Bridging: Journal of Islamic Digital Economic and Management
ISSN: 3025-9177
Vol. 3 No. 1 Maret 2026 Hal. 61-70
Open Access: https://journal.alshobar.or.id/index.php/bridging

PUBLIC PROCUREMENT DIGITALISATION AS A MECHANISM FOR TRANSPARENCY AND ANTI-CORRUPTION (CROSS BORDER MANAGEMENT STUDY): A SYSTEMATIC LITERATURE REVIEW

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INFO ARTIKEL
Sejarah Artikel:
Diterima, 19 Maret 2026
Direvisi, 25 Maret 2026
Disetujui, 31 Maret 2026

KEYWORDS
Digitalisation, E-Procurement, Public Procurement, Transparency, Anti-Corruption, Efficiency.

ABSTRACT

The digitalisation process in public procurement, which includes systems such as e- procurement, electronic government procurement, digital tendering, online auctions, and the use of analytics with risk modelling, has received considerable attention as an approach for improving transparency, enhancing operational efficiency, and reducing corruption. This systematic literature review aims to synthesize empirical evidence as well as conceptual findings on how the digitalisation of procurement affects four key areas: (1) transparency and accountability; (2) outcomes related to integrity, including anti-corruption measures and fraud prevention; (3) operational efficiency and value for money; and (4) competitive dynamics and supplier participation levels. The PRISMA 2020 protocol was followed for the review. Keywords such as "public procurement," "e-procurement," "transparency," and "efficiency" were used in Scopus searches, which were filtered by discipline relevance, English language, and open-access criteria. Out of 561 initial records, 23 studies met the inclusion criteria. The review found, through thematic synthesis, that digitalisation generally improves transparency by creating digital audit trails. Integrity is also strengthened through the implementation of control indicators and the use of risk-based analytics. Operational efficiency also improves. However, effects on supplier competition remain inconsistent. The success of the digitalisation of procurement systems depends heavily on the quality of institutional governance, the design of the systems, and the adequacy of national digital infrastructure.

INTRODUCTION

Procurement of public goods is a strategic element in governance frameworks today; it represents around 10–20% of GDP in many countries (Bosio et al., 2023). However, procurement remains one of the sectors most vulnerable to corruption. Many reform initiatives have tried to reduce inefficiencies and misconduct by increasing transparency and automating processes. These developments are called the digitalisation of procurement systems. Digitalisation includes e-procurement and e-government procurement (e-GP) platforms, which move tendering and contracting into electronic environments that are data-driven and traceable. The systems provide better transparency through real-time audit mechanisms and reduce discretionary power; however, implementation success varies widely. Some studies show improvements in efficiency and accountability (Radojicic et al., 2025; Jimenez et al., 2022). Other research highlights major

differences due to institutional capacity, system design complexity, and unclear effects on competition (Kubák et al., 2023; De Medeiros Costa, 2024). Therefore, a systematic synthesis is needed to explain the mechanisms and conditions under which procurement digitalisation improves governance quality and performance outcomes.

Objectives and Research Questions This review aims to:

1. Identify the forms of digitalisation adopted in public procurement and which stages of the procurement cycle they are applied in. Digital procurement systems have been increasingly incorporated into public-sector operations. These technologies appear across various procurement phases, from initial tender announcements to contract execution and performance monitoring. E- tendering platforms make bid submissions easier; electronic catalogues streamline requisition processes. Automated evaluation tools also enhance objectivity in vendor selection.
2. Examine the effects of digitalisation on transparency, accountability, and integrity (anti-corruption and fraud prevention). Digitalisation has a substantial impact on transparency and accountability. Electronic systems create audit trails that document every transaction and decision point. This increased visibility reduces opportunities for corrupt practices, since activities become more traceable. However, the effectiveness of these transparency mechanisms depends on how well they are designed and whether proper oversight structures exist to utilise the data generated.
3. Evaluate its implications for efficiency and supplier competition, alongside moderating influences such as institutional quality and infrastructure readiness. The efficiency gains from digital procurement are multifaceted but not uniform across contexts. Automated workflows reduce processing times and administrative burden. Despite these potential benefits, realised improvements vary considerably depending on implementation quality. Digital platforms theoretically expand supplier access by lowering participation barriers, though this effect is moderated by factors including internet connectivity and digital literacy among potential vendors. Accordingly, the paper contributes both empirically and conceptually to the evolving discourse on digital governance in the public sector.

