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Digital Transformation Readiness of Indonesia's State-Owned Telecommunications Enterprise through Enterprise Architecture

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Abstract

Digital transformation has become a strategic necessity for state-owned enterprises, and PT Telkom Indonesia (Persero) Tbk has adopted Enterprise Architecture (EA) to align its business strategy with its information technology systems. Although the TOGAF Architecture Development Method (ADM) has been widely applied in banking, education, and government contexts, structured documentation of how its four core domains, business, application, data, and technology architecture, jointly capture the transition from manual to automated operations within a large Indonesian telecommunications state-owned enterprise remains limited. This study analyses Telkom's EA implementation using TOGAF through a qualitative descriptive case study design, drawing on internal documentation and Unified Modelling Language (UML) diagrams. The analysis shows that Telkom has progressively shifted to fully automated processes within the middle office (provisioning, network configuration, and service monitoring) and back office (billing, financial analytics, and audit and compliance), while the front office retains partially manual service registration and verification. The SWOT analysis indicates that extensive national infrastructure and financial stability are key strengths, whereas suboptimal system integration is the most significant weakness. Managers should therefore prioritize integrating front-office registration systems with the already-automated middle and back office layers to achieve end-to-end digital service delivery.

Keywords: *digital transformation; enterprise architecture; PT Telkom Indonesia; TOGAF; UML*

1. Introduction

The development of information and communication technology in the digital era has brought fundamental changes to the way organizations conduct their business. Organizations are increasingly required to integrate technology into all aspects of their operations in order to compete effectively in fast-moving digital markets. One strategic approach used to align information technology systems with a company's business strategy is Enterprise Architecture (EA), which provides a systematic framework for designing organizational structures, business processes, applications, data, and technology infrastructure (Egodawele, Sedera, & Bui, 2022). PT Telkom Indonesia (Persero) Tbk is an example of a national company undergoing comprehensive digital transformation. As a state-owned enterprise in the telecommunications and information technology sector, Telkom not only provides basic communication services but also develops digital services such as internet connectivity, cloud computing, data centres, and enterprise digital solutions for corporate and government clients.

Prior research has consistently shown that EA functions as a management tool for aligning business and information technology strategies across diverse sectors. Studies have demonstrated EA's role in improving conformance and realizing benefits in systems development (Foorthuis, van Steenbergen, Mushkudiani, Bruls, & Brinkkemper, 2010), in supporting systematic literature reviews of EA practice in complex healthcare networks (Maris, Hoppenbrouwers, & Van Hillegersberg, 2023), and in modelling strategic alignment between business strategy and the TOGAF Architecture Development Method (Maulana, Azmi, & Arshah, 2023). The TOGAF framework, in particular, has been applied to design information system architecture for educational institutions (Jordan, Andry, Adikara, Geasela, & Lee, 2024) and to compare open Internet of Things architectures for industrial implementation (Camatti, Rabelo, Borsato, & Pellicciari,

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2020). These studies collectively indicate that TOGAF offers a structured, replicable method for capturing the relationship between an organization's business processes and its supporting information systems.

Although TOGAF-based enterprise architecture design has been documented extensively for educational institutions, government agencies, and industrial IoT implementations, structured case documentation of how the four core TOGAF domains, namely business, application, data, and technology architecture, jointly represent the transition from manual to automated operations within a large Indonesian telecommunications state-owned enterprise remains scarce. Most prior TOGAF case studies focus on a single organizational function or a small institution, leaving a gap in understanding how an enterprise-wide architecture spanning front office, middle office, and back office functions can be modelled for a telecommunications operator of Telkom's scale and complexity. Addressing this gap matters because Telkom's digital transformation strategy depends on the seamless integration of customer-facing, operational, and administrative systems, and an incomplete architectural picture limits the ability of decision makers to identify where automation gaps remain.

To address this gap, this study adopts a qualitative descriptive case study design, consistent with an interpretive epistemological stance that treats organizational documentation and process models as primary sources of evidence for understanding how enterprise architecture is enacted in practice. The TOGAF Architecture Development Method (ADM) is used as the analytical lens because it provides explicit phase-by-phase guidance, from the Preliminary Phase through Migration Planning, for decomposing an organization's architecture into business, data, application, and technology domains. Unified Modelling Language (UML) diagrams, including use case diagrams, activity diagrams, and entity relationship diagrams, are used as complementary modelling artifacts to visualize the interactions between actors, processes, and data entities within Telkom's information systems.

The significance of this study lies in its potential to provide a structured, business-oriented account of how a major Indonesian state-owned telecommunications enterprise operationalizes enterprise architecture to support digital transformation. From a managerial perspective, identifying which business functions remain manual and which have been automated allows decision makers to prioritize investment in system integration. From a theoretical perspective, this study extends the application of TOGAF ADM to a telecommunications case characterized by a large organizational structure, multiple subsidiaries, and a diverse service portfolio spanning retail internet, data centre, and enterprise digital services.

This study makes three explicit contributions. First, methodologically, it documents the application of TOGAF ADM together with UML modelling to a large telecommunications state-owned enterprise, covering all four core architecture domains within a single integrated case. Second, empirically, it identifies which specific business functions within the front office, middle office, and back office have transitioned from manual to system-based ("By System") operation, and which remain manual in the current state architecture. Third, practically, it provides a SWOT-informed assessment of Telkom's digital transformation readiness that can guide managers in prioritizing system integration efforts. Accordingly, this study aims to (1) document Telkom's current and target state application, data, and business architecture using TOGAF ADM and UML, and (2) identify the strategic strengths, weaknesses, opportunities, and threats that shape Telkom's readiness for further digital transformation.

