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SPBE Integration Strategy Through Enterprise Architectur

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Abstract: The digital transformation of the public sector in Indonesia has fostered the need for integrated public services through the implementation of the Electronic-Based Government System (SPBE). However, low interoperability among information systems remains a major challenge that hampers service efficiency. This article conducts a literature review of 50 national journals related to SPBE integration based on Enterprise Architecture. The findings highlight the crucial role of Enterprise Architecture in aligning business processes, data, and technology across institutions, thereby enhancing public service interoperability. This study also offers strategic recommendations such as adopting the TOGAF framework, strengthening data infrastructure, and formulating integrative policies as actionable solutions to support unified and sustainable digital government governance.

Keywords: Electronic-Based Government System (SPBE), Enterprise Architecture, Public Service Intoperability, Government Digital Transformation, TOGAF Framework, Information System Integration, E-Government.

INTRODUCTION

Digital transformation has become a strategic agenda in the bureaucratic reform of the government in Indonesia. The government consistently encourages the implementation of the Electronic-Based Government System (SPBE) to enhance the efficiency, effectiveness, transparency, and accountability of public services. SPBE is expected to be able to integrate information systems across agencies, thus promoting integrated and collaborative governance (Hakim, 2023).

However, in practice, many government agencies still build information systems in a soiled and sectoral manner. This results in data redundancy, inefficiency, and low quality of digital public services. A study by Hapsari (2024) indicates that the level of interoperability between systems is still low due to the absence of a shared architectural framework referenced across organizations.

Enterprise Architecture (EA) has become one of the approaches frequently recommended to address system fragmentation. EA plays a role in aligning business needs, workflows, and information technology within an organization. The TOGAF (The Open Group Architecture

Framework) framework is the dominant reference in designing SPBE architecture because it provides a holistic and flexible system development structure (Santosa, 2023; Yusuf, 2025).

Furthermore, the interoperability of public services is not only determined by technical readiness but also by semantics (similarity of data meanings), organization (alignment of processes), and legality (supporting regulations). Studies conducted by Rizky (2025) and Ramli (2025) indicate that the absence of standardized data sharing policies poses a significant barrier to the integration of SPBE.

Based on this background, this article aims to examine the integration strategy of SPBE based on Enterprise Architecture through a literature study of 50 national journal articles. The author summarizes the approaches, frameworks, challenges, and proposed implementational solutions found in previous research to strengthen the interoperability of digital public services in Indonesia.

METHODS

This research utilizes a qualitative descriptive approach known as 'Systematic Literature Review (SLR)'. SLR is chosen so that researchers can systematically examine, filter, and synthesize findings from relevant literature (Wulandari, 2024). This approach is effective in answering questions about how Enterprise Architecture is used in the integration strategy of SPBE and how it impacts the interoperability of digital public services.

Research Design and Procedure

The research design is structured following these steps: (1) identification of keywords and research focus, (2) collection of journal articles, (3) selection based on inclusion and exclusion criteria, (4) data extraction and categorization, and (5) thematic synthesis. This model aligns with the systematic approach used by Santosa (2023) in the study of government digitization strategies based on TOGAF.

Sources and Data Collection Techniques

Scientific articles were collected from: Google Scholar; Accredited national journals (SINTA 2–5); Repositories of higher education institutions.

The search keywords included: "SPBE," "Enterprise Architecture," "TOGAF," "public service interoperability," and "digital government." The publication range analyzed is from 2022 to 2025, to ensure the relevance of policies and cutting-edge technology approaches (Rizky, 2025).

Inclusion and Exclusion Criteria

The inclusion criteria for selecting articles are as follows: the articles must be national scientific publications focusing on SPBE (Electronic-Based Government System), enterprise architecture, and digital interoperability, and they must be written in either Indonesian or English. Additionally, the articles should be available in PDF format or be open access. On the other hand, the exclusion criteria include non-scientific articles such as opinions or blogs, articles irrelevant to government system integration, and those published before 2022.

As emphasized by Hapsari (2024), the use of strict inclusion criteria is essential for enhancing the validity of literature synthesis, especially in studies addressing technical topics and government policies.

Data Analysis Techniques

Data is analyzed using a thematic analysis approach, which involves several key steps: First, metadata extraction is carried out, including details such as author, year, institution, and URL, which are then organized in a spreadsheet. Next, open coding is applied to identify relevant terms, frameworks, and key issues from the articles. Following that, the identified

topics are categorized, for example, into technical interoperability, TOGAF implementation, and regional case studies. Finally, a narrative synthesis is performed, where collective conclusions are drawn across the journals, and patterns in the findings are identified.

