Sinkron : Jurnal dan Penelitian Teknik Informatika
Volume 9, Number 1, January 2025
DOI : https://doi.org/10.33395/sinkron.v9i1.14496
e-ISSN : 2541-2019
p-ISSN : 2541-044X

Enterprise Architecture for Enhanced Mutual Fund Service Integration in Digital Channel in the Banking Industry

Achmad Fathurrazi Akbar[1)*], Eko Indrajit[2)], Erick Dazki[3)]
[1,2,3)]Pradita University, Serpong, Tangeran
[1)]Achmad.fathurrazi@student.pradita.ac.id , [(2))]eko.indrajit@pradita.ac.id , [(3)])erick.dazki@pradita.ac,id

Submitted : Jan 20, 2025 | **Accepted** : Feb 15, 2025 | **Published** : Feb 18, 2025

Abstract: The investment awareness among the Indonesian populace is rising, particularly during the Covid-19 pandemic. Mutual funds are the most prevalent investment vehicle due to their accessibility, requiring minimal cash, and offering competitive returns, as they are managed by seasoned investment professionals. This is due to the relative ease of investing in this instrument with accessible capital and competitive returns, as fund management is conducted by seasoned investment managers. Conversely, the rapid advancement and proliferation of technology present new challenges for firms in the financial sector, particularly in banking and financial technology, as they strive to innovate and provide convenient services that cater to the needs of customers and investors. This research seeks to develop Enterprise Architecture for the integration of Mutual Fund services into digital channels via mobile banking, utilizing the TOGAF framework as the foundational design approach, supplemented by SWOT analysis to assess the strategic position and market potential. The research employed a qualitative methodology utilizing the ArchiMate program to illustrate diagrams in Enterprise Architecture (EA) across the public banking sector. The research indicated that architectural design can facilitate improved data access and enhance adaptability to technology and market advancements, hence removing inefficiencies and streamlining the review process. In conclusion, the application of EA in the incorporation of mutual fund services into the digital banking platform will optimize the company's performance processes to attain objectives, while also enhancing agility in evaluating technological risks to facilitate the monitoring, metrics, and analysis of information technology, thereby ensuring the achievement of business goals.

Keywords: Enterprise Architecture, TOGAF, Investment Financial Services, Mutual Funds, Digital Banking, SWOT Analysis

INTRODUCTION

The advancement of digital technology in the financial sector, particularly among commercial banks, has led to competition from financial technology companies (fintech), necessitating a reform of business models to expedite digital transformation. Conversely, the Covid-19 pandemic has fostered a favorable trend in the transformation of individuals' habits, propelling the digitalization of nearly all industries, including finance and investing tools. The expansion of each investment vehicle, such as SID (Single Investor Identification) via mutual fund accounts, is accelerating rapidly due to the extensive infrastructure and distribution networks in asset management. This has also become crucial for commercial banks in enhancing access and user experience in mobile banking digital platforms.

To accomplish this, the management of Enterprise Architecture (EA) in integrating information technology, particularly investment services such as Mutual Funds, into the digital ecosystem is crucial for banks. This integration facilitates operational efficiencies and product innovations that were previously executed through traditional methods, thereby reducing the time and validation processes for all stakeholders amidst complex challenges and diverse requirements in a rapidly evolving environment.

In this context, selecting a suitable architecture framework is crucial for formulating a successful strategy for managing information technology architecture, including TOGAF, Zachman, FEAF, and GEAF. Considering public banking sector companies with substantial and intricate organizational structures, TOGAF offers extensive guidance, particularly via the meticulously organized Architecture Development Method (ADM), which

*name of corresponding author

Sinkron : Jurnal dan Penelitian Teknik Informatika
Volume 9, Number 1, January 2025
DOI : https://doi.org/10.33395/sinkron.v9i1.14496
e-ISSN : 2541-2019
p-ISSN : 2541-044X

encompasses the identification, planning, implementation, and maintenance of IT architecture. TOGAF is a prevalent framework for the design and management of Enterprise Architecture, offering a flexible and organized methodology for tailoring architecture to particular business goals (*The Open Group*, n.d.).

In mutual fund services within commercial banks, TOGAF aids in developing an architectural vision that aligns with the organization's strategy and promotes integration among business processes, applications, data, and technology (Crosley et al., 2023). The integration process presents strategic and technical challenges, including reliance on legacy systems, compliance risks, and financial technology innovations that are heavily regulated, prompting many banks to adopt a conservative approach to new technologies due to lengthy procedures and stringent requirements necessary to ensure regulatory compliance and maintain customer trust (Prawira et al., 2023).

This study poses several primary inquiries: In what ways may TOGAF facilitate the design of Enterprise Architecture for the integration of Mutual Fund services? How can architectural aspects be integrated to fulfill commercial requirements and comply with regulations? How can integration difficulties be addressed by an effective architectural solution.?

Utilizing this methodology for TOGAF, the author will formulate a comprehensive Enterprise Architecture to facilitate the integration of investment banking services into digital platforms, while promoting broader financial inclusion. The architectural aspects, including stakeholders, key processes, and resources, will be shown using ArchiMate in conjunction with TOGAF to guarantee a comprehensive and comprehensible design (Abu et al., 2023).

LITERATURE REVIEW

Enterprise Architecture

Enterprise Architecture is a methodology for building and overseeing organizational frameworks and information systems that facilitate business objectives. Enterprise Architecture functions as a framework that delineates the existing and aspirational conditions of an organization, offering a strategic plan for the transition between these states (Suja et al., 2020). The adoption of Enterprise Architecture offers substantial advantages for commercial banks facing complexities and challenges in their information technology services, including enhanced operational efficiency, strategic alignment, improved risk management, and better collaboration and communication among all stakeholders (Susatyo et al., 2024).

TOGAF

TOGAF, an acronym for The Open Group Architecture Framework, serves as an extensive guide for organizations seeking to comprehend and execute Enterprise Architecture. By offering structured tools, methodologies, and guidelines, TOGAF assists enterprise architects in effectively planning and managing architectural transformation. TOGAF offers the Architecture Development Method (ADM), a systematic framework designed to aid organizations in the formulation of their Enterprise Architecture. A primary purpose is to guarantee that architecture development aligns with the organization's vision and business objectives, ensuring that each architectural decision is grounded in a comprehensive grasp of the actual business requirements (Abu et al., 2023).

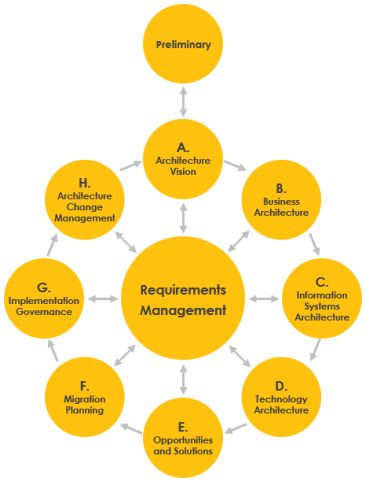

Fig. 1 TOGAF Frameworks (Source: The Open Group)

Figure 1 illustrates the stages of the TOGAF ADM framework, which in this study will delineate phases A to E in relation to the integration of Mutual Fund services into the banking digital ecosystem.

