

Corruption Risks in Indonesian Local Government Procurement: Evaluating Digital Procurement as an Anti-Corruption Instrument

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DOI: <https://doi.org/10.65815/1exfrs04>

Submitted: 28-09-2025

Revised: 20-11-2025, 21-02-2026

Accepted: 15-03-2026

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Abstract

Public procurement represents a significant area of corruption risk because government contracts involve substantial financial resources and interactions between public officials and private businesses. Indonesia has expanded electronic procurement systems to improve transparency, standardization, and competition. This article examines whether digital procurement mechanisms effectively reduce corruption risks in Indonesian local governments. Using normative juridical and policy analysis, the study evaluates electronic procurement regulations, transparency requirements, procurement processes, conflict-of-interest controls, and monitoring mechanisms. The article argues that digitalization can reduce opportunities for certain forms of manipulation but cannot eliminate corruption when collusion occurs outside the digital platform or when procurement specifications are designed to favor particular suppliers. The study proposes an integrated anti-corruption framework combining digital transparency with beneficial ownership disclosure, conflict-of-interest declarations, procurement analytics, whistleblower protection, and independent monitoring. Particular attention is given to local governments where institutional capacity and oversight quality may vary significantly. The article concludes that electronic procurement should be understood as an enabling technology rather than a complete anti-corruption solution. Effective corruption prevention requires technological systems to be supported by institutional independence, data analysis, and meaningful enforcement.

[Pengadaan publik merupakan area risiko korupsi yang signifikan karena kontrak pemerintah melibatkan sumber daya keuangan yang besar dan interaksi antara pejabat publik dan bisnis swasta. Indonesia telah memperluas sistem pengadaan elektronik untuk meningkatkan transparansi, standardisasi, dan persaingan. Artikel ini mengkaji apakah mekanisme pengadaan digital efektif mengurangi risiko korupsi di pemerintah daerah Indonesia. Dengan menggunakan analisis yuridis dan kebijakan normatif, studi ini mengevaluasi

peraturan pengadaan elektronik, persyaratan transparansi, proses pengadaan, pengendalian konflik kepentingan, dan mekanisme pemantauan. Artikel ini berpendapat bahwa digitalisasi dapat mengurangi peluang untuk bentuk manipulasi tertentu tetapi tidak dapat menghilangkan korupsi ketika kolusi terjadi di luar platform digital atau ketika spesifikasi pengadaan dirancang untuk menguntungkan pemasok tertentu. Studi ini mengusulkan kerangka kerja anti-korupsi terintegrasi yang menggabungkan transparansi digital dengan pengungkapan kepemilikan manfaat, deklarasi konflik kepentingan, analitik pengadaan, perlindungan pelapor, dan pemantauan independen. Perhatian khusus diberikan kepada pemerintah daerah di mana kapasitas kelembagaan dan kualitas pengawasan dapat sangat bervariasi. Artikel ini menyimpulkan bahwa pengadaan elektronik harus dipahami sebagai teknologi pendukung daripada solusi anti-korupsi yang lengkap. Pencegahan korupsi yang efektif membutuhkan sistem teknologi yang didukung oleh independensi kelembagaan, analisis data, dan penegakan hukum yang bermakna.]

Keywords: Public procurement, e-procurement, local government, corruption prevention, Indonesia

Introduction

Public procurement is often presented as a technical administrative function, but its economic and political consequences make it a central governance institution. Governments use procurement to construct infrastructure, provide public services, acquire medical supplies, purchase information systems, and implement development programs. These activities involve substantial financial resources and repeated interactions between public officials and private suppliers, creating opportunities for bribery, favoritism, collusion, conflicts of interest, fraud, and contract manipulation. The corruption risk is not confined to the moment when a supplier is selected. It can arise during needs assessment, budget preparation, specification design, tender evaluation, contract award, implementation, and payment. Graycar (2022) therefore emphasizes that procurement should be understood as a multidimensional environment in which opportunities for corrupt behavior are distributed across the entire procurement process. Similarly, Fazekas and Kocsis (2020) demonstrate that procurement data can be used to identify objective indicators of corruption risk, particularly where competition is artificially restricted. The analytical implication is important for Indonesia: an anti-corruption strategy that focuses only on the tendering interface risks overlooking the earlier and later stages where corruption may be strategically organized.

Indonesia's decentralization has intensified the relevance of this problem at the local level. Provincial and district governments possess significant responsibility for infrastructure, health, education, social services, and local development,

generating extensive procurement activity. Empirical research has associated capital expenditure with higher corruption risks in Indonesian local governments, suggesting that procurement-intensive spending categories require particular scrutiny (Haryadi, Rossieta, and Utama 2019). The problem is not simply the amount of money involved. Local procurement is embedded in political and administrative relationships that may be more difficult to observe than national transactions. Regional executives, legislators, bureaucrats, local entrepreneurs, and political networks can interact repeatedly within relatively concentrated markets. Such conditions can facilitate informal agreements, supplier favoritism, and reciprocal relationships. D6vid-Barrett and Fazekas (2020) show more generally how political transitions can affect the allocation of public contracts, while Fazekas, Wachs, and Kertűsz (2021) demonstrate that procurement markets can be analyzed as networks in which buyer-supplier concentration reveals potential corruption structures. Local procurement should therefore be examined as an institutional ecosystem rather than merely as a sequence of electronic transactions.

