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Enterprise Architecture Design for the Electronic-Based Government System (SPBE) at the East Kalimantan Housing and Settlement Office Using the TOGAF ADM Framework

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Abstract. The Electronic-Based Government System (SPBE) is a key element of Indonesia's digital governance agenda. At the East Kalimantan Housing and Settlement Office (Disperkim), the residential area quality index has not consistently met annual targets, indicating fragmented information system use and inefficiencies in managing infrastructure, facilities, and public utilities (PSU) services. This study proposes an enterprise architecture design using the TOGAF ADM framework. Data were collected through semi-structured interviews with five Disperkim stakeholders and supported by Presidential Regulation No. 95 of 2018 on SPBE. The resulting blueprint covers business, data, application, and technology architectures aligned with organizational performance indicators and regulatory needs. The study also proposes the integration of the Sakti Gemas mobile application as a centralized public service platform to improve PSU service responsiveness. The architecture was validated through a Focus Group Discussion with key stakeholders, confirming its contextual suitability and technical feasibility. Since the study is limited to the design stage, implementation and quantitative performance evaluation remain future work. This study offers a replicable enterprise architecture model for strengthening digital governance in regional government institutions.

Keywords: SPBE; TOGAF ADM; Enterprise Architecture; Digital Governance; Public Service Information System.

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1. INTRODUCTION

Digital Information technology is rapidly evolving and significantly impacts multiple sectors, including government. In order to get as much positive impact as possible from the continuous development of technology, all sectors of companies and organizations exert their best capabilities, resources, and efforts for the sake of aligning and following the rapid development of technology, including the government sector. The role of information technology has a significant impact in providing better support for information management and access to public services for the community both at the regional and central levels. The government clearly has a role in creating policies and actions in each sector in providing support for the performance of public services by utilizing Information Technology [1,2]. Through e-government, by utilizing information technology, the Government is highly expected to be able to achieve its main goal, which is to improve services to the community more effectively and efficiently [2]. The optimal use of IT in question includes activities that are related to each other, namely management systems, data processing, information, and electronic work processes [3-5]. The existence of technology can also have an impact on new problems. What is meant is that it will arise if IT is only used as a software or hardware provision for automation, even though there must be alignment between information technology and business [4].

Enterprise architecture has become a critical framework for organizations seeking to align their information technology infrastructure with business objectives. Several studies have demonstrated the effectiveness of various enterprise architecture frameworks in government settings. Zachman [5] proposed one of the earliest comprehensive frameworks for information systems architecture, establishing foundational principles that remain relevant today. Winter and Fischer [6] identified essential layers, artifacts, and dependencies of enterprise architecture, providing a structured approach to organizational IT planning. Lankhorst et al. [7] presented comprehensive methodologies for enterprise architecture modeling, communication, and analysis, which have been widely adopted across different organizational contexts. Sessions [8] conducted a comparative analysis of the top four enterprise architecture methodologies, highlighting the strengths and applications of each framework. More recently, Qurratuaini [9] demonstrated the practical application of TOGAF 9.1 framework

in designing enterprise architecture, showing its adaptability to modern organizational needs.

The implementation of SPBE has a vision, namely the realization of an integrated and comprehensive electronic-based government system to achieve high-performance bureaucracy and public services. To achieve the vision, mission, and goals of SPBE, a framework is needed that will be the foundation in the initial steps of making SPBE. In Presidential Regulation Number 95 of 2018 [8,10], it is explained that SPBE has a basic framework called SPBE Architecture. Digital government research has evolved significantly, with scholars exploring the crossroads of technology and governance. Gil-Garcia and Dawes [11] examined digital government research, identifying key themes and future directions in the field. Janssen and Estevez [12] discussed lean government and platform-based governance, proposing new models for efficient public service delivery. Nam and Pardo [13] conceptualized smart city as urban innovation, linking technological advancement with urban governance improvements. Cordella and Bonina [14] presented a public value perspective for ICT enabled public sector reforms, emphasizing the importance of creating public value through technology. Bannister and Connolly [15] explored ICT, public values and transformative government, discussing how technology can support democratic values and public sector transformation.

Quoted from a report uploaded by the United Nations in 2020 regarding the e-Government Survey [16,17], Indonesia has an e-Government Development Index (EGDI) value of 0.6612 and is ranked 88th out of 193 countries in the world. The development of EGDI Indonesia has shown considerable increase every year, rising from 0.44784 in 2016 to 0.52580 in 2018, and reaching 0.66120 in 2020, demonstrating the country's commitment to digital transformation in governance. Every local government in Indonesia has tried its best in the preparation of SPBE architecture, including the East Kalimantan Provincial Government. In IT management, the East Kalimantan Provincial Government has an urgency in designing an enterprise architecture with the aim of improving quality and closing the shortcomings of the system that is currently running by aligning business processes with the implementation of information technology.