*name of corresponding author

e-ISSN : 2541-2019
p-ISSN : 2541-044X

Phase A involves the development of a High-Level Architecture Vision that outlines the capabilities and economic value anticipated from the proposed Enterprise Architecture. Subsequently, obtain approval for the architectural statement of work that delineates the program to develop and implement the architecture specified in the architectural vision, which will facilitate the integration of Mutual Fund services into the mobile banking channel (*The TOGAF® Standard, Version 9.2*, n.d.).

In Phase B, create a Business Architecture that delineates the operational requirements of the company, particularly regarding banking services, to fulfill business objectives, including the integration of digital Mutual Fund service products, while addressing the strategic drivers outlined in the Architecture Vision concerning stakeholder concerns. It also delineates process components by analyzing discrepancies between architectures

In Phase C, create an Information Systems Architecture that delineates the enabling of information systems within the digital Mutual Fund service, aligned with the Business Architecture and Vision Architecture. Additionally, identify the elements of the architecture roadmap, encompassing both Data Architecture and Application Architecture (*The TOGAF® Standard, Version 9.2*, n.d.).

Phase D involves the development of a Technology Architecture that facilitates the realization of the architectural vision, business objectives, data, and application building blocks via technological components. Determine the elements of the architectural roadmap by analyzing the discrepancies between the baseline and target technology architecture in the digital Mutual Fund product offering (*The TOGAF® Standard, Version 9.2*, n.d.).

Phase E entails the creation of a comprehensive initial version of the architecture roadmap, informed by the gap analysis and architecture roadmap components derived from Phases B, C, and D. This phase assesses the necessity of an incremental approach, and if required, the identification of the architecture will yield sustainable economic value (*The TOGAF® Standard, Version 9.2*, n.d.).

This research will utilize all TOGAF ADM phases from A to E to guide the design of an Enterprise Architecture that facilitates the integration of digital Mutual Fund services, ensuring that all architectural phases are mutually supportive and aligned with the organization's strategic objectives.

Archimate

ArchiMate is a modeling tool intended to facilitate the Enterprise Architecture (EA) process by providing a framework for delineating several facets of an organization's architecture, including the interconnections across business, information systems, and technological components. ArchiMate enables stakeholders to comprehend how alterations in one domain can impact other domains within the Enterprise Architecture.

This research employs ArchiMate to illustrate the fundamental components of a digital Mutual Fund service incorporated into mobile banking inside a digital ecosystem at a commercial bank, facilitating the phases of TOGAF ADM from A to E. ArchiMate is versatile and may be integrated with many architecture frameworks, facilitating the implementation of a comprehensive organizational architecture methodology (*The ArchiMate® Enterprise Architecture Modeling Language*, n.d.).

Previous Research

Research concerning the incorporation of Mutual Fund services inside the digital channel ecosystem of Indonesian commercial banks continues to encounter obstacles. Commercial banks in Indonesia require digital transformation, as they face challenges in integrating investment services, such as Mutual Funds, into their digital platforms, despite the numerous advantages of digitalization. This indicates a deficiency in the execution of additional financial services, particularly Mutual Funds, which might be enhanced through improved Enterprise Architecture.

Moreover, despite technological advancements in the application of financial technology (Fintech) to enhance banking services in Indonesia, numerous banks have not completely capitalized on the potential of digitalization to provide superior investment products (Goyal et al., 2022). This presents an opportunity for a strategic approach to formulate an Enterprise Architecture that facilitates the integration of investment product offerings.

In the realm of incorporating Mutual Funds into the digital framework of commercial banks, particularly regarding digital transformation in Islamic banks, advancements have been made in digitizing investment services; yet, these services frequently lack effective integration within digital platforms (Desky & Maulina, 2022). This research underscores the need of developing an architecture capable of customizing investment products within digital platforms to enhance client experience and ensure business sustainability in the banking industry.

Gap analysis from prior research indicates that while numerous studies address the application of Enterprise Architecture in the banking sector, there remains a deficiency in the integration of investment product offerings into digital channels. This study does not expressly address investing services in the context of digital banking, despite the potential for synergy in Islamic banking (Cipta & Hatamar, 2023). This section elucidates the performance assessment of Islamic banks through SWOT analysis, indicating that while there are strengths in the services provided, issues remain in enhancing the integration of investment product services into digital platforms.

*name of corresponding author

Sinkron : Jurnal dan Penelitian Teknik Informatika
Volume 9, Number 1, January 2025
DOI : https://doi.org/10.33395/sinkron.v9i1.14496
e-ISSN : 2541-2019
p-ISSN : 2541-044X

Other studies have shown the integration of investment products into mobile banking applications; however, the quality of these services need enhancement. This indicates the necessity to develop an Enterprise Architecture that encompasses not only fundamental banking services but also intricate investment products (Muthalib & Hasan, 2023).

Moreover, a strategic planning methodology grounded in SWOT analysis can enhance the alignment of information technology businesses pertinent to the integration of mutual fund services within banking digital services, as it demonstrates that SWOT analysis aids in identifying strengths and weaknesses in the implementation of Enterprise Architecture (Torkjazi et al., 2022).

Consequently, this research aims to address the identified gap by implementing TOGAF from phases A to E to integrate mutual fund investment product services within digital banking channels, ensuring that all architectural components align with the organization's strategic objectives.

METHOD

In this research, the author uses a qualitative approach with the TOGAF framework, assisted by the ArchiMate tool, and also SWOT analysis to develop Enterprise Architecture in the public banking sector in improving service quality on digital channels, especially investment products. Each technique plays a crucial role in attaining objectives to maintain coherence between strategic and technical dimensions. The implementation of TOGAF in Enterprise Architecture for the banking sector in Indonesia is delineated by the subsequent stages:

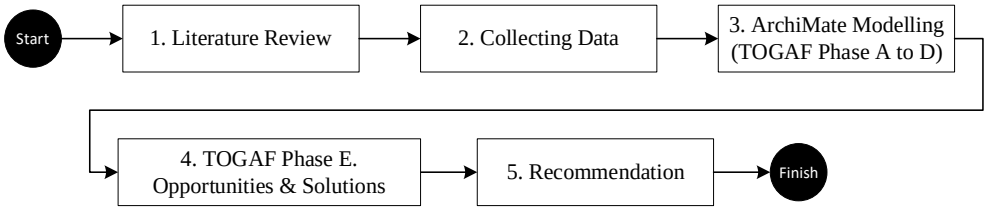

Fig. 2 Research Methodology

Figure 2 illustrates that this study methodology comprises five primary steps for the development of an Enterprise Architecture that facilitates the digital transformation of Mutual Fund services inside the digital banking ecosystem.

The initial phase involves a Literature Review, whereby the author must comprehend the concept and application of Enterprise Architecture through the TOGAF framework, specifically within the banking sector regarding digital transformation, as well as in other industries for comparative analysis. This literature evaluation assists the author in recognizing contemporary trends and research deficiencies about the utilization of technology in financial services.

In the second step, data collecting occurs, when primary data is gathered through stakeholder interviews and the observation of business processes, information systems, and technology employed in Mutual Fund services to accurately depict their environment.

