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Public Procurement Performance in the Digital Transformation Era: A PRISMA-Based Systematic Review of Determinant Factors

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A B S T R A C T

This review synthesizes the internal and external determinants of PP performance reported in 2016–2026 and tests how consistent that evidence is. Following PRISMA 2020, a Scopus search returned 321 records, and 153 primary empirical studies met the inclusion criteria. Practitioner competence (14 of 14 studies), institutional capability (23 of 23), competition and supplier quality (19 of 21) and oversight against political interference (19 of 20) showed consistent associations with performance, and regulatory effects depended on context in 10 of 12 studies. Only 14 studies tested e-procurement against a performance outcome rather than adoption. Thirteen found positive links, mostly with transparency, integrity and cost efficiency, yet none measured timeliness, and the cost gains usually came alongside stronger competition or organizational reform. The review separates adoption evidence from outcome evidence and proposes a revised TOE model in which organizational and environmental conditions shape the cost effects of technology. For Indonesia, spending on digital procurement should go hand in hand with workforce professionalization, capacity-sensitive regulation and outcome-based oversight.

INTRODUCTION

Public procurement (PP) is one of the largest fiscal instruments shaping the quality of public services. Governments spent about USD 11 trillion on goods, services and works in 2018, roughly 12% of world gross domestic product (GDP), and in some developing economies the share exceeds a quarter of GDP (Bosio & Djankov, 2020). Over the past decade, electronic catalogues, e-tendering and data-driven monitoring have replaced manual processes in many jurisdictions. Directive 2014/24/EU, which member states had to transpose by April 2016, made electronic communication mandatory in EU procurement procedures from October 2018 (European Parliament & Council of the European Union, 2014). Indonesia launched e-Katalog version 6 in January 2025 and issued Presidential Regulation Number 46 of 2025, the second amendment to Presidential Regulation Number 16 of 2018 (Lembaga Kebijakan Pengadaan Barang/Jasa Pemerintah, n.d.; Peraturan Presiden Republik Indonesia Nomor 46 Tahun 2025, 2025). With national procurement above IDR 1,200 trillion over three years (ANTARA, 2025), the performance of a digitalized procurement system is a fiscal question as much as a technical one.

Technology alone does not guarantee better results. Its effect on procurement outcomes depends on practitioner competence, institutional capability, regulatory quality and the integrity of oversight (Bandiera et al., 2009; Decarolis et al., 2020). In a pioneering study of public works in India and Indonesia, e-procurement improved quality and timeliness but did not lower prices (Lewis-Faupel et al., 2016). Stricter procurement laws went with better outcomes only in countries with low public-sector capacity (Bosio et al., 2022), and preferences for domestic suppliers worked only under certain implementers (Best et al., 2023). For regulators, the useful question is therefore under which institutional, market and governance conditions digital procurement improves performance.

Existing reviews answer this question only in part. Content analyses have mapped the topics and theories of the field (Flynn & Davis, 2014; Patrucco et al., 2017), bibliometric reviews have charted trends in efficiency and e-procurement research (Gálvez-Rodríguez et al., 2024; Santosa & Pramesti, 2025), policy reviews have examined which tools improve outcomes and how their impact is evaluated (Fazekas & Blum, 2021; Kundu et al., 2025), and Indonesian reviews have described practices and implementation problems (Utami et al., 2024). Three gaps remain. No synthesis has placed organizational and environmental determinants in one framework for the digital period. Few studies link these determinants to the separate indicators of timeliness, quality, cost, transparency and corruption prevention. The methods and settings of the evidence have also not been mapped, which makes it hard to judge how far the findings transfer to Indonesia.