Contributions of the Review

This research provides three main contributions:

- A structured, cross-country analysis of how digitalisation affects procurement governance.
- A model that integrates practical findings and is grounded in mechanisms and concepts.

Evidence-based policy recommendations to help design and implement e- procurement systems more effectively.

RESEARCH METHOD

Review Design and Reporting Standard

This study adopts a Systematic Literature Review (SLR) approach and follows the PRISMA 2020 guidelines. This methodological choice ensures transparency, reproducibility, and minimal selection bias throughout the review process.

All reporting elements—including identification, screening, and final inclusion—were structured according to the three-stage PRISMA framework, as summarised in the flow diagram (Figure 1).

Data Source and Search Strategy

Literature searches were conducted using the Scopus database in February 2026. Search terms captured two major domains: (1) digitalisation of public procurement and (2) governance outcomes. The exact syntax was:

("public procurement" OR "government procurement" OR "e-procurement" OR "e-government procurement" OR "e-tendering" OR "e-auction")

AND ("transparency" OR "corruption" OR "efficiency" OR "fraud" OR "competition" OR "value for money")

Filters applied included subject area (Business, Management & Accounting; Economics, Econometrics & Finance), document type (articles and conference papers), language (English), and open access availability.

From an initial 561 records, the final set after PRISMA screening included 23 studies.

Selection and Eligibility Process

The PRISMA selection stages are as follows:

1. Identification:
   561 articles were initially retrieved.
2. Screening:
   After filtering by subject area, 174 remained; following document type filters, 142 remained. Applying topical keyword filters yielded 74 articles; language limited to English reduced the set to 70; applying the open-access filter resulted in 24 records.
3. Eligibility:
   Titles and abstracts were reviewed to ensure relevance to *public procurement*. One article (Wu, 2025) was excluded as it focused on e-commerce rather than public procurement.
4. Included Studies:
   23 studies qualified for final thematic synthesis.

Inclusion and Exclusion Criteria Inclusion criteria:

- Empirical or conceptual studies specifically addressing *public procurement*.
- Focus on digitalisation mechanisms (e-procurement, e-GP, e-tendering, e-auction, risk analytics, or digital control).
- Examine at least one of four core outcomes: transparency, integrity (anti-corruption/fraud), efficiency, or competition.

Exclusion criteria:

- Non-public sector digitalisation (e.g., consumer e-commerce).
- Studies lacking primary data or direct procurement focus.
- Non-peer-reviewed materials (editorials, general commentaries, or reports).

Data Extraction and Analysis

- Data extraction followed a standardised template capturing:
  (1) authors and publication year,
  (2) national or institutional context,
  (3) type of digitalisation,
  (4) approach or methodology,
  (5) key outcomes, and
  (6) core findings.
- A thematic synthesis method was applied to cluster evidence across four main outcome areas: *transparency and accountability*, *integrity (anti-corruption/fraud)*, *efficiency and value for money*, and *competition and supplier participation*. Triangulation across contexts and digitalisation mechanisms helped ensure interpretive reliability.