Digitalization has emerged as a principal response to these risks. Indonesia has progressively institutionalized electronic procurement through mechanisms such as the Electronic Procurement System (*Sistem Pengadaan Secara Elektronik* or SPSE), Electronic Procurement Services (*Layanan Pengadaan Secara Elektronik* or LPSE), electronic catalogues, and digitally documented procurement procedures. The regulatory architecture is currently anchored in Presidential Regulation No. 16 of 2018 concerning Government Procurement of Goods/Services, as amended by Presidential Regulation No. 12 of 2021 and, most recently within the period examined by this article, Presidential Regulation No. 46 of 2025. The latter entered into force on 30 April 2025 and amended several provisions concerning government procurement, including provisions relevant to procurement financed through central, regional, and village budgets. These developments indicate a clear policy assumption: moving procurement procedures into digital environments should reduce discretion, increase traceability, and make manipulation more difficult. Yet the existence of a digital platform does not necessarily change the underlying distribution of power among procurement actors.

The empirical literature produces a more complicated picture than the technological optimism sometimes associated with e-procurement. Puspita and Gultom (2024), using a difference-in-differences design covering Indonesian provinces and corruption cases handled by the Corruption Eradication Commission, find that e-procurement significantly reduces procurement corruption, particularly in provinces with relatively high procurement or capital expenditure. Dani and Revindo (2025), analyzing corruption cases between 2015 and 2022, similarly find a significant association between e-procurement implementation and reductions in procurement corruption, while institutional quality and bureaucratic reform strengthen the effect. Yet Ariani and Setyaningrum (2023) report no significant association between e-procurement and local-government anti-corruption strategy, partly because electronic implementation had

not fully reached the transaction stage in many local governments. Maytandi and Abbas (2020) reach a similarly cautious conclusion through game-theoretical analysis, arguing that electronic procedures do not eliminate corruption if officials and suppliers can continue negotiating outside the system. These apparently contradictory findings are not necessarily inconsistent. They suggest that e-procurement works under specific institutional conditions and fails when digitalization merely reproduces pre-existing corrupt relationships.

This article addresses that institutional condition. It asks three questions: where in the local-government procurement cycle do corruption risks remain after digitalization; what types of corruption can e-procurement realistically prevent; and what complementary institutional mechanisms are necessary to convert procurement data into effective corruption prevention? The article adopts a normative juridical and institutional analytical approach, combining Indonesian procurement legislation with empirical and theoretical journal literature on procurement corruption, digital governance, transparency, competition, institutional quality, and data-driven risk detection. Instead of treating e-procurement as a binary policy variable—present or absent—the article conceptualizes digital procurement as a set of institutional capabilities. These include information disclosure, procedural standardization, transaction traceability, competition management, data accumulation, automated risk detection, and public oversight. The central thesis is that digital procurement reduces corruption most effectively when it changes the informational and institutional environment in which corrupt transactions occur. Technology is therefore necessary but insufficient: its anti-corruption value depends on whether institutions can use the information produced by digital systems to identify, investigate, and sanction abnormal procurement behavior.

Mapping Corruption Across the Procurement Cycle

The first analytical step is to reject the assumption that procurement corruption is synonymous with tender manipulation. Procurement corruption can be understood as a sequence of potential intervention points. During planning, officials may manipulate needs assessments, inflate projected demand, or structure budgets around preferred suppliers. During specification design, technical requirements may be tailored to a particular product or company. During supplier selection, officials and bidders may manipulate qualification criteria, leak confidential information, coordinate bids, or arrange cover bidding. After award, corruption can continue through contract amendments, price adjustments, subcontracting, weak supervision, acceptance of substandard goods, or fictitious invoicing. OECD procurement research similarly identifies distinct corruption risks across pre-tendering, tendering, and post-award stages, emphasizing that corruption can affect both the selection of procedures and the implementation of contracts. This lifecycle perspective is crucial because digital procurement platforms generally have

stronger capabilities at some stages than others. A system may record tender submissions with great precision while providing much weaker visibility into informal specification negotiations or contract performance.

The planning stage represents a particularly difficult challenge for digital anti-corruption mechanisms. Once procurement specifications have been uploaded to an electronic platform, the system may provide transparency regarding what government intends to purchase. It does not necessarily reveal how the specification was created or whether it was designed to exclude competitors. A technically neutral procurement interface can therefore conceal an earlier political or administrative decision. A specification requiring a unique technical feature, proprietary compatibility, geographic condition, or unusually narrow experience criterion may effectively predetermine the winner while remaining formally compliant. This is consistent with the broader literature showing that procurement corruption often involves restriction of access rather than overt manipulation of the final bid. Fazekas and Kocsis (2020) conceptualize single bidding and procurement red flags as indicators of potentially unjustified restrictions on competition. Decarolis and Giorgantonio (2022) similarly show how procurement-level indicators can identify patterns associated with corruption risk. Digitalization therefore needs to move upstream: it must capture procurement planning, market analysis, specification development, and justification for procurement methods rather than beginning only when a tender is electronically announced.

The tendering stage is where e-procurement has its clearest anti-corruption potential. Electronic submission can reduce face-to-face contact, standardize deadlines, automatically record transactions, and limit opportunities for officials to selectively disclose information. Digital systems can also create audit trails that are unavailable in paper-based procedures. This reduces certain forms of petty corruption, administrative discretion, and post hoc alteration of procurement records. Empirical evidence from Indonesia supports this proposition. Puspita and Gultom (2024) find that e-procurement reduced government procurement corruption across Indonesian provinces, particularly where procurement expenditure was relatively high. International evidence also suggests that the effect can extend beyond public officials. Jiménez, Hanoteau, and Barkemeyer (2022), analyzing 8,373 firms in 72 countries, find that e-procurement reduces firm-level corruption in obtaining public contracts, although the effect becomes stronger where governance institutions are of higher quality. Digitalization therefore changes the transaction environment by increasing the cost of certain forms of manipulation. Its effectiveness, however, remains contingent on institutional quality.

