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A standardised public procurement data architecture: a framework for tendering-stage analytics and decision support

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Abstract: This paper proposes a uniform public procurement data architecture defining minimum mandatory fields, mapping them to the open contracting data standard (OCDS), and linking tender-stage data to analytical outputs and government objectives. A comparative conceptual study examines six ecosystems: the European Union (TED), the UK (Contracts Finder), Singapore (GeBIZ), and three GCC systems (Saudi Arabia's Etimad, Qatar's Monaqasat, and the UAE federal eSourcing portals). Using OCDS as a reference schema, fields were extracted, canonicalised, and mapped across jurisdictions. A conceptual model links data statements to procurement stages, analytical performance, and policy goals. Core identification, timeline, and value fields appear universally, but major gaps remain in supplier identifiers, evaluation scoring, SME or local vendor flags, past performance metrics, and contract implementation data. GeBIZ demonstrates near-complete lifecycle traceability and advanced analytics, whereas EU and UK systems show moderate gaps and GCC platforms provide limited supplier-level and performance information.

Keywords: public procurement; data architecture; open contracting data standard; OCDS; tendering; data standardisation; e-procurement; decision support.

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1 Introduction

Public procurement accounts for approximately 12–20% of global GDP, with even higher proportions observed across developing economies (Panya and Awuor, 2023). In addition to its large financial scale, it is a strategic policy instrument of advancing transparency, innovation, resilience, and social inclusion (Manta and Mansi, 2024). These two

economic and social functions have necessitated the rapid growth in the size and complexity of procurement systems, coupled with the increasing demands on governments to enhance their data infrastructure to enable evidence-based policymaking.

A typical procurement cycle comprises a set of steps: planning, requisition, tendering, evaluation and award, contracting, and contract administration (Opuwari, 2024). One of them is particularly important in the tendering stage. It creates the conditions of competition, forms the participation of suppliers, and develops the most valuable, similar, and analytically rich information on market prices, supplier behaviour, and the effectiveness of the procurement design (Kelly et al., 2021; Volker and Schotanus, 2023).

Although tendering data is important, the current research and practice demonstrate that there are still inconsistencies. The lack of similarity between classification systems used and the differences in reporting systems prevent cross-jurisdictional comparisons. CPV codes are used in the European Union (Mackie et al., 2022), the United Kingdom uses a modified regime, which is post-Brexit (Telles and Graells, 2019), and the GCC countries rely on national standards through platforms like Etimad in Saudi Arabia (Sultan et al., 2025) or Monaqasat in Qatar (Hameed, 2020). All these variations, along with the presence of regular gaps in supplier identifiers, evaluation scoring, SME flags, past performance metrics, and data on contract implementation, support the undermining of transparency, limiting the analytical usability of such data, and hindering the ability to create evidence-based policies (Culot et al., 2023).

By contrast, the GeBIZ platform of Singapore shows the promise of a well-designed, mandatory single system that imposes comprehensive standardised data collection in the procurement lifecycle (Erh, 2023). Nonetheless, such best-practice examples are the exception and not the rule. The fragmentation thus created has two implications of great significance. To start with, policymakers do not have harmonised datasets that can be used in cross-region benchmarking, efficiency analysis, competition analysis, SME inclusion, and supplier performance evaluation. Second, the data regarding procurement is not often operationalised into dashboards, KPIs, risk-detecting systems, or advanced analytical systems that are required by the modern system of financial management of the population (Cao et al., 2025).

This paper fills these gaps by:

- 1 developing a taxonomy of core tendering-stage data fields that are aligned with the Open Contracting Data Standard (OCDS)
- 2 applying a systematic comparative analysis of field availability and completeness across the EU (TED), UK (Contracts Finder), Singapore (GeBIZ), and three GCC systems (Etimad, Monaqasat, and UAE federal eSourcing portals)
- 3 suggesting a conceptual framework that would bridge the gap between tender-stage data fields and analytical outputs and government policy objectives.

Based on this, the following are research questions that guide this paper:

- Q1 What are the core data elements and common fields needed to effectively manage and analyse tender management in different procurement regimes?
- Q2 How much can standardised tendering-stage data architecture improve efficiency in decision making in the systems of public procurement?

Q3 Which framework can be used to guide governments in how they organise tendering data so that it is effectively used to support decision making?

This research contributes to the literature as it presents an original empirical mapping of the tendering-stage data field and a practical architecture based on cross-jurisdictional evidence. Although the study is limited to the tendering phase, such a narrow scope allows taking a closer look at the phase that provides the most similar data on the market and suppliers.

The rest of the paper is organised as follows: Section 2 presents the official literature review, Section 3 deals with the description of the methodology and framework development, Section 4 presents the results of the comparative analysis, Section 5 deals with the results and policy implications, and Section 6 concludes.

2 Literature review

2.1 International procurement data standards

The number of international initiatives aimed at harmonising the information concerning the public procurement has also increased significantly, with the OCDS becoming an overly popular framework in terms of organising and releasing procurement information at both the planning and tendering stages, as well as the award phase and the contract implementation phase. More than 50 countries have adopted OCDS, fully or partially, and notable implementations have taken place in the ProZorro platform of Ukraine (Tymoshenko and Sargiacomo, 2025), in Paraguay, Colombia, and Moldova. However, the implementation is not even. The high-quality award or contract implementation data are published only in approximately 30 countries as of 2024, and most systems are only limited to basic tender notification (Nemec, 2025). The recurrent problems are the lack of full coverage of the contract execution and supplier performance metrics (Diadia et al., 2022).

