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Challenges in Utilizing an Integrated Information System in Bid Evaluation: Evidence from an Integrated Information System for Construction Services

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Bid evaluation; construction procurement; integrated information system; public procurement; data quality.

Abstract
The Integrated Information System for Construction Services (SIJKT) was developed to support data-driven procurement by integrating information related to business entities, personnel, equipment, and contract performance. However, challenges in its utilization may limit its ability to support bid evaluation activities. This study aims to identify the challenges encountered in utilizing SIJKT during the bid evaluation stage of construction procurement at the Ministry of Public Works of Indonesia. A qualitative approach was employed using semi-structured interviews with eleven members of the Selection Working Committee (Pokja Pemilihan) who are directly involved in evaluating bid documents using SIJKT. Data were analyzed using inductive thematic analysis following Braun and Clarke's approach, supported by NVivo 15 software. The findings reveal five interconnected themes of challenges: data quality and reliability, system integration and technical reliability, process inefficiency and workflow complexity, user capability gap and organizational readiness, and regulatory challenges and system sustainability. Incomplete and inconsistent data, fragmented subsystem integration, technical disruptions, additional verification requirements, uneven user competency, and regulatory inconsistencies collectively limit the effective utilization of SIJKT in bid evaluation. Furthermore, these challenges are interrelated, as weaknesses in one area reinforce difficulties in others and contribute to inefficiencies in the evaluation process. The study concludes that optimizing SIJKT utilization in bid evaluation requires coordinated improvements across technological, data governance, organizational, and regulatory domains to support more effective and reliable bid evaluation processes.

INTRODUCTION

Public procurement plays a critical role in supporting national infrastructure development and ensuring the efficient use of public resources (Adekoya, 2024; Ebekozien et al., 2023; Kyalo, 2024; Xu, 2023). In Indonesia, procurement processes are governed by principles of efficiency, effectiveness, transparency, openness, fairness, and accountability as stipulated in Presidential Regulation No. 16 of 2018. With increasing demands for transparency and performance, digital transformation in public procurement has become a strategic priority to enhance efficiency, reduce costs, and strengthen governance (Adjei-Bamfo et al., 2019; Dudić et al., 2024; Handfield et al., 2019).

One of the most critical stages in procurement is bid evaluation, as it determines the selection of providers and directly influences project outcomes (Waseem et al., 2024). However, empirical evidence from the Ministry of Public Works (Kementerian PU) shows that procurement failures

still frequently occur at this stage. In 2024, 20.7% of construction tenders were declared failed, of which 39.69% were attributed to the absence of bidders passing the bid evaluation stage. Business entity experiences not recorded in the SIMPAN system (*Sistem Informasi Pengalaman*, an experience information system for business entities and construction personnel) accounted for 30.93% of the recorded causes of tender failure. A similar pattern occurred in 2025, where 64.75% of procurement failures were attributed to unsuccessful bid evaluation, while business entity experience not recorded in SIMPAN and equipment not registered in the SIMPK system (Sistem Informasi Material dan Peralatan Konstruksi, a construction materials and equipment information system) accounted for 38.52% and 40.16% of the recorded causes, respectively. These figures were calculated by the authors based on procurement data extracted from the LPSE (Electronic Procurement Service) portal of the Ministry of Public Works (LKPP, 2025).

These findings suggest that challenges in bid evaluation are not solely related to bidder compliance, but are also associated with limitations in the availability and utilization of data within procurement systems. Given that evaluation processes rely heavily on data related to qualifications, experience, and resources, the absence or underutilization of such data may reduce the reliability and accuracy of evaluation outcomes.

In this context, the Integrated Information System for Construction Services (SIJKT) has been developed as a digital platform that integrates multiple subsystems to support data-driven procurement. The system is intended to provide structured and accessible data to support evaluation processes. However, its utilization remains suboptimal, particularly in terms of data integration and system usage in practice, which creates challenges in effectively supporting bid evaluation.