What Digital Procurement Actually Changes

The strongest anti-corruption contribution of e-procurement is arguably not transparency in itself but the reduction of transactional opacity. Traditional

procurement can allow information to circulate selectively through informal relationships. An official may privately inform one supplier about an upcoming tender, adjust a deadline, or provide informal guidance concerning technical requirements. Electronic procurement can constrain these practices by requiring information to pass through standardized channels and by creating records of interactions. This transforms corruption from a low-visibility interpersonal transaction into a potentially traceable digital event. Bauhr (2020) argues that procurement transparency can expose previously hidden interactions between public and private actors, while research on electronic procurement adoption emphasizes its potential to improve information availability and process standardization (Davila, Gupta, and Palmer 2003; Vaidya, Sajeew, and Callender 2006). The significance for Indonesia is that digitalization can reduce opportunities for corruption that depend on asymmetric access to procurement information. It does not necessarily eliminate corruption, but it can alter the probability of detection and therefore the expected cost of corrupt behavior.

Digitalization also changes the temporal structure of accountability. Paper-based procurement creates records that may be reviewed only after an audit, investigation, or complaint. Electronic systems can potentially generate information while procurement is still underway. This creates an opportunity to shift anti-corruption policy from ex post investigation to preventive risk management. For example, an unusually high proportion of single-bid tenders, repeated awards to the same supplier, identical bid patterns, abnormal contract amendments, or unusually short tender periods can be identified before a procurement relationship becomes entrenched. Decarolis et al. (2022) demonstrate the value of procurement-level red flags in identifying corruption risks, while Decarolis and Giorgiantonio (2022) develop a corruption-risk indicator capable of separating inefficiency from potential corruption. The analytical shift is significant: procurement databases should not merely preserve evidence for auditors; they should become active instruments for identifying suspicious patterns. Indonesia's digital procurement infrastructure already produces much of the underlying information required for this approach.

However, digital records can create a false sense of security when institutions confuse traceability with integrity. A procurement process can be perfectly traceable and still be corrupt. If an official deliberately writes a restrictive specification and uploads it transparently, the platform faithfully records the discriminatory decision. If several companies agree in advance on who will win a tender, the electronic submission process may record their coordinated bids without identifying the underlying agreement. If a supplier receives an advantageous contract and subsequently subcontracts substantial work to an undisclosed related company, the original electronic tender may remain procedurally impeccable. Fazekas, Sberna, and Vannucci (2022) demonstrate how corruption can be organized through extra-legal governance structures that operate around formal procurement rules. The central lesson is that digital procurement

reduces corruption only when digital information is connected to analytical and investigative capabilities capable of interpreting what the records mean.

The Hidden Zone: Collusion Outside the Platform

Collusion is the most important limitation of an exclusively technology-centered anti-corruption strategy. Unlike petty corruption, which may depend on direct interactions between officials and suppliers, collusion can be coordinated before procurement enters the electronic system. Several suppliers may agree which company will win, determine who will submit nominally competitive bids, divide markets geographically, or compensate losing bidders through subcontracting arrangements. The electronic platform then becomes the location where a prearranged outcome is formally executed. OECD research distinguishes corruption from collusion but emphasizes that they can occur simultaneously and reinforce each other. In Indonesia, Anggriawan (2024) identifies horizontal, vertical, and combined forms of procurement conspiracy, illustrating that corruption may involve relationships among suppliers, officials, or both. The implication is straightforward: the presence of multiple electronic bids cannot automatically be interpreted as genuine competition.

Bid-rigging also illustrates why procurement analytics should focus on patterns rather than individual transactions. A procurement authority may observe that several firms regularly participate in the same tenders, that one firm wins while others consistently lose, that losing firms later become subcontractors, or that certain suppliers rotate winning positions across similar contracts. Each transaction may appear legally defensible when examined independently. Viewed as a network, however, the pattern may reveal coordinated market allocation. Wachs, Fazekas, and Kertűsz (2021) demonstrate how network science can identify corruption risks in contracting markets using relationships between buyers and suppliers. Fazekas, Wachs, and Kertűsz (2020) likewise show that corruption can distort procurement market structures in ways that become visible through network analysis. The Indonesian policy challenge is therefore to move from document-based auditing toward relationship-based procurement intelligence. Digitalization provides the data infrastructure for such analysis, but it does not perform the analysis automatically.

The existence of collusion also complicates the conventional argument that greater transparency always improves competition. Transparency can reduce information asymmetry between government and suppliers, but excessive or poorly timed disclosure can sometimes make coordination among bidders easier. OECD analysis explicitly recognizes this tension, noting that transparency should be adequate and timely while avoiding disclosures that facilitate bid-rigging. The Indonesian system should consequently distinguish between accountability transparency and strategically sensitive procurement information. Public access should be maximized regarding procurement plans, tender outcomes, contract

values, contract amendments, supplier identities, and performance, while information that could facilitate coordination before bids are submitted may require carefully designed disclosure timing. The objective is not maximum disclosure at every moment but transparency that strengthens public accountability without unintentionally increasing opportunities for cartel coordination.

Specifications as a Digital Blind Spot

One of the most consequential corruption risks occurs before suppliers compete: the construction of technical specifications. A procurement specification can be written in apparently neutral technical language while effectively favoring one supplier. The mechanism may involve brand compatibility, highly specific technical parameters, unusual certification requirements, prior experience with a particular technology, or requirements that only a preferred company can realistically satisfy. Because digital procurement systems generally publish the final specification rather than the deliberative process through which it was produced, they may make a biased decision appear transparent. OECD procurement research identifies tailored specifications and unjustified selection criteria as major pre-tendering corruption risks. This indicates that digital anti-corruption policy must focus on the quality of procurement decisions before they become electronic records. Otherwise, the platform may increase the visibility of procedural compliance while leaving substantive favoritism intact.