One of the biggest obstacles to successful data utilisation is the incompatibility among various classification systems. The Common Procurement Vocabulary (CPV) of the European Union is mandatory but has been criticised as outdated and unlikely to meet digital and sustainability objectives (Moiraghi et al., 2024; Kalimo et al., 2022). Conversely, some systems, like NAICS (used in North America), are economic statistics-based and not procurement-oriented (Lynch and Manduca, 2024). WTO Government Procurement Agreement (GPA) and OECD MAPS assessments focus on disclosure but do not mandate detailed data architectures that could be used to support advanced analytics (Khorana et al., 2024; Soylyu et al., 2022). The guidelines issued by the World Bank also include minimum disclosure requirements without mentioning interoperability or analytics preparedness (Noce et al., 2024). In general, although international standards have improved the normative principles, they have not fully addressed the practical issue that is the creation of coherent and analytics-ready data architectures.

2.2 *National-level procurement data architectures*

The national procurement systems are indicative of the larger conflict between fragmentation and digital advances.

2.2.1 *European Union*

The mandatory use of CPV codes under the Directive 2014/24/EU has brought about significant standardisation by the EU. Nonetheless, empirical studies of Tenders Electronic Daily (TED) data demonstrate significant gaps, especially in the terms of detailed assessment scoring, subcontracting data, the status of the SMEs indicators, and suppliers past performance indicators (Prier et al., 2018; Platsidis, 2024). Such shortcomings restrict the prospects of an overall EU-wide analytics and cross-border benchmarking.

2.2.2 *UK*

Since the Brexit, the UK has switched to the Contracts Finder platform and adopted standardised notice templates and organisation IDs. The Procurement Act 2023 makes further improvements on the data requirements, including those of below-threshold notices and monitoring supplier performance (Bovis, 2025; Henty, 2025). With all these advances, there are still gaps in contract adjustments, post-award tracking of performance, and detailed histories of supplier performance (Jones, 2021; Barton, 2022).

2.2.3 *Gulf Cooperation Council*

GCC nations have been fast tracked with regard to digital procurement platforms. Tendering, awards, and payments are now managed at the federal and emirate-level systems of Saudi Arabia (Etimad platform), Qatar (Monaqasat), and the UAE (federal and emirate-level systems). The Saudi Arabian Vision 2030 and other national strategies are clearly focused on more transparency and local content. Nevertheless, field structures are not consistent, and there is a lack of supplier metadata, disclosure of evaluation criteria, and data on contract implementation (Shalan, 2025; Bawazeer et al., 2025).

2.2.4 *Singapore*

One of the most integrated systems is the Government Electronic Business (GeBIZ) platform introduced in Singapore in 2000. It implements granular, mandatory data fields throughout the entire procurement lifecycle, including planning and tendering, award and implementation (Sipahi and Saayi, 2024; Zhang et al., 2025; Erh, 2023). Such an organised method allows more complex traceability and analytics that many other jurisdictions do not yet have.

2.3 *Transparency, supplier selection and tendering data fields*

It has been widely acknowledged that transparency is the key to minimising corruption, increasing competition, and promoting accountability of government procurement (Mahuwi and Israel, 2024; Duguay et al., 2023). Nevertheless, it is not enough to publish data when datasets are not structured and complete. Some of the critical areas that are

often not included or not fully reported include detailed evaluation scoring and weightings, subcontracting arrangements, SME and local vendor indicators and supplier past performance indicators (Mahmoudi and Javed, 2022). Long-standing supplier identifiers are of particular interest, as they allow conducting longitudinal analysis of supplier behaviour, pricing patterns, and performance in multiple contracts and procuring organisations.

In their absence, even legally open datasets are analytically constrained and limit the capacity of governments to identify favouritism, measure policy performance, or aid in advanced decision making.

2.4 Procurement data and supply chain analytics

The use of structured, granular, and longitudinally connected data has long been proven to be very useful in the supply chain management of the private sector (Kang and Bhawna, 2025; Teixeira et al., 2025). In comparison, public procurement is much behind in these capabilities (Manyathi et al., 2021). More complex applications like AI-based bid evaluation, anomaly detection, and risk prediction demand complete, standardised, and semantically consistent datasets (Kusonkhum et al., 2023; Kuiper, 2024). The existing literature sheds light on the structural gap: existing transparency initiatives have become the source of increased access to data, yet few studies offer specific mappings of tendering data fields to particular analytical outputs and government aims. This research paper makes a contribution towards filling that gap by basing its proposed data architecture and framework on a systematic cross-jurisdictional empirical comparison.

3 Methodology and framework development

In this study, the conceptual research design used is comparative and combines systematic field extraction and mapping to investigate variation in tendering-stage procurement data architectures across jurisdictions and to assess their implications on analytics and decision support. The methodology allows a systematic assessment of data completeness, interoperability, and readiness to analyse data.

The study focuses on six major procurement ecosystems that were chosen to reflect a variety of regulatory, economic, and technological environments: the TED of the European Union, the Contracts Finder of the UK, GeBIZ of Singapore, Etimad of Saudi Arabia, Monaqsat of Qatar, and the federal digital procurement platform of the United Arab Emirates. These platforms were selected as they reflect large-scale harmonised systems (EU), post-Brexit reformed regimes (UK), best practices in digital (Singapore), and GCC systems that are rapidly modernising.

This paper pays special attention to the tendering phase of government procurement. Although this emphasis permits a closer analysis of the phase that yields the most similar and analytically useful data, it omits other phases, like contract execution, monitoring, and post-award evaluation.

