

BPJS Kesehatan Enterprise Architecture (BEA): Strategy for Integrating Business Processes and Information Technology in the Sustainability of the Social Health Insurance Program

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Abstract

Social Health Insurance Administration Body (**BPJS Kesehatan**), as the administrator of the Social Health Insurance Program (SHI), is required to run the organization effectively and efficiently in order to meet the expectations of participants and the needs of stakeholders through accelerated digital transformation. To achieve this, since 2021 BPJS Kesehatan has initiated the **BPJS Kesehatan Enterprise Architecture (BEA)** based on the TOGAF Architecture Development Method (ADM) using ArchiMate and the application of Business Process Model and Notation (BPMN). This study aims to describe the BEA development process, analyze the implementation results, and evaluate its contribution to organizational performance using a qualitative case study approach through internal documentation, interviews, and participatory observation.

The results show that BEA resulted in the simplification of 354 processes, the re-arrangement of 229 processes, the digitization of 636 activities, and the strengthening of functions in 54 processes. These findings confirm that the business-driven EA approach is relevant for large-scale public organizations. Theoretically, this research enriches the EA literature in the health sector; practically, BEA can be used as a best practice for digital transformation and governance in highly complex public institutions.

Keywords: BPJS Kesehatan Enterprise Architecture, TOGAF ADM, ArchiMate, BPMN, Digital Transformation, Governance

1. Introduction

Social Health Insurance Administration Body (BPJS Kesehatan) is a Public Legal Entity that manages the Social Health Insurance Program (SHI) for all Indonesian citizens. According to data as of December 31, 2024, SHI coverage reached 282.4 million people, or 98.45% of the total population. This number makes the SHI program one of the largest health insurance systems in the world, while also presenting complex strategic challenges for the organization. BPJS Kesehatan is encouraged to continue adapting to external and internal dynamics in the form of participant expectations, organizational needs for effectiveness and efficiency, digital transformation, and cyber security risks. These conditions require BPJS Kesehatan to become an agile and resilient organization.

To address these challenges, since 2021 BPJS Kesehatan has initiated the development of the BPJS Kesehatan Enterprise Architecture (BEA) based on the TOGAF Architecture Development Method (TOGAF-ADM), supported by the ArchiMate and Business Process Model and Notation (BPMN) modeling languages, as well as BizDesign EA tools. This step is in line with previous studies that show the success of TOGAF in designing the integration of health referral systems in Indonesia (Handayani et al., 2019), improving interoperability in the Asia eHealth Information Network (Jonagaddala et al., 2020), and

strengthening IT strategy alignment in healthcare centers in Jordan (Al Omari et al., 2024). A systematic review also confirms

that EA in the healthcare sector effectively improves efficiency, governance, and data integration, despite challenges such as application silos and weak regulations (Luz Júnior et al., 2020).

The implementation of EA at BPJS Kesehatan was carried out through a business-driven EA approach with the direct involvement of business units and more than 600 BPJS Kesehatan ambassadors. This participatory process resulted in tangible benefits in the form of the simplification of 354 processes, the rearrangement of 229 processes, the digitization of 636 activities, and the strengthening of functions in 54 processes. In addition to accelerating digital transformation, BEA serves as the foundation for organizational governance that ensures the sustainability of the SHI Program amid environmental dynamics. This study aims to describe the BEA development process, analyze the implementation results, and evaluate its contribution to organizational performance, thereby providing a theoretical contribution to EA literature in the public sector and practical contributions to other institutions facing similar complexities.

2. Literature Review

2.1 Enterprise Architecture Definition

Enterprise Architecture (EA) is understood as a comprehensive approach to aligning business strategy with information systems, technology, and organizational resources. According to Kotusev (2017), EA is a management practice that documents the structure and operations of an organization to bridge the communication gap between business and IT, with the aim of improving organizational alignment and effectiveness. Lankhorst (2017) also emphasizes that EA is a comprehensive blueprint that describes the relationship between business processes, information, applications, and technology infrastructure. In the context of the public sector, Ross, Weill, and Robertson (2006) mention EA as a means to reduce organizational complexity through standardization and cross-unit integration, thereby strengthening governance and performance.

2.2 TOGAF Framework

The Open Group Architecture Framework (TOGAF) is one of the most widely used EA frameworks globally. TOGAF provides the Architecture Development Method (ADM), which is an iterative cycle consisting of eight phases: Preliminary, Architecture Vision, Business Architecture, Information Systems Architecture, Technology Architecture, Opportunities and Solutions, Migration Planning, Implementation Governance, and Architecture Change Management (The Open Group, 2021). Research by Handayani et al. (2019) shows that TOGAF 9.1 can be adopted in the design of a health referral system in Indonesia, resulting in data integration and improved coordination of services between health facilities. Meanwhile, a study by Al Omari et al. (2024) proves that the application of TOGAF ADM in the health sector can align business strategies with IT systems, improve interoperability, and strengthen organizational governance.