This review contributes in three ways. It brings organizational, technological and environmental determinants into one TOE frame. It separates studies on the adoption of digital procurement from studies on its performance outcomes, a distinction the literature seldom makes. It also rates the consistency of evidence with decision rules fixed in advance under the PRISMA 2020 and

SWiM guidelines (Campbell et al., 2020; Page et al., 2021). Four research questions guide the review. RQ1 asks which internal factors (human-resource competence, institutional capacity and digitalization) influence PP performance. RQ2 asks which external factors (regulation, supplier behaviour and political interference) influence it. RQ3 asks which research methods and settings dominate the literature, and RQ4 asks how consistent the evidence is for each factor. Section 2 sets out the framework and method, Section 3 presents and discusses the results, and Section 4 concludes.

THEORETICAL REVIEW

Theoretical Framework and Propositions

Following Thai (2001), PP performance is treated as multidimensional, covering quality, timeliness, cost, competition and integrity. The review codes five indicator families: timeliness, quality, cost efficiency or value for money (VfM), transparency, and corruption prevention.

The Technology–Organization–Environment (TOE) framework (Tornatzky & Fleischer, 1990) serves as the umbrella. It separates the technological context (maturity and fit of digital systems), the organizational context (structure, leadership and competence) and the environmental context (regulation, markets and political oversight). TOE was built to explain adoption; here it organizes the determinants of outcomes, since the same three contexts shape both. The resource-based view (Barney, 1991) adds that scarce, hard-to-imitate staff and institutional capabilities drive organizational performance. Agency theory (Eisenhardt, 1989; Jensen & Meckling, 1976) explains how information asymmetry between the public and procurement officials creates room for malfeasance, which oversight and incentives can reduce. Institutional theory (DiMaggio & Powell, 1983) explains how coercive, mimetic and normative pressures make procurement practices converge. For coding, the three TOE contexts were split into five starting categories: organization and human resources; technology and e-procurement; and, on the environmental side, regulation and process, market and suppliers, and politics and oversight.

Seven propositions were set before coding (Table 1). P1 draws on evidence that competent procurement bureaus cut delays and cost overruns in US federal contracts (Decarolis et al., 2020) and that passive waste made up 83% of total waste in Italian standardized purchases (Bandiera et al., 2009). P2 rests on the finding that individuals and organizations explain 39% of the price variation in Russian public purchases (Best et al., 2023). P3 and P5 follow the Indian and Indonesian e-procurement results, where electronic tendering improved quality and timeliness and attracted better contractors without lowering prices (Lewis-Faupel et al., 2016). P4 builds on the capacity-dependent effect of procurement laws (Bosio et al., 2022). P6 draws on Olken (2007), where raising the audit probability from 4% to 100% cut missing expenditures by about 8 percentage points, and on Coviello and Gagliarducci (2017), who found worse procurement outcomes under longer mayoral tenure. P7 expects country context to moderate all of these relationships.

Table 1. Research propositions and theoretical grounding

Code	Proposition	Theoretical grounding
P1	Practitioner competence and professionalization are positively associated with timeliness, quality and cost.	Resource-based view; agency theory
P2	Institutional capability is positively associated with performance and strengthens the effects of policy and technology.	Resource-based view; TOE (organizational context)
P3	E-procurement adoption is positively associated with transparency, timeliness and quality, but not necessarily with cost.	Agency theory; TOE (technological context)
P4	The effect of regulation on performance depends on public-sector capacity.	Institutional theory; agency theory
P5	Competition intensity and supplier quality are positively associated with cost and quality.	Agency theory; TOE (environmental context)
P6	Credible oversight is positively associated with corruption prevention; political interference is negatively associated with transparency and cost efficiency.	Agency theory; institutional theory
P7	Country context moderates the strength of the relationships in P1–P6.	TOE (macro-environmental context)

METHODOLOGY

Population and Sample

The population covers empirical journal articles on the determinants of PP performance in any sector and at any level of government. Scopus was chosen for its coverage of reputable journals and its consistent metadata (Gusenbauer & Haddaway, 2020). The window starts in 2016, the transposition deadline of Directive 2014/24/EU, and covers Indonesia's move to Presidential Regulation Number 16 of 2018 and its amendments. The string leaves out digital terms on purpose, because a corpus limited to e-procurement studies could not show how technology compares with other determinants. The search, run on 24 September 2026, used the following string:

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TITLE-ABS-KEY ( ( "public procurement" OR "government procurement" OR
"public purchasing" OR "public tender*" OR "public e-procurement" OR
"government e-procurement" OR "public sector procurement" ) AND (
performance OR effectiveness OR efficiency OR "value for money" OR outcome*
) AND ( factor* OR determinant* OR antecedent* OR driver* OR "success
factor*" OR barrier* OR influenc* ) ) AND PUBYEAR > 2015 AND PUBYEAR < 2027
AND ( LIMIT-TO ( DOCTYPE , "ar" ) OR LIMIT-TO ( DOCTYPE , "re" ) )
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The search returned 321 records (307 articles and 14 reviews). Table 2 lists the eligibility criteria. Studies explaining the uptake of a procurement practice, such as e-procurement or green criteria, were kept as implementation outcomes, but only studies that linked a factor to a performance indicator entered the vote count.

Table 2. Inclusion and exclusion criteria

Criterion	Inclusion	Exclusion
Publication window	2016–2026	Outside this window
Document type	Peer-reviewed journal articles with primary empirical data	Reviews of any kind; conceptual, legal-doctrinal or method-only papers
Language	English original	Other languages of the original document
Context	Public procurement of goods, services or works, including PPP and concessions	Private procurement; procurement used only as a policy lever on firms, farmers or consumers
Focus	Relates ≥1 factor to ≥1 procurement performance or implementation outcome	Descriptive overviews; supplier-side outcomes; tools proposed without testing factors
Information	Title, abstract and keywords available	No abstract

Research Method

The review follows PRISMA 2020 reporting (Page et al., 2021); the protocol was not registered. One reviewer screened all 321 records against Table 2 using titles, abstracts, keywords and Scopus metadata. Full texts were not retrieved, so eligibility and coding rest on the abstracts (see Section 4.2). Screening excluded 168 records: 62 did not relate a factor to a procurement outcome or were not empirical, 54 fell outside public procurement, 32 had a non-English original, 19 were reviews (eight of them indexed as articles), and one had no abstract. The remaining 153 studies entered the synthesis (Figure 1).

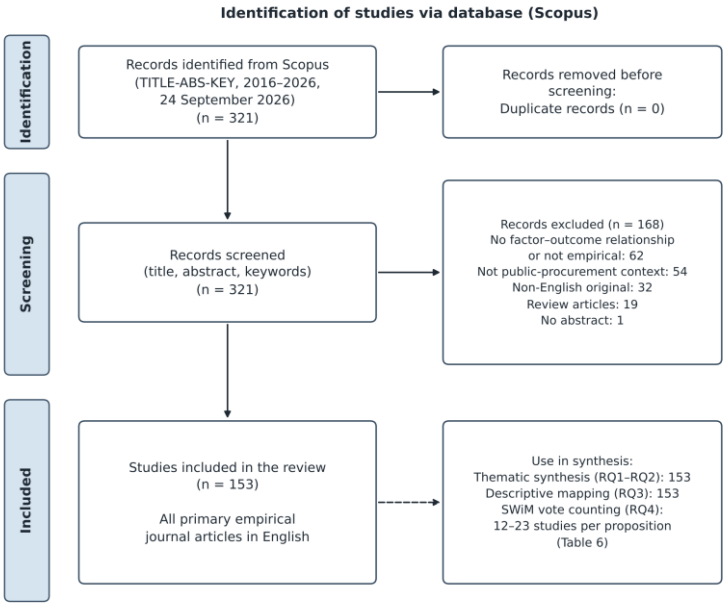


Figure 1. PRISMA 2020 flow diagram

An extraction sheet recorded each study's identity, setting, design, determinant category, factors, outcome and the reported direction of each relationship. Supplementary File S1 holds the full matrix for all 321 records, including the reason for every exclusion. No formal appraisal tool was applied; study design (Table 4) served as the indicator of evidence strength.