3.1 Field extraction and categorisation process

3.1.1 Source selection and portal-level field review

Each jurisdiction underwent a systematic review of the official documentation about the platform, its data dictionaries, user manuals, published notices, and available APIs. In cases where structured data was available (e.g., Contracts Finder API and TED records), fields were read directly out of JSON/CSV responses. In the case of platforms that did not have programmatic access (GeBIZ, Etimad, Monaqasat and UAE portal), a manual inspection of stratified samples of tender notices (by sector and year) was conducted to ensure that all types of procurement were covered.

3.1.2 Field extraction procedure

A standardised and repeatable protocol was used to extract fields. All types of notices (tender, award, and planning) were tested. The extracted fields were entered with their original labels, data type, optionality (mandatory/optional), and source. Fields in duplicate or semantically similar fields across platforms (e.g., published date; date of publication) were canonicalised into one standardised label. The analysis has been performed on the basis of the records of the 2019–2024 period in order to preserve the comparability and prevent the distortion of the records due to the outdated system.

3.1.3 Field categorisation process

Fields extracted were subdivided into seven analytic categories, which were in accordance with core procurement functions:

- 1 tender identification
- 2 timeline
- 3 value
- 4 supplier/bidder data
- 5 evaluation
- 6 award
- 7 contract implementation.

Two rules were followed in categorisation:

- a respecting platform-defined groupings where available
- b applying semantic meaning where platform-defined groupings were not available.

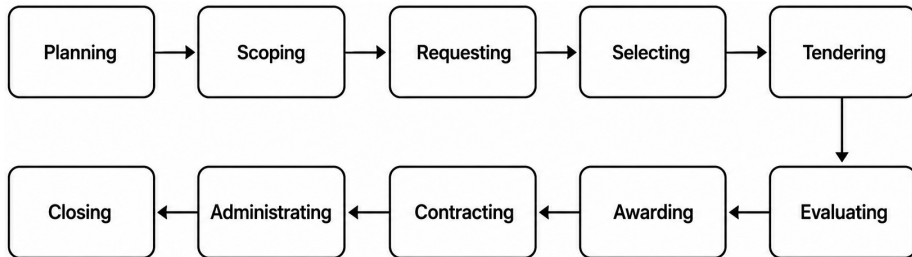
This taxonomy made comparison easier.

3.2 Tendering workflow

Figure 1 illustrates the complete 10-stage tender and procurement process, and each phase results in the creation of unique data variables that answer specific analytical questions and serve specific policy goals. This process starts with planning, during which

data on spending intentions, the ministries to which they are intended, and approximate needs are generated through internal demand validation and budget approvals. These data can be used to answer analytical questions on budget discipline, forward procurement planning, and alignment with sectoral priorities, and to inform policy on fiscal efficiency and strategic procurement programming. The scoping stage would yield specifications, procurement categories, and terms of reference. These spheres permit the evaluation of market clarity, standardisation of requirements, and possible fragmentation of procurement categories.

Figure 1 Tendering process and stages



The request stage is when the tender is publicly posted, creating timestamps for publication dates, deadlines, and enquiry periods. These aspects enable analysis of transparency, sufficient time to bid, and procedural fairness. During the selecting stage, the system captures the identities of the bidders, details of the submissions, and the amounts of the proposals. These data are useful for examining suppliers' participation trends, the risks of concentration, and pricing behaviour. To policy, this serves the purpose of promoting market openness, encouraging SME participation, and monitoring anti-collusion. Similarly, the tendering phase concerns compliance with technical specifications, the creation of codes of conduct, screening outcomes, and technical opening dates. The policy goal in this case is to guarantee the proportional requirements and equal qualification procedures.

Moreover, financial comparisons and scoring decisions are recorded during the evaluation stage. These areas enable the measurement of evaluation transparency, cost-effectiveness, and value for money. The awarding stage produces award dates, awarded amounts, and supplier confirmation records. These data allow studying the timeliness of awards, the rationality of a decision, and the estimated price variance. The contracting stage entails capturing agreement details, contract terms, and negotiated clauses. This data field facilitates analysis of questions related to contracting integrity, price adjustments, and adherence to standard templates, which provide grounds for policies that encourage contract standardisation and mitigate the risks of renegotiation.

In addition, the administering phase produces data on delivery dates, progress reports, performance records, and contract variations. Policies derived from this phase aim to govern contracts, support performance-based procurement, and manage suppliers. Lastly, data fields including closure dates, final inspection outcome, and vendor ratings assess lessons learned, contract completion efficiency, and long-term supplier quality.

The expanded Table 1 connects each stage to its primary data fields and explains the analytical use of each field.

Table 1 Tendering stages

<i>Stage</i>	<i>Description</i>	<i>Data fields</i>	<i>Analytical use</i>
Planning	Internal demand validated; budget approval obtained	Ministry, tender number, requested sector	Budget tracking, demand forecasting, and alignment with strategic priorities
Scoping	Specifications and requirements drafted	Tender subject, procurement category	Category management, specification standardisation, market readiness assessment
Requesting	Tender published on the platform	Publish date, closing date, enquiry deadline	Transparency checks, compliance with legal timeframes, and bidder accessibility analysis
Selecting	Bids formally opened	Company name, proposal amount	Supplier participation trends, competition assessment, pricing behaviour analysis
Tendering	Compliance with technical criteria assessed	Activity code, technical opening date	Eligibility profiling, proportionality analysis, and competition impact of technical criteria
Evaluating	Financial offers compared	Proposal amount, financial result	Value-for-money assessment, scoring fairness, and evaluation consistency
Awarding	Selected supplier notified	Award date, awarded amount	Award timeliness, price variance monitoring, and cycle-time efficiency
Contracting	Formal contract signed	Agreement details	Contract integrity analysis, standardisation monitoring, and renegotiation risk assessment
Administering	Execution and follow-up	Delivery date, performance records	Supplier performance analysis, delay/overrun detection, contract governance evaluation
Closing	Final evaluation completed; contract closed	Vendor grades, bid clarification end date	Supplier ranking quality, completion efficiency, lessons-learned documentation