Recent research has focused on the integration of enterprise architecture frameworks in government organizations. Bernus and Nemes [18] discussed enterprise integration and

interoperability, addressing challenges in connecting diverse organizational systems. Meijer et al. [19] conducted research on smart city contextual conditions, governance models, and public value assessment, providing insights into technology-enabled urban governance. Anthopoulos [20,21] provided a comprehensive understanding of smart government, exploring how digital technologies can enhance government operations and service delivery. These studies collectively highlight the growing importance of structured approaches to digital transformation in the public sector, yet a significant research gap remains in the specific application of TOGAF framework to address performance gaps in regional government housing and settlement services in Indonesia. In its development, SPBE in the East Kalimantan region includes various Regional Apparatus Organizations. One of them is the Public Housing and Settlement Areas Office (Department of Housing and Settlement Areas or Disperkim) which has duties and functions that essentially have continuity with improving public services. In fact, the East Kalimantan Disperkim has established an SPBE system in helping organizations to achieve their goals. In 2019, several of the Disperkim's targets on key performance indicators have been achieved. However, for the main performance indicator of the quality level of residential areas which has a target of 6.86, in realization it only reaches 6.39. This indicates the need for performance improvements that support these key performance indicators. One of the factors that causes the quality level of residential areas to still not reach the target is the Infrastructure, Facilities and Public Utilities (PSU) Services which currently do not meet standards so that they have the potential to reduce the quality of the residential environment. To overcome this problem, it is necessary to improve PSU services to the community. The existence of this issue indicates that there is an unachieved goal of SPBE, namely realizing quality and reliable public services.

Previous studies have applied TOGAF framework in various government contexts. Research on the design of electronic-based government system enterprise architecture using TOGAF ADM (The Open Group Architecture Framework - Architecture Development Method) in construction services [22] demonstrated the framework's applicability to specific government sectors. Another study focused on enterprise architecture of electronic-based government systems in the housing sector using TOGAF ADM 9.1 [23], showing similar architectural approaches. Research on information system architecture using TOGAF ADM in promotion functions [24] illustrated the framework's versatility across different government functions. Additionally, a study on designing enterprise

architecture on human resource functions using TOGAF ADM [25] provided insights into HR system architecture in banking sectors. While these studies have contributed to understanding TOGAF implementation in various contexts, they have not specifically addressed the integration of SPBE architecture with mobile-based public service applications in provincial housing and settlement offices, particularly in addressing specific performance indicator gaps.

Despite the growing body of enterprise architecture literature, a specific research gap remains: no study has systematically applied TOGAF ADM to address a measurable, institutionally specific performance deficit in regional government housing and settlement services within the Indonesian SPBE regulatory context. This study fills that gap by designing an SPBE enterprise architecture for Disperkim using the TOGAF ADM framework. Three contributions are made: (1) a comprehensive SPBE architecture blueprint covering business, data, application, and technology domains, tailored to Disperkim's regulatory context under Presidential Regulation No. 95 of 2018; (2) the proposed integration of the Sakti Gemas mobile application as a centralized PSU service platform; and (3) an explicit linkage between the architectural design and the specific, measurable residential area quality performance indicator. This research focuses on designing SPBE architecture in four architectural domains, namely business architecture, data architecture, application architecture, and technology architecture, specifically tailored to solve the identified performance issues in residential area quality management.

The theoretical foundation of enterprise architecture has been extensively studied, with recent research emphasizing its strategic value in organizational transformation. Gong and Janssen [26] critically examined the value propositions and common misconceptions surrounding enterprise architecture management, revealing that many organizations struggle to realize EA's full potential due to implementation challenges and organizational resistance. Ahlemann et al. [27] contributed to this discourse by proposing a resource-based perspective on value generation through enterprise architecture management, demonstrating how EA capabilities can be leveraged as strategic organizational resources. Kotusev et al. [28] investigated the practical usage of enterprise architecture artifacts in real-world settings, finding significant gaps between prescribed EA frameworks and actual organizational practices. Iyamu and Mphahlele [29] explored

the critical influence of organizational structure on enterprise architecture deployment success, highlighting the importance of structural alignment for effective EA implementation. Simon et al. [30] established the significant role of enterprise architecture management in corporate strategic management, arguing that EA serves as a crucial bridge between business strategy and IT implementation. Despite these valuable contributions to EA theory and practice, there remains a notable gap in research specifically addressing how enterprise architecture frameworks can be systematically applied to resolve measurable performance deficits in regional government housing and settlement services, particularly within the Indonesian regulatory context where SPBE implementation is mandated but practical guidance remains limited.

2. METHODS

2.1. Research Design and Conceptual Framework

This study employs an architectural design research approach, in which the primary output is a designed artifact, specifically, a proposed SPBE enterprise architecture blueprint for the East Kalimantan Housing and Settlement Office (Disperkim). The research does not claim a full Design Science Research (DSR) cycle, as the study scope is delimited to the architecture design phase and does not include formal implementation or empirical evaluation of the deployed system. The research produces design artifacts as its main contribution, consistent with enterprise architecture design studies in the public sector.

The conceptual framework, as illustrated in Figure 1 , maps three key components that structure the design process: (1) the organizational environment at Disperkim, encompassing people, organizational processes, and existing technology; (2) the Information Systems research component, grounded in the artifacts mandated by Presidential Regulation No. 95 of 2018 on SPBE Architecture, covering domains of business processes, services, data, applications, infrastructure or technology, and security; and (3) the knowledge base, comprising enterprise architecture theory, the TOGAF ADM methodology, and Indonesian SPBE regulations. This framework guided all data collection, artifact design, and validation activities throughout the study.