Data Analysis Technique

RQ1 and RQ2 were answered through thematic synthesis (Thomas & Harden, 2008) adapted to quantitative findings and guided by the principles of thematic analysis (Braun & Clarke, 2006). Factors were coded per study and grouped under the five starting categories, with new categories added when codes did not fit. Each study received one primary category. RQ3 drew on descriptive counts of year, journal, citations, design, setting and author affiliation.

RQ4 used SWiM, since heterogeneous measures and designs ruled out pooling (Campbell et al., 2020). A study entered the vote count for a proposition only if its abstract reported the direction of the relationship; studies that only listed or ranked factors fed the thematic synthesis. The thresholds were fixed before coding: fewer than three assessable studies meant inadequate evidence, at least 70% alignment meant supported, 50–69% partially supported, and below 50% not supported. Non-significant results counted as not aligned, and one study could inform several propositions. For P3, outcomes were also coded as transparency or integrity, cost, timeliness, quality, or general performance. For P4, which predicts heterogeneity, a study counted as aligned when the effect of a rule or procedure depended on capacity, enforcement or context, and as not aligned when the effect was uniform. Each proportion is reported with a Wilson 95% confidence interval and a two-sided exact binomial (sign) test against 50% (McKenzie & Brennan, 2019).

RESULTS AND DISCUSSION

Study Demographics

All 153 studies are primary empirical journal articles in English; eight were in press at the search date. Output grew from 9 studies in 2016 to 23 in 2025, and 2026 had already reached 22 by late September (Table 3).

Table 3. Distribution of publication year (n = 153)

Year	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026*	Total
Studies	9	12	9	10	14	11	12	13	18	23	22	153

*Partial year: the search was run on 24 September 2026.

The studies appeared in 106 journals, led by the *Journal of Public Procurement* (10 articles). They had 2,011 citations in total (median 5); the most cited, with 274 citations, examined what drives green tendering in Italian municipalities (Testa et al., 2016). The settings covered 43 countries, plus 17 multi-country studies and 14 that named no setting in the abstract. Europe accounted for 46 studies, Asia and the Middle East for 42, Africa for 25 and the Americas for 9, with Slovakia (11), Indonesia (10), China (8) and Ghana (8) the most frequent single settings. Authors came from 50 countries, led by the Czech Republic (16), Slovakia (15), the United Kingdom (14) and the United States (12).

Table 4 answers the methodological part of RQ3. Administrative or transaction data (36.6%) and cross-sectional surveys (32.7%) dominate. Only one study ran an experiment, and none evaluated a digital reform with a quasi-experimental design.

Table 4. Distribution of research designs (n = 153)

Research design	Studies	%
Quantitative: administrative or transaction data	56	36.6
Quantitative: survey (mostly cross-sectional)	50	32.7
Qualitative or case study	26	17.0
Mixed methods	10	6.5
Multi-criteria or expert modelling (AHP, DEMATEL, ISM, Delphi)	10	6.5
Experiment	1	0.7
Total	153	100.0

Design follows region. Twenty-nine of the 46 European studies analysed tender records, while 21 of the 25 African studies were surveys. Two research traditions therefore coexist: efficiency studies built on national procurement data in Central and Eastern Europe, and survey-based studies of determinants and implementation in Africa and Asia. The ten Indonesian studies belong to the

second group. Most examine the adoption of e-procurement and e-catalogue systems or staffing problems (Jumas et al., 2023; Puspitasari et al., 2025; Seo et al., 2018), and only Dani and Revindo (2025) link e-procurement to an objective outcome using administrative data.