The solution requires greater integration between procurement data and market intelligence. A local government specification should be compared with available market alternatives, historical procurement specifications, supplier capabilities, and previous procurement outcomes. If a specification is substantially narrower than comparable procurements without adequate justification, the system should generate a review signal. Such an approach would not automatically classify a procurement as corrupt; specialized goods may legitimately require narrow specifications. Instead, the system would identify cases requiring human assessment. This is consistent with the risk-based logic developed in the procurement analytics literature. Decarolis et al. (2022) show that red flags are useful precisely because they identify cases for further investigation rather than proving corruption. A sophisticated Indonesian system could therefore calculate a Specification Restrictiveness Score, combining the number of mandatory technical requirements, supplier concentration, frequency of similar specifications, and market availability. This would transform digital procurement from a passive repository into an early-warning system.

Local institutional capacity is critical at this stage. A procurement unit may possess access to electronic procurement software but lack personnel capable of conducting sophisticated market analysis. This problem is particularly relevant in decentralized systems where local governments vary significantly in administrative resources. Ariani and Setyaningrum (2023) demonstrate that incomplete

implementation can limit the anti-corruption effect of e-procurement in local governments. The digital divide in procurement is therefore not merely technological. It is an institutional capability divide. Two local governments may use the same platform but obtain very different anti-corruption outcomes because one has procurement professionals capable of interpreting data while the other treats the system primarily as a mandatory administrative interface. Effective digital reform must consequently invest in analytical capacity, not simply software deployment.

Contract Management: Where Digital Procurement Often Ends Too Early

Another limitation is the tendency to evaluate procurement integrity primarily through the tendering stage. Yet the economic consequences of procurement become fully visible only during contract implementation. A supplier may win legitimately but subsequently deliver lower-quality goods, substitute products, request unjustified contract amendments, delay completion, or submit invoices for work that was not performed. OECD procurement research identifies contract implementation as a distinct risk zone involving product substitution, deficient supervision, unjustified modifications, and collusion between suppliers and supervising officials. This means that a procurement platform that successfully records tendering but provides limited information about implementation offers only partial transparency. The anti-corruption value of digital procurement therefore depends on whether digitalization covers the entire contract lifecycle—from needs assessment through payment and final acceptance.

The problem is particularly significant in infrastructure procurement, where contract execution is difficult to verify remotely. A digital system may show that a road construction contract was awarded for a specific amount and formally completed, but it may not establish whether the road meets technical specifications or whether the reported quantity of work corresponds to physical reality. Digital procurement must therefore be connected to other forms of evidence. Contract data should be linked where possible to payment records, project-management information, geospatial information, inspection reports, photographs, audit findings, and citizen complaints. Such integration would permit cross-validation between what the procurement system reports and what actually occurs. The approach is consistent with the broader data-driven procurement literature, which emphasizes that corruption detection improves when multiple indicators are combined rather than relying on a single transaction variable (Lyra et al. 2022). Digital procurement should consequently be understood as one layer within a broader public expenditure intelligence system.

This lifecycle perspective also changes how local governments should measure procurement performance. Traditional indicators often emphasize completion rates, procurement savings, number of tenders, or compliance with

deadlines. These indicators are useful but insufficient for corruption prevention. A procurement unit could achieve a high completion rate while repeatedly awarding contracts to the same politically connected suppliers. Conversely, a procurement unit could show modest financial savings because it purchases complex specialized goods but maintain excellent competitive integrity. Performance evaluation should therefore combine efficiency and integrity indicators. These might include competition levels, supplier concentration, single-bid frequency, contract modification rates, audit findings, complaint patterns, delivery deviations, and links between suppliers and public officials. The objective is to avoid equating administrative smoothness with integrity. A procurement system should be considered successful when it produces value for money and maintains fair, transparent, and defensible decision-making.

Institutional Quality as the Missing Variable

The strongest evidence emerging from recent research is that institutional quality conditions the effect of e-procurement. Dani and Revindo (2025) find that e-procurement reduces procurement corruption but that bureaucratic reform and institutional performance accountability are also significantly associated with corruption reduction. Jiménez, Hanoteau, and Barkemeyer (2022) reach a comparable conclusion internationally: e-procurement reduces firm-level corruption more effectively where governance institutions are stronger. These findings challenge technological determinism. The platform does not independently produce integrity. Instead, it changes the environment in which institutions operate. Where procurement officials are professionally trained, internal controls are credible, audit institutions are active, and sanctions are predictable, digital records can become powerful anti-corruption tools. Where these institutions are weak, digital systems may simply make existing processes more orderly without changing their substantive integrity.

The local-government context makes institutional variation particularly important. Local procurement units differ in staffing, technical expertise, leadership commitment, internal audit capacity, supplier markets, and political conditions. A national digital platform cannot eliminate these differences. Indeed, uniform technology may sometimes conceal divergent institutional realities because all local governments appear to comply with the same electronic requirements. Ariani and Setyaningrum's (2023) findings are important in this respect because they demonstrate that the ratio and depth of e-procurement implementation matter. The relevant policy question should therefore not be “Does a local government use e-procurement?” but “How deeply has the local government integrated digital procurement into its actual decision-making and control processes?” Full electronic transactions, comprehensive data capture, analytical use of procurement information, and integration with oversight institutions should be treated as separate dimensions of implementation.