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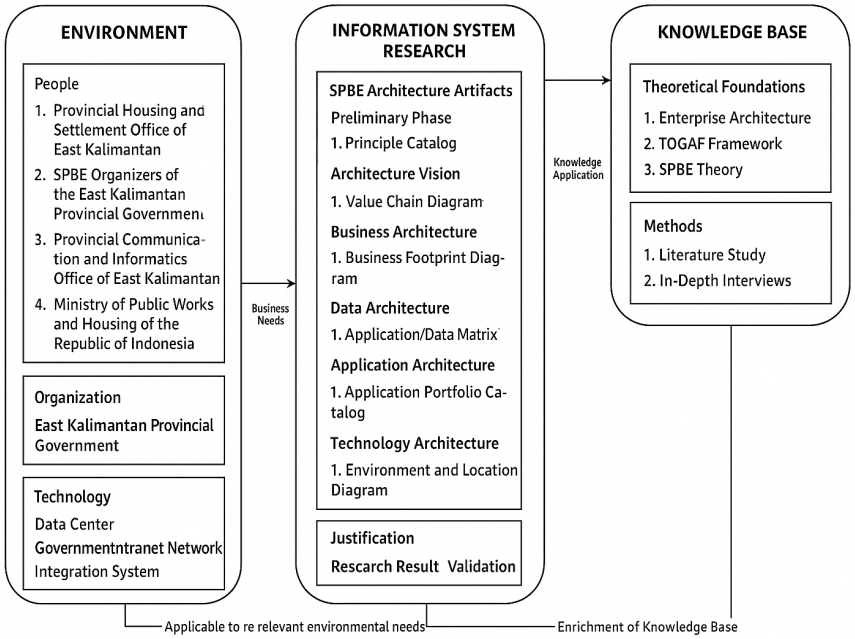

Figure 1. Conceptual Model of SPBE Architecture for East Kalimantan Disperkim

The conceptual model consists of three components, namely the environment, Information Systems research, and the knowledge base. The environment discusses the problems that exist in the SPBE architecture of the East Kalimantan Disperkim. Lack of documentation on the use of IT in a company's business processes, and the company's architecture, and therefore the scope of business processes can change. In the environment, three elements are described, namely people, organization, and technology. SI's research provides an explanation based on artifacts in Presidential Regulation Number 95 of 2018 concerning SPBE Architecture. This element will discuss the artifacts that will be produced, namely based on the domains of business processes, services, data, applications, infrastructure/technology, and security. The knowledge base describes the basic knowledge of SPBE architectural design in the East Kalimantan Disperkim. The basic knowledge used in this study is about the concept of enterprise architecture, the TOGAF framework, and SPBE regulations.

2.2. Research Workflow and Data Collection

The research proceeded through four sequential stages as depicted in Figure 2: initiation, identification, analysis and design, and conclusion. Each stage is described as follows.

Stage 1: Initiation

This stage involved establishing formal research access and coordination with Disperkim. An initial meeting was conducted to define the research scope, agree on data-sharing arrangements, and identify key contact persons within the organization.

Stage 2: Identification (Data Collection)

Data were collected from two sources. Primary data were obtained through semi-structured interviews conducted with five key stakeholders representing the core functional units of Disperkim: (1) the Head of the Housing Division, (2) the Head of the Settlement Division, (3) the Head of the Information Technology Sub-division, (4) the Head of the Planning Sub-division, and (5) a frontline service officer. Interviews were conducted between January and March 2024, combining online sessions via Zoom and face-to-face meetings at the Disperkim office in Samarinda. Interview questions focused on current business processes, existing information system use, identified pain points, and service delivery bottlenecks related to the unmet residential area quality indicator. Table 1 summarizes the five interview respondents, their positions within Disperkim, and the category of data each contributed to the architectural analysis.

Table 1. Interview Respondents and Category of Data Contributed

No	Code	Position	Division / Unit	Category of Data Contributed
1	R1	Head of Housing Division	Housing	Current business processes of housing program management; performance gap in residential area quality indicator; key stakeholder relationships and program priorities.
2	R2	Head of Settlement Division	Settlement	PSU service workflows; infrastructure condition reporting procedures; data flow between field officers and divisional management.
3	R3	Head of Information Technology Sub-division	IT & Data	Existing information system inventory; current hosting and network infrastructure; IT governance constraints and

No	Code	Position	Division / Unit	Category of Data Contributed
				Diskominfo coordination mechanisms.
4	R4	Head of Planning Sub-division	Planning & Evaluation	Organizational strategic planning documents (Renstra 2019–2023); SPBE implementation targets; alignment between KPI indicators and IT system use.
5	R5	Senior Public Service Officer	Public Service Frontline	Frontline service delivery procedures; citizen complaint-handling process; pain points in the current manual reporting and request-submission workflow.

Secondary data comprised Presidential Regulation No. 95 of 2018 on SPBE, the East Kalimantan Provincial Medium-Term Development Plan (RPJMD) 2018–2023, and the Disperkim Strategic Plan (Renstra) 2019-2023.

Stage 3: Analysis and Architectural Design

Interview data and documentary analysis were synthesized to develop TOGAF ADM artifacts across four architectural domains. The study applies TOGAF ADM phases selectively: the Preliminary Phase, Architecture Vision (Phase A), Business Architecture (Phase B), and Information Systems and Technology Architecture (Phases C and D). The remaining phases, Opportunities and Solutions, Migration Planning, Implementation Governance, and Architecture Change Management, are beyond the scope of the present study because this research is delimited to the architectural design phase, not implementation. This scope is consistent with similar TOGAF-based enterprise architecture studies in the Indonesian public sector. The produced artifacts include the Principle Catalog, Stakeholder Map Matrix, Value Chain Diagram, Business Footprint Diagram, Application or Data Matrix, Application Portfolio Catalog, and Environment and Location Diagram.