During the third stage, the design of Enterprise Architecture will be executed in Phases A, B, C, and D, which will be represented using the ArchiMate tool for architectural modeling.

The fourth phase, Phase E, involves the formulation of an architecture roadmap derived from the gap analysis conducted in phases B, C, and D, supplemented by the SWOT analysis method to assess the strengths, weaknesses, opportunities, and threats associated with the proposed architecture.

The last stage involves utilizing the analytical results to formulate strategic recommendations, encompassing implementation solutions and system enhancements. All these phases guarantee that the architecture developed will facilitate the digital transformation objectives and generate additional value for the organization.

RESULT

Phase A: Architecture Vision

*name of corresponding author

Sinkron : Jurnal dan Penelitian Teknik Informatika
Volume 9, Number 1, January 2025
DOI : https://doi.org/10.33395/sinkron.v9i1.14496
e-ISSN : 2541-2019
p-ISSN : 2541-044X

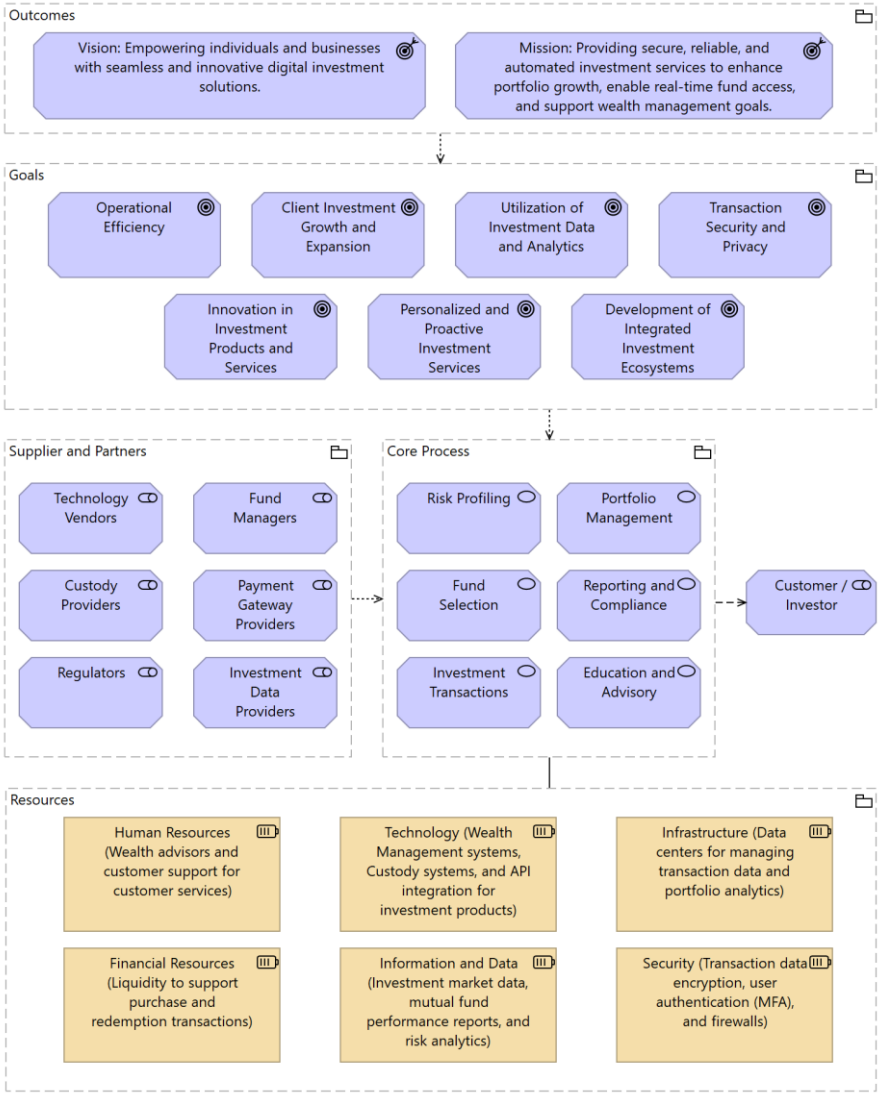

Fig. 3 Architecture Vision for Digital Mutual Fund Product

In Phase A, the Architecture Vision depicted in Figure 3 pertains to the Mutual Fund service within the mobile banking application, where an organizational strategy was established to guarantee alignment between the architecture and business objectives. This methodology employs the ArchiMate framework to illustrate essential components, such as outputs, strategic objectives, stakeholders, fundamental processes, and resources.

This architectural vision aims to empower individuals through creative and seamless digital investing options. Digital transformation is fundamental, aiming to establish efficient, secure, and data-driven services. These outcomes aim to enhance investment accessibility across all societal strata, facilitate consumer portfolio expansion, and bolster financial inclusion. This service is anticipated to enhance the digital economy environment by offering pertinent and contemporary investment alternatives.

The objective of the Mutual Fund service is to deliver efficient, rapid, and dependable investment services that facilitate real-time access to raised investment funds, offer comprehensible wealth management tools, and foster trust while improving customer service within the digital banking ecosystem.

The aim of incorporating digital Mutual Fund services is to facilitate digital transformation, enhancing operational efficiency via technology and streamlining processes to enable quicker transactions and an improved customer experience. Furthermore, it promotes investment growth by stimulating customer interest in the significance of investment and the bank's ability to facilitate and motivate clients to invest.

A variety of providers and key partners are essential for the flawless and secure operation of investment service products, particularly mutual funds. Banks, as financial service providers, are accountable for delivering technological infrastructure, custodial services, portfolio management, regulatory control, and facilitating data and payment activities. Therefore, teamwork among all stakeholders is essential to guarantee seamless services,

*name of corresponding author

Sinkron : Jurnal dan Penelitian Teknik Informatika
Volume 9, Number 1, January 2025
DOI : https://doi.org/10.33395/sinkron.v9i1.14496
e-ISSN : 2541-2019
p-ISSN : 2541-044X

regulatory adherence, and enhanced value for customers. The subsequent table enumerates the vendors and partners engaged:

Table 1.
List of Suppliers and Partners for Digital Mutual Fund Product Notation

Notation	Description
Technology Vendors	Suppliers of Wealth Management Systems, integration APIs, and automation solutions to facilitate seamless service delivery.
Custody Providers	A financial institution that offers custodial services to guarantee the secure management of investment funds and assets in compliance with rules.
Regulators	The entity tasked with ensuring the service's adherence to banking and investing regulations, including Anti-Money Laundering (AML) and financial data reporting requirements.
Fund Managers	The entity accountable for overseeing the client's investment portfolio in alignment with the client's financial goals and assessed risk profile.
Payment Gateway Providers	The transaction manager for investment fund payments and redemptions guarantees a swift and secure payment process.
Investment Data Providers	Delivers real-time investment market data, mutual fund performance reports, and risk analytics to facilitate investment decision-making.