Internal oversight also requires reconsideration. Research on Indonesian local government procurement suggests that expenditure patterns and corruption risks are related to oversight environments (Haryadi, Rossieta, and Utama 2019). Yanto and Adrison (2020) find that prior government expenditure audits correlate with subsequent changes in local-government corruption behavior, indicating that audit exposure can affect officials' expectations about the cost of corruption. The implication is that digital procurement should not replace auditing; it should make auditing more targeted. Instead of manually examining every procurement transaction with equal intensity, internal and external auditors could use procurement red flags to prioritize high-risk contracts. This would make oversight more efficient while increasing the probability that suspicious transactions receive detailed scrutiny. Digitalization should therefore be viewed as a mechanism for reallocating oversight resources toward higher-risk transactions, not as a substitute for oversight itself.

Conflict of Interest and the Problem of Beneficial Ownership

Conflict of interest represents a particularly important corruption risk because it can exist without an obvious bribe. A procurement official may participate in decisions involving a former employer, family member, political associate, business partner, or company in which the official has an indirect financial interest. Digital procurement systems may record the official's procedural actions but remain unable to identify the underlying relationship. Fauziah and Marpaung (2024), examining procurement in an Indonesian government institution, find that personal gain, nepotism, and political influence can affect procurement committees and exploit procedural gaps. This illustrates the difference between procedural transparency and relational transparency. A procurement platform can show who approved a document without showing whom that person is connected to economically or politically. Effective anti-corruption digitalization must therefore expand the information architecture beyond procurement transactions.

Beneficial ownership disclosure is particularly important. The legal identity of a supplier does not necessarily reveal the person who ultimately controls or benefits from the company. Several apparently independent bidders may in fact be controlled by related individuals. If such relationships remain invisible, a procurement system may incorrectly interpret multiple bids as evidence of competition. The procurement literature increasingly emphasizes network-based approaches precisely because corruption may be embedded in relationships rather than isolated transactions (Fazekas and Tyth 2016; Wachs, Fazekas, and Kertész 2021). Indonesia should therefore connect procurement databases with legally available corporate ownership information, conflict-of-interest declarations, and supplier relationship data. The objective is not to expose every private relationship but to identify relationships that create material risks to procurement impartiality.

A robust conflict-of-interest regime should also require affirmative declarations rather than relying solely on retrospective investigation. Procurement officials should disclose relevant financial and relational interests before participating in procurement decisions. Suppliers should disclose ownership and relevant relationships where legally required. Digital systems can then create automated checks before key decisions occur. If a procurement committee member is connected to a bidder through a declared ownership or employment relationship, the system could generate an alert and require reassignment. This would shift conflict-of-interest regulation from a largely reactive model to a preventive model. The approach is consistent with the broader institutional argument of this article: technology is most useful when it changes behavior before corruption becomes irreversible. A digital declaration that merely sits in an archive has limited value; a declaration connected to procurement decision-making can materially reduce risk.

Procurement Analytics and the Emergence of Predictive Oversight

The accumulation of procurement data creates a possibility that traditional procurement regulation rarely possessed: systematic identification of abnormal patterns across thousands of transactions. Red flags can include single bidding, repeated awards to the same supplier, unusually high supplier concentration, short tender periods, repeated use of non-competitive procedures, suspicious contract amendments, unusual price patterns, or relationships among bidders. Fazekas and Kocsis (2020) demonstrate the usefulness of single-bid and composite tender red flags as objective corruption-risk indicators. Decarolis and Giorgiantonio (2022) similarly develop a procurement-level corruption risk indicator, while Decarolis et al. (2022) provide empirical evidence on red flags in tendering. These approaches are especially relevant to Indonesia because the national electronic procurement infrastructure can potentially generate the transaction-level data necessary for risk-based monitoring.

The crucial methodological point is that red flags should not be treated as proof of corruption. A single-bid tender may occur because only one supplier possesses the required technology. A high supplier concentration may reflect a small local market. A contract amendment may be legitimate because unforeseen circumstances changed project requirements. Risk analytics therefore should function as a screening mechanism, not as an automated criminal judgment. The appropriate architecture is a two-stage system. First, algorithms identify unusual transactions or patterns. Second, trained procurement investigators assess the underlying reasons. This distinction protects both procurement integrity and administrative fairness. Lyra et al. (2022), reviewing data-driven approaches to fraud, corruption, and collusion in public procurement, demonstrate the growing importance of computational methods while emphasizing the complexity of identifying corrupt behavior from administrative data. Indonesia should consequently combine algorithmic detection with professional human judgment.

At the local level, procurement analytics could also enable comparative benchmarking. A district government could compare its procurement patterns with similar districts in terms of supplier concentration, competition, contract amendments, procurement methods, and expenditure categories. Persistent deviations from peer patterns could trigger institutional review. This would be particularly valuable because corruption risks are not always visible from absolute values. A 20 percent contract modification rate might appear acceptable in isolation but become suspicious if comparable local governments average 5 percent for similar procurement categories. Benchmarking would therefore create a relative measure of institutional performance. It would also reduce the dependence of oversight on individual complaints. Citizens and auditors would not need to know in advance that a specific procurement was corrupt; the system could identify statistically or institutionally unusual patterns for further review.