This approach is similar to the one used by Ilham (2025), who categorized articles based on the SPBE domain and the maturity level of enterprise architecture.

Validity and Reliability

To ensure the validity of the research results, triangulation is employed by comparing various journal sources. Additionally, all the articles analyzed have undergone a peer-review process (Ramli, 2025). An audit trail is also maintained, including search logs, selection criteria, and analysis documentation. The combination of diverse primary sources and a systematic synthesis process provides a solid foundation for the research's validity, as noted by Yusuf (2025).

RESULTS AND DISCUSSION

Journal Focus Distribution

From a total of 50 articles analyzed, the following distribution was obtained:

Table 1.

Focus Area	Articles	Percentage
SPBE Integration with EA	35	70%
Public Service Interoperability	29	58%
Local Government Case Studies	22	44%
SPBE Maturity Evaluation	18	36%
Government IT Policy	13	26%

Most articles integrate multiple focuses, reflecting the relationship between architectural design, interoperability, and the enhancement of service governance.

Framework and Implementation Approaches

1. TOGAF as the Dominant Framework

   The literature consistently identifies TOGAF (The Open Group Architecture Framework) as the most widely used architectural framework in the development of Indonesia’s Electronic-Based Government System (SPBE). TOGAF is recognized for its ability to align business, data, application, and technology domains into a comprehensive government system structure. It offers the ADM (Architecture Development Method), which is iterative and flexible, allowing system development to be conducted in cycles while adapting to institutional needs and public policy dynamics (Santosa, 2023; Yusuf, 2025).

   Santosa (2023) demonstrated that TOGAF implementation in the West Java Provincial Government successfully mapped cross-organizational business processes, ultimately improving coordination effectiveness and minimizing digital system overlaps. Furthermore, Yusuf (2025) emphasized TOGAF’s relevance in public service interoperability, as it provides an assessment framework to measure the maturity level of an institution’s digital architecture. The connection between TOGAF and SPBE’s goal of building a connected service ecosystem is reflected in TOGAF’s role in institutional blueprinting, business process structuring, and user needs tracking. The combination of systematic structure and adaptive flexibility makes TOGAF a strategic foundation for integrating information technology across government sectors.

2. Open API and GSB as Technical Approaches.

To achieve efficient digital public service interoperability, several studies recommend technical approaches such as Open Application Programming Interface (Open API) and Government Service Bus (GSB). Open API enables government agencies to exchange data in real time without rebuilding their information systems from scratch, significantly improving time and cost efficiency. GSB, on the other hand, serves as an integration channel between digital services, acting as government middleware to securely and structurally connect various sectoral systems (Satria, 2024; Rizky, 2025).

Satria (2024) emphasized that implementing Open API and GSB positively impacts service speed, system flexibility, and technological adaptability across institutions. A case study in Makassar showed that GSB adoption reduced public service processing time by up to 30%, thanks to an integrated system architecture across digital services (Hakim, 2023). Additionally, Open API helps maintain data standards and strengthen information security, as system access can be controlled based on predefined access rights and protocols.

However, implementing these approaches requires adequate infrastructure and human resource capacity. Without strong governance mechanisms for API usage, system fragmentation and data leakage risks remain threats. Therefore, Open API and GSB must be integrated into a holistic enterprise architecture framework to achieve interoperability not only in technical terms but also in semantic, organizational, and legal dimensions (Rizky, 2025; Diah, 2024).

Interoperability Dimensions in the Literature.

Literature analysis reveals that public service interoperability must be viewed as multidimensional. Based on the European Interoperability Framework (EIF), the most frequently discussed dimensions are:

Table 2.

Dimension	Number of Journal	Case Example
Technical	32	GSB in Makassar (Hakim, 2023)
Semantic	21	Metadata standardization in Surabaya
Organizational	24	Integrated SPBE SOPs (Ilham, 2024)
Legal/ Regulation	11	Provincial data-sharing regulation (Diah, 2024)

Implementation Challenges.

The implementation of SPBE in Indonesia faces complex and multidimensional challenges. One major obstacle is the decentralization of information system development by regional government agencies (OPDs). Many OPDs build applications sectorally without referring to a shared architectural framework, resulting in system duplication, data redundancy, and inefficiencies in public service integration (Hapsari, 2024). This situation highlights the urgent need for a cross-institutional enterprise architecture blueprint.