The core processes in Mutual Fund services are structured to perform essential duties that create value for both the client and the organization, primarily concentrating on portfolio management, improving customer happiness, and streamlining procedures. Every process contributes to the alignment of digital services to meet client requirements, along with the bank's purpose of providing value throughout its service product lines, including investment offerings. The subsequent table delineates the specifics of the fundamental processes:

Table 2.
List of Core Process Notation for Digital Mutual Fund Product

Notation	Description
Risk Profiling	The assessment of a client's risk tolerance to identify suitable investment opportunities and assist in aligning their financial objectives.
Fund Selection	A procedure to assist consumers in selecting the optimal Mutual Fund product based on investment manager performance, risk classification, and individual preferences determined by risk profiling.
Investment Transactions	This procedure facilitates Mutual Fund transactions, encompassing purchases, redemptions, and switches via the mobile banking application.
Portfolio Management	This approach dynamically manages the client's investment portfolio to achieve optimal asset allocation in accordance with financial objectives and market conditions.
Reporting and Compliance	This procedure generates investment performance reports and guarantees adherence to legislation pertinent to financial services and investments.
Education and Advisory	This approach offers financial education and online professional guidance to assist customers in managing their finances and investment strategies.

Phase B: Business Architecture

This portion of the research examines the process of mutual fund investment transactions, encompassing various key activities like Single Investor Identification (SID) registration, Customer Risk Profiling, Fund Selection, and Mutual Fund Purchase and Redemption.

The SID process guarantees customer registration in compliance with data verification aligned with regulatory standards. Risk profiling provides a thorough assessment of the potential risks associated with the entire portfolio or investment exposure. Fund Selection assists clients in identifying goods through performance information and individual preferences. The mutual fund purchasing and redemption process is conducted to facilitate transaction execution by clients.

*name of corresponding author

Sinkron : Jurnal dan Penelitian Teknik Informatika
Volume 9, Number 1, January 2025
DOI : https://doi.org/10.33395/sinkron.v9i1.14496
e-ISSN : 2541-2019
p-ISSN : 2541-044X

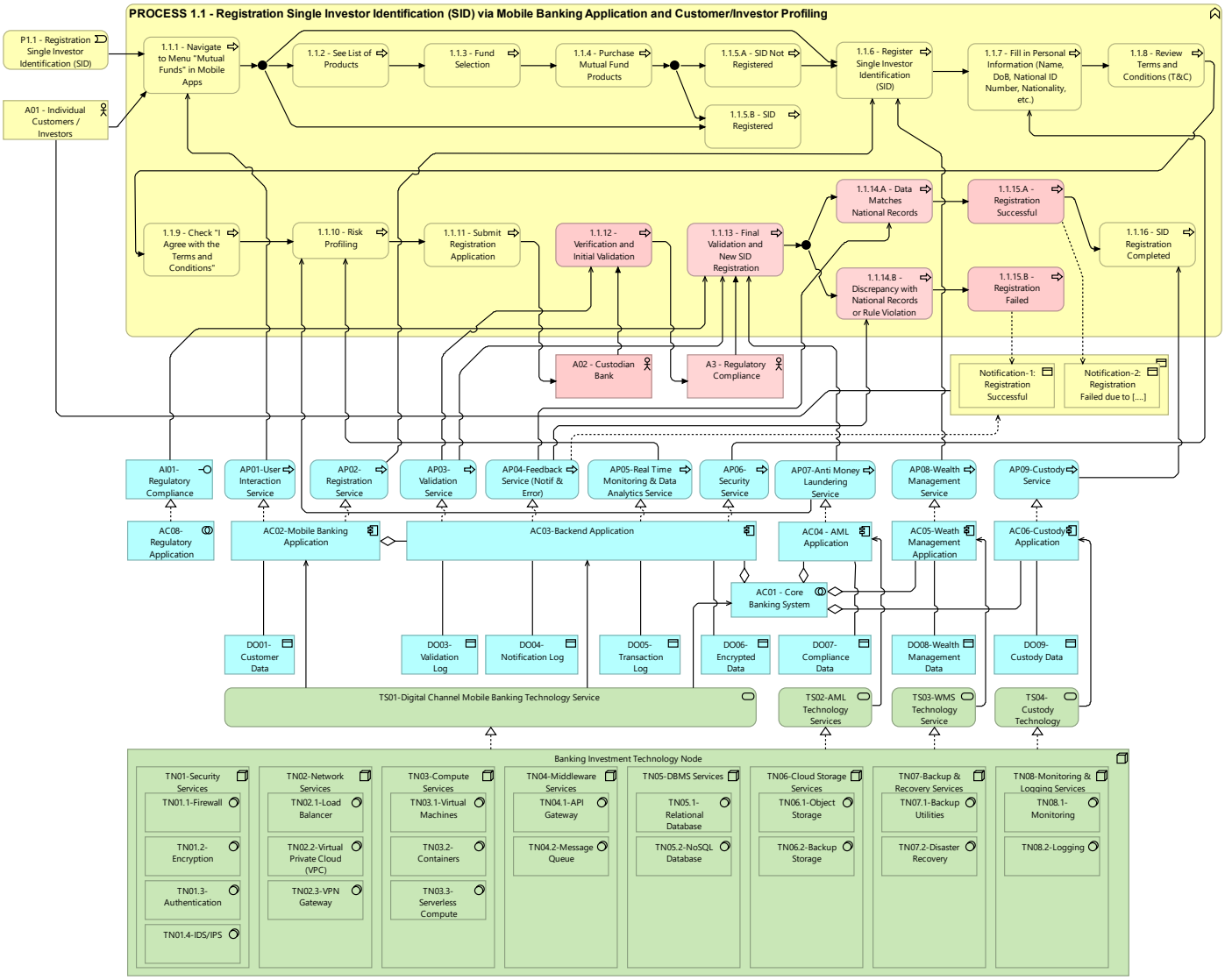

Fig. 4 Registration of Single Investor Identification (SID) through Mobile Banking Application

Figure 4 illustrates the business architecture for the Single Investor Identification (SID) registration process flow. The process commences when the consumer logs into the mobile banking application and navigates to the Mutual Fund service menu. The customer will encounter two options: to first review the contained products or to proceed directly with the SID registration process.

The consumer thereafter verifies personal information, including identity, nationality, and financial data (CIF or GCN), before consenting to the terms and conditions to advance the registration process.

Upon completion of the initial data, the system advances to the Risk Profiling phase to assess the customer's risk tolerance via a series of inquiries, which will inform the determination of the customer's risk profile (conservative, moderate, or aggressive). This information serves as the foundation for offering the suitable Mutual Fund product to the consumer based on their preferences. The risk profiling data is integrated with SID validation to guarantee that registration complies with rules and satisfies client requirements.

The validated data undergoes additional processing for SID issuance. Upon successful validation, the customer's SID will be generated, and a notification will be dispatched through the mobile banking application or SMS. Customers will be requested to rectify their information if erroneous data is identified.