2.3 ArchiMate Definition

ArchiMate is an open modeling language developed by The Open Group to support EA visualization, analysis, and documentation. According to Iacob, Jonkers, Lankhorst, and Proper (2012), ArchiMate provides a standard notation that allows the depiction of interrelationships between architectural domains (business, application, and technology) in a consistent framework. The advantage of ArchiMate is its ability to provide a common language for various stakeholders, thereby facilitating cross-unit communication within an organization (Lankhorst, 2017). In practice, ArchiMate is often combined with BPMN for detailed operational process modeling. A study by Luz Júnior et al. (2020) found that the use of ArchiMate in the healthcare sector helps identify application silos, design data integration, and support the interoperability of healthcare systems.

2.4 Enterprise Architecture in the Public Sector

The implementation of *Enterprise Architecture (EA)* in the public sector has grown rapidly over the past two decades in response to increasing bureaucratic complexity, the need for efficiency, and the push for digital

transformation. According to Janssen and Hjort-Madsen (2007), EA in the public sector serves as a tool for cross-agency coordination, enabling service integration and strengthening government accountability. In developed countries such as the United States, the United Kingdom, and Australia, EA is positioned as a strategic enabler in public administration reform, particularly in the provision of integrated digital services. In the context of health, EA plays an important role in aligning service strategies with health technology infrastructure. A study by Handayani et al. (2019) shows that the implementation of TOGAF 9.1 in Indonesia's healthcare referral system has improved data integration between service facilities. Similarly, research by Luz Júnior et al. (2020) reveals that EA in international healthcare systems provides benefits in the form of increased interoperability, cost efficiency, and improved service quality. However, challenges such as dependence on application silos, weak data governance, and resistance to change remain major obstacles.

At the regional level, Jonnagaddala et al. (2020) highlight the Asia eHealth Information Network (AeHIN) initiative, which promotes the adoption of EA as an effort to improve interoperability between countries in healthcare systems. Meanwhile, Al Omari et al. (2024), through a case study in Jordan, show that the TOGAF ADM framework can be adapted to the national context to strengthen governance and align clinical strategies with IT infrastructure. Thus, the literature review confirms that although EA has been widely applied in the public and health sectors, there is still limited research documenting its application in large-scale social insurance institutions such as BPJS Kesehatan. This opens up new research opportunities related to how EA can become the foundation of organizational governance as well as a strategic instrument for the sustainability of national health insurance programs.

3. Concepts And Research Methodology

3.1. Concepts and Research Model

The basic concept of this research stems from the understanding that Enterprise Architecture (EA) is a strategic instrument that aligns organizational strategy with business processes, data, applications, technology, and governance. In the context of BPJS Kesehatan, EA was developed in the form of BPJS Kesehatan Enterprise Architecture (BEA) as a response to the need for digital transformation, increased process efficiency, and strengthened governance of the SHI program.

The main framework used is the TOGAF Architecture Development Method (TOGAF-ADM), which provides systematic stages ranging from vision formulation, definition of business, information, system, and technology architecture, to implementation plans and change governance (The Open Group, 2021). To support architecture visualization and communication, ArchiMate is used as a standard modeling language that describes the interrelationships between business, application, and technology domains (Iacob et al., 2012), as well as Business Process Model and Notation (BPMN) to map operational process details.

In addition, BEA integrates other model references such as APQC for process standardization, COBIT for IT governance, and ITIL for IT service management. Thus, the conceptual model of this study positions BEA as business-driven EA that focuses on process ownership by business units, not just technology initiatives. This model is visualized in the form of a research model that connects inputs (strategy & organizational needs), processes (TOGAF ADM stages), and outputs (target architecture, roadmap, and sustainable governance).