This study addresses the research gap by providing empirical evidence on the challenges encountered in utilizing SIJKT in the bid evaluation process within the Ministry of Public Works. By focusing on practitioners' experiences, this study provides empirical insights into system-related challenges in real-world procurement practices. The findings are expected to contribute to the improvement of digital governance in public procurement by identifying the specific challenges that limit SIJKT utilization and offering a basis for policy recommendations and system enhancements. The urgency of this research is underscored by the critical role of procurement in national development and the ongoing digital transformation agenda in Indonesia. Ultimately, this study aims to support public organizations in optimizing the utilization of integrated information systems for more effective and reliable bid evaluation processes.

METHOD

Sampling

This study focused on the utilization of the Integrated Information System for Construction Services (SIJKT) in the bid evaluation stage within the context of public procurement. The unit of analysis is the bid evaluation process conducted by the Selection Working Committee. A purposive sampling strategy was employed to select participants who have direct involvement in the evaluation of bid documents using SIJKT. The target population consists exclusively of the

Selection Working Committee, as this entity is responsible for conducting bid evaluations and determining the selection of contractors. This approach ensures that participants possess the relevant experience and knowledge required to provide meaningful insights into the research topic.

The Selection Working Committee was selected as the sole respondent group because it serves as the primary user of SIJKT in the evaluation stage. It is directly involved in verifying bidder qualifications, assessing administrative and technical compliance, and making procurement decisions. This role enables the respondents to provide detailed, experience-based insights into the challenges encountered in system utilization.

A total of 11 participants were interviewed in this study. All participants have more than four years of experience serving in the Selection Working Committee, indicating that they have been actively involved in bid evaluation processes both before and after the implementation of SIJKT in 2021. This level of experience ensures that participants are able to provide comparative and in-depth perspectives on changes in evaluation practices following system adoption.

The number of participants was determined based on the principle of data saturation, where no new themes or substantial insights emerged from additional interviews. This indicates that the collected data were sufficient to capture the range of challenges experienced in SIJKT utilization. The use of data saturation as a stopping criterion ensures that the analysis achieves both depth and adequacy, which is essential in qualitative research.

Data Collection

Data were collected through semi-structured interviews with members of the Selection Working Committee. This method allows for in-depth exploration of participants' experiences while maintaining consistency across key research topics. The interview questions were designed to capture information related to the use of SIJKT during bid evaluation, including system interaction, data utilization, and challenges encountered in practice.

All interviews were conducted with the consent of participants and were recorded to ensure accuracy. The recordings were then transcribed verbatim to preserve the original meaning and context of participants' responses.

Analytical Approach

This study adopts an inductive analytical approach using thematic analysis as proposed by Braun & Clarke (2006). The purpose of this approach is to identify and interpret patterns or themes emerging from qualitative data without relying on predefined categories. The analysis process includes several stages, namely data familiarization, initial coding, theme development, theme review, and theme definition. In this study, codes and themes were developed directly from interview data, ensuring that the identified challenges reflect the actual experiences of the Selection Working Committee in using SIJKT (Braun & Clarke, 2006).

NVivo 15 software was used to support the analysis process by organizing interview transcripts, facilitating systematic coding, and grouping data into themes. NVivo is widely recognized as a computer-assisted qualitative data analysis software (CAQDAS) that enables researchers to manage, structure, code, retrieve, and explore qualitative data systematically, particularly in studies involving narrative and thematic analysis (Ardiansyah et al., 2025;

Mortelmans, 2025). The software supports data management, coding, querying, and visualization processes, thereby enhancing the transparency, consistency, and traceability of qualitative analysis through systematic coding, categorization, and the exploration of relationships between themes (Ardiansyah et al., 2025; Mortelmans, 2025).

RESULTS AND DISCUSSION

This study investigated the challenges encountered in utilizing the Integrated Information System for Construction Services (*Sistem Informasi Jasa Konstruksi Terintegrasi*/SIJKT) during the bid evaluation process for construction procurement at the Ministry of Public Works of the Republic of Indonesia. Data were collected through in-depth interviews with eleven participants, all of whom serve as Selection Working Committee (*Pokja Pemilihan*) members who are directly involved in bid evaluation activities using SIJKT. The data were analyzed using thematic analysis following the approach developed by Braun & Clarke (2006) facilitated by NVivo 15 software.