Whistleblowing and Human Intelligence

Despite the sophistication of digital analytics, procurement corruption cannot be detected entirely through transaction data. Some of the most important information concerns conversations, informal instructions, promises, threats, and relationships that never enter the electronic system. Whistleblowers and insiders therefore remain essential sources of anti-corruption intelligence. This is particularly true when corruption involves sophisticated collusion that is deliberately designed to appear procedurally compliant. The digital system may reveal that a particular supplier repeatedly wins contracts, but an insider may explain how specifications were negotiated, why competitors withdrew, or how subcontracting arrangements were organized. Public procurement integrity therefore requires a hybrid model combining machine-generated risk signals with human reporting.

The legal and institutional protection of whistleblowers is consequently an important complement to digital procurement. A procurement official who reports a superior's intervention may face professional retaliation, while a supplier who refuses to participate in bid-rigging may risk losing access to future contracts. Without credible protection, individuals have incentives to remain silent. The anti-corruption literature consistently recognizes the importance of reporting mechanisms because corruption often remains hidden from conventional oversight. In the Indonesian context, recent legal scholarship has emphasized the role of whistleblowers and justice collaborators in procurement-related corruption cases. Alfitra et al. (2025) argue that technological development should be accompanied by stronger mechanisms for utilizing and protecting individuals who provide information concerning procurement corruption. Digital procurement should therefore include secure reporting channels, anonymous communication where legally appropriate, protection against retaliation, and clear procedures for escalating credible reports.

Whistleblowing should also be integrated with procurement analytics rather than treated as a separate channel. A report concerning a supplier relationship should be cross-checked against procurement data. Conversely, an algorithmic red flag should be capable of prompting targeted human inquiries. This creates a mutually reinforcing intelligence system: data identify where to look, while human sources explain what the data cannot reveal. Such integration is particularly important for local governments because procurement networks may be relatively concentrated and socially interconnected. The objective is not to create a surveillance bureaucracy but to increase the probability that meaningful warning signs receive appropriate investigation. Digital procurement is most effective when it functions as a bridge between data-based detection and institution-based judgment.

Transparency, Public Monitoring, and Local Accountability

Public access to procurement information is often justified on the grounds that transparency strengthens competition and accountability. Yet transparency becomes meaningful only when information is usable. A procurement portal containing thousands of technically formatted documents may satisfy a formal disclosure obligation while remaining inaccessible to ordinary citizens. Bauhr (2020) argues that transparency can function as an antidote to corruption when it exposes hidden interactions and allows scrutiny. However, the effectiveness of transparency depends on whether users can interpret the information and whether institutions respond to anomalies. Indonesia should therefore distinguish between document publication and actionable transparency. The latter requires standardized data, searchable records, historical comparisons, supplier information, contract performance information, and mechanisms through which citizens can raise concerns.

Local civil society can play an important role in this process. NGOs, journalists, business associations, professional organizations, and community groups may identify procurement anomalies that internal institutions overlook. Prakasa et al. (2023) argue that social participation can contribute to reducing corruption in Indonesian public procurement, emphasizing the importance of involving actors beyond government institutions. Prakasa, Asis, and Sahid (2022) similarly conclude that Indonesian procurement law cannot be effective without stronger public participation and governance mechanisms. This suggests that procurement digitalization should not be designed solely for government officials and suppliers. It should also create interfaces through which external actors can monitor procurement outcomes, access historical information, and identify recurring patterns.

Nevertheless, public monitoring must be designed carefully. Citizens should not be expected to conduct professional audits of complex procurement transactions. Instead, procurement platforms should present information in ways

that facilitate meaningful scrutiny. A public dashboard could display supplier concentration, single-bid rates, contract modifications, average procurement duration, and major procurement categories by local government. More detailed data could be available for journalists and researchers. This layered model would balance accessibility with technical depth. The objective is to create a distributed accountability system in which government auditors, procurement professionals, civil society, and citizens perform complementary roles. Digital procurement thus becomes not merely a government information system but part of the broader institutional architecture of public accountability.

The Indonesian Legal Architecture and Its Anti-Corruption Function

The principal legal foundation for Indonesian government procurement is Presidential Regulation No. 16 of 2018 concerning Government Procurement of Goods/Services. It has been amended by Presidential Regulation No. 12 of 2021 and Presidential Regulation No. 46 of 2025. The current regulatory sequence is significant because it demonstrates that procurement governance has evolved from a procedural framework toward a more comprehensive system covering procurement actors, methods, electronic processes, domestic products, small businesses, and procurement financed through different public budgets. Perpres No. 46/2025 entered into force on 30 April 2025 and expressly defines government procurement as activities financed by APBN, APBD, APB Desa, and other relevant public budgets. This expansion is important for local governance because procurement risks increasingly intersect with decentralized public spending. The legal framework therefore provides the foundation upon which digital procurement and integrity mechanisms must operate.

The operational layer is reinforced by LKPP regulations. Peraturan LKPP No. 12 of 2021 establishes guidelines for procurement through providers and covers preparation, provider selection, tendering, e-purchasing, direct procurement, rapid tendering, contract implementation, handover, and supplier performance evaluation. This lifecycle coverage is analytically relevant because it corresponds with the article's argument that anti-corruption digitalization should extend beyond the tendering event. Peraturan LKPP No. 12/2021 has subsequently been amended by Peraturan LKPP No. 4/2024. The legal framework therefore permits a more comprehensive conception of digital procurement, but legal authorization alone does not guarantee technological integration. The challenge is to ensure that procurement planning, supplier selection, contracting, implementation, and performance information are digitally connected and available for risk analysis.