Results Analysis and Modeling

Thematic coding sorted the 153 studies into seven categories (Table 5). Regulation, process and methods was the largest (31 studies), followed by organization and human resources (27) and technology and e-procurement (26). Sustainability and green procurement (21) and PPP (10) emerged beyond the initial framework and together make up 20.3% of the corpus.

Table 5. Determinant factor categories (n = 153)

Category	Scope	Studies
1. Organization and HR	Competence, training, structure and size, leadership, institutional capability	27
2. Technology and e-procurement	E-procurement and e-catalogue adoption, digital tools, data-driven decisions	26
3. Regulation, process and methods	Procedures, award criteria, tender design, regulatory frameworks, red tape	31
4. Market and suppliers	Number of bidders, SME participation, supplier quality	18
5. Politics and oversight	Audit, compliance, corruption, political interference, transparency initiatives	20
6. Sustainability and green procurement (new)	Uptake and effects of green and sustainable procurement	21
7. PPP and VfM (new)	PPP performance, value-for-money factors, contract governance	10
Total		153

Table 6 reports the SWiM results.

Table 6. SWiM-based proposition assessment

Proposition	Studies	Aligned, n/N (%)	95% CI	Sign test p	Verdict
P1 Competence and professionalization	14	14/14 (100%)	78–100%	< .001	Supported

Proposition	Studies	Aligned, n/N (%)	95% CI	Sign test p	Verdict
P2 Institutional capability	23	23/23 (100%)	86–100%	< .001	Supported
P3 E-procurement adoption	14	13/14 (93%)	69–99%	.002	Supported (thin evidence)
P4 Regulatory contextuality	12	10/12 (83%)	55–95%	.039	Supported
P5 Competition and supplier quality	21	19/21 (90%)	71–97%	< .001	Supported
P6 Oversight and political interference	20	19/20 (95%)	76–99%	< .001	Supported
P7 Country-context moderation	n/a	Narrative	n/a	n/a	Suggestive

Note. CI = Wilson confidence interval of the proportion aligned; p = two-sided exact binomial test against 50%. A study could inform more than one proposition.

All 14 studies that tested practitioner competence found a positive link (P1). Staff competence predicted the job performance of procurement professionals in Tanzania (Mwagike, 2025) and, together with institutional factors and compliance, the achievement of value for money (Mchopa & Changalima, 2026). Certified and experienced project managers delivered more successful technology procurement projects (Strang, 2021). In Chinese local governments, officials who knew the green procurement policies performed better on green purchasing, especially after training (Liu et al., 2019). The reverse also holds: a lack of technical knowledge slowed disaster procurement in Chile and New Zealand (Aparicio-Arias & Moreno, 2021). Indonesian work on this factor is still descriptive. Jumas et al. (2023), for example, mapped why civil servants are reluctant to take up procurement functional positions.

All 23 studies on institutional capability supported P2. Procurement capacity in process management, resources and finance was positively related to each of twelve procurement objectives (Manu et al., 2021). In Italian public works, larger and more experienced contracting authorities had fewer overruns and delays (Caserta et al., 2025), while small municipalities that relied on external designers faced more cost and time renegotiation (Cavalieri et al., 2019). Procurement audit raised quality when top management was committed (Anin et al., 2024), and implementation capability carried the effect of compliance and transparency mechanisms through to outcomes in Ghana (Dwomoh et al., 2026). The best organizational form is still debated. Centralization and digitalization went with better performance in Italian and US municipalities (Patrucco et al., 2021), and mandatory framework agreements saved money in Mexico (Mendoza

López, 2026), yet the right configuration depends on internal and external contingencies (Patrucco et al., 2019).