*name of corresponding author

Sinkron : Jurnal dan Penelitian Teknik Informatika
Volume 9, Number 1, January 2025
DOI : https://doi.org/10.33395/sinkron.v9i1.14496
e-ISSN : 2541-2019
p-ISSN : 2541-044X

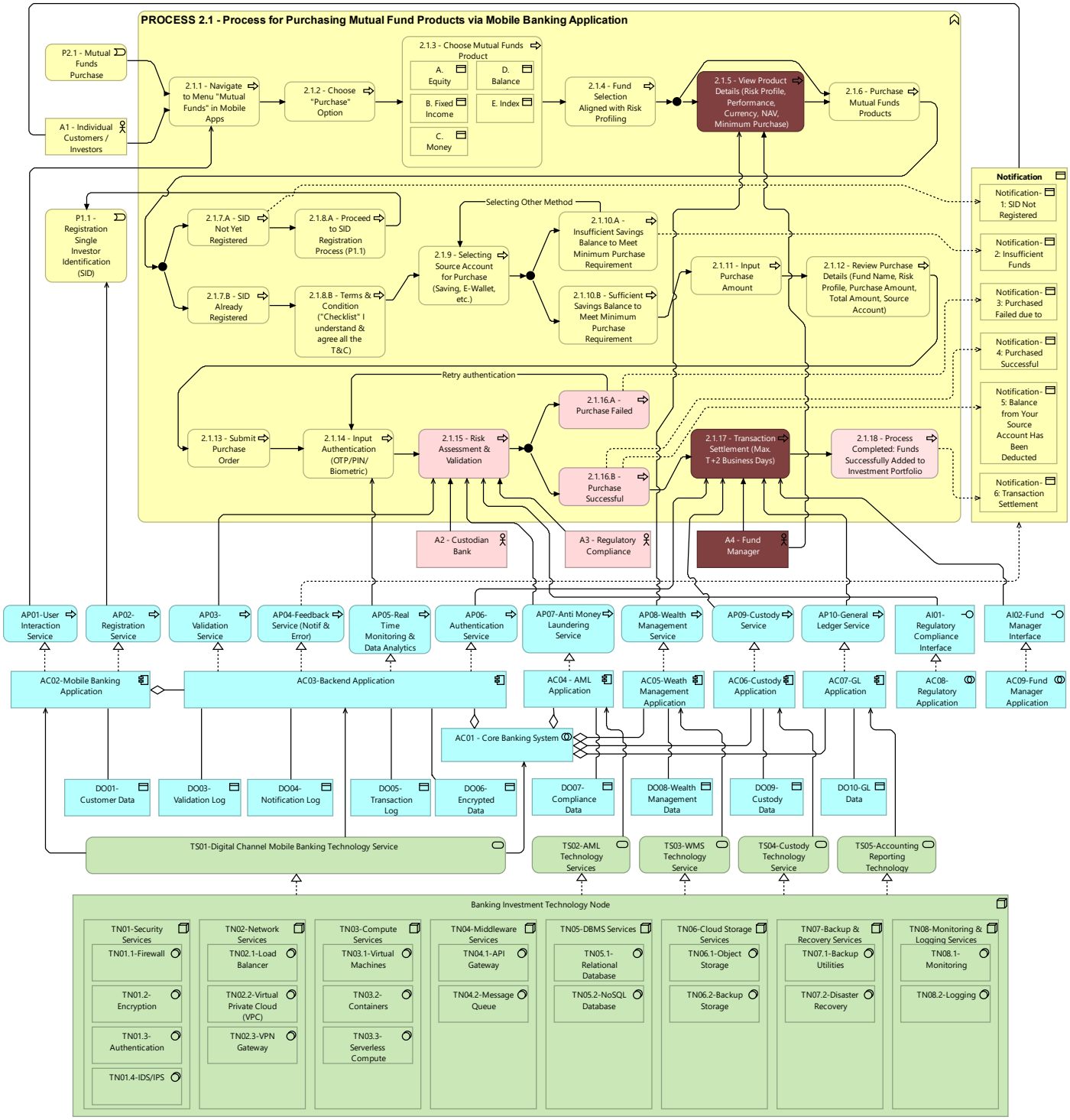

Fig. 5 Procedure for Purchasing Mutual Fund Products using Mobile Banking Application

Figure 5 delineates the business architecture for the acquisition of mutual funds using the mobile banking application to enhance the investment portfolio. The process commences when the customer navigates to the purchase section of the mutual fund menu within the application, whereupon they are presented with a list of available products, inclusive of historical performance data, risk assessments, and minimum deposit requirements for the instrument.

Subsequently, the customer can ascertain the investment amount, and the system will authenticate the transaction details, including verifying the adequacy of the customer's account balance for the transaction. This validation also ensures that the purchase aligns with the previously established risk profile from the risk profiling stage.

*name of corresponding author

Sinkron : Jurnal dan Penelitian Teknik Informatika
Volume 9, Number 1, January 2025
DOI : https://doi.org/10.33395/sinkron.v9i1.14496
e-ISSN : 2541-2019
p-ISSN : 2541-044X

Furthermore, this validation is intended to guarantee that transactions operate in accordance with client requirements.

Following customer approval of the transaction, authentication measures such as PIN or OTP input will be implemented to safeguard the transaction process. The transaction incorporates AML (Anti-Money Laundering) services to guarantee regulatory compliance. Upon completion of a transaction, customers are notified of their purchase, and their investment portfolio is updated instantaneously.