Stage 4: Validation and Conclusion

Each produced artifact was validated through a focused group discussion (FGD) session

involving four of the five interviewed stakeholders, who reviewed the proposed architecture for accuracy, completeness, and practical relevance. Participants were asked to assess whether the artifacts correctly reflected Disperkim's current and target business processes, whether the proposed Sakti Gemas application addressed the identified service gap, and whether the technology architecture was feasible within the existing Diskominfo infrastructure. The outcome of the FGD confirmed that the proposed architecture was contextually appropriate and aligned with organizational goals, although stakeholders also noted that implementation feasibility would require further planning in subsequent TOGAF phases. Table 2 presents the three evaluation criteria used in the FGD, the consolidated stakeholder responses and the resulting implication for the proposed architecture.

Table 2. FGD Validation Criteria, Stakeholder Responses, and Architectural Implications

No	Validation Criterion	Stakeholder Responses	Consolidated Result	Architectural Implication
1	Criterion 1: Does the proposed Business Architecture (Preliminary Phase, Architecture Vision, Business Architecture) correctly represent the target business processes for PSU service improvement at Disperkim?	R1: Agree R2: Agree R3: Agree R4: Agree	Confirmed	The Business Architecture artifacts (Principle Catalog, Stakeholder Map Matrix, Value Chain Diagram, Business Footprint Diagram) are retained as designed. The business process coverage is confirmed as complete and accurate relative to Disperkim's organizational structure.
2	Criterion 2: Does the Data and Application Architecture (Phase C) adequately support the information flows required to address the PSU service delivery gap and contribute to improvement of the residential area quality index?	R1: Agree R2: Agree R3: Partially Agree R4: Agree	Confirmed with Note	The Application/Data Matrix (Table 3) and Application Portfolio Catalog (Table 4) are retained. A clarifying note on data governance responsibilities between Disperkim and Diskominfo has been added in the Technology Architecture section following R3's feedback on inter-agency data access rights.

No	Validation Criterion	Stakeholder Responses	Consolidated Result	Architectural Implication
3	Criterion 3: Is the proposed Technology Architecture (Phase D) technically feasible within the existing East Kalimantan Diskominfo Cloud infrastructure and governance framework?	R1: Agree R2: Agree R3: Agree R4: Agree	Confirmed	The Environment and Location Diagram (Figure 5) and the proposed cloud hosting arrangement are retained without structural change. R3 confirmed that Diskominfo's existing cloud capacity and service-level agreements with regional agencies are sufficient to support the proposed deployment.

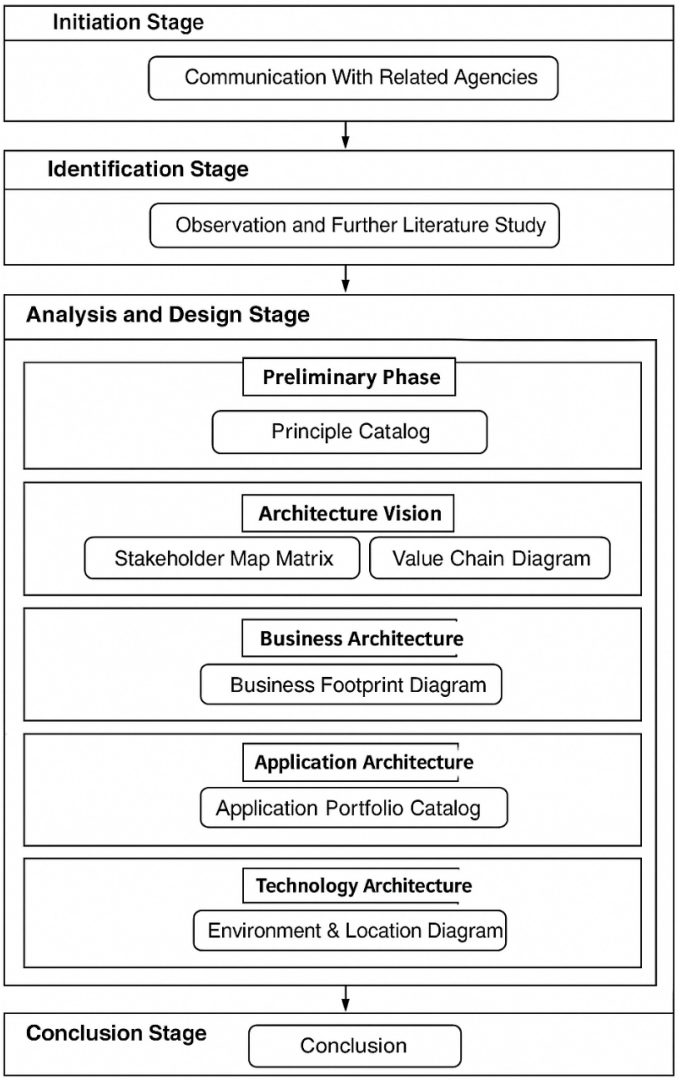

Figure 2. Problem-Solving Systematics

3. RESULTS AND DISCUSSION

3.1. Preliminary Phase

The preliminary phase describes the beginning of enterprise architecture which contains the preparation of initial activities carried out to support the achievement of business needs. In this phase, the principles contained in the artifact called the principle catalog are defined. These principles are not only taken as guidelines but also as a limitation in the implementation of architecture in the company. Table 3 shows the principle catalog artifacts at the East Kalimantan Disperkim. This table presents the fundamental architectural principles that guide the SPBE implementation at East Kalimantan Disperkim across four architectural domains: Business, Data, Application, and Technology. Each principle defines the governance rules and guidelines that must be followed throughout the architecture development and implementation phases.