Overview of Coding Results

Thematic analysis of interview transcripts yielded 25 initial codes representing a range of challenges encountered during bid evaluation. These codes were subsequently grouped into five major themes. Analysis of coding references in NVivo 15 indicated that the most dominant codes based on frequency of references across transcripts were related to data validity, data quality, and system integration, reflecting the centrality of data reliability and inter-subsystem connectivity as recurring concerns among participants.

Table 1 presents the five themes identified in this study, together with the corresponding codes and thematic definitions.

Table 1. Thematic Grouping of Challenges in SIJKT Utilization

No.	Theme	Codes	Theme Definition
1	Data Quality and Reliability	Data quality, data validity, evaluation consistency, assessment standardization, manual validation	Challenges related to the accuracy, completeness, consistency, and reliability of data used in SIJKT, including limitations in the data validation process and inconsistency in evaluation outcomes.
2	System Integration and Technical Reliability	System integration, system stability, system readiness, system dependency, system risk, network infrastructure, system access	Challenges related to inter-subsystem connectivity and technical reliability, including system stability, dependency on specific subsystems, and network infrastructure issues affecting bid evaluation.
3	Process Inefficiency and Workflow Complexity	Additional workflow steps, manual processes, initial complexity, system issue reporting mechanism, helpdesk response	Challenges related to inefficient evaluation workflows, including remaining manual procedures, added steps, complexity of system use, and limited operational support services.
4	User Capability Gap and Organizational Readiness	User competency, competency gap, user training, socialization, user involvement, HR capacity	Challenges related to user and organizational readiness in utilizing SIJKT, including varying user competency, limited formal training and socialization, user involvement in data management, and HR capacity to support system operations.

No.	Theme	Codes	Theme Definition
5	Regulatory Challenges and System Sustainability	Regulatory support, system sustainability	Challenges related to regulatory support, policy consistency, and the continuity of SIJKT development and implementation.

Theme 1: Data Quality and Reliability

This theme was among the most dominant in the interviews, encompassing challenges related to data accuracy, completeness, validity, evaluation consistency, and the continued need for manual validation.

Findings indicate that data within SIJKT subsystems including personnel, work experience, and equipment records were not always up-to-date or complete. Participants reported cases where completed contracts remained marked as active, and supporting documents uploaded by providers were sometimes incomplete or contained unsigned contracts. As one participant explained:

> *"The data is often not updated, especially for older records, because it may be difficult to find or upload data from decades ago. For recent years, it is more real-time, but for older ones, a lot has probably been lost." (Participant 10)*

Regarding data validity, participants noted that the system did not consistently enforce verification of uploaded documents prior to acceptance. Work experience records and personnel data could be entered without centralized validation, leading evaluators to question the reliability of the data available. One participant stated:

> *"There is no verification for personnel experience whether what is entered in SIJKT is accurate or not. The same applies to equipment. So, I think data quality still needs to be improved." (Participant 10)*

Inconsistency in evaluation outcomes was also reported. The same data submitted by a provider could be accepted by one *Pokja* and rejected by another, indicating that evaluation results were influenced not only by data quality but also by differences in how evaluators interpreted the available information.

These findings are consistent with Azeroual et al. (2020), who emphasized that incomplete, inaccurate, or outdated data reduces the reliability of information produced by information systems. Syed et al. (2023) similarly identified accuracy, completeness, consistency, and timeliness as key dimensions of data quality. The continued need for manual validation in this study indicates that the digitalization of data has not yet been accompanied by sufficiently robust data governance mechanisms.