Records identified through Scopus: 561

- After subject area filtering: 174
- After document type filtering: 142
- After topic/keyword filtering: 74
- After English language filtering: 70
- After open-access filtering: 24
- Title/abstract screening conducted: 24

- Excluded (non-relevant): 1 (Wu, 2025)
- Final studies included for synthesis: 23

PRISMA 2020 Flow Diagram

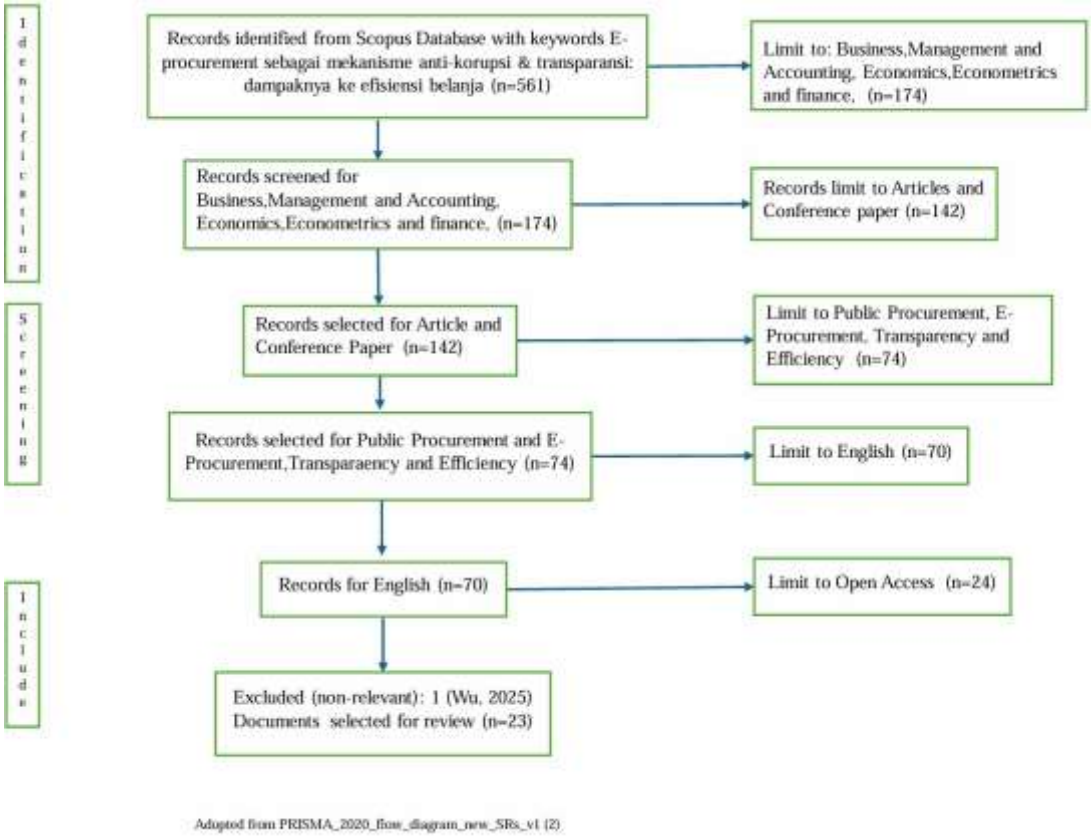

Figure 1. PRISMA 2020 Flow Diagram

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This flow represents the sequential filtering and eligibility process in accordance with the PRISMA 2020 guideline.

RESULT AND DISCUSSION

Overview of Included Studies

A total of 23 studies included in the final PRISMA stage spanned from 2013 to 2025, reflecting a rising research focus on public procurement digitalisation after the COVID-19 pandemic. The studies cover five major regions:
- Europe (Slovenia, Slovakia, Ukraine, Germany, Czech Republic, EU),

- Central Asia (Kazakhstan, Kyrgyz Republic),
- Africa (South Africa, Ghana),
- Latin America (Brazil),
- and Cross-country global datasets (72 nations).

Forms of digitalisation examined:

1. E-procurement / E-GP (implementation and effects) — 13 studies.
2. E-auction / reverse auction mechanisms — 4 studies.
3. Procurement analytics and control indicators — 2 studies.
4. Risk modelling and AI-based monitoring tools — 2 studies.
5. Hybrid models (digital + internal control frameworks) — 2 studies.