Human resources readiness is another significant challenge. Wulandari (2024) and Ramli (2025) underline that civil servants' understanding and competence in enterprise architecture concepts and implementation remain limited. Consequently, digital system development and integration often fail to align with interoperability principles and service efficiency. The lack of structured training programs and a weak digital culture among civil servants further slows SPBE adoption.

Another challenge is the inconsistency of data-sharing policies across institutions. Several regional governments lack strong regulations and standard operating procedures (SOPs) to support secure and legal data exchange. This becomes a major barrier to building integrated systems and fostering trust among government institutions. Diah (2024) stresses the

importance of issuing regional regulations (Perda) that govern cross-sector data integration mechanisms as a prerequisite for SPBE success.

Overall, these implementation challenges show that digital transformation in government cannot be resolved through technical approaches alone. A collective and synergistic effort is needed, encompassing system architecture planning, human resource capacity building, and consistent data governance policies across all levels of government.

Best Practices from Case Studies.

Despite the challenges, several studies showcase exemplary practices in the development of SPBE (Electronic-Based Government System). For instance, the West Java Provincial Government successfully developed an integrated enterprise architecture by mapping cross-agency business processes (Santosa, 2023). In Surabaya City**,** over 50 digital services were integrated using a domain-based architecture (Hidayati, 2024). Meanwhile, the Makassar City Government implemented GSB (Government Service Bus) and cross-service APIs, which led to a significant reduction in service delivery time, up to 30% (Hakim, 2023). These cases highlight that successful SPBE integration requires more than just technical tools; it also demands careful strategic planning, institutional commitment, and fostering a culture of collaboration across various agencies.

Strategic Recommendations Based on Literature.

Based on the synthesis of 50 national journal articles, several strategic recommendations can be proposed to strengthen the holistic integration of SPBE (Electronic-Based Government System). First, it is essential to adopt a TOGAF-based national enterprise architecture framework that is tailored to key SPBE domains such as data, services, business processes, applications, technology, and information security. This framework will provide systematic guidance for the development and management of digital government architecture, addressing system fragmentation (Santosa, 2023; Yusuf, 2025).

Next, the technical infrastructure should be strengthened, particularly through the development of a national data center equipped with GSB (Government Service Bus) and an Open API-based service integration architecture. According to studies by Rizky (2025) and Satria (2024), this approach not only enhances service speed and efficiency but also creates a standardized and well-controlled digital service ecosystem.

Additionally, it is important to formulate cross-organizational blueprints based on actual business process mapping in each institution. This ensures alignment among government entities before digital system development begins. Ilham (2025) stresses that harmonizing business processes across agencies is vital, so that SPBE architecture becomes a strategic decision-making tool rather than mere documentation.

Another crucial step is to issue joint regulations and Standard Operating Procedures (SOPs) to support secure and legal data exchange. Without clear legal instruments, the potential for data integration is hindered by trust issues and policy fragmentation. Diah (2024) highlights that regional governments with established data integration regulations show faster progress in achieving integrated SPBE.

Lastly, to ensure the sustainability of SPBE, there is a need to enhance human resource capacity and provide enterprise architecture training. Wulandari (2024) emphasizes that civil servants often have a low understanding of digital architecture principles, which necessitates continuous and structured training programs. By focusing on mastering frameworks, digital tools, and data governance, these training strategies will help accelerate the transformation of public services.

These recommendations aim to address key challenges in SPBE integration and ensure the long-term effectiveness of digital government systems in Korea.

CONCLUSION

The synthesis of 50 national articles reveals that the success of SPBE integration heavily depends on the alignment of information system architecture across institutions. Enterprise Architecture—particularly TOGAF-based—has proven effective in designing structured and responsive digital public service blueprints (Yusuf, 2025; Santosa, 2023). TOGAF not only supports domain-based system governance but also offers an adaptive system development framework through its iterative ADM method.

Nevertheless, implementation challenges remain significant. Digital system fragmentation, limited human resource capacity, and inconsistent data-sharing policies across institutions are real barriers to SPBE success. Achieving public service interoperability requires a collaborative approach that combines technical infrastructure enhancement, governance structuring, and regulation-based policy development.

Literature also shows that regional governments that successfully implement SPBE integration typically combine systematic planning, political commitment, and a strong data-sharing culture (Diah, 2024; Ilham, 2025). Therefore, SPBE integration should not be viewed merely as a technological project. It must be positioned as a strategic agenda in government reform, demanding cross-actor collaboration and policy alignment with the principles of transparency, efficiency, and digital accountability.

This article is expected to serve as both an academic reference and a practical guide for policymakers, system developers, and researchers working in the fields of e-government and digital governance architecture.

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