Theme 2: System Integration and Technical Reliability

Participants consistently reported that SIJKT subsystems operated in a fragmented manner. Evaluators were required to access multiple separate applications during the evaluation process, as data were not automatically synchronized across subsystems. One participant noted:

> *"There are still several systems that are not connected. We have to log in here, then log in there." (Participant 11)*

Data entry duplication was also reported, with users needing to input identical information into multiple subsystems due to the absence of automatic data synchronization. System instability

was another recurring concern participants reported delays, errors, and system outages occurring during peak usage periods, directly disrupting the evaluation process:

> *"Sometimes the application goes down when many users are accessing it simultaneously. Sometimes it causes errors or crashes. That is what becomes an obstacle." (Participant 4)*

The dependency of evaluators on specific subsystems, particularly SIMPAN for personnel data verification, created additional vulnerability. When these systems were unavailable, evaluation activities could not proceed. The decommissioning of SIMPK a subsystem used for equipment data verification was also cited as an example of technical unreadiness disrupting active procurement processes.

Network infrastructure was identified as a critical enabling factor. Poor internet connectivity at some BP2JK offices resulted in slow system access and impeded the evaluation process. Access issues, including account synchronization failures with e-HRM, further compounded these challenges.

These findings align with Inayah & Baihaqi (2024), who identified interoperability as a key barrier in digital transformation, and with Renaldo et al. (2022), who noted that data format and infrastructure incompatibilities hinder effective system integration. The high level of process dependency on specific subsystems also resonates with Benbya et al. (2020), who warned that increasing digital interconnectedness amplifies operational risk when individual components fail.

Theme 3: Process Inefficiency and Workflow Complexity

Despite the digitalization of procurement data, participants reported that SIJKT had not fully streamlined the bid evaluation workflow. Evaluators were still required to cross-reference data from multiple subsystems, conduct manual verifications, and in some cases coordinate with PPK (Commitment-Making Officers) to obtain clarifications or complete missing information.

Additional workflow steps also emerged in procurement administration tasks. For example, changes in procurement schedules previously modifiable directly within SPSE now required input into additional systems such as SIP-SPSE and required approval from designated parties before the change could take effect. One participant explained:

> *"There are cases where additional time was added not in days, but in hours. When changing a schedule, we now have to input it in another application and wait for approval from another party." (Participant 5)*

Challenges related to helpdesk responsiveness and issue reporting mechanisms were also identified. Users particularly providers were often unclear about the appropriate channels for reporting system problems, and resolution timelines were inconsistent. One participant noted:

> *"Sometimes providers don't know where to report. They only report to Pokja, even though Pokja cannot do anything about it." (Participant 4)*

These findings are consistent with Benbya et al. (2020), who noted that increasing digital interconnectedness creates more complex relationships between systems, processes, and users. They also align with Inayah & Baihaqi (2024), who identified interoperability barriers as a source of process inefficiency. The need for manual cross-system verification and the persistence of

paper-based document validation indicate that SIJKT's digitalization has not yet eliminated procedural redundancies.

Theme 4: User Capability Gap and Organizational Readiness

Findings indicate that user competency in utilizing SIJKT was uneven. Users more familiar with digital technologies adapted more quickly, while others particularly senior staff required considerably longer adaptation periods. Formal training specific to SIJKT was generally not provided; instead, learning took place through socialization sessions, technical guidance, peer learning, or self-directed exploration. One participant stated:

> *"Many feature additions are not accompanied by concrete training. So, users end up learning on their own." (Participant 2)*

Data quality within SIJKT was also closely linked to user engagement. When operators and unit organizations (*unor*) actively entered and updated records, data completeness improved. Conversely, inactive or infrequent data entry led to gaps in system records, affecting evaluation accuracy.

HR capacity constraints further limited support for system operations. Staff responsible for handling SIJKT-related issues frequently held concurrent responsibilities, reducing their ability to respond promptly to system problems. One participant reported that resolution times could reach up to 24 hours.

These findings are consistent with Keshvari et al. (2018), who identified knowledge as a primary challenge in information system adoption. They also align with Sofalina (2026) and Lubis et al. (2024), who found that user competency positively influences system satisfaction and effective decision-making. Bondanini et al. (2020) further noted that technological change increases adaptation demands on users, a dynamic clearly evident in this study.