Table 3. Principle Catalog

No	Architecture	Principle	Information
1	Business Architecture	Key Principles	Architectural principles apply to the entire Regional Apparatus.
		Compliance with the Law	The governance process of Information Technology Provincial Government must comply with every relevant internal and external law, policy, and regulation.
		Data and information management is the responsibility of all regional apparatus organizations	All Regional Apparatus participates in Preparation and determination of the necessary business architecture in order to support public services and government administration.
		Service Orientation	The Enterprise Architecture of the East Kalimantan Provincial Government has a basis, namely service design that reflects public service activities and government administration and covers all business processes in East Kalimantan.
2	Data Architecture	Data is an Asset	Data is a valuable asset for organization so that it must be managed properly
		Data can be shared	Data must be able to be shared across

No	Architecture	Principle	Information
			regional devices so that users have access to the data needed to perform their tasks.
		Data accessible	Data can be accessed by users to perform their functions.
		Data Stewardship	There is a data guardian on each data element who has responsibility for data quality.
3	Application Architecture	Requirements-Based Change	Changes to applications and technology are made with the aim of responding to business needs.
		Responsive Change Management	Changes to the information environment in government must be implemented in a timely manner.
		Application Management	Development and use of The application used in all regional apparatus will always be based on the vision, mission of the East Kalimantan provincial government as well as the Architecture and SPBE Plan Map.
4	Technology	Responsive Change Management	Changes to the company environment must be implemented in a timely manner.
		Technical Diversity Control	Technological diversity needs to be managed to minimize the costs of maintaining expertise and connectivity between multiple environments.
		Interoperability	Software and hardware that are used must meet the standards that have been previously set so that they can support interoperability. data, application, and technology capabilities.

3.2. Architecture Vision

The architecture vision phase is the initial stage of the TOGAF ADM that defines the stakeholders involved, the constraints, and the vision of the architecture. The purpose of this phase is inseparable from enterprise architecture is to build business value in the company. Stakeholders involved in the business activities of the East Kalimantan

Disperkim are described in the artifacts of the stakeholder map matrix in Table 4. This matrix identifies the key stakeholders involved in the SPBE architecture implementation at East Kalimantan Disperkim, including their primary roles and concerns. Understanding these stakeholders is essential for ensuring alignment between the architecture design and organizational goals, as well as for effective communication and collaboration throughout the implementation process.

Table 4 Stakeholder Map Matrix

No	Stakeholder	Key Concern
1	Department of Communication and Informatics	Carry out government affairs in the fields of communication technology, informatics, and community hubs based on the principles of autonomy and assistance.
2	Regional Development Planning Agency	Have responsibility in the implementation Government affairs in the field of planning include planning, control, and evaluation of regional development.
3	Highways and Spatial Planning Service	Carry out development, maintenance, and improvement of roads and bridges.
4	Regional Financial and Asset Management Agency	Manages and fosters administrative reporting related to financial support and regional property.
5	Environmental Management Agency	Carry out environmental management, environmental pollution control and climate change control.
6	Ministry of Public Works and Housing	Give a decision and have the right to know the development of housing and settlement affairs.

In the architecture vision phase, a value chain diagram is also depicted in which the main and supporting activities of the East Kalimantan Disperkim are depicted as shown in Figure 3. This value chain diagram illustrates the main and supporting activities of the East Kalimantan Provincial Housing and Settlement Office (Disperkim). The diagram identifies primary business processes directly related to housing and settlement service delivery, as well as supporting processes that enable the organization to achieve its objectives. Understanding the value chain is critical for aligning the SPBE architecture with organizational activities and ensuring that technology investments support core business functions.

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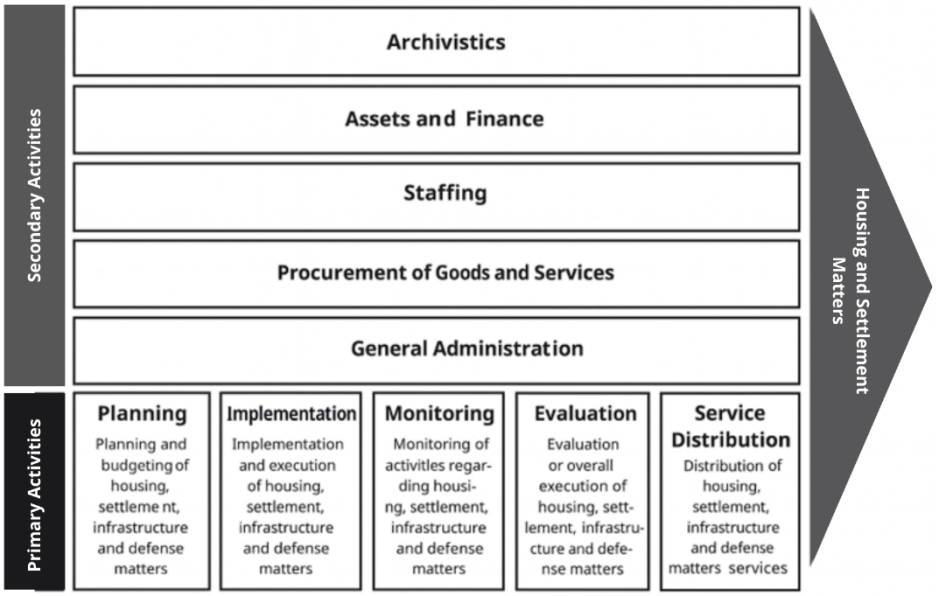

Figure 3. Value Chain Diagram of East Kalimantan Disperkim

The value chain analysis reveals that the primary activities most directly linked to the unmet residential area quality indicator are Infrastructure, Facilities, and Public Utilities (PSU) services, specifically the planning, reporting, and complaint-handling sub-processes. In the current state, these sub-processes operate without integrated data flows, relying on manual reporting and fragmented communication channels between field officers, the Housing Division, and the Settlement Division. The proposed enterprise architecture is designed to restructure exactly these activities by creating centralized data repositories and standardized service request workflows that connect citizens, field officers, and division heads through a single digital platform.