3.3 Data fields and definitions

Every data field was aligned to a schema based on the OCDS to establish interoperability across jurisdictions (Soylu et al., 2019). This coordination confirms that the differences that exist between different taxonomies, like CPV in the EU and UK, NAICS in North America, Singapore in the GeBIZ platform, Etimad in Saudi Arabia, Monaqasat in Qatar, and the Digital Procurement Platform in the UAE, have been mapped into a standardised framework upon which country-to-country comparisons can be made. The data fields and their definition are summarised in Table 2.

Table 2 Data fields and definitions

<i>Data field</i>	<i>Definition</i>	<i>OCDS alignment</i>	<i>Cross-jurisdiction availability</i>
Tender type	Tender classification (open/restricted)	tender.procurementMethod	A
Requested sector type	Sector for which tender is issued	tender.items.Classification	B
Ministry	Procuring ministry name	tender.procuringEntity.name	B
Tender number	Unique tender ID	tender.id	A
Tender number at ministry	Internal ministry reference number	No OCDS equivalent	B
Tender subject	Tender title/summary	tender.title/tender.description	A
Classification/grade	Vendor or activity grade	No OCDS equivalent	C
Specialisation	Vendor specialisation/expertise	No OCDS equivalent	C
Procurement category	Goods/services/works	tender.mainProcurementCategory	A
Publish date	Publication date	tender.tenderPeriod.startDate	A
Closing date	Bid submission deadline	tender.tenderPeriod.endDate	A
Enquiry deadline	Deadline for queries	tender.enquiryPeriod.endDate	B
Bid clarification end date	Final clarification deadline	tender.enquiryPeriod.endDate	C
Technical opening date	Technical opening time	extension: tender.openingDates.technical	C
Financial opening date	Financial bid opening	extension: tender.openingDates.financial	C
Envelopes system	Technical/financial envelope format	No OCDS equivalent	C
Document value	Estimated value of tender	tender.value.amount	A
Tender bond value	Bid security requirement	extension: tender.bidSecurity.amount	C
Proposal amount	Amount proposed by bidder	bids.value.amount	B
Total value	Total tender value	tender.value.amount	A
Local value ratio	Required local content %	No OCDS equivalent	C
Company name	Bidder name	bids.tenderers.name	A
Commercial registration number	Company registration ID	parties.identifier.id	B

Note: For each field, we recorded cross-jurisdictional availability using a 4-point code:

A – available in all four jurisdictions [EU, UK, Singapore, GCC (Saudi Arabia, Qatar, UAE)], B – available in 2–3 jurisdictions, C – available in only 1 jurisdiction, N – Not systematically available (ad hoc or inconsistent).

Table 2 Data fields and definitions (continued)

<i>Data field</i>	<i>Definition</i>	<i>OCDS alignment</i>	<i>Cross-jurisdiction availability</i>
Profile number	Vendor system profile ID	No OCDS equivalent	C
Company type	Private/public/JV	parties.details.type	C
Company size	SME/large	No OCDS equivalent	C
Vendor type	Local vs. international	No OCDS equivalent	C
Technically opened companies	Vendors whose technical bids were opened	bids.details	C
Financially opened companies	Vendors whose financial bids were opened	bids.details	C
Awarded companies	Contract-winning suppliers	awards.suppliers	A
Awarded date	Official award date	awards.date	A
Awarded amount	Final awarded contract value	awards.value.amount	A
Financial result	Financial evaluation outcome	awards.suppliers + awards.value	B
Government entities evaluation	Government assessment notes	awards.documents	C
Activities details	Detailed task descriptions	tender.items.description	B
Activity code	Code for tender activity	tender.items.classification.id	B
Activity name	Description of tender activities	tender.items.description	B
Certificate end date	Vendor certificate expiry	parties.details.validUntil	B
Offer validity duration	Validity period of bid	tender.tenderPeriod.durationInDays	B
Suitability	Vendor eligibility/qualification	bids.qualification	C
Location	Project location	tender.items.deliveryLocation	A
Duration	Project execution timeframe	contracts.period.durationInDays	B
Alternative offers	Optional substitute proposals.	No OCDS equivalent	C
Vendor grades	Ranking or vendor scoring.	No OCDS equivalent	C

Note: For each field, we recorded cross-jurisdictional availability using a 4-point code:

A – available in all four jurisdictions [EU, UK, Singapore, GCC (Saudi Arabia, Qatar, UAE)], B – available in 2–3 jurisdictions, C – available in only 1 jurisdiction, N – Not systematically available (ad hoc or inconsistent).

3.4 Framework development

3.4.1 Data fields layer

In Figure 2, the data fields layer shows the detailed procurement data fields used in the analytical framework. Each step in the procurement process includes specific data fields that collect important information. For example, fields such as tender number, requested sector type and ministry are used from the start in the planning and scoping stages, which helps properly organise and determine the order of procurement activities. Fields such as publish date, closing date and bid clarification end date are important for tracking legal time limits and ensuring the tender publication and response process is fair and open. In addition, specific vendor fields, such as company name, commercial registration number, company size and vendor type, are processed alongside the main steps of the procurement process. This track helps thoroughly profile suppliers, assess their eligibility, including small and medium enterprises, and track their performance across different tenders.