The criminal-law dimension is provided principally by Law No. 31 of 1999 concerning the Eradication of Corruption Crimes, as amended by Law No. 20 of 2001. Procurement-related corruption can involve bribery, gratification, abuse of authority, state financial losses, conflicts of interest in procurement, and other prohibited conduct. The procurement regime should therefore not be viewed as a

self-contained administrative system. Where procurement irregularities indicate criminal conduct, administrative and criminal enforcement must interact appropriately. Anggriawan (2024) demonstrates the importance of distinguishing procurement collusion and conspiracy while examining the legal consequences of such conduct. The strongest regulatory architecture is therefore one in which procurement rules prevent and document irregularities while anti-corruption institutions retain the capacity to investigate conduct that crosses the boundary into criminal corruption.

Why E-Procurement Should Be Evaluated as an Institutional Capability

The conflicting empirical evidence concerning Indonesian e-procurement can be reconciled by treating digitalization as a capability rather than a technology. Puspita and Gultom (2024) identify a significant reduction in procurement corruption associated with e-procurement, while Dani and Revindo (2025) similarly find a relationship between e-procurement and lower corruption and emphasize the role of institutional quality. By contrast, Ariani and Setyaningrum (2023) find no association in local-government anti-corruption strategy where implementation remains incomplete, and Maytandi and Abbas (2020) demonstrate theoretically how corruption can continue through interactions outside the electronic system. These findings become coherent once e-procurement is disaggregated into capabilities: transaction digitalization, information disclosure, auditability, data integration, analytics, competition management, and institutional response. A local government that possesses only the first capability should not be considered equivalent to one that possesses all seven.

This distinction has major implications for policy evaluation. Governments often measure digital procurement by counting the percentage of procurement conducted electronically. Such indicators measure adoption but not effectiveness. A more meaningful evaluation framework should examine whether electronic procurement reduces face-to-face interactions, increases supplier participation, reduces unexplained single-bid tenders, improves contract transparency, decreases procurement irregularities, accelerates detection, and strengthens sanctions. It should also evaluate whether procurement data are actively used by internal auditors and anti-corruption institutions. Ariani and Setyaningrum's (2023) finding that implementation had not fully reached the transaction stage illustrates why adoption statistics can be misleading. Digitalization should therefore be evaluated according to the institutional outcomes it enables, not merely the percentage of procedures transferred online.

This approach also prevents technological reform from becoming a substitute for administrative reform. If procurement officials remain politically dependent, internal auditors lack independence, supplier ownership is opaque, or sanctions are rarely applied, adding new software may have limited effect. Jiménez,

Hanoteau, and Barkemeyer (2022) provide international evidence for this institutional complementarity, showing that governance quality strengthens the anti-corruption effect of e-procurement. Dani and Revindo (2025) reach the same conclusion in Indonesia. The appropriate policy therefore combines digitalization with professionalization, institutional independence, risk analytics, and credible enforcement. Technology should reduce the opportunities for corruption, while institutions must increase the probability that remaining corruption will be detected and punished.

Toward a Digital Procurement Integrity Framework

This article proposes a Digital Procurement Integrity Framework (DPIF) consisting of five interconnected layers. The first is full-cycle digitalization, extending beyond tendering to planning, specifications, supplier selection, contract management, payment, and performance evaluation. The second is relational transparency, linking procurement transactions with legally available information about beneficial ownership, conflicts of interest, supplier relationships, and public officials. The third is risk analytics, using red flags and network analysis to identify abnormal procurement patterns. The fourth is institutional response, involving APIP, procurement units, auditors, and anti-corruption institutions capable of investigating high-risk cases. The fifth is social accountability, through accessible procurement information, whistleblower mechanisms, and independent monitoring. The framework differs from conventional e-procurement models because it treats technology as an infrastructure connecting several accountability institutions rather than as the accountability mechanism itself.

The first two layers are designed to prevent the concealment of procurement relationships. Full-cycle digitalization ensures that corruption cannot simply move from the tendering stage to contract implementation, while relational transparency reduces the ability of politically connected suppliers to hide behind formal corporate identities. The third layer then transforms accumulated data into risk information. Indicators such as single bidding, supplier concentration, repeated awards, abnormal contract amendments, short tender periods, and ownership overlaps should be used to identify cases requiring investigation. This approach is supported by Fazekas and Kocsis (2020), Decarolis and Giorgiantonio (2022), and Wachs, Fazekas, and Kertűsz (2021). Importantly, risk analytics should never automatically label a procurement transaction corrupt. Its function is to prioritize institutional attention.

The fourth and fifth layers provide the missing human and institutional dimensions. Risk signals must be evaluated by competent procurement and audit professionals, while credible whistleblowing and public monitoring provide information that administrative data cannot capture. The effectiveness of the framework consequently depends on institutional independence. A local government cannot be expected to investigate its own politically connected

procurement network without adequate safeguards. External audit, procurement oversight, and anti-corruption institutions must therefore possess mechanisms for escalating high-risk transactions. The objective is a chain of accountability in which digital evidence can move from platform to analyst, from analyst to investigator, and from investigator to enforcement. Without this chain, sophisticated analytics merely generate dashboards. With it, digital procurement can become a preventive anti-corruption infrastructure.

Policy Implications for Indonesian Local Governments

The first policy priority should be to shift from e-procurement adoption to full-cycle digital procurement. Local governments should not receive full credit for digitalization merely because tender submissions occur through SPSE or related platforms. Planning, specifications, procurement methods, contract amendments, implementation progress, payment information, and supplier performance should be digitally connected wherever legally and technically feasible. This would enable auditors to examine procurement as a continuous process rather than a series of disconnected administrative events. The 2025 amendment to the procurement framework provides an updated legal context for this development, while LKPP's procurement guidelines already cover multiple stages of procurement through providers. The policy objective should be interoperability rather than simply digitization. Separate information silos create the same informational weaknesses as paper records even when every individual document is electronic.