3.3. Business Architecture

The business architecture explains the government affairs carried out by the Disperkim based on the Business Process Reference Model that has previously been determined. The goal of the business architecture phase is to build a target architecture from the current state of the organization to achieve goals, and support the architecture vision. The goals of the East Kalimantan Disperkim are depicted through the business footprint diagram artifacts shown in Figure 4.

This business footprint diagram visualizes the strategic goals and objectives of East Kalimantan Disperkim within the SPBE architecture framework. The diagram maps the

organization's business functions and their relationships, providing a comprehensive view of how different operational areas contribute to achieving the organization's mission. This artifact is essential for ensuring that the target architecture addresses all critical business requirements and supports the improvement of residential area quality indicators.

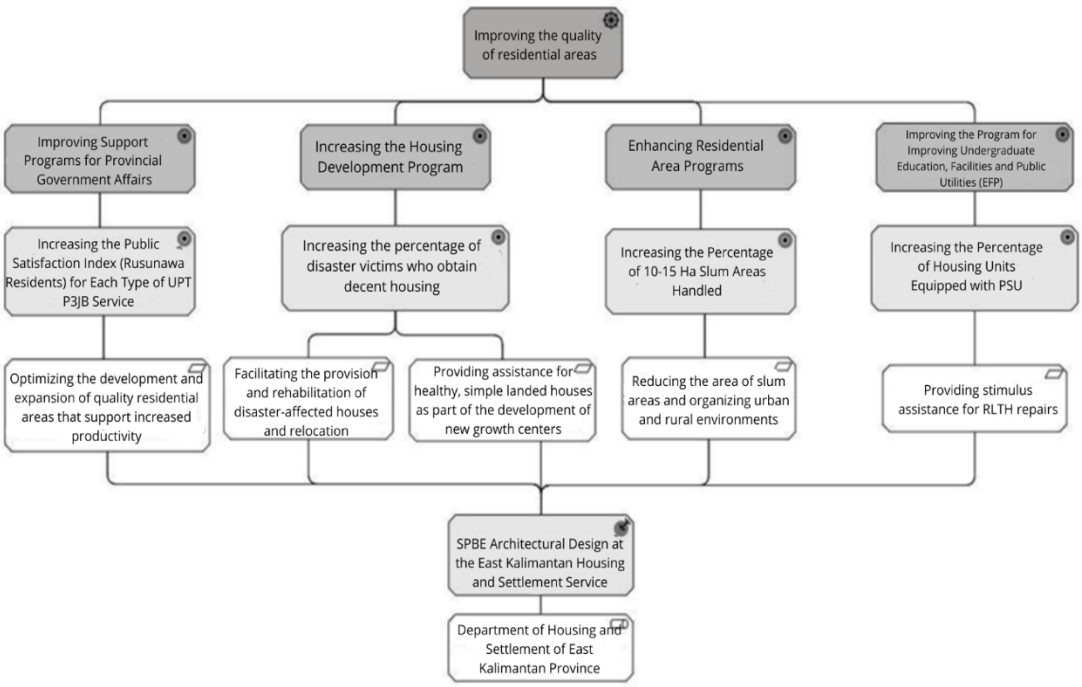

Figure 4. Business Footprint Diagram

The business footprint diagram demonstrates how the target architecture directly maps organizational goals to specific business functions and information technology enablers. Critically, the performance objective of improving the residential area quality index (from the current 6.39 to the target of 6.86) is connected through the diagram to the PSU services cluster, which in turn maps to the Sakti Gemas application as its primary IT enabler. This linkage makes explicit that the architectural design is not a generic IT initiative but is specifically structured around the measurable gap that motivated the study. Each business function in the footprint diagram corresponds to at least one data entity or application component in the subsequent information system architecture artifacts.

3.4. Information System Architecture

In accordance with TOGAF ADM, information system architecture is an advanced phase after business architecture which is divided into two elements, namely data architecture and application architecture.

1) Data Architecture

One of the domains in the information system architecture phase is data architecture. In the data architecture, data entities are described that are mapped into applications that have been described into physical application components and logical application components. The mapping is illustrated in the application/matrix data artifacts in Table 5. This matrix maps the relationship between physical application components, logical application components, and data entities within the SPBE architecture. It demonstrates how data flows through different application layers and ensures proper data management across the system, supporting the integration of the Sakti Gemas mobile application with other organizational systems.

Table 5. Application/Data Matrix

Physical Application Component	Logical Application Component	Data Entity
Transit Apartment	Transit Apartment Registration	Officer, Region, Location, Transit Apartment Registry, Transit Apartment Residents, and Transit Apartment
Sakti Gemas	Application for Rutilahu (Uninhabitable Houses) Repair	Residents, Officer, Location, Uninhabitable houses, Prospective recipients of Rutilahu assistance, Proposal for submission of Rutilahu
	Information on Availability of Drinking Water, Garbage, Drainage, and Wastewater	Officer, Region, Land Acquisition Proposal, Drinking Water Supply System (SPAM) Planning Document, Waste Management Activity Proposal, Residential Flooding Point Identification, Drainage Management, Domestic Wastewater Management System (SPALD) Planning Document, Proper Sanitation
	Complaints about Drinking Water, Garbage, Drainage, and Wastewater Facilities	Residents, Location, Complaints