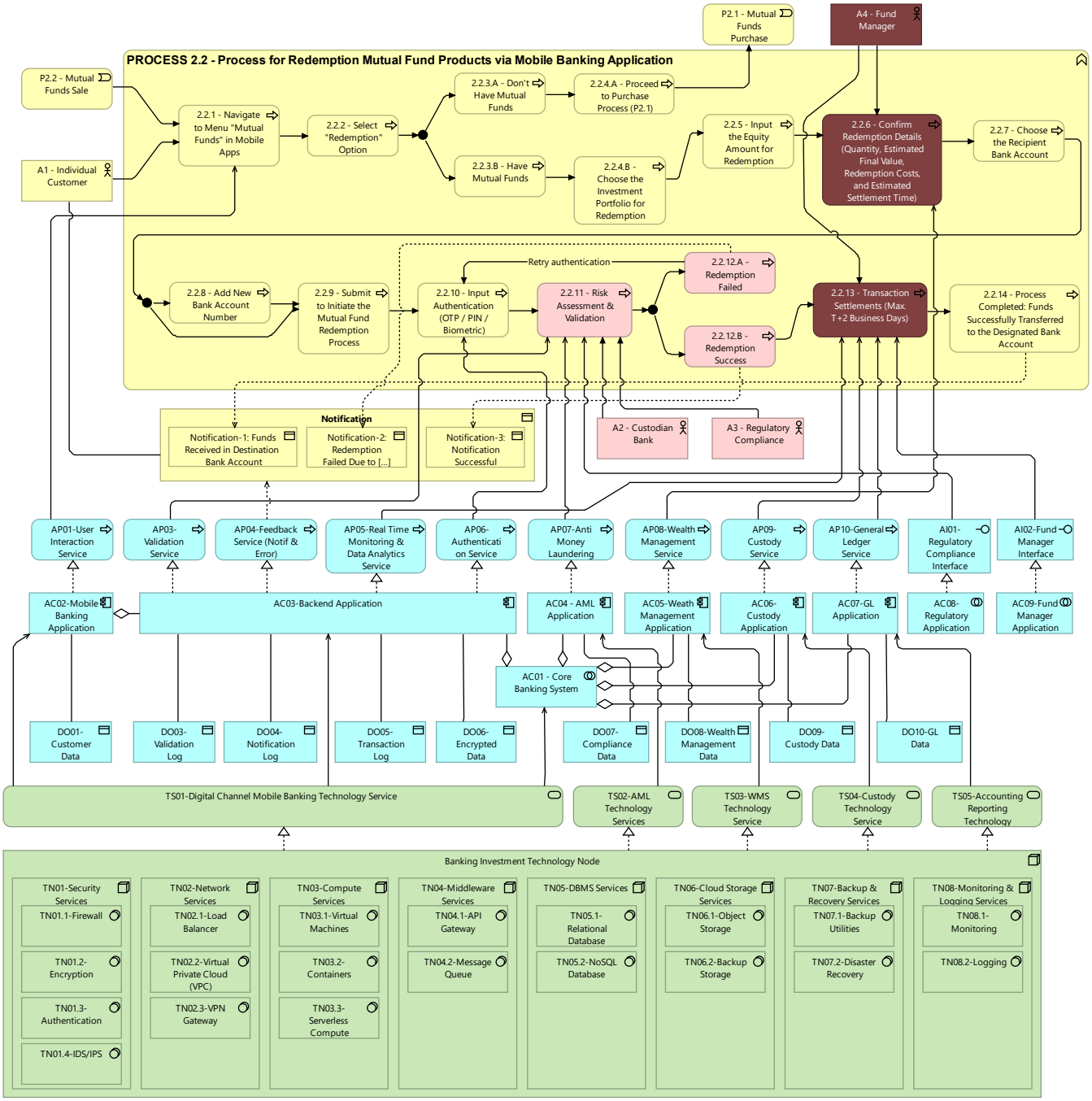

Fig. 6 Procedure for Redeeming Mutual Fund Products using Mobile Banking Application

Figure 6 delineates the business architecture for the Mutual Fund redemption process using the mobile banking application, facilitating the withdrawal of investment monies. The process commences when customers navigate to the Mutual Fund redemption menu within the app, allowing them to examine their investment portfolio, which includes details of the investment value, accrued profits, and the projected redemption fee, thereby assisting customers in their redemption decisions.

Upon selecting the Mutual Fund product for redemption, the customer ascertains the quantity of units or nominal amounts to be disbursed. The system will thereafter authenticate the transaction data and verify the availability of

*name of corresponding author

Sinkron : Jurnal dan Penelitian Teknik Informatika
Volume 9, Number 1, January 2025
DOI : https://doi.org/10.33395/sinkron.v9i1.14496
e-ISSN : 2541-2019
p-ISSN : 2541-044X

redeemable units. This process is validated by Anti-Money Laundering (AML) measures to guarantee data integrity and adherence to regulations.

The consumer will subsequently be requested to authorize the transaction, followed by an authentication procedure (inputting a PIN or OTP) as a security measure. Upon confirmation of the transaction, the system processes it and offers an expected time for the monies to be transferred to the customer's account. This procedure is automatically documented in the backend module to facilitate regulatory reporting and auditing. The customer's investment portfolio dashboard is updated in real-time based on the most recent investment funds.

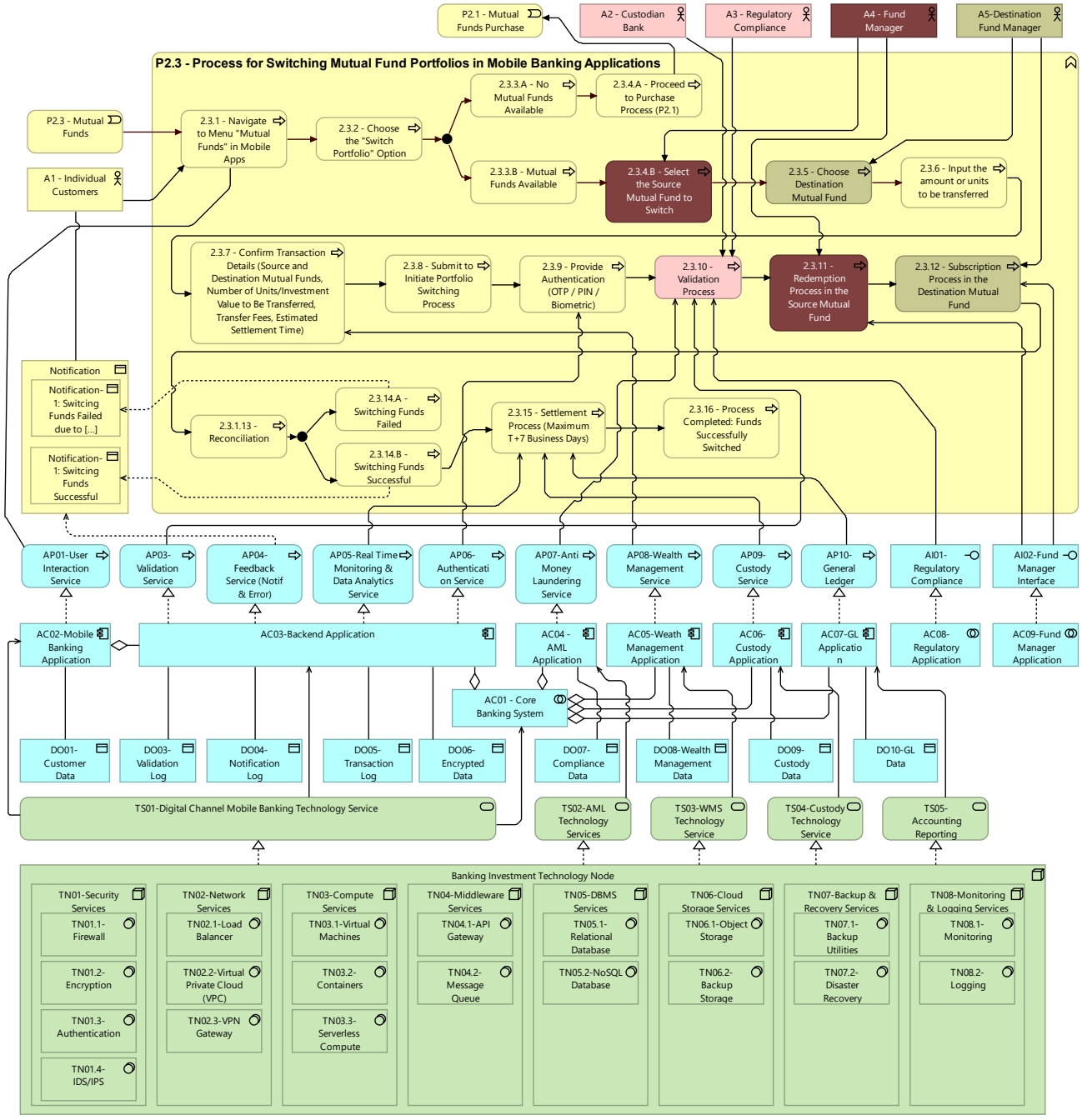

Fig. 7 Procedure for Switching Mutual Fund Portfolios in Mobile Applications

Figure 7 delineates the business architecture for the portfolio switching process inside the Mutual Fund digital service, which involves the transfer of investments from one Mutual Fund product to another via the mobile banking application. This procedure enables consumers to adjust their portfolio in response to alterations in investing objectives, market conditions, or risk profiles.