P3 matters most for the digital frame of this review, and it exposes a gap between adoption and outcomes. Eighteen of the 26 technology studies examined why users adopt or implement digital systems, or designed analytical tools, without measuring performance. Indonesian examples include vendor satisfaction with e-procurement and the use of local e-catalogues (Puspitasari et al., 2025; Seo et al., 2018); elsewhere, researchers built control indicators to flag suspicious purchases (Mokeeva & Yurko, 2023). Only 14 studies, 8 of them in the technology category, related digital procurement to a performance outcome, and 13 found a positive direction. Five reported gains in transparency or integrity. E-procurement weakened monopoly power and information asymmetry in Somalia (Mohamed et al., 2025), went with fewer corruption cases in Indonesia alongside bureaucratic reform (Dani & Revindo, 2025), and improved transparency in Armenia and Kyrgyzstan (Mkhitaryan et al., 2026; Shirdakova et al., 2025). Five reported cost gains, mostly next to other reforms: digitalization offset the cost penalty of decentralized purchasing (Patrucco et al., 2021), e-auctions raised savings in Slovakia (Grega et al., 2019), and e-procurement assimilation improved efficiency (Vaidya & Campbell, 2016). Four found better general performance (e.g., Similä et al., 2024). The one negative study linked e-auctions to lower savings across Slovak regions (Tkacova et al., 2022), and Mkhitaryan et al. (2026) saw transparency rise while efficiency barely moved.

No study tested timeliness, although faster procurement is a common promise of digital reform; the main evidence on shorter delays predates the review window (Lewis-Faupel et al., 2016). Eight of the 14 outcome studies were cross-sectional surveys and only three used administrative data. Digital procurement is thus firmly linked to transparency and integrity, while its cost benefits appear mainly where competition and organizational capability are also present. That conditional pattern still awaits a direct test.

P4 held in 10 of 12 studies. Strong institutions softened the cost penalty of less transparent, competition-restricting procedures in Central and Eastern European healthcare purchasing (P. Nemec et al., 2023). Mandatory transposition of Directive 2014/24/EU raised green procurement uptake, while voluntary options worked only where bureaucratic quality was high (Rosell, 2026). Stricter rules cut sustainable procurement in Slovakia and later simplification restored it (P. Nemec et al., 2026), and coercive green rules in Nigeria achieved little without normative support (Olele et al., 2026). Two studies found uniform effects instead. Removing red tape shortened German defence procurement by 36.6% (Glas et al., 2025), and complex, unstable legislation hurt efficiency in Russian education procurement (Demchenko et al., 2022). The pattern fits the argument of Bosio et al. (2022) that the payoff from stricter rules depends on public-sector capacity, which bears on the pace of Indonesia's regulatory reform. Since P4 predicts heterogeneity, its support shows that regulatory effects are seldom uniform; few studies tested capacity as a moderator directly (P. Nemec et al., 2023; Rosell, 2026).

P5 held in 19 of 21 studies, most of them Central European analyses of tender data. Each additional bid raised savings in Slovak and Czech procurement (Gavurova et al., 2020; J. Nemec et al., 2020; Tkacova et al., 2017), competition lowered the cost of waste collection (Pavel & Slavík, 2018), and Japanese tenders with fewer bidders closed nearer the reserve price (Nakanishi, 2022). Supplier quality mattered as well, since suppliers with poor track records harmed delivery in Brazilian e-procurement (Reis & Cabral, 2018). The two exceptions carry a warning for lowest-price tendering. Lower bid rates went with poorer construction quality in Japan (Arai, 2021), and contractor quality did not predict project success in the expected direction (Strang, 2021).

P6 held in 19 of 20 studies. Thailand's infrastructure data-disclosure standard went with budget savings of about 5% (Saelawong et al., 2024), and effective internal audit drove value for money in Ghanaian district assemblies (Karikari Appiah et al., 2022). On the other side, local corruption lowered the efficiency of Italian healthcare infrastructure contracts (Cavalieri et al., 2017), corruption and weak political accountability caused quality failures in South African social housing (Amoah, 2024), and political interference weakened the link between procurement practice and performance in Ghana (Toku et al., 2025). An Indonesian laboratory experiment showed that pressure and opportunity raise procurement fraud (Rustiarini et al., 2019). The single exception found that political-economic pressure did not moderate the governance–fraud link in Indonesian central-government procurement (Sulaeman et al., 2026). These results agree with Olken (2007) and Coviello and Gagliarducci (2017).