3.4.2 Procurement stages layer

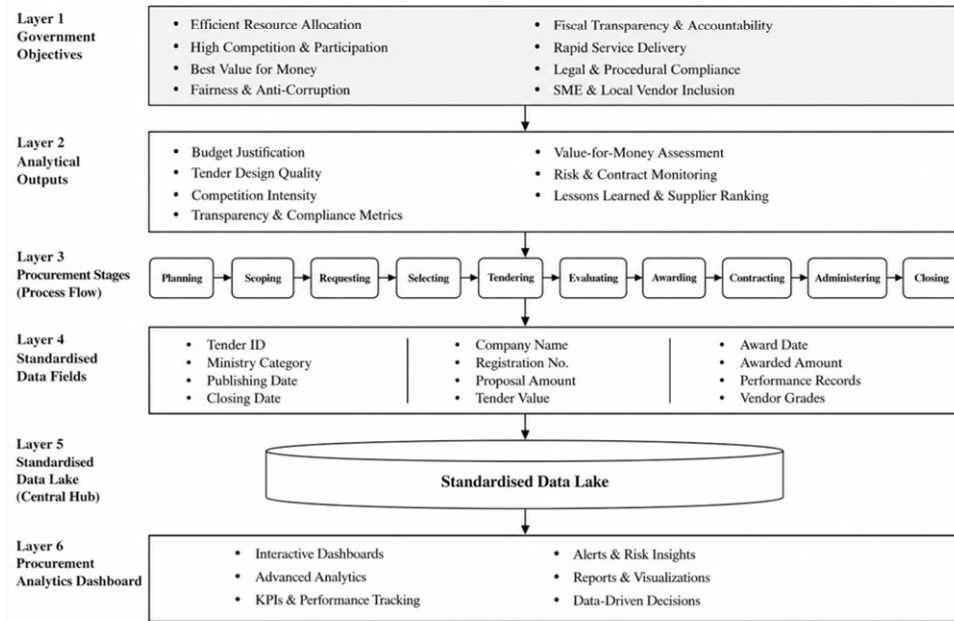
The framework uses a 10-step procurement process, from planning to closing that covers all public procurement steps, as shown in Figure 2. Each step shows a major choice or important action in the process. The 10-step model was chosen to ensure everything is covered, from the initial plans through contract signing and sharing what was learned. It follows the best international practices while also complying with local legal rules. Some jurisdictions group certain steps, like combining selecting and tendering, or split other steps into smaller parts, like breaking evaluation into technical and financial parts, but the overall process stays the same.

3.4.3 Analytical outputs layer

The analytical outputs layer transforms the data collected at each stage into actionable insights, as indicated in Figure 2. Each output is explicitly defined as provided in Table 3:

Table 3 Analytical output layer

<i>Analytical output</i>	<i>Insights</i>
Budget justification	Aggregates tender and financial data to support budget allocation and forecasting decisions.
Tender design quality	Evaluates the completeness and clarity of tender documents, including classification, technical requirements, and compliance indicators.
Competition intensity	Measures supplier participation trends, bidding patterns, and the effect of tender design on SME and vendor engagement.
Transparency and compliance metrics	Tracks adherence to publication and closing dates, bid clarifications, and financial opening procedures.
Value-for-money assessment	Quantifies efficiency, pricing competitiveness, and contract outcomes relative to expected standards.
Risk and contract monitoring	Monitors awarded contracts for performance delays, overruns, or renegotiation risks.
Lessons learned and supplier ranking	Documents completion efficiency, supplier reliability, and knowledge capture for future procurement cycles.

Figure 2 Procurement data standardisation and analytical framework: the conceptual framework linking data fields, stages, analytical output, and government objectives

3.4.4 Government objectives layer

The last part of the jurisdiction framework in the wider context of public policy is shown in Figure 2. Each of the eight goals is connected to certain analysis results and data fields:

- **Efficient resource allocation:** based on budget tracking, tender sizes, and vendor financial data fields, some gaps exist due to missing cost or historical spending data.
- **High competition and involvement:** this is due to the data fields provided by vendors and the extent of their participation; however, there are gaps when data from small businesses or local vendors is unavailable.
- **Best value for money:** depends on the proposed and awarded amounts and the value-for-money score; some gaps may appear because there is no comparison data for bids.
- **Fairness and anti-corruption efforts** are supported by compliance checks and bid evaluation processes; however, there are gaps in tracking unexpected changes or unusual activities.
- **Fiscal transparency and accountability:** uses financial and procurement reporting outputs; gaps happen when publishing or verifying tender data is delayed.
- **Quick service delivery:** based on tender timing and contract performance, issues appear when milestone tracking is not fully done.

- Legal and procedural compliance depends on all stages and on data showing that things follow the rules. However, there are some missing parts where it is unclear what the rules are in certain areas, or where the data does not match up consistently.
- SME and local vendor inclusion are based on vendor type, size, and local value ratio data; gaps occur when vendor registration or local sourcing data are missing.

Figure 2 displays the entire structure, with standardised data fields being inputs into the analytical outputs, and ultimately supporting the strategic goals of the government. Dark blue boxes are used to indicate the stages of procurement, light blue boxes are used to indicate individual data fields, light green boxes are used to indicate analytical outputs, and yellow boxes are used to indicate government objectives. The key technical infrastructure of the suggested architecture comprises a standardised data lake and procurement analytics dashboard.