Theme 5: Regulatory Challenges and System Sustainability

Participants reported inconsistencies between the regulatory provisions governing specific SIJKT subsystems and the evaluation criteria set out in procurement documents such as the Instructions to Participants (IKP) and the Model Procurement Document (MDP). These inconsistencies particularly in the use of SIMPK for equipment verification led to ambiguity in evaluation decisions, as Pokja members were required to interpret overlapping or conflicting requirements:

> *"Sometimes the regulations conflict with each other, and we get confused. For example, in SIMPK, a difference between uploaded photos and brochure specifications could lead to disqualification, but the IKP said it was just supplementary data and should not automatically disqualify." (Participant 6)*

System sustainability was also a concern. SIMPK was eventually decommissioned from bid evaluation processes after being found to introduce complications rather than support evaluation efficiency. Several other subsystems remained under ongoing evaluation and refinement based on field usage, suggesting that not all components of SIJKT had been fully optimized for operational implementation.

These findings align with Inusah et al. (2025), who identified inadequate or non-uniform policy standards and an underdeveloped legal framework as primary barriers to e-procurement

implementation. They are also consistent with Yevu et al. (2023) and Renaldo et al. (2022), who emphasized the importance of regulatory consistency and effective system governance for sustained digital adoption.

Inter-Theme Linkages

The five themes identified in this study are not independent they are interconnected and mutually reinforcing. Figure 1 illustrates the relationships between themes, showing how challenges in one area can amplify or precipitate difficulties in another.

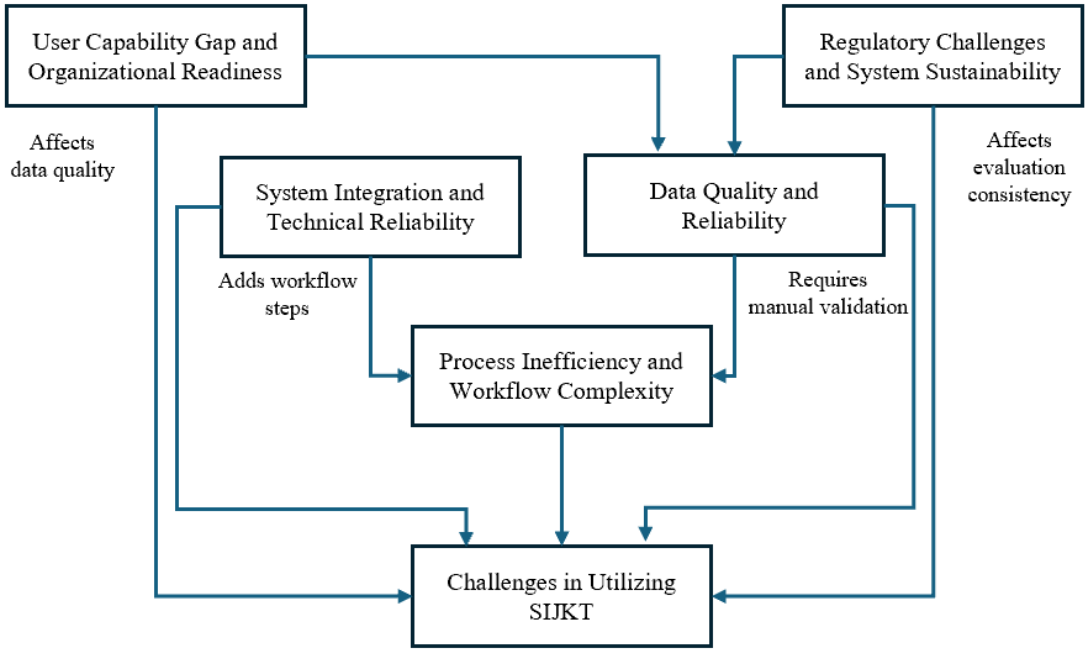

Figure 1. The Relationship Between Themes of Challenges in Utilizing SIJKT in the Evaluation of Bidding Documents

User capability gaps and limited organizational readiness (Theme 4) directly affect data quality (Theme 1), as inconsistent data entry and infrequent updates by operators result in incomplete or outdated records within SIJKT subsystems. Regulatory inconsistencies and system sustainability concerns (Theme 5) also influence data quality and evaluation consistency, as ambiguous provisions or subsystem decommissioning affect the availability and reliability of data used in evaluation.