P7 could only be judged narratively. Institutional quality shaped the cost effects of procedures and contract size (Caserta et al., 2025; P. Nemec et al., 2023) and the effect of regulation on green purchasing (Rosell, 2026). Surveys from Ghana, Tanzania, Nigeria and Indonesia tended to report strong links between basic capacity and performance, whereas Central European studies estimated the marginal effects of competition and procedure design. The contrast fits Bosio et al. (2022) and Best et al. (2023), but region and design overlap, so the comparison is confounded.

The two new categories show the same tendency. Most of the 21 green procurement studies explained uptake, for instance through information and the maturity of environmental management systems (Testa et al., 2016) or officials' awareness (Liu et al., 2019). Its economic effects are mixed: green procurement went with lower price and time efficiency in China (Wang et al., 2020), but with more competition and lower corruption risk in Bulgaria (Poltoratskaia et al., 2026). The ten PPP studies are also mixed. Indonesian power projects procured as PPPs beat traditional projects on time and availability but not on cost (Atmo et al., 2017), and PPP efficiency in UK primary-care buildings depended on context and on the discretion left to public staff (Mudyarabikwa & Regmi, 2016). In both areas, implementation capacity and contract governance weigh more than the chosen policy or scheme.

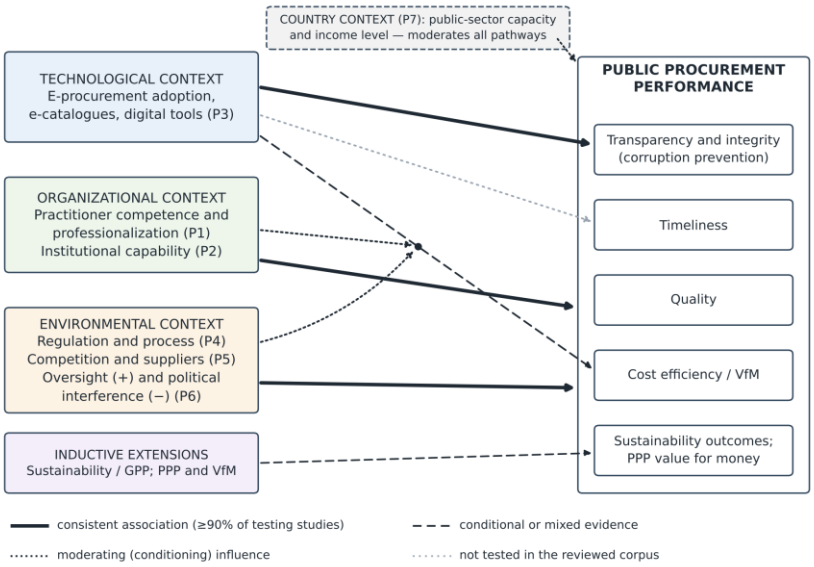


Figure 2. Revised conceptual model of PP performance determinants in the digital transformation era

Figure 2 updates the initial TOE model. The organizational and environmental contexts have the most consistent links with performance. Technology relates consistently to transparency and integrity, its link with cost depends on capability and competition, and its effect on timeliness remains untested. Sustainability and PPP extend the environmental context, and country context moderates every pathway.