Second, local governments should establish procurement risk units or analytical functions within their procurement and internal-control architecture. These units would not replace APIP or law enforcement. Their function would be to screen procurement data and identify unusual transactions. Risk indicators should be calibrated to local market conditions to avoid excessive false positives. A district with only two qualified suppliers for specialized medical equipment should not automatically be treated as corrupt because it records frequent single-bid procurement. By contrast, a construction market containing dozens of qualified companies but repeatedly producing the same winner should receive closer examination. The analytical model should therefore combine statistical indicators with market knowledge. This approach reflects the methodological caution in procurement risk literature that red flags identify potential corruption but do not establish it independently (Decarolis et al. 2022; Lyra et al. 2022).

Third, conflict-of-interest declarations should become more operational. Procurement officials should not merely sign standardized declarations that are stored administratively. The information should be digitally linked to procurement assignments and supplier information. Where a declared relationship exists, the system should generate an alert and require review or reassignment. Supplier ownership information should likewise be incorporated into procurement risk analysis where legally available. This would address the relational dimension of

corruption that transaction-level systems cannot detect. The objective is to identify potential conflicts before contract awards occur. Such preventive architecture would be more consistent with the logic of anti-corruption than relying exclusively on post-award investigations.

Fourth, whistleblower protection should be integrated into procurement governance. Procurement officials, suppliers, consultants, and contractors should have secure channels to report manipulation, collusion, specification tailoring, and contract-performance irregularities. Reports should be capable of being linked to procurement records, allowing investigators to verify allegations. Protection from retaliation is essential because the individuals best positioned to identify procurement corruption may also be the individuals most vulnerable to professional or commercial consequences. The digital platform should therefore facilitate reporting but should not itself be the only investigative institution. Complaints must be assessed independently and, where necessary, referred to appropriate oversight or law-enforcement bodies.

Fifth, public transparency should move toward open procurement intelligence rather than simple document publication. Local-government procurement portals should make key information searchable and comparable: procurement plans, tender values, bidders, winners, contract amendments, supplier performance, and final outcomes. Researchers and civil society organizations should be able to download machine-readable datasets for independent analysis. Public dashboards could highlight procurement concentration and major contract changes without exposing sensitive information that could facilitate bid-rigging. This would create a balance between transparency and competition, consistent with OECD principles concerning adequate and timely disclosure. Transparency should ultimately increase the probability that suspicious procurement patterns are noticed by someone outside the immediate procurement hierarchy.

Conclusion

Digital procurement has become an important component of Indonesia's anti-corruption strategy because it can reduce information asymmetry, standardize procedures, limit certain forms of direct interaction, preserve transaction records, and create datasets suitable for risk analysis. The empirical evidence supports a qualified positive assessment. Puspita and Gultom (2024) find that e-procurement reduces procurement corruption in Indonesian provinces, while Dani and Revindo (2025) find that e-procurement is significantly associated with lower corruption and that institutional reform strengthens this relationship. Nevertheless, Ariani and Setyaningrum (2023) and Maytandi and Abbas (2020) demonstrate that digitalization cannot guarantee anti-corruption outcomes when implementation is incomplete or when corrupt actors continue to negotiate outside the digital system. The evidence therefore supports neither technological pessimism nor technological optimism. It supports conditional institutionalism.

The principal finding of this article is that corruption has migrated rather than disappeared as procurement becomes digital. Some forms of petty manipulation become more difficult because electronic systems reduce opportunities for undocumented interactions. Yet more sophisticated forms of corruption may shift toward specification design, bid coordination, ownership concealment, political connections, subcontracting, and contract implementation. This is why a digital platform can simultaneously increase procedural transparency and leave substantive corruption intact. The key analytical distinction is between digital visibility and institutional accountability. Visibility means that a transaction is recorded. Accountability means that the record can be interpreted, questioned, investigated, and linked to consequences. Only the latter produces durable anti-corruption effects.

Indonesia's current legal architecture provides a substantial foundation for the next stage of reform. Presidential Regulation No. 16 of 2018, as amended by Presidential Regulation No. 12 of 2021 and Presidential Regulation No. 46 of 2025, establishes the principal procurement framework, while LKPP regulations operationalize procurement through providers and related procedures. These rules should now be supported by a stronger analytical and institutional infrastructure. Full-cycle digitalization, beneficial ownership transparency, conflict-of-interest declarations, procurement red-flag analytics, whistleblower protection, and independent oversight should be treated as complementary elements rather than separate reforms.

The article therefore concludes that e-procurement should be understood as an enabling technology for procurement integrity, not as a self-contained anti-corruption instrument. Its effectiveness depends on whether digital records are transformed into actionable intelligence and whether institutions possess the independence and capacity to act upon that intelligence. The proposed Digital Procurement Integrity Framework seeks to establish this connection by integrating technology, institutional oversight, relational transparency, risk analytics, and social accountability. For Indonesian local governments, the strategic objective should no longer be merely to conduct procurement electronically. The objective should be to create a procurement environment in which corrupt behavior becomes more difficult to conceal, abnormal transactions become easier to identify, conflicts of interest become visible, and credible enforcement follows credible evidence. Digitalization becomes anti-corruptive only when it changes these underlying incentives.

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Acknowledgment

None

Funding Information

None

Conflicting Interest Statement

The authors state that there is no conflict of interest in the publication of this article.

Publishing Ethical and Originality Statement

All authors declared that this work is original and has never been published in any form and in any media, nor is it under consideration for publication in any journal, and all sources cited in this work refer to the basic standards of scientific citation.

Generative AI Statement

N/A