2. Literature Review

2.1 Enterprise Architecture and the TOGAF Framework

Enterprise Architecture (EA) encompasses the principles, methods, and models used in the design and implementation of an organization's structure, business processes, information systems, and infrastructure. Designing an EA model requires a framework capable of managing complex systems while balancing business requirements with the information technology that supports them. The Open Group Architecture Framework (TOGAF) is one such framework, defined as a transformation process that can be implemented systematically to document strategic ideas and requirements relating to a product or system (Egodawele et al., 2022). TOGAF originated within a defense-sector context but has since been adopted across manufacturing, banking, and education (Camatti et al., 2020). Compared with other enterprise architecture frameworks, TOGAF offers detailed methods and tools for creating, implementing, and maintaining enterprise architecture through its Architecture Development Method (ADM) (Jordan et al., 2024; Maulana et al., 2023). One of TOGAF's principal advantages is that it can be accessed and used freely by organizations seeking to develop their enterprise architecture.

The TOGAF ADM consists of a sequence of phases, beginning with a Preliminary Phase that establishes the architectural principles guiding subsequent development of the Business, Data, Application, and Technology Architectures, and producing a Principal Catalog as its key artifact. Phase A, Architecture Vision, defines the scope, stakeholders, and architecture vision, producing artifacts such as the Stakeholder Map Matrix and Value Chain Diagram. Phase B, Business Architecture, designs the enterprise architecture from a business perspective and produces artifacts including the Business Footprint Diagram and Organizational/Actor Catalog. Phase C, Information System Architecture, comprises two sub-phases: Data Architecture, which defines the data required to support the business architecture through artifacts such as the Entity Relationship Diagram and Data Dissemination Diagram, and Application Architecture, which defines the application landscape through artifacts such as the Application Portfolio Catalog and Application Communication Diagram. Phase D, Technology Architecture, defines the technology infrastructure required to support the application and data architectures. Phase E, Opportunities and Solutions, bridges architecture development and implementation planning by identifying solution options and dependencies, while the Migration Planning phase determines the transition sequence from the current state to the target state architecture (Foorthuis et al., 2010; Maris et al., 2023).

2.2 Unified Modelling Language in Enterprise Architecture Documentation

Unified Modelling Language (UML) provides a standard visual notation for documenting the structure and behaviour of information systems and is widely used as a complementary tool within enterprise architecture projects. Use case diagrams illustrate the interactions between actors and the system, clarifying which functionalities are accessible to which roles (Putra, Setiaji, & Arifin, 2025; Calista, Husaein, & Gunardi, 2023). Activity diagrams map standard and alternative workflows, including exception handling for conditions such as invalid input or unavailable stock (Putra et al., 2025; Calista et al., 2023). Entity Relationship Diagrams and class diagrams represent the structure of system data, including entities and the relationships between them, and support Business Area Analysis by clustering entities and business functions into coherent groups (Putra, Fu'adi, & Hikmahwan, 2024). According to Marlinda, as cited in Tabrani (2014), the entity relationship model explains the relationships between data in a database based on the premise that the real world consists of fundamental objects with relationships or associations to one another. Within the context of large telecommunications enterprises, these UML artifacts allow system analysts, developers, and business stakeholders to share a common representation of otherwise complex, multi-layered business processes such as inventory management, customer order processing, and material logistics.

2.3 Digital Transformation, System Integration, and SWOT Analysis

Digital transformation requires organizations to migrate from manual, paper-based, or siloed processes toward integrated, system-driven operations. A persistent challenge in this migration is system integration: legacy applications, databases, and manual workflows often coexist with newly automated components, creating fragmented architectures that increase the risk of errors and data inconsistency (Gholami, Daneshgar, Beydoun, & Rabhi, 2017). Within the telecommunications sector specifically, enterprise digital ecosystems depend on the reliable integration of customer-facing front-office systems with operationally critical middle-office and administratively essential back-office systems. Information security awareness is a related concern as organizations expand their digital footprint, since greater reliance on digital channels increases exposure to threats such as phishing, smishing, and vishing (Ladayya, Prayitno, Syani, Hikmawan, & Abdulmajid, 2024).

Before designing an enterprise architecture, organizations commonly conduct a SWOT analysis to identify internal strengths and weaknesses alongside external opportunities and threats, providing context for architectural priorities. For a national telecommunications operator such as Telkom, strengths typically include extensive physical infrastructure, financial stability, and brand reputation, while weaknesses often relate to the coordination challenges inherent in a large organizational structure and the regulatory constraints associated with state ownership. Opportunities frequently arise from emerging technologies such as 5G, artificial intelligence, and the Internet of Things, whereas threats include competitive pressure from global technology firms and heightened cybersecurity and data-privacy risks (Alhari & Fajrillah, 2022; Amalia, Fajrillah, Lubis, & Syam, 2022). This study therefore positions the SWOT analysis as a complementary lens for interpreting the architectural findings derived from TOGAF ADM and UML modelling, closing the literature review by linking the architectural domains discussed above to the empirical case of Telkom's digital transformation, examined in the following sections.