Thematic Synthesis

Theme 1 – Transparency and Accountability

Most evidence indicates improvement in transparency following digitalisation. E-procurement creates traceable audit trails, limits manual interventions, and facilitates oversight. In Slovenia, the share of non-transparent procedures decreased significantly (Radojicic et al., 2025); in Ukraine, the ProZorro platform expanded public contract access (Psota et al., 2020). However, effectiveness depends greatly on institutional integrity and continual auditing capacity.

Theme 2 – Integrity (Anti-Corruption and Deterrence)

Cross-country findings demonstrate that e-procurement substantially reduces corruption risk (Jimenez et al., 2022), particularly in high-quality governance environments with supranational support. Locally, combining internal control systems with e-procurement yields significant positive effects on fraud deterrence (Koerniawan et al., 2025). Additionally, *risk modelling* (Kazbekova et al., 2025) and *control indicators* (Mokeeva & Yurko, 2023) assist in early detection of collusion and irregularities.

Theme 3 – Efficiency and Value for Money

Efficiency gains are the most consistent finding. Global cost-benefit analysis (Bosio et al., 2023) shows high return-to-investment ratios for e-GP systems. Eastern European studies demonstrate that e-auctions decrease prices by increasing competition (Pavel & Sičáková-Beblavá, 2013; Hanák, 2018), while Brazilian research warns of performance risks arising from aggressive underbidding (De Medeiros-Costa, 2024). Hence, efficiency should consider the full contract lifecycle, not only tender price savings.

Theme 4 – Competition and Supplier Participation

The impact of digitalisation on competition is mixed. In Slovenia, SME participation increased, yet bid intensity did not (Radojicic et al., 2025). Conversely, during COVID-19 emergency procurement, competition dropped sharply (Kubák et al., 2023). System design, market capacity, and crisis contexts are key determinants.

Discussion

General Patterns and Causal Mechanisms

Across the 23 studies, public procurement digitalisation is found to enhance governance through four primary mechanisms:

1. Traceability and Digital Auditing:
   Digitalisation establishes automatic, traceable audit logs throughout tendering phases, reducing opportunities for manipulation and human error—illustrated by improved transparency in Slovenia (Radojicic et al., 2025) and Ukraine (Psota et al., 2020).
2. Standardisation and Reduced Discretion:

E-procurement platforms harmonise documentation, evaluation criteria, and timelines, thereby limiting bureaucratic discretion and rent-seeking
opportunities. Jimenez et al. (2022) attribute anti-corruption effects to this reduction in informal bargaining space.

3. Market Access and Participation Expansion:
   Digital systems lower administrative costs and widen supplier access, particularly for SMEs and cross-regional firms (Radojicic et al., 2025). Nevertheless, higher participation does not automatically translate into stronger competition intensity.
4. Data-Driven Monitoring and Risk Analytics:
   Digitalisation facilitates analytical oversight using control indicators and risk modelling (Mokeeva & Yurko, 2023; Kazbekova et al., 2025), shifting monitoring paradigms from post-hoc auditing toward proactive anomaly detection.

The Complex Link Between Digitalisation and Efficiency

Procurement efficiency is multidimensional—it depends not only on bidding price competition but also on *contract performance quality*. Evidence from Brazil (De Medeiros-Costa, 2024) reveals a *trade-off* between low bidding prices and post-award contract stability, underscoring the need for lifecycle-based efficiency measurements.

Meanwhile, global cost-benefit evidence (Bosio et al., 2023) shows that the large-scale financial benefits of e-GP materialise only when systems are fully integrated across government agencies. Hence, *economies of scale* in procurement platforms are essential for realising true *value for money*.

Contextual Variation and Moderating Factors

This review identifies several contextual moderators explaining heterogeneous outcomes across countries:

5. Institutional Quality:
   According to Jimenez et al. (2022), e-procurement curbs corruption effectively only in contexts with strong governance. In weak institutions, digitalisation can merely shift corruption channels from analogue to digital formats.
6. Supranational and Regulatory Support:
   EU-driven harmonisation policies strengthen transparency norms and inter-country benchmarking (Radojicic et al., 2025; Kunz et al., 2020).
7. ICT Capacity and Organisational Readiness:
   Limited infrastructure and human resource constraints slow adoption, particularly in African contexts (Osei-Tutu et al., 2019; Nchabeleng & Ncube, 2025).
8. Crisis Context and Procurement Discretion:
   During COVID-19, emergency contracting expanded direct awards, undermining digitalisation's transparency and competitiveness benefits (Kubák et al., 2023).