This framework provides an empirical base for the cross-jurisdictional field mapping and is tailored to be actionable to governments seeking to add to the analytical value of their procurement data.

4 Results

4.1 *Comparative analysis of procurement data fields across selected jurisdictions*

The procurement data fields in the six jurisdictions vary greatly in terms of data completeness and extent of the analysis that are possible as indicated in Table 4. Basic information about tenders (e.g., tender type, sector requested, ministry, tender numbers, tender subject, procurement category) are always present. Other key timeline fields like publish date and closing date are also regularly provided and basic value and contract execution fields. This means that there is a universal standard of transparency in procurement reporting.

Nevertheless, there are large differences in more developed areas. European Union (TED) and Singapore (GeBIZ) have more detailed datasets and they collect detailed supplier information, activity codes and financial data such as the proposal amounts and company details. Singapore also offers tender bond values, offer validity period, and financial outcomes which support the full lifecycle performance analysis. The Contracts Finder of the UK is considered to be moderately complete with good coverage of award data and SME flags but lacks several supplier profile and performance measures.

The data availability on the GCC platforms (Etimad in Saudi Arabia, Monaqasat in Qatar, and the federal platform in the UAE) is the least available. Although financial and basic execution areas are usually in place, the details of suppliers, evaluation procedures, and performance monitoring are not well-established. Numerous sensitive areas, like technical and financial opening dates, vendor grades, and specific evaluation information, are always either absent or inconsistently reported in jurisdictions.

Table 4 Analysis of procurement data fields across selected jurisdictions

<i>Data field</i>	<i>Category</i>	<i>Saudi Arabia (Etimad)</i>	<i>UK (Contract Finder)</i>	<i>EU (TED)</i>	<i>Singapore (GeBIZ platform)</i>	<i>UAE (Digital procurement platform)</i>	<i>Qatar (Monaqasat)</i>
Tender type	Tender identification	✓	✓	✓	✓	✓	✓
Requested sector type	Tender identification	✓	✓	✓	✓	✓	✓
Ministry	Tender identification	✓	✓	✓	✓	✓	✓
Tender number	Tender identification	✓	✓	✓	✓	✓	✓
Tender number at ministry	Tender identification	✓	✓	✓	✓	✓	✓
Reference number	Tender identification	✓	✓	✓	✓	✓	✓
Tender subject	Tender identification	✓	✓	✓	✓	✓	✓
Classification/grade	Tender identification	✗	✗	✓	✓	✓	✓
Specialisation	Tender identification	✗	✗	✗	✗	✗	✗
Procurement category	Tender identification	✓	✓	✓	✓	✓	✓
Publish date	Timeline fields	✓	✓	✓	✓	✓	✓
Closing date	Timeline fields	✓	✓	✓	✓	✓	✓
Enquiry deadline	Timeline fields	✓	✗	✗	✓	✗	✗
Bid clarification end date	Timeline fields	✓	✗	✓	✓	✓	✓
Technical opening date	Timeline fields	✗	✗	✗	✗	✗	✗
Financial opening date	Timeline fields	✗	✗	✗	✗	✗	✗
Envelopes system	Timeline fields	✓	✗	✗	✓	✗	✗
Document value	Value fields	✓	✓	✓	✓	✓	✓
Tender bond value	Value fields	✗	✗	✗	✓	✗	✗
Proposal amount	Value fields	✗	✗	✓	✓	✓	✓

Table 4 Analysis of procurement data fields across selected jurisdictions (continued)

<i>Data field</i>	<i>Category</i>	<i>Saudi Arabia (Etimad)</i>	<i>UK (Contract Finder)</i>	<i>EU (TED)</i>	<i>Singapore (GeBIZ platform)</i>	<i>UAE (Digital procurement platform)</i>	<i>Qatar (Monaqasat)</i>
Total value	Value fields	×	✓	✓	✓	✓	✓
Local value ratio	Value fields	×	×	×	✓	×	×
Company name	Supplier/bidder fields	×	✓	✓	✓	✓	✓
Commercial registration number	Supplier/bidder fields	×	×	✓	✓	✓	✓
Profile number	Supplier/bidder fields	×	×	×	✓	✓	✓
Company type	Supplier/bidder fields	×	×	✓	✓	×	×
Company size	Supplier/bidder fields	×	×	✓	✓	×	×
Vendor type	Supplier/bidder fields	×	×	×	✓	✓	✓
Technically opened companies	Supplier/bidder fields	×	×	×	×	×	×
Financially opened companies	Supplier/bidder fields	×	×	×	×	×	×
Awarded companies	Award fields	×	✓	✓	✓	✓	✓
Awarded date	Award fields	×	✓	✓	✓	✓	✓
Awarded amount	Award fields	×	✓	✓	✓	✓	✓
Financial result	Award fields	×	×	×	✓	×	×
Government entities evaluation	Award fields	×	×	✓	×	×	×
Activities details	Contract execution fields	✓	✓	✓	✓	✓	✓
Activity code	Contract execution fields	×	×	✓	✓	×	×
Activity name	Contract execution fields	✓	✓	✓	✓	×	×

Table 4 Analysis of procurement data fields across selected jurisdictions (continued)