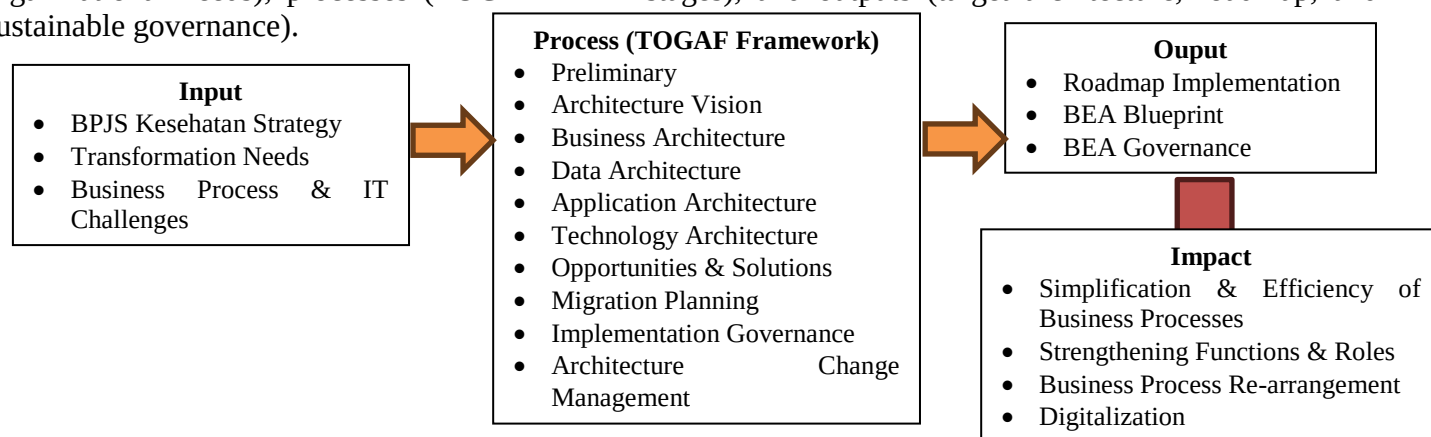


Figure 1 Research Framework
Sources: Processed Data (2025)

3.2. Research methodology

This study uses a **descriptive qualitative** approach with a focus on a case study of BEA implementation at BPJS Kesehatan. Data was collected from three main sources:

1. Internal documentation in the form of organizational strategic plans, board regulations, socialization materials, and progress reports on the preparation of BEA for the 2021-2025 period.
2. Structured interviews and discussions with Business Process Owners (BPO), directors, and BPJS Kesehatan ambassadors representing business units. More than 151 parallel discussion sessions and 33 finalization sessions were recorded to support data validity.
3. Participatory observation through workshops, EA Notation (Archimate & BPMN) training, and BEA seminars involving more than 600 participants across units.

Data analysis was conducted using triangulation methods to ensure validity. The analysis process included:

- Identification of as-is conditions through mapping of existing business processes, data, applications, and technology.
- Gap analysis of the 2026 target conditions based on stakeholder needs and international best practices.
- Design of target architecture and roadmap using TOGAF ADM and supported by BizzDesign tools.
- Evaluation of results based on indicators of process simplification, digitalization, and enhancement of organizational roles/functions.

This methodological approach is in line with similar studies in the health sector that use TOGAF ADM as an EA design framework (Handayani et al., 2019; Al Omari et al., 2024). With this design, the research not only produces a description of the BEA development process but also analyzes its contribution to organizational transformation and the sustainability of the SHI program.

4. Results And Discussion

4.1 Results

The implementation of BEA has resulted in a number of strategic and operational achievements. Based on the 2021–2025 roadmap, there are four main categories of development outcomes:

1. Simplification and Efficiency of Business Processes

A total of 354 Level 3 processes were simplified through the elimination of redundant activities and standardization across the Head Office, Regional Offices, and Branch Offices, such as the simplification of face-to-face and non-face-to-face service processes, which previously differed between channels, into a single integrated standard.

2. Re-arrangement of Business Processes

229 processes were restructured to align with organizational developments and cross-unit standardization needs, such as the addition of an integrated competency assessment process and IT & metadata portfolio management.

3. Process Digitalization and Automation

636 activities were digitized or automated, such as the development of a CRM-based core system for cross-segment participant registration, a virtual robot assistant for complaints, and the integration of the IHC and PETAKU applications for payroll. Improved interoperability between applications was achieved through the harmonization of business architecture with IT architecture using the BizzDesign tool.

4. Strengthening Organizational Functions and Roles

54 processes were strengthened in terms of people, including the addition of a data protection officer function in accordance with the Personal Data Protection Law, a Data Architect function, and an enhanced Data Steward role. These results support the strengthening of data governance and organizational compliance with external regulations.

Overall, BEA successfully produced a target architecture blueprint, implementation roadmap, and EA governance operating model that serve as a reference across work units. These results not only improve internal efficiency but also support SHI participant satisfaction through faster, integrated, and digital-based services.

4.2 Discussion

The results of EA implementation at BPJS Kesehatan are in line with international literature that confirms the benefits of EA in the health sector. Handayani et al. (2019) show that TOGAF is capable of strengthening data integration in the health referral system in Indonesia, while Luz Júnior et al. (2020) highlight that EA improves interoperability and efficiency, despite facing challenges such as application silos and resistance to change. A study by Al Omari et al. (2024) in Jordan also shows a similar result: the application of TOGAF ADM supports the alignment of clinical strategies with IT infrastructure.