3. Methods

3.1 Research Design

This research adopts a qualitative descriptive case study design to analyse the implementation of Enterprise Architecture (EA) at PT Telkom Indonesia (Persero) Tbk. The study follows an interpretive epistemological stance, treating internal organizational documentation, architecture diagrams, and UML models as primary evidence for understanding how enterprise architecture is enacted in practice. The design is exploratory and descriptive in nature: it does not test hypotheses but instead aims to produce a structured, replicable account of Telkom's current and target state architecture across the four core TOGAF domains.

3.2 Unit of Analysis and Data Sources

The unit of analysis is the enterprise architecture of PT Telkom Indonesia (Persero) Tbk, examined through its front office, middle office, and back office business functions. Data sources comprise internal organizational documentation and company profiles describing Telkom's business model, organizational structure, and digital service portfolio, together with two student group case study reports that document Telkom's inventory and supply chain management processes through UML modelling. Secondary literature on the TOGAF framework, the Zachman framework, and relevant national ICT governance regulations was used to contextualize the case findings. No primary survey data were collected; the inclusion criterion for documentary sources was that the material directly described Telkom's business processes, application systems, data structures, or technology infrastructure.

3.3 Data Collection Procedure

Data collection techniques included document analysis of internal reports and organizational structure maps, together with the review of UML diagrams produced for Telkom's inventory and customer order processing systems. Three types of UML diagrams were collected and analysed: use case diagrams, which illustrate interactions between actors such as warehouse operators, inventory managers, suppliers, and customer service staff, and the system; activity diagrams, which map standard and alternative workflows including exception handling for invalid input or out-of-stock conditions; and entity relationship diagrams, which represent the structure of system data, including entities such as materials, receipts, returns, and transactions, and the relationships between them.

3.4 Data Analysis Technique

Data analysis followed the phase structure of the TOGAF Architecture Development Method (ADM), which provided the analytical framework for organizing the architectural findings. The Preliminary Phase and Architecture Vision phase were used to establish the scope and stakeholder context of the analysis. Business Architecture (Phase B) was analysed by mapping Telkom's core and supporting business activities into a value chain perspective. Information System Architecture (Phase C) was analysed by separately examining the Data Architecture, represented through entity relationship diagrams and a current state data architecture block diagram, and the Application Architecture, represented through current state and target state application architecture integration diagrams. Technology Architecture (Phase D) considerations were incorporated into the discussion of the supporting infrastructure referenced within the application and data architecture diagrams. Each business function within the front office, middle office, and back office was classified as either manually performed or system-automated, based on the colour coding (manual versus "By System") used in the current state and target state diagrams. This classification provided the basis for identifying automation gaps, which were then interpreted in conjunction with the SWOT analysis to derive the digital transformation readiness assessment presented in the Results and Discussion sections.

4. Results

4.1 Organizational Profile and Business Context

PT Telkom Indonesia (Persero) Tbk is a state-owned enterprise engaged in information technology, communications, and digital telecommunications services. Established on 6 July 1965, Telkom has transformed from a fixed-line service provider into a digital company offering integrated technology solutions. The Government of Indonesia owns 52.09% of Telkom's shares, and the company operates a nationwide network supported by 12 subsidiaries. Telkom's business focuses

on internet services, data centres, cloud computing, digital enterprise services, and digital applications for customer segments ranging from retail to government.

Telkom's business processes integrate core and supporting activities within a single value chain. Three core activities were identified: internet services, which form the backbone of retail offerings such as IndiHome and Telkomsel and meet the connectivity needs of individuals and households; data centre and cloud computing services, which provide digital infrastructure and data storage solutions for business and government clients; and enterprise digital services, which include information technology-based solutions for corporations such as private networks and unified communication platforms. Five supporting activities were identified: network infrastructure management, encompassing fiber optic networks, base transceiver stations (BTS), and satellites; human resource management; continuous technology and innovation development; strategic partnership management with startups and technology partners; and digital ecosystem management.

4.2 SWOT Analysis

Table 1 summarizes the SWOT analysis derived from the organizational documentation. Telkom's strengths include extensive and evenly distributed digital infrastructure throughout Indonesia, comprising fiber optic networks, BTS, and data centres, together with a stable financial condition that supports continued investment, a comprehensive service portfolio spanning retail internet to digital enterprise solutions, and a strong reputation with high customer trust. Weaknesses include the coordination challenges associated with a large organizational structure, regulatory constraints arising from state ownership that may limit flexibility to innovate, the risk of errors in complex billing and data management systems if not optimally managed, and the persistence of business processes that are not yet fully automated or integrated. Opportunities arise from growing demand for digital services, emerging technologies such as 5G, artificial intelligence, and the Internet of Things, and the potential for international market expansion and collaboration with local startups. Threats include intense competition from local and global companies, the risk that disruptive technologies could displace conventional services if not anticipated, new regulations related to data privacy and security that could constrain operational flexibility, and increasing cybersecurity threats.

Table 1. SWOT Analysis of PT Telkom Indonesia (Persero) Tbk

SWOT Element	Description
Strengths	Extensive nationwide digital infrastructure (fiber optic, BTS, data centres); stable financial condition; comprehensive service portfolio; strong brand reputation and customer trust.
Weaknesses	Large organizational structure leading to coordination challenges; regulatory constraints from state ownership; complex billing and data management systems with error risk; some business processes not yet fully automated or integrated.
Opportunities	Growing demand for digital services; emerging technologies (5G, AI, IoT); potential expansion into international markets and startup collaboration.
Threats	Intense competition from local and global firms; potential displacement by disruptive technologies; new data privacy and security regulations; rising cybersecurity threats.