Theoretical Implications: Digitalisation as a Governance Ecosystem

The synthesis suggests that procurement digitalisation should be understood not merely as a technical upgrade but as a governance ecosystem involving institutional reform, inter-agency integration, and public oversight. Analytical innovations—*risk modelling*, *blockchain*, *open data dashboards*—are reshaping oversight from passive auditing to participatory accountability.

Cases from the Kyrgyz Republic (Shirdakova et al., 2025) and Italy (Pellegrini et al., 2020) demonstrate that combining *smart contracts*, *Building Information Modelling (BIM)*, and blockchain enhances systemic transparency. Consequently, digital governance scholarship should reposition e-procurement within an *adaptive accountability framework* connecting citizens, auditors, and suppliers in real time.

Figure 2
Conceptual Model

Digitalisation Inputs:

E-procurement → E-GP → E-auctions → Risk Analytics → Open Data Platforms Intervening Mechanisms:

- *Traceability* → strengthens transparency
- *Standardisation* → reduces discretion and corruption risks
- *Market Access* → expands supplier participation
- *Automation* → generates cost reductions
- *Data-Driven Monitoring* → enhances integrity and accountability Main Outcomes:
- Transparency ↑
- Integrity ↑
- Efficiency ↑
- Competition (± depending on institutional context)

Moderators: institutional quality, technological capacity, regulatory framework, and crisis conditions.

Implications & Limitations

Policy Implications

Drawing from cross-country evidence and mechanism synthesis, three key-policy implications emerge:

1. Digitalisation must be coupled with institutional reform.

Technologies such as e-procurement and e-GP can only deliver integrity gains when supported by credible governance institutions, independent audit bodies, and inter-agency coordination among procurement units and anti-corruption agencies.

2. Performance evaluation should adopt a full contract-cycle perspective. Efficiency indicators should go beyond initial tender prices to include contract quality, timeliness, and modification rates. A *life-cycle cost analysis* framework ensures long-term *value for money*.
3. Competition policies should be data-driven and inclusive.
   Digital procurement platforms must incorporate anti-discrimination rules for SMEs and utilise analytical monitoring of competition anomalies (e.g., bid-rigging or single-bid patterns).

Study Limitations

Despite adherence to rigorous SLR procedures, several limitations should be acknowledged:

4. Data Source Restricted to Scopus.
   Publication bias may arise since other databases such as Web of Science or Google Scholar were not included.
5. Methodological Heterogeneity.
   Variations in methods (quantitative, qualitative, mixed) and national contexts limited the feasibility of quantitative meta-analysis.
6. Open Access Focus.
   Restricting the review to open-access sources may have excluded pivotal yet paywalled studies.

CONCLUSION

Summary of Key Findings

The digitalisation of public procurement significantly enhances transparency, accountability, and fiscal efficiency. e-procurement and e-GP platforms generate digital audit trails that reduce opportunities for corruption and improve spending efficiency through process standardisation and open data access. Nevertheless, their impact on supplier competition remains inconsistent. This impact is strongly conditioned by system design, institutional quality, and national ICT capacity.

Cross-country evidence underscores that digital transformation is not a quick fix but an evolutionary reform process. This requires integrated governance, political will, and inter-agency collaboration

Future Research Agenda

1. Comparative quantitative analysis are needed to evaluate the long-term impact of e-procurement on contract performance outcomes.
2. Policy experiments and field studies should assess the effectiveness of *AI-based monitoring* and *blockchain* applications in procurement oversight.
   Integrating *public administration* and *information systems* can yield a more comprehensive *adaptive digital governance* framework

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