier, as the simple-slope analysis (Table 9) shows its association with Fraud Prevention rising from a negligible 0.014 at low commitment to 0.360 at high commitment, indicating that technological controls are enabling rather than self-sufficient instruments. Collectively, these findings show that fraud prevention is associated with layered governance mechanisms in which structural safeguards,

digital monitoring, and internalized values interact conditionally rather than additively; the novelty of this study lies in identifying this dual conditioning pattern, in which Organizational Commitment substitutes for structural independence while complementing digital transparency, integrating perspectives prior studies examined separately and advancing Agency Theory and Fraud Pentagon Theory in a decentralized digital procurement context. This pattern reflects one decentralized setting rather than a universal law and may depend on institutional stability, digital maturity, and ethical enforcement strength, warranting further replication (Mussari et al., 2025; Dewata et al., 2026).

CONCLUSION

This study examined the association of Procurement Actor Independence and E-Procurement with Fraud Prevention, with Organizational Commitment as a moderating variable. Procurement Actor Independence is significantly and positively associated with Fraud Prevention, confirming that professional autonomy and freedom from political interference are relevant to anti-fraud governance. E-Procurement shows a positive but non-significant direct association, indicating that digital systems alone cannot ensure fraud control without institutional readiness and ethical reinforcement. Organizational Commitment shows a positive direct association and also moderates both structural relationships, corresponding to reduced reliance on individual autonomy and a stronger association involving digital systems. Fraud control therefore appears most effective when structural independence, technological transparency, and ethical commitment operate in alignment, advancing an integrated governance model in which Organizational Commitment conditions the link between behavioral autonomy, digital control, and fraud prevention.

Practically, public institutions are advised to strengthen procurement actor independence, enhance digital system readiness, cultivate integrity-based leadership, and improve compliance monitoring and anti-fraud training within E-Procurement systems. Several limitations should nonetheless be acknowledged. The cross-sectional design and the focus on procurement personnel within the Palembang City Government constrain the generalizability of the findings and preclude causal inference regarding the observed associations. Three measurement caveats warrant caution: the E-Procurement construct's reliance on only two dimension-level composites, below the recommended three-indicator minimum; the direct association of Organizational Commitment sitting at the boundary of significance ($p = 0.050$); and the relatively high HTMT value between Procurement Actor Independence and E-Procurement (0.887), which, while below the 0.90 threshold, indicates that these two constructs warrant continued attention to discriminant validity in future measurement refinement.

Future research could address these limitations by adopting a longitudinal or time-lagged design to strengthen inference beyond common method variance and move closer to causal interpretation, replicating the model across other decentralized local governments to test generalizability, employing mixed-methods approaches to capture contextual and behavioral nuances not observable through self-reported

survey data, and incorporating additional moderators such as leadership integrity and digital literacy.

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