4.3 UML Modelling of Inventory and Order Processing Systems

Figure 1 presents the use case diagram developed for Telkom's inventory and supply chain management system, involving four main actors: Admin, Inventory Manager, Supplier, and Customer Service. The Admin and Inventory Manager roles have the most extensive access, including logging in, managing suppliers, updating profiles, checking notifications, viewing and paying invoices, placing and viewing orders, managing stock and inventory, and generating reports. The "View Order" and "Generate Report" use cases include extend relationships, indicating optional or conditional functionality, such as performing a "Check Quality" action depending on context. The Supplier actor is responsible for sending stock, receiving returned goods, raising invoices, and ensuring product quality, reflecting a collaborative relationship between the system and external suppliers. The Customer Service actor is associated with a single function, "Send Notification", which supports communication regarding order status and stock updates.

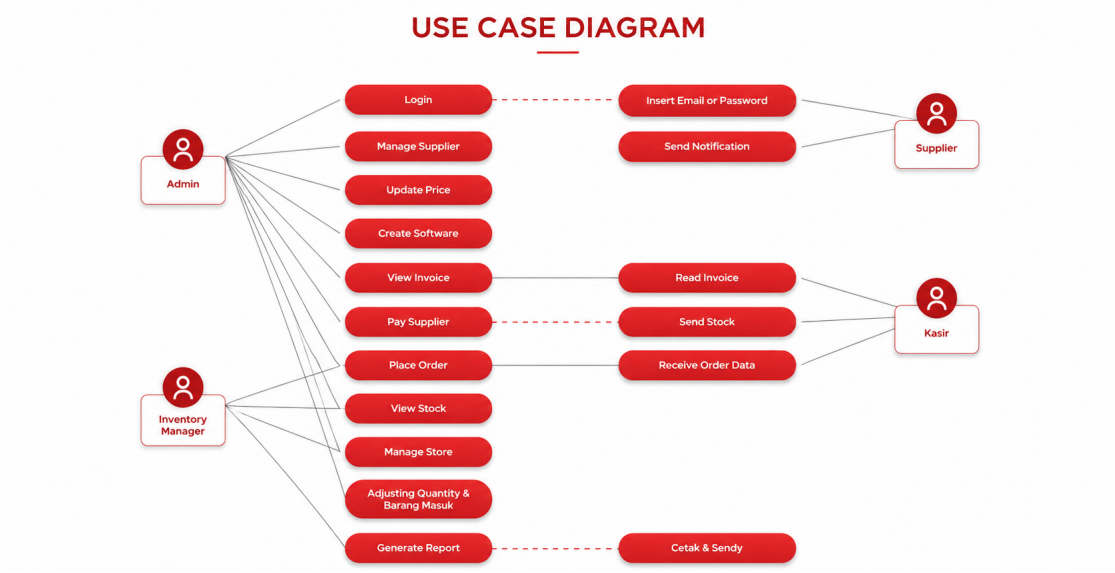

Figure 1. Use Case Diagram of the Inventory and Supply Chain Management System

Figure 2 presents the activity diagram for the service ordering process through the IT Connect application, leading to payment processing via a Payment Gateway. The process begins with the customer opening the application, logging in, selecting a service, searching for a product, and reviewing the shopping cart, with the option to return to product selection if changes are needed. After confirming the order, the customer selects a payment method, and the system validates login credentials and processes the product search request. Payment data is then submitted to the system and forwarded to the Payment Gateway, which performs verification steps to confirm transaction accuracy. A successful verification returns a success status to the system, while discrepancies return an error status, ensuring that both the system and the user are informed of the transaction outcome in real time. Once payment is verified, the system updates the order status and confirms receipt, completing the transaction workflow.