Table 5 demonstrates that the Sakti Gemas application integrates four logical application components, each mapped to specific data entities that address the identified service gaps. The Application for Rutilahu Repair component directly supports the PSU improvement objective by enabling digital submission and tracking of uninhabitable house repair proposals, replacing the previous manual and paper-based process. The 'Information on Availability of Drinking Water, Garbage, Drainage, and Wastewater' component creates a centralized data layer for infrastructure condition monitoring, which was previously unavailable at the organizational level. The 'Complaints' component closes the feedback loop between citizens and service officers, enabling faster response to PSU-related complaints. Together, these components address the three most critical data flow breakdowns identified during stakeholder interviews, namely, fragmented reporting, lack of real-time infrastructure status, and absence of a formal complaint-tracking mechanism.

2) Application Architecture

After the data architecture, in phase C there is also an application architecture. The application used by the East Kalimantan Disperkim is described in the application architecture. The application is described into a physical application com- ponent and logical application component and a description of the application in the application portfolio catalog artifact in Table 6. This catalog provides a comprehensive overview of the applications utilized within the East Kalimantan Disperkim SPBE architecture, detailing both physical and logical components along with their functional descriptions. The catalog serves as a reference for understanding the role of each application in supporting housing and settlement services, with particular emphasis on the Sakti Gemas mobile application as the primary public service interface.

Table 6. Application Portfolio Catalog

Physical Application Component	Logical Application Component	Description
Transit Apartment	Transit Apartment Registration	This application is used to display information related to Transit Apartments and Transit Apartment registration.

Sakti Gemas	Request for Rutilahu Improvements Information on Drinking Water Availability, Garbage, Drainage, and Wastewater Complaints Regarding Drinking Water Facilities and Garbage	A mobile application that can be accessed by the public to facilitate public services.

The application portfolio in Table 6 reflects a deliberate design decision to consolidate multiple PSU-related service functions within the Sakti Gemas mobile application rather than developing isolated applications for each function. This consolidation is justified on three grounds. First, it reduces the interoperability burden by routing all citizen-facing transactions through a single API interface connected to the Disperkim Cloud. Second, it simplifies the citizen experience by providing a unified access point for all PSU-related services. Third, it lowers long-term maintenance costs by minimizing the number of separately managed application stacks. The Transit Apartment application is retained as a separate physical component because its user base (building administrators and residents) and data entities are organizationally distinct from the PSU service domain.

3.5. Technology Architecture

The next phase is phase technology architecture. The technology architecture depicts the target locations and relationships of the technologies used by the East Kalimantan Department of Housing and Settlements. The technology used to support the applications utilized by the East Kalimantan Department of Housing and Settlements will eventually be housed within the East Kalimantan Department of Communication and Informatics. This target condition is depicted in the artifact environment and location diagram in Figure 5.

This diagram depicts the target technology architecture, showing the physical and logical locations of technology components within the SPBE infrastructure. The diagram illustrates how the Transit Apartment application and Sakti Gemas mobile application will be deployed on the East Kalimantan Disperkim Cloud infrastructure, which is physically housed at the East Kalimantan Communication and Information Service (Diskominfo). This centralized approach ensures better resource management, security, and interoperability across regional government systems.

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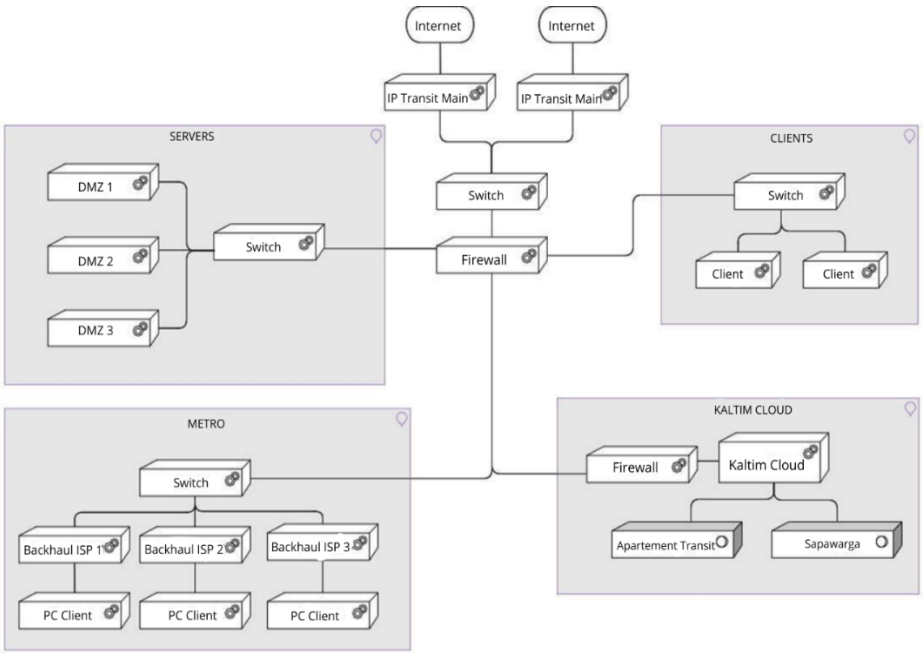

Figure 5. Environment and Location Diagram

The technology architecture depicted in Figure 5 shows that both the Transit Apartment application and Sakti Gemas will be migrated from local Disperkim servers to the East Kalimantan Diskominfo Cloud. This architectural decision has three practical implications for service performance. First, centralized hosting under Diskominfo ensures compliance with SPBE interoperability standards and allows future integration with other provincial government systems. Second, it removes the infrastructure management burden from Disperkim, allowing the agency to focus its IT resources on data governance and user support rather than server maintenance. Third, cloud hosting enables scalable access for mobile users of Sakti Gemas without requiring Disperkim to independently manage mobile infrastructure. During the validation FGD, the Head of the IT Sub-division confirmed that this target architecture is technically feasible given Diskominfo's existing cloud capacity and service-level agreements with regional government agencies.