*name of corresponding author

Sinkron : Jurnal dan Penelitian Teknik Informatika
Volume 9, Number 1, January 2025
DOI : https://doi.org/10.33395/sinkron.v9i1.14496
e-ISSN : 2541-2019
p-ISSN : 2541-044X

The procedure commences when clients access the Switch Portfolio section of the mobile banking application. Customers can then get a comprehensive list of their investment portfolio, encompassing facts on investment value, product performance, and unit balances, so facilitating their assessment of the switching option.

Customers may select a Mutual Fund product to be transferred to a different Mutual Fund product, after which they specify the quantity of units or nominal monies to be transferred. The system will autonomously authenticate the transaction by assessing the availability of transferable units, ensuring that the destination Mutual Fund product aligns with the customer's risk profile and complies with the relevant switching rules for each Mutual Fund product.

Subsequently, customers must authorize the transaction and verify their identity (by entering a PIN or OTP) for transaction security. The system is connected with Anti-Money Laundering (AML) measures to ensure compliance with relevant legislation regarding transactions.

Upon confirmation of the transaction, the system will execute the transfer of investment units to the designated product and subsequently update the customer's portfolio on the investment dashboard within the mobile application. Upon completion of the transaction, the customer will receive a confirmation notification detailing the executed transaction.

Phase C: Information System Architecture

During this phase, service components and applications are developed to effectively, securely, and cohesively address mutual fund service requirements. This phase emphasizes the seamless operation of application processes and data, as well as the collaborative integration of systems to support business architecture. The subsequent table delineates the elements of the information system architecture:

Table 3.
List of Information System Architecture Notations

Code	Notation	Application and Data	Description
AP01	Application Process	User Interaction Service	This service facilitates user interaction with the program, encompassing menu navigation and data input.
AP02	Application Process	Registration Service	This service facilitates customer registration, encompassing Single Investor Identification (SID) and the collecting of personal data.
AP03	Application Process	Validation Service	This service verifies customer data by confirming the completeness and precision of the given information.
AP04	Application Process	Feedback Service (Notif & Error)	This service is designed to notify customers about the state of the process, including transaction success or failure.
AP05	Application Process	Real Time Monitoring & Data Analytics Service	The service monitors, analyzes, and displays data in real time, facilitating prompt decision-making and anomaly identification.
AP06	Application Process	Security Service	his service offers security features including multi-factor authentication and data encryption during the transaction process.
AP07	Application Process	AML Service	This service guarantees adherence to Anti-Money Laundering (AML) requirements during registration and transactions.
AP08	Application Process	Wealth Management Service	This service manages customer portfolios, encompassing asset allocation and investment advice.
AP09	Application Process	Custody Service	This service manages Mutual Fund assets and ownership details.
AP10	Application Process	General Ledger Service	This service facilitates the documentation of financial transactions within the company's accounting system.
AI01	Application Interface	Regulatory Compliance Interface	This interface facilitates the integration of the application with regulatory systems for the purposes of reporting and auditing.
AI02	Application Interface	Fund Manager Interface	This interface facilitates data integration with fund managers for investment management purposes.
AC01	Application Collaboration	Core Banking System	This system is designed for the management of client account information associated with Mutual Fund transactions.

*name of corresponding author

Sinkron : Jurnal dan Penelitian Teknik Informatika
Volume 9, Number 1, January 2025
DOI : https://doi.org/10.33395/sinkron.v9i1.14496
e-ISSN : 2541-2019
p-ISSN : 2541-044X

Code	Notation	Application and Data	Description
AC02	Application Component	Mobile Banking Application	This system serves as the primary platform for users to access Mutual Fund services and execute investment transactions.
AC03	Application Component	Backend Application	This system is designed to facilitate backend operations including data validation, monitoring, and transaction data storage.
AC04	Application Component	AML Application	This technology is designed to identify and thwart money laundering activities.
AC05	Application Component	Wealth Management Application	This system is a specialized program designed to facilitate the digital management of customer investments and portfolios.
AC06	Application Component	Custody Application	This system is a specialized application for administering custodial functions to maintain the security and integrity of customer investment assets.
AC07	Application Component	GL Application	This system is a specialized application designed to facilitate the recording of transactions in the general ledger system.
AC08	Application Collaboration	Regulatory Application	This system is a specialized application designed for integration with regulatory systems for reporting and compliance purposes.
AC09	Application Collaboration	Fund Manager Application	This system serves as an application for collaboration with the fund management system to achieve effective investment management.
DO01	Data Object	Customer Data	Customer data encompassing personal information including name, identification number, address, and risk profile.
DO03	Data Object	Validation Log	This log comprises recordings of the outcomes of the customer data validation process, detailing the status of information completeness and accuracy.
DO04	Data Object	Notification Log	This log comprises records of alerts issued to clients concerning registration status, transactions, or errors.
DO05	Data Object	Transaction Log	This log encompasses records of all customer transactions, including purchases, redemptions, and mutual fund switches.
DO06	Data Object	Encrypted Data	Data is encrypted to ensure client confidentiality and security during transmission and storage.
DO07	Data Object	Compliance Data	Records of regulatory compliance, including Anti-Money Laundering (AML) and regulatory reporting.
DO08	Data Object	Wealth Management Data	Information pertaining to the administration of client assets, encompassing investment portfolios and performance analyses.
DO09	Data Object	Custody Data	Custodial data encompassing information regarding asset ownership and the custody of client assets.
DO10	Data Object	GL Data	The general journal data encompasses all transaction records that are recorded in accounting reports.

Phase D: Technology Architecture

This phase involves designing a technological architecture that integrates data architecture, application architecture, and business architecture to meet the requirements for deploying digital mutual fund services within the digital banking ecosystem. This phase primarily emphasizes contemporary, secure, and efficient technology services for banks to fulfill their operating requirements and enhance customer service. The subsequent table delineates the components of the technology architecture:

Table 4.
List of Technology Architecture Notations

Code	Notation	Technology	Description
TS01	Technology Service	Digital Channel Mobile Banking	This technology facilitates access to financial services via mobile banking applications, which contain