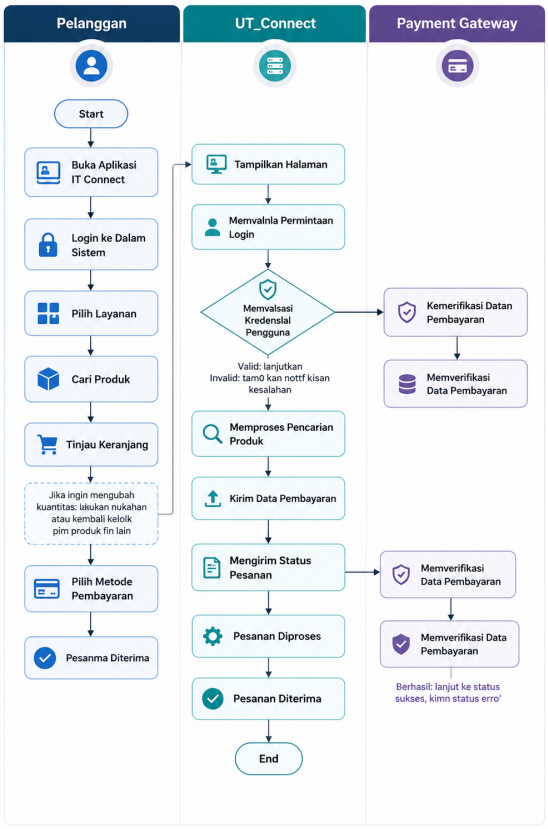

Figure 2. Activity Diagram of the Service Ordering and Payment Process

4.4 Current State and Target State Application Architecture

Figure 3 illustrates the current state application architecture integration diagram, which spans customer service processes in the front office, technical operational processes in the middle office, and internal management and administration activities in the back office. The diagram distinguishes manual processes, shown with light blue connectors, from automated processes, shown with green connectors, reflecting the level of system integration maturity at each stage. Each activity is assigned a code, for example B.01 or B.04, indicating its sequence and functional identification. The process begins with the Customer, who initiates a request for services such as internet, cloud, or other digital offerings. In the front office, three activities were identified: Service Registration (B.01) and Sales and Customer Service (B.02), both still carried out manually by service personnel, and Verification and Activation (B.03), which is managed automatically by the system. In the middle office, three activities, Provisioning System (B.04), Network Configuration Management (B.05), and Service and Network Monitoring (B.06), are fully automated. In the back office, Billing and Payments (B.08), Financial Analytics and Reporting (B.09), and Audit and Compliance (B.10) are all carried out automatically through the internal system, supporting administrative efficiency and corporate accountability.

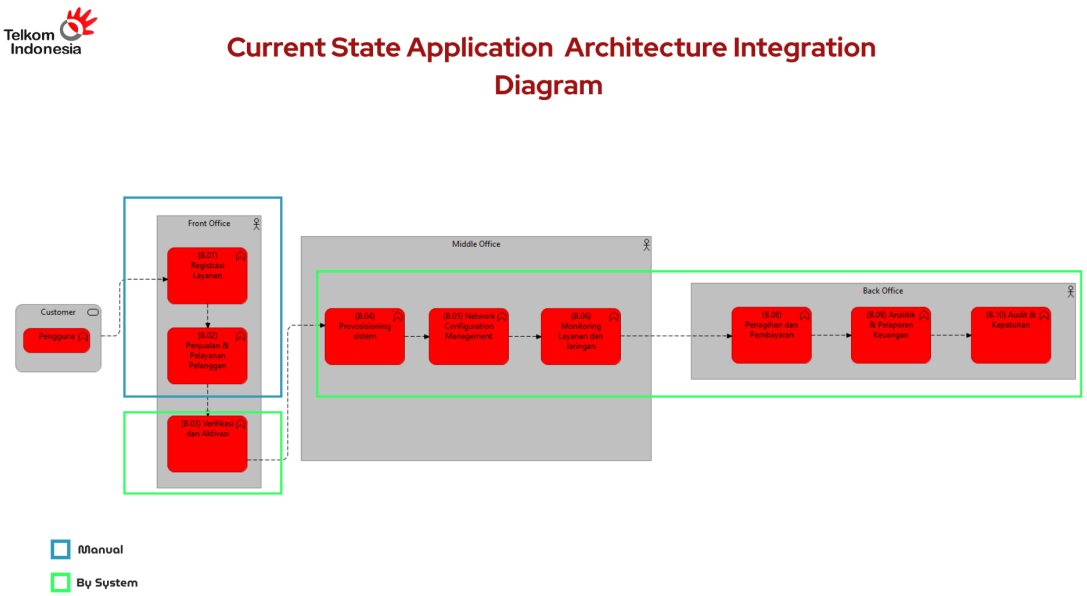

Figure 3. Current State Application Architecture Integration Diagram

Figure 4 depicts the target state application architecture integration diagram, representing Telkom's intended condition for increased efficiency, automation, and system integration.

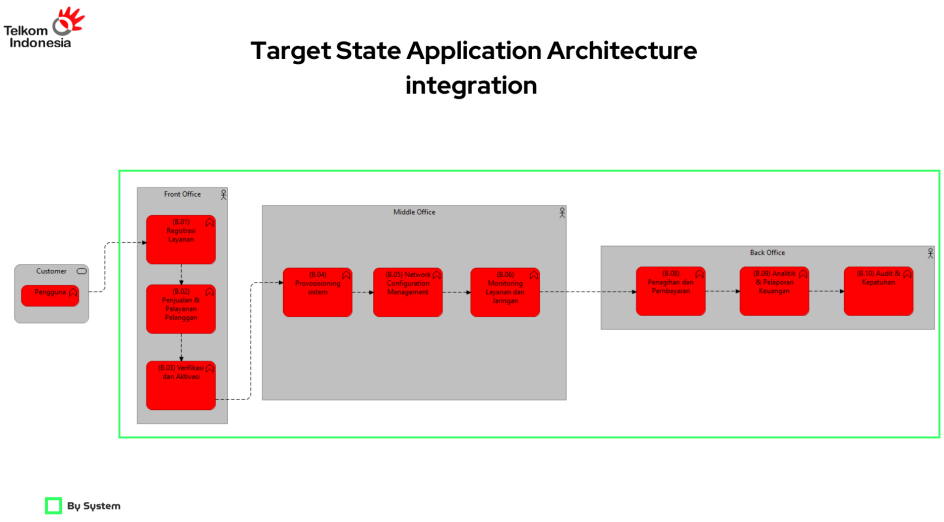

Figure 4. Target State Application Architecture Integration Diagram

In contrast to the current state, all process blocks in the target state are enclosed within a single green "By System" boundary, indicating that customer interactions previously requiring manual input, such as service registration through self-service portals or digital applications, are directed toward fully automated channels. In the target front office, Service Registration (B.01) is performed by customers directly through systems such as the MyTelkomsel application, with the system handling data input and validation; Sales and Customer Service (B.02) responses are delivered digitally through a developed system interface; and Verification and Activation (B.03) is performed automatically once a customer selects a service. The middle office activities (B.04 to B.06) and back office activities (B.08 to B.10) remain fully automated, consistent with the current state, but are now integrated within the same system boundary as the front office, reflecting a complete transition from manual to system-based operation across all three organizational layers.

4.5 Data Architecture and Implementation Components

Figure 5 presents the current state data architecture block diagram, which represents the structure and flow of Telkom's data management. The diagram is organized into three functional divisions, Front Office, Middle Office, and Back Office, each responsible for collecting, processing, and utilizing data related to its operational tasks, and is further grouped according to Core Business Processes and Core Enterprise Processes. Three lines of business form the foundation of data management: internet services, which provide connectivity to the broader community; data centre and cloud computing services, which store and process data at scale; and enterprise digital services, which provide digital solutions for corporate and institutional customers. In the front office, three activities generate data: Service Registration produces initial customer identity and service preference data, Sales and Customer Service records transaction activities, questions, and complaints, and Verification and Activation validates data before systematic service activation. In the middle office, Provisioning, Network Configuration Management, and Service and Network Monitoring generate technical data on service configuration, network connectivity, and real-time performance. In the back office, the Core Business Process category covers provisioning of internet services, telecommunications network management, digital service development, and data centre and cloud computing service management, while the Core Enterprise Process category covers network infrastructure management, human resource management, technology and innovation development, strategic partnership management, and digital ecosystem management.

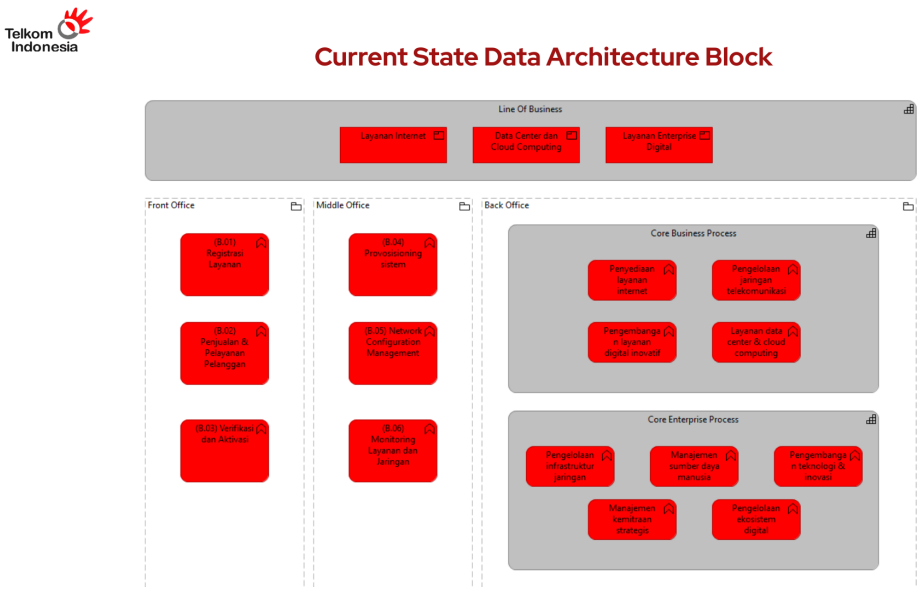

Figure 5. Current State Data Architecture Block Diagram

Figure 6 presents the entity relationship diagram for the material management system, illustrating the data structure and relationships among entities in Telkom's material logistics process. Six main entities were identified: Material, Penerimaan (Receipt), Pengeluaran (Expenditure), Pengembalian (Return), and Transaksi (Transaction), linked through primary keys (PK) and foreign keys (FK). The Material entity sits at the centre of the model, since all receipt, expenditure, return, and transaction records reference specific material types and quantities. The Receipt entity records information on incoming goods, including supplier details, delivery order and purchase order numbers, and receipt dates. The Expenditure entity records the distribution of materials to projects or partners, while the Return entity documents materials returned from the expenditure process. The Transaction entity records the history of material movements by date and warehouse

location. This entity relationship model supports a more systematic and efficient logistics management process by ensuring that all activities have clearly documented data relationships, which in turn supports transparency, accountability, and digital monitoring of the material supply chain.

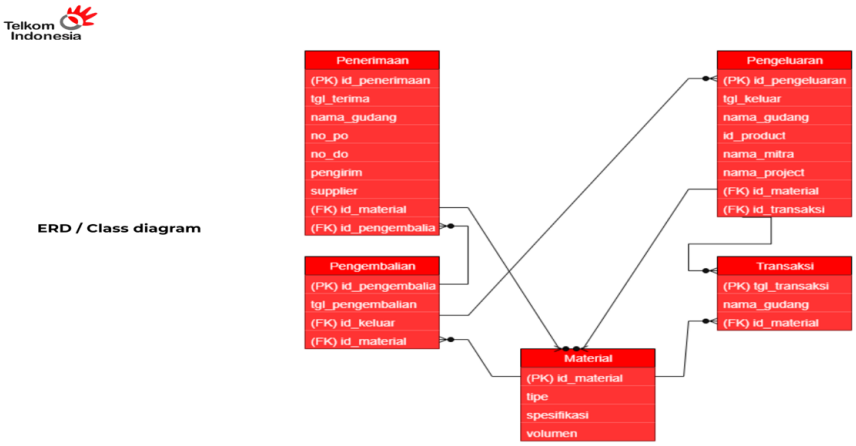

Figure 6. Entity Relationship Diagram of the Material Management System

Figure 7 illustrates the enterprise architecture implementation components supporting Telkom's material management system, organized into three stages.