In the environment and location diagram, the location of the technology component used by the East Kalimantan Disperkim is depicted at the Department of Communication and Informatics. In the target architecture, later the Transit Apartment application which was initially located in the East Kalimantan Disperkim will be moved to the East Kalimantan Disperkim Cloud which is located in the East Kalimantan Diskominfo along with the application Sakti Gemas.

3.6. Validation of Proposed Architecture

The proposed architecture was validated through a focused group discussion (FGD) attended by four Disperkim stakeholders: the Head of the Housing Division, the Head of the Settlement Division, the Head of the IT Sub-division, and one senior service officer. The FGD was structured around three evaluation criteria derived from the original performance problem: (1) whether the proposed business architecture correctly represents the target business processes for PSU service improvement; (2) whether the data and application architecture adequately supports the information flows required to improve the residential area quality index; and (3) whether the technology architecture is feasible within the existing Diskominfo infrastructure. All four participants confirmed that the proposed architecture met criteria 1 and 3. For criterion 2, participants agreed that the Sakti Gemas application components address the three most critical information flow gaps, repair proposal tracking, infrastructure status monitoring, and complaint management, and that, if fully implemented, the architecture would provide the digital infrastructure needed to support improvement of the residential area quality indicator. Participants also noted that the proposed architecture is appropriately scoped and that subsequent migration planning and implementation governance phases will be required before performance impacts can be measured empirically. These validation outcomes demonstrate that the proposed architecture is both technically feasible and organizationally relevant, even though operational performance cannot be assessed until after deployment.

3.7. Comparative Analysis

The comparison aims to identify similarities, differences, and contributions of this study in the context of public service digitalization. Previous studies have shown that TOGAF ADM is widely used to design enterprise architecture in various domains, including smart village development, e-government systems, and organizational information systems [31-33], all studies apply a structured TOGAF ADM approach starting from the Preliminary Phase to Migration Planning research on smart village architecture emphasizes alignment between ICT infrastructure and village development strategies [31], while e-government research in Simpang Pasir Village highlights the importance of integrated systems and improved public services through enterprise architecture [32]. Similarly, research in the Bandung City Government demonstrates that TOGAF ADM can produce an IT roadmap to support effective and efficient electronic-based government systems [33].

Differences can be identified in terms of architectural focus and implementation scope. Some studies emphasize specific domains such as data and application architecture [33], while others focus on improving operational efficiency and service quality through system integration [34]. Research in social service contexts demonstrates that TOGAF-based architecture can significantly improve process efficiency, such as reducing operational delays and improving service management [35]. Compared to these studies, the current research provides a more comprehensive approach by integrating business, data, application, and technology architecture specifically tailored to the SPBE implementation in the housing and settlement sector. This study also introduces a one-stop service integration through the "Sakti Gemas" mobile application, which directly addresses performance gaps in public service delivery. Table 7 shows, the main contribution of this research lies in its contextual adaptation of TOGAF ADM to regional government needs and its focus on measurable service improvement outcomes.

Table 7. Comparative Analysis

TOGAF Phase	Artifacts in This Study	Artifacts in Other Research	Comparative Notes
Preliminary Phase	Principle Catalog	Principle Catalog	Other studies apply the same artifact in the preliminary stage [32].
Architecture Vision	Value Chain Diagram, Stakeholder Map Matrix	Value Chain Diagram	This study adds Stakeholder Map Matrix to enhance stakeholder analysis [32].
Business Architecture	Business Footprint Diagram	Business Footprint Diagram	Both studies use similar artifacts to describe business processes [31, 32].
Data Architecture	Application/Data Matrix	Data Dissemination Diagram	This study integrates application and data more comprehensively [33, 34].
Application Architecture	Application Portfolio Catalog	Application Communication Diagram	This study focuses on application integration and service portfolio [33].
Technology Architecture	Environment and Location Diagram	Environment and Location Diagram	Both studies use similar artifacts to map infrastructure [32,35].

4. CONCLUSION

This study addresses the performance gap in housing and settlement services at the East Kalimantan Housing and Settlement Office (Disperkim), specifically the persistently unmet residential area quality index, by proposing an SPBE enterprise architecture designed using the TOGAF ADM framework. Through a structured architectural design process covering business, data, application, and technology domains, informed by stakeholder interviews and validated through a design-level FGD with Disperkim officials,

this research produces an integrated SPBE architectural blueprint aligned with Presidential Regulation No. 95 of 2018. The proposed architecture integrates the Sakti Gemas mobile application as a centralized PSU service platform expected to support more responsive public service delivery. The proposed architecture has been confirmed as contextually appropriate and technically feasible by Disperkim stakeholders through a design-level FGD; this does not constitute operational performance validation. Operational impact on the residential area quality index can only be measured following full system implementation and deployment. Future work should extend this architectural design to subsequent TOGAF ADM phases, including migration planning (Phases E–F), implementation governance (Phase G), and architecture change management (Phase H). Empirical performance evaluation and user satisfaction measurement should be conducted following system deployment.

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