<i>Data field</i>	<i>Category</i>	<i>Saudi Arabia (Etimad)</i>	<i>UK (Contract Finder)</i>	<i>EU (TED)</i>	<i>Singapore (GeBIZ platform)</i>	<i>UAE (Digital procurement platform)</i>	<i>Qatar (Monaqasat)</i>
Certificate end date	Contract execution fields	x	x	x	x	x	x
Offer validity duration	Contract execution fields	x	x	x	✓	x	x
Suitability	Contract execution fields	x	✓	✓	x	x	x
Location	Contract execution fields	✓	✓	✓	✓	✓	✓
Duration	Contract execution fields	✓	✓	✓	✓	✓	✓
Alternative offers	Contract execution fields	x	x	✓	x	x	x
Vendor grades	Contract execution fields	x	x	✓	✓	x	x

4.2 Gap analysis by jurisdiction

4.2.1 European Union (TED)

The European Union, via the TED platform, demonstrates a great initiative towards standardisation through CPV codes and compulsory publication of tenders. Fields of execution of a contract, its term, and codes of activity are always provided, and the fields related to awarding are always reported. Nevertheless, significant gaps exist in the number of supplier profiles, comprehensive company information, qualitative evaluation information, and post-contract performance follow-up. These curbs limit the supplier-level analysis and longitudinal performance evaluation, regardless of the good contract-level spending analysis potential.

4.2.2 UK (Contracts Finder)

The UK Contracts Finder offers structured templates with names of companies, SME flags, and the specifics of the contracts, such as the location, duration, and suitability. Award information is well-reported, which aids in competition and analysis of spending. Nevertheless, there are restrictions on contract changes, post-award performance monitoring, and supplier performance history, limiting the full lifecycle and supplier reliability evaluations.

4.2.3 Singapore (GeBIZ)

The GeBIZ system of Singapore is the most detailed, and it includes almost all the important aspects of procurement, such as details of suppliers, results of award, performance monitoring, and delivery handling. It allows the supplier lifecycle and performance to be analysed at the supplier level. The most critical issue is that the data is very granular, making it hard to interpret some of the data to analyse it as an aggregate. On the whole, GeBIZ offers the most solid basis of predictive analytics and performance tracking.

4.2.4 GCC countries (Saudi Arabia, UAE, Qatar)

GCC platforms have benefits in value reporting and in a few instances, tracking local content or type of vendor. Nevertheless, there are still critical gaps in supplier specific data, evaluation criteria, and contract performance metrics. The lack of information about the supplier and the absence of award requirements are a great limitation to advanced analysis, risk assessment, and performance-based decision making.

Table 5 OCDS schema and comparison across jurisdictions

<i>OCDS schema section</i>	<i>EU (TED)</i>	<i>UK (Contracts Finder)</i>	<i>Singapore (GeBIZ)</i>	<i>GCC (Saudi Arabia, UAE, Qatar)</i>
Planning	Partial	Partial	✓	×
Tender	✓	✓	✓	Partial
Award	✓	✓	✓	Partial
Contract	Partial	Partial	✓	×
Implementation	×	×	✓	×

Table 6 Government objectives

<i>Government objective</i>	<i>EU (TED)</i>	<i>UK (Contracts Finder)</i>	<i>Singapore (GeBIZ)</i>	<i>GCC (Saudi Arabia, UAE, Qatar)</i>
Efficient resource allocation	Partial	Partial	✓	Partial
High competition and participation	✓	✓	✓	×
Best value for money	Partial	Partial	✓	Partial
Fairness and anti-corruption	Partial	×	✓	×
Fiscal transparency and accountability	Partial	Partial	✓	×
Rapid service delivery	Partial	Partial	✓	Partial
Legal and procedural compliance	✓	Partial	✓	×
SME and local vendor inclusion	Partial	✓	✓	×

4.3 OCDS alignment assessment

The data alignment of procurement with the OCDS can differ significantly among jurisdictions, as demonstrated in Table 5. EU and Singapore demonstrate the highest conformity, especially in tender and award processes. The UK exhibits fair compliance, and GCC countries exhibit the least conformity, with coverage being mostly restricted to basic tender and award phases.

4.4 Framework validation

The suggested framework (Figure 2) connects data fields to the analytical outputs and government goals. Those jurisdictions with richer datasets (especially Singapore) are those that demonstrate stronger support for the various government objectives, whereas systems with larger gaps (especially GCC platforms) indicate only partial successful attainment of policy goals, as summarised in Table 6.

5 Discussion

The empirical results show that there is an apparent pattern, as core identifiers, timeline, and value fields are generally widely available across jurisdictions; there are still significant gaps, such as supplier identifiers, evaluation scoring, SME or local vendor flags, past performance measures, and contract implementation data (see Table 7). These loopholes significantly constrain the level of analysis and policy applicability of procurement data in most jurisdictions.

Table 7 Gap identified and recommended actions

<i>Gap identified</i>	<i>Affected jurisdictions</i>	<i>Recommended action</i>	<i>Priority</i>
Missing supplier IDs	EU, GCC (Saudi Arabia, UAE, Qatar)	Mandate standardised supplier registration with unique identifiers	High
No SME status flags	EU, GCC	Introduce mandatory SME self-declaration fields in tender submission	High
Absent performance tracking	EU, UK, GCC	Implement post-award outcome reporting, including contract milestones and completion status	Medium
Incomplete award criteria	EU, GCC	Require structured disclosure of evaluation methodology, scoring, and award rationale	High
Limited local value ratio reporting	GCC, UAE	Incorporate local content and vendor contribution data in published fields	Medium

The GeBIZ platform is unique to Singapore and offers transparent, machine-readable data on the entire procurement process to effectively allocate resources, analyse competition, clarify spending, and track performance (Erh, 2023; Sipahi and Saayi, 2024). Conversely, GCC countries, although very active in digital investments, are constrained by the lack of supplier IDs, incomplete evaluation criteria, and limited information on contract execution (Sultan et al., 2025; Hameed, 2020; Shalan, 2025). This confirms that digital

infrastructure is incomplete unless they are structured and analytics-ready. The findings are consistent with the literature endorsing the idea that the lack of transparency with data quality and standardisation limits informed decision making and policy evaluation (Duguay et al., 2023; Soylu et al., 2022; Culot et al., 2023).