These results carry TOE from adoption to outcomes. Technology mattered mainly in combination with the other two contexts, which fits a complementarity reading of the resource-based view: any agency can buy a platform, but competent staff and capable institutions are scarce, and they decide how much value the platform yields. Agency theory explains why transparency and integrity show the clearest digital gains. Electronic records narrow the information gap between principals and officials directly, whereas savings also need the market discipline that competition brings (P5). Institutional theory helps to read the regulatory findings. When coercive rules outrun an organization's capacity, compliance turns ceremonial and performance can fall, as the Slovak green procurement reforms suggest (P. Nemec et al., 2026). Earlier bibliometric and content reviews mapped topics (Gálvez-Rodríguez et al., 2024; Patrucco et al., 2017; Santosa & Pramesti, 2025). This review rates the direction and consistency of the evidence, and its finding that causal, outcome-based evidence on digital procurement is scarce echoes calls for stronger evaluation of procurement tools (Fazekas & Blum, 2021; Kundu et al., 2025).

The high alignment rates in Table 6 need care. One reviewer coded abstracts, and abstracts favour significant, expected results. Many determinant studies rely on perception surveys exposed to common-method bias, and vote counting ignores effect size. The unanimous support for P1 and P2 shows a consistent direction in the published record; it does not prove large causal effects. The sign tests still separate two kinds of evidence. Support for competence, capability, competition and oversight is consistent and broad, whereas the

evidence on e-procurement outcomes, the core of the digital question, rests on 14 mostly survey-based studies and contains no test of timeliness. Table 7 turns these gaps into a research agenda.

Table 7. Research agenda

Evidence gap	Research direction	Indicative design
Adoption–outcome gap: 18 of 26 technology studies; no test of timeliness	Link e-procurement and e-catalogue use to price, competition, cycle time and quality	Difference-in-differences around the e-Katalog v6 rollout with national transaction data
Capacity as a moderator is mostly inferred (P2, P4, P7)	Test capacity × regulation and capacity × technology interactions	Multilevel models across local governments with procurement-unit maturity scores
Competence and oversight rest on self-reported measures (P1, P6)	Link certification and red-flag data to contract outcomes	Administrative panel data and analytics on tender records
Region–design overlap and language bias	Combine administrative data and surveys in developing countries; add Indonesian-language studies	Multi-database reviews (Scopus, Web of Science, Garuda, SINTA) with full-text coding

CONCLUSIONS AND RECOMMENDATIONS

This review synthesized 153 empirical studies from 2016–2026 on what drives PP performance in the digital era. Practitioner competence, institutional capability, supplier competition and credible oversight show consistent links with better performance, political interference weakens integrity and efficiency, and regulatory effects usually depend on public-sector capacity. Digital procurement is firmly associated with transparency and integrity. Its cost benefits appear mostly where competition and organizational capability are also in place, and its effect on timeliness has not yet been measured. For policymakers, the task is to pair digital investment with human-resource capacity, competitive markets and adaptive regulation. Green procurement and PPP follow the same logic, since implementation capacity and contract governance shape their results more than the policy or scheme chosen.

For Indonesian regulators and practitioners, including local governments, four implications follow. Investment in e-Katalog and e-tendering should come with investment in a professional procurement workforce and capable procurement units. Regulatory simplification should take implementer capacity into account, because one rule can produce different results in different organizations. Oversight should use platform data, for example red-flag indicators drawn from tender and catalogue transactions. Finally, digital reform should be

judged by outcomes such as prices, number of bidders, cycle time and contract quality rather than by transaction volume; Indonesian research, now dominated by adoption surveys, would gain directly from such data.

FURTHER STUDY

The review has several limitations. It searched only Scopus and kept only English originals, so Indonesian-language journals and other databases were left out. Eligibility and coding relied on titles, abstracts and keywords, and relationships reported only in full texts may be missing. One reviewer did the screening and coding without independent checking, and no standardized appraisal tool was used. Vote counting ignores effect size, only 12 to 23 studies were assessable per proposition, and the protocol was not registered. Future reviews should search several databases including Indonesian sources, code full texts with at least two reviewers, apply a formal appraisal tool, and test the proposed relationships causally in Indonesia.

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