The comparison of the before–after conditions of BEA in BPJS Kesehatan is as follows:

Table 1 Condition of BEA in BPJS Kesehatan

Domain	Before	After
Data	Managed in separate documents, some of which are still static and not yet synergized.	Managed in a single dynamic repository, so that the interrelationships and connections between outcomes and outputs and performance can be seen.
Change Management	Application development and business process changes based on user requests without considering the impact on other business processes and applications, as well as human resource management.	Requests for application development and business process changes are discussed jointly between the business unit and the IT unit to assess the impact of these changes on business processes and other applications, as well as on human resource management.
Governance	Business architecture is developed after the issuance of policies/guidelines by work units, which may result in processes that are not synergistic, not aligned, redundant, mutually exclusive, and not integrated.	Serving as the basis/reference for all work units in the formulation of policies/guidelines and operational implementation at the Head Office, Regional Offices, and Branch Offices.
Business Architecture	- Business architecture identification is as-is and managed using Excel, and is not yet connected to data, application, and technology architecture. - Depiction of business processes using simple circular diagrams, boxes, and arrows.	- Identification of the to-be business architecture is based on the results of problem identification and reference studies, as well as leading practices, and is linked to data, application, and technology architecture through Archimate. - Business process mapping using BPMN and documented in a single repository, namely the BizzDesign application.

The results of several performances before and after the implementation of BEA are as follows:

Table 2 Performances Implementation of BEA

Description	Before	After
Number of Business Processes:	- Level 1 : 83 main processes - Level 2 : 223 subprocesses - Level 3 : 781 operational procedures - Level 4 : 1.187 activities	- Level 1 : 16 main processes - Level 2 : 88 subprocesses - Level 3: 610 operational procedures - Level 4 : 6.018 activities
Increased Productivity	Average FTE per employee 1.41 Full Time Equivalent (FTE).	The average FTE target for 2026 is 1.2 Full Time Equivalent (FTE) for each employee.
Increase in Customer Retention Rate	Active participant ratio: 82.15%.	Target active participant ratio of 87.75%.
Improving Organizational	Organizational compliance rate: 96.27%.	Target organizational compliance rate of 97.02%.

Description	Before	After
Compliance		
Improving the Efficiency of Information Technology Investment	The amount of IT investment is Rp. 69.51 billion.	Target IT efficiency value of Rp. 13.8 billion.

5. Conclusion And Recommendations

5.1 Conclusion

This study describes BPJS Kesehatan's experience in developing BPJS Kesehatan Enterprise Architecture (BEA) based on TOGAF ADM as a strategic instrument to align strategy, business processes, technology, and organizational governance. The implementation of BEA has resulted in tangible benefits in the form of simplification of 354 business processes, *re-arrangement* of 229 processes, digitization of 636 activities, and strengthening of functions and roles in 54 processes. In addition, BEA requires the formation of an *Enterprise Architecture Steering Committee (EASC)* to strengthen organizational governance, ensuring cross-functional coordination and sustainability of architecture management.

Conceptually, this study confirms that the *business-driven EA* approach is relevant for large-scale public organizations, as the involvement of business units as process owners ensures that the architecture is aligned with the organization's strategic needs. Empirically, the results of this study support previous literature that highlights the effectiveness of TOGAF in the health sector (Handayani et al., 2019; Al Omari et al., 2024; Luz Júnior et al., 2020). Thus, BEA functions not only as a technical document, but also as a strategic instrument that increases the resilience of organizations in facing external dynamics, while ensuring the sustainability of the SHI Program.

5.2 Recommendations

The recommendations from this study are as follows:

1. Strengthening Internal Capacity
BPJS Kesehatan needs to continue to improve the competence of EA ambassadors in architecture modeling (ArchiMate, BPMN, UML, and ERD), data governance, and risk management so that EA sustainability does not depend solely on external consultants.
2. BEA Governance Arrangements and Integration with Organizational Governance
To ensure the sustainable implementation of BEA, it is necessary to establish BEA governance arrangements and synergize BEA with the Baldrige Excellence Framework (BEF), ISO 9001:2015, and OCEG-based GRC frameworks to ensure consistency in organizational planning, implementation, and performance evaluation.
3. Strengthening Digitalization and Interoperability
The digital transformation that has begun through 636 digitized activities needs to be expanded with a focus on system interoperability between external stakeholders, including ministries/institutions and partner health facilities.
4. Periodic Evaluation of BEA Maturity
An assessment of BEA maturity levels using a hybrid scoring & maturity level approach is needed to ensure implementation is proceeding according to the roadmap and resulting in continuous improvement.
5. Replication to Other Public Sectors
BPJS Kesehatan's experience in implementing BEA can be used as a reference or benchmark by other public institutions in Indonesia and internationally, particularly social security and public service providers with high complexity.

With consistent implementation, BEA has the potential to become a best practice in institutional transformation in the public sector, strengthening digital governance and ensuring the sustainability of the national health insurance system.

Conflicts of Interest: The authors declare no conflict of interest.

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