5.1 Addressing research questions

5.1.1 Core data fields (Q1)

The comparative analysis outlines the basic core areas needed in the successful tender management and analysis in various regimes of procurement. These include tender identification (tender type, number, ministry, and subject), timeline data (publish and closing dates, bid clarification deadlines), value metrics (document value, awarded amount, proposal amounts), supplier/bidder details, award data, and contract execution metrics (Soylu et al., 2022). By categorising these fields into well-organised groups, one can perform basic and advanced analytics.

5.1.2 Cross-jurisdictional comparison and decision-making efficiency (Q2)

A standardised tendering-stage data architecture has the potential to greatly increase the efficiency of decision making in the system of public procurement. The near-complete coverage of Singapore supports comprehensive analytics across the procurement lifecycle (Erh, 2023; Zhang et al., 2025), whereas the systems in the EU, UK, and, in particular, GCC show some level of limitation. With the sophisticated digital platforms, GCC countries provide mainly basic spending tracking as data gaps persist (Sultan et al., 2025; Alanzi, 2025). This observation shows the essential importance of data completeness, rather than simply digitalisation.

5.1.3 Framework utility (Q3)

The proposed conceptual framework is useful in linking tender-stage data fields through procurement stages and analytical outputs to government objectives. It provides an effective framework that governments can employ to prioritise data improvements and enhance decision support capabilities, based on the cross-jurisdictional empirical mapping carried out in this study.

5.2 Policy implications

There are direct policy implications of the findings. Most jurisdictions do not have the basic data fields that are necessary to support sound analysis, track risks, and evaluate policies. This lack of standardised supplier identifiers especially causes the inability to track the performance of suppliers over time and to evaluate the dynamics of competition (Mahmoudi and Javed, 2022). Similarly, the absence of SME flags restricts the evaluation of inclusion policies. One of the main weaknesses in most of the systems, except Singapore, is performance monitoring (Erh, 2023). In the case of GCC countries, to ensure that their procurement data architectures can be aligned with the national vision, such as Vision 2030, these gaps must be addressed to facilitate economic diversification, transparency, and evidence-based reform (Sultan et al., 2025; Elayah, 2025).

5.3 *Implications on GCC procurement modernisation*

The findings of the analysis have a profound implication on the effective procurement modernisation in GCC countries. In the case of Saudi Arabia, the implementation of the objectives of the Vision 2030 will require the use of procurement systems that will facilitate economic diversification, the involvement of the private sector, and enhanced financial control (Sultan et al., 2025). The absence of standardised supplier IDs, SME indicators, and clear award criteria is a step backwards to these objectives. The National Vision 2030 of Qatar is no exception, as it also focuses on the strength of institutions and competitive markets, but the current data constraints limit the evidence-based reforms (Elayah, 2025). The Digital Government Strategy 2025 in the UAE would be improved with the introduction of more data standardisation to facilitate integration between systems (Hujran et al., 2023). The example of the GeBIZ model in Singapore shows that a cohesive, analytics-enabled data architecture can be successfully used to support transparency, competition, and real-time monitoring.

5.4 *Limitations*

Although the study is comprehensive, there are certain limitations inherent in the study. The model is yet to be empirically integrated using sophisticated analytics or practical application. The procurement portal, especially in the GCC countries, was difficult to access because of the registration process and scarcity of machine-readable formats. The study also reflects a point-in-time analysis, based on the period of 2019–2024, and the procurement systems are still rapidly evolving.

5.5 *Future research directions*

This research offers a systematic method of assessing tendering-stage data architecture, yet there is great potential. The framework should be empirically tested and validated in future research through the application of the framework in other jurisdictions. Particularly valuable would be longitudinal studies, cost-benefit analysis of data standardisation, and the application of machine learning in the case of standardised data (Kusonkhum et al., 2023; Kang and Bhawna, 2025). Comparative case-based applications would also investigate the flexibility of the framework to various situations of governance and markets.

6 **Conclusions**

Public procurement is increasingly reliant on well-organised, accurate data, but this study finds that most jurisdictions still use scattered and missing data fields, limiting the ability to conduct proper analysis and make decisions based on real evidence. To address this issue, the paper proposed a single classification system for data fields at the tender stage, compared how data fields are shared across regions, and developed a data structure that adheres to OCDS standards. Singapore is the only system to offer a complete and clear data system covering supplier IDs, organised evaluation rules, a bid comparison data field, and performance monitoring, making it a worldwide standard. Second, the EU and UK have strict rules in place but still lack reliable performance data and clear criteria for

awarding, making it hard to track how things work overtime. Third, GCC countries, despite investing heavily in digital procurement, still miss key areas such as supplier IDs, SME indicators, evaluation criteria, and implementation data. This mostly limits them to reporting on transactions, rather than providing deeper strategic insights. This study advances the theory of managing procurement data, offers practical guidance for creating systems that work together smoothly, and supports policies that aim to make procurement more open and data-driven. Consequently, improving procurement analytics and ensuring they deliver greater accountability, efficiency, and value depends on regularly sharing full, easily readable data.

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Declarations

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New data have been generated; all data have been provided in the paper.

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