Process inefficiency and workflow complexity (Theme 3) are in turn shaped by both data quality and system integration challenges (Themes 1 and 2). When data cannot be trusted without further verification, evaluators must conduct additional manual checks. When subsystems are not integrated, cross-system navigation and repeated data entry become necessary. Together, these conditions extend the evaluation workflow, increase cognitive burden on evaluators, and raise the likelihood of procedural delays.

Table 2 summarizes the five themes, their core findings, and their respective impacts on bid evaluation.

Table 2. Summary of Thematic Analysis Results: Challenges in Utilizing SIJKT

No.	Theme	Core Challenge	Impact on Bid Evaluation
1	Data Quality and Reliability	Data in SIJKT subsystems is not consistently complete, current, consistent, or validated.	Necessitates manual verification, reduces the direct usability of SIJKT data as an evaluation basis, and risks inconsistent evaluation outcomes across Pokja.
2	System Integration and Technical Reliability	Inter-subsystem integration is incomplete; data synchronization is unreliable; technical disruptions and access limitations occur.	Increases cross-system verification burden; system errors, access failures, and network issues can halt or delay evaluation activities.
3	Process Inefficiency and Workflow Complexity	Evaluators must perform cross-system checks, manual verification, and additional administrative steps not fully supported by the system.	Extends evaluation timelines, requires coordination with multiple parties, and increases procedural complexity for Pokja.
4	User Capability Gap and Organizational Readiness	User competency is uneven; formal training is limited; data entry participation is inconsistent; HR support capacity is constrained.	Reduces optimal utilization of SIJKT features, contributes to incomplete data records, and slows issue resolution during evaluation.
5	Regulatory Challenges and System Sustainability	Inconsistencies exist between subsystem regulations and procurement evaluation documents; some subsystems remain under development.	Requires Pokja to exercise additional interpretive judgment, and creates uncertainty in the utilization of SIJKT data and features during evaluation.

CONCLUSION

This study examined the challenges in utilizing the Integrated Information System for Construction Services (SIJKT) during bid evaluation for construction procurement at the Ministry of Public Works of the Republic of Indonesia. Using thematic analysis of in-depth interviews with eleven Selection Working Committee members, five interconnected themes of challenges were identified: data quality and reliability, system integration and technical reliability, process inefficiency and workflow complexity, user capability gap and organizational readiness, and regulatory challenges and system sustainability. These themes are not isolated phenomena; gaps in user capability directly affect data quality, regulatory inconsistencies influence system sustainability and data reliability, and challenges in data quality and system integration compound process inefficiency. This interconnected nature of challenges indicates that optimizing SIJKT for bid evaluation cannot be addressed through isolated improvements to any single dimension. Effective reform requires coordinated action across technological, data governance, organizational, and regulatory domains. Future research may examine the impact of the identified challenges on procurement efficiency outcomes, such as evaluation duration and error rates. Quantitative approaches, such as survey-based studies, could complement the qualitative insights generated by this study by enabling broader generalization of findings across Selection Working Committee members throughout the Ministry of Public Works. Intervention-based studies evaluating the effectiveness of specific improvement strategies such as data governance mechanisms or structured user training programs would also contribute meaningful evidence for system optimization. Furthermore, mixed-methods approaches that integrate quantitative measurement with qualitative exploration could provide a more comprehensive understanding of

the factors shaping SIJKT utilization in practice. Comparative studies examining the implementation of similar integrated systems in other countries would also be valuable for identifying best practices and lessons learned.

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