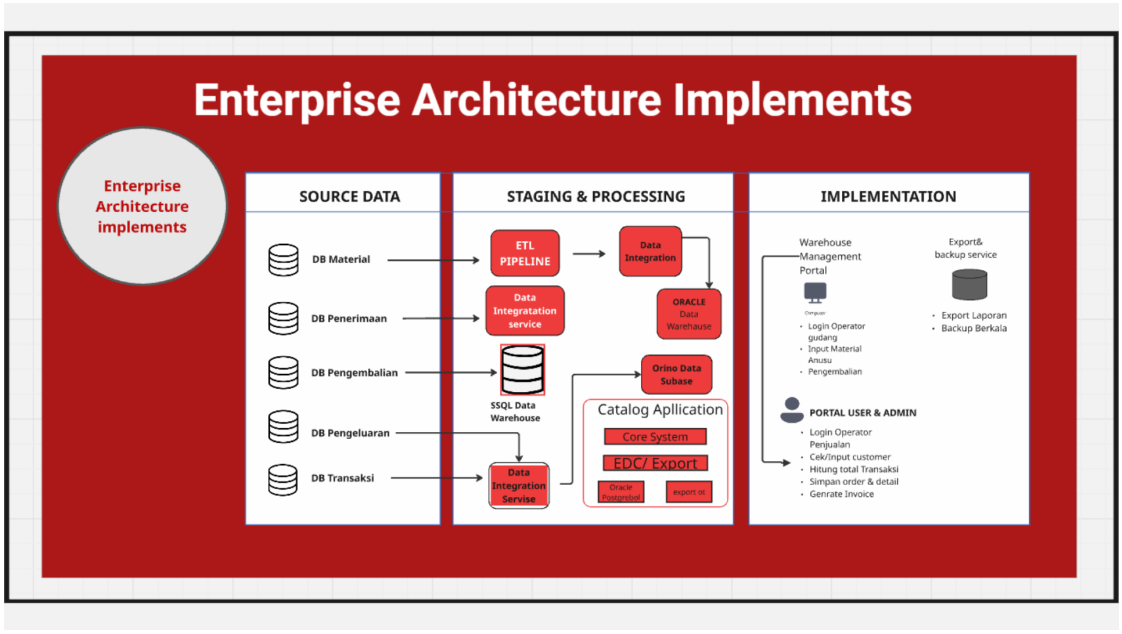

Figure 7. Enterprise Architecture Implementation Components for the Material Management System

The Source Data stage comprises five primary databases: a Material Database storing stock levels, specifications, and material statuses; Receiving Database recording goods received from suppliers or internal procurement; a Return Database maintaining records of returned goods; an Outbound Database capturing material issuance for operational or distribution purposes; and a Transaction Database logging purchases, payments, and deliveries. The Staging and Processing stage integrates these data sources through an Extract, Transform, Load (ETL) pipeline and a Data Integration Service, with an SQL Data Warehouse serving as primary storage and an Oracle Data Warehouse and Orino database providing secondary storage for replication and redundancy, alongside a Catalog Application comprising a Core System, an Export module, and PostgreSQL-based storage. The Implementation stage covers system deployment for end users: a Warehouse Management Portal allows warehouse operators to log in, input material data, and manage returns; a User and Admin Portal supports sales and administrative staff with customer data entry, transaction calculations, order storage, and invoice generation; and an Export and Backup Service ensures data safety through scheduled reporting and backups.

5. Discussion

5.1 Interpretation of Findings

The architectural mapping presented in the Results section indicates that Telkom's digital transformation has progressed unevenly across the front, middle, and back office layers. The middle office (Provisioning, Network Configuration Management, and Service and Network Monitoring) and the back office (Billing and Payments, Financial Analytics and Reporting, and Audit and Compliance) are already fully automated in the current state architecture, consistent with the expectation that operationally intensive, rule-based processes are prioritized for automation (Gholami et al., 2017). By contrast, two of the three front-office activities, Service Registration and Sales and Customer Service, remain manual in the current state, while only Verification and Activation has been automated. This pattern is consistent with the view that customer-facing registration processes are often the last to be digitized because they involve direct human interaction and judgment, such as advising customers on suitable service packages.

The target state architecture addresses this gap by enclosing all front, middle, and back office processes within a single "By System" boundary, indicating that Service Registration and Sales and Customer Service are intended to be redirected toward self-service portals and digital applications such as MyTelkomsel. This finding is consistent with prior TOGAF-based studies that emphasize the role of the Application Architecture phase in defining how application systems manage data to deliver information across organizational layers (Jordan et al., 2024; Maulana et al., 2023). The current state therefore represents a partially automated architecture in which the operational core (middle office) and administrative core (back office) are digitally mature, while the customer-facing layer (front office) is the primary remaining target for automation.

The UML modelling results reinforce this interpretation. The use case diagram (Figure 1) shows that Admin and Inventory Manager roles already operate within a digitally mediated system encompassing stock management, order processing, and reporting, while the activity diagram (Figure 2) demonstrates that the customer-facing ordering and payment workflow through the IT Connect application is already structured for automated validation and payment gateway verification. This suggests that, at the level of inventory and order-processing subsystems, automation capability already exists; the remaining challenge identified in the application architecture diagrams (Figures 3 and 4) is extending this capability to the broader front-office service registration and customer service functions across Telkom's full digital service portfolio.

5.2 Theoretical Contribution

This study contributes to the enterprise architecture literature by demonstrating how the TOGAF Architecture Development Method can be applied in combination with UML modelling to document the current-to-target state transition of a large telecommunications state-owned enterprise across all four core architecture domains within a single integrated case. While prior studies have applied TOGAF ADM to educational institutions (Jordan et al., 2024), e-government smart village initiatives (Alhari & Fajrillah, 2022), and provincial banking services (Fajrillah, Lubis, & Syam, 2022), this study extends the framework's application to an enterprise characterized by a substantially larger organizational structure, multiple subsidiaries, and a diverse digital service portfolio spanning retail internet, data centre, and enterprise digital services. The use of a colour-coded manual versus "By System" classification across the current and target state diagrams offers a replicable approach for visually communicating automation maturity within TOGAF-based EA documentation, extending the modelling conventions used in strategic alignment studies (Maulana et al., 2023).

5.3 Managerial and Practical Implications

Given that the middle office and back office functions are already fully automated while the front office Service Registration and Sales and Customer Service activities remain manual, Telkom's management should prioritize integrating these front-office functions into the existing digital infrastructure rather than developing new back-end automation capabilities, since the underlying system architecture for provisioning, billing, and monitoring is already in place. Specifically, expanding self-service registration channels such as MyTelkomsel to cover the full range of Telkom's digital enterprise services, rather than only retail internet packages, would allow the company to extend the "By System" automation boundary shown in the target state architecture (Figure 4) to customer acquisition processes that currently rely on direct staff interaction.

The SWOT analysis further suggests that Telkom's extensive infrastructure and financial stability provide the resource foundation necessary to fund this front-office automation, while the identified weakness of suboptimal system integration indicates that the technical challenge lies less in infrastructure availability and more in connecting front-office customer relationship systems with the already-automated middle and back office data flows documented in Figures 5 and 7. From a cybersecurity perspective, as front-office digitization expands the volume of customer data collected through self-service channels, management should ensure that information security awareness programmes, addressing risks such as phishing and social engineering, are extended to both staff and customers (Ladayya et al., 2024), particularly given the threats identified in the SWOT analysis regarding data privacy regulation and cybersecurity risk.

5.4 Limitations and Future Research Directions

This study has several limitations. First, the qualitative descriptive case study design relies on secondary documentation and UML models rather than direct interviews with Telkom personnel, which means that the classification of business activities as manual or automated reflects the documentation available at the time of analysis and may not capture undocumented operational workarounds. Second, the analysis focuses on the inventory and material management subsystem for the UML modelling component, which, while illustrative of broader system design patterns, does not cover all of Telkom's digital service lines such as cloud computing and enterprise digital solutions in equal depth. Third, as a single-case study of one Indonesian state-owned telecommunications enterprise, the generalizability of the specific automation gaps identified here to other telecommunications operators, particularly privately owned firms with different regulatory constraints, should be made with caution.

Future research should pursue at least three concrete directions. First, subsequent studies could incorporate primary data collection, such as interviews with IT governance staff, to validate the current state versus target state classifications presented in this study and to assess the implementation timeline for the front-office automation identified as the primary remaining gap. Second, future work could extend the TOGAF ADM analysis to Telkom's Technology Architecture phase (Phase D) in greater detail, examining the specific infrastructure components, such as cloud platforms and network configuration tools, that underpin the application architecture documented here. Third, comparative case studies across multiple Indonesian state-owned enterprises in different sectors could examine whether the pattern observed at Telkom, namely that middle and back office automation precedes front office automation, generalizes across other state-owned digital transformation initiatives, thereby contributing to a broader body of evidence on EA implementation sequencing in emerging-market telecommunications firms.

6. Conclusion

This study set out to document Telkom's current and target state application, data, and business architecture using TOGAF ADM and UML, and to identify the strategic strengths, weaknesses, opportunities, and threats shaping its digital transformation readiness. The findings show that Telkom's middle office (provisioning, network configuration management, and service and network monitoring) and back office (billing and payments, financial analytics and reporting, and audit and compliance) functions are already fully automated, while two of three front-office functions, service registration and sales and customer service, remain manual in the current state and are targeted for full system-based operation in the target state architecture.

This study makes three contributions. Methodologically, it demonstrates an integrated application of TOGAF ADM and UML modelling across all four core architecture domains within a single large telecommunications state-owned enterprise case. Empirically, it identifies the specific business functions within the front, middle, and back office that have transitioned from manual to system-based operation and those that remain targeted for automation. Practically, it provides a SWOT-informed basis for prioritizing Telkom's digital transformation investments toward front-office system integration.

For practitioners, the principal recommendation is that Telkom's management should prioritize integrating front-office customer registration and sales functions with the already-automated middle and back office systems, leveraging the company's existing infrastructure and financial stability while addressing the system integration weaknesses identified in the SWOT analysis. Expanding self-service digital channels to cover the full range of Telkom's service portfolio, supported by strengthened information security awareness, would represent a concrete step toward the fully integrated target state architecture documented in this study.

Future research should incorporate primary data collection to validate the automation classifications presented here, extend the analysis to Telkom's Technology Architecture phase in greater detail, and conduct comparative case studies across other Indonesian state-owned enterprises to examine whether the sequencing pattern observed at Telkom, in which middle and back office automation precedes front office automation, holds more broadly across emerging-market digital transformation initiatives.

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