*name of corresponding author

e-ISSN : 2541-2019
p-ISSN : 2541-044X

Code	Notation	Technology	Description
			features that assist users in executing transactions, particularly in mutual fund investments.
TS02	Technology Service	AML	This technology is employed to assure adherence to Anti-Money Laundering legislation to prevent fraud, particularly in mutual fund investment services.
TS03	Technology Service	WMS	This technology facilitates portfolio management encompassing performance analysis, investment suggestions, and alignment with client requirements.
TS04	Technology Service	Custody	This technology is employed by custodian banks for the management, documentation, and preservation of customer mutual fund assets with enhanced security.
TS05	Technology Service	Accounting Reporting	Technology is employed to document financial records pertaining to Mutual Fund transactions in real-time and dynamically.
TN01	Technology Node	Security Services	This node operates to safeguard Mutual Fund data, transactions, and application systems against both external and internal threats.
TN01.1	System Software	Firewall	Firewalls are employed to safeguard the whole network linked to all banking apps and services against unauthorized access during operations.
TN01.2	System Software	Encryption	Encryption is employed to transform data into a confidential code to safeguard client information.
TN01.3	System Software	Authentication	The authentication mechanism verifies the user's identification, confirming that the user is the rightful account owner.
TN01.4	System Software	IDS/IPS	Intrusion Detection Systems (IDS) are effective at identifying intrusions from internal sources, but Intrusion Prevention Systems (IPS) are adept at detecting attacks and implementing subsequent filtering measures.
TN02	Technology Node	Network Services	This node functions as a service that links users with applications and data within the network, encompassing both internal and external infrastructures.
TN02.1	System Software	Load Balancer	Load balancer systems are employed by computer networks to equitably spread workloads across two or more network connections, ensuring optimal performance and preventing overload on any single connection line.
TN02.2	System Software	Virtual Private Cloud	Private cloud systems provide the management of virtual networks that are logically segregated from public cloud users, thereby establishing a secure and private environment within the public cloud.
TN02.3	System Software	VPN Gateway	VPN systems serve as conduits to link private networks with public networks. This gateway creates and secures a VPN connection, or tunnel, between the data transmitter and recipient.
TN03	Technology Node	Compute Services	This node functions as a computational resource for extensive processing of Mutual Fund service data.
TN03.1	System Software	Virtual Machine	Virtualization solutions are employed to operate Mutual Fund applications within a segregated environment.
TN03.2	System Software	Containers	The container architecture facilitates the flexible and consistent operation of Mutual Fund service components across various digital contexts.

*name of corresponding author

e-ISSN : 2541-2019
p-ISSN : 2541-044X

Code	Notation	Technology	Description
TN03.3	System Software	Serverless Compute	The serverless computing solution automatically allocates resources according to the service requirements of the Mutual Fund.
TN04	Technology Node	Middleware Services	The middleware node functions as the communication and integration manager between the Mutual Fund service component and other digital banking apps.
TN04.1	System Software	API Gateway	The API gateway system facilitates communication between internal applications and external systems.
TN04.2	System Software	Message Queue	Message queuing systems facilitate asynchronous communication among services. Messages are retained in a queue until they are processed and subsequently removed. Each communication is handled singularly, by an individual consumer.
TN005	Technology Node	DBMS Services	The database node is utilized for the storage and management of Mutual Fund data, including customer information, transactions, and performance reports.
TN005.1	System Software	Relational Database	Relational database systems are employed to administer structured data, including client information and mutual fund transactions.
TN005.2	System Software	NoSQL Database	A NoSQL database system is a data management system that eschews the relational model and integrates other data storage methodologies. storing nodes facilitate the storing of digital data on an off-site server, commonly referred to as the cloud.
TN06	Technology Node	Cloud Storage Services	Storing nodes facilitate the storing of digital data on an off-site server, commonly referred to as the cloud.
TN06.1	System Software	Object Storage	Object-based storage systems serve as a data storage architecture for managing substantial volumes of unstructured data.
TN06.2	System Software	Backup Storage	Backup storage systems are utilized to facilitate the duplication of data pertaining to mutual fund services, ensuring data recovery in instances of loss or corruption.
TN07	Technology Node	Backup and Recovery Services	Backup and recovery nodes are designed to safeguard customer data and maintain service continuity during emergencies.
TN07.1	System Software	Backup Utilities	The backup utility system is employed to ensure the safety of client data and the integrity of Mutual Fund transactions.
TN07.2	System Software	Disaster Recovery	Disaster recovery solutions are employed to guarantee the continuity of Mutual Fund services in the face of significant system disruptions.
TN08	Technology Node	Monitoring and Logging Services	Monitoring and recording nodes are designed to guarantee the best execution of Mutual Fund services and facilitate operational audits.
TN08.1	System Software	Monitoring	The monitoring system is utilized to oversee the actions of application services, systems, and infrastructure in real-time.
TN08.2	System Software	Logging	System logging is employed to document operating system events, including system modifications, starting notifications, problems, warnings, and unanticipated shutdowns.

PHASE E: Opportunities & Solutions

This phase involves identifying opportunities and solutions, wherein the author use the SWOT analysis approach to assess the strengths, weaknesses, opportunities, and threats associated with Enterprise Architecture in mutual

*name of corresponding author

e-ISSN : 2541-2019
p-ISSN : 2541-044X

fund services within the mobile banking channel. This methodology guarantees that the constructed architecture fulfills both the technical requirements and the strategic objectives of the organization.

SWOT analysis assists organizations in comprehending the internal and external factors that influence the execution of Mutual Fund services. Internal elements, including strengths and weaknesses, are manifested in the resources and capacities of the bank. External elements, including opportunities and dangers, are manifested in market, technological, and regulatory conditions that may influence this execution plan. By using the findings of this study, the bank can formulate suitable strategies to address vulnerabilities, exploit opportunities, and alleviate dangers.

The subsequent results of the SWOT analysis are encapsulated in the table:

Table 5.
SWOT Analysis Result

Category	Details
Strengths	1. Dependable and cohesive technological infrastructure. 2. Robust data security (encryption, firewall, and multi-factor authentication). 3. Contemporary technological functionalities (APIs, cloud computing, and middleware services). 4. Deliver real-time information about customer investment advisories. 5. Regulatory compliance (Anti-Money Laundering and Report Automation).
Weaknesses	1. Dependence on outdated systems that diminish adaptability. 2. Insufficient technical proficiency among personnel in embracing new technology. 3. Inadequate integration within certain Mutual Fund service modules. 4. Manual processes continue to be employed in certain operational functions.
Opportunities	1. Enhanced utilization of digital banking services within the community. 2. Opportunities to collaborate with technology suppliers and fund managers to enhance services. 3. Government regulatory assistance for the digital transformation of the banking industry. 4. Heightened public interest in technology-driven investments and customized services. 5. Capability to cultivate an expansive digital banking ecosystem featuring innovative products.
Threats	1. Fierce competition within the financial sector, encompassing commercial banks, digital banks, and fintech companies. 2. Compliance risk associated with evolving regulations that may be subject to change at any moment. 3. Cybersecurity threats (data breaches and fraud) 4. Reliance on external entities (technology suppliers, regulatory bodies, and others)

Strategic solutions to facilitate the deployment of Enterprise Architecture for Mutual Fund services encompass enhancing technology infrastructure via the adoption of cloud and middleware for improved integration, alongside the automation of operational operations to augment efficiency. The application of AI is crucial for delivering analytics-driven personalized investment recommendations that identify transaction irregularities to mitigate fraud, along with real-time portfolio management. Moreover, enhancing security through real-time monitoring, Intrusion Detection Systems (IDS), Intrusion Prevention Systems (IPS), and sophisticated encryption is essential for safeguarding data and systems against cyber threats.

Organizations are encouraged to establish strategic alliances with technology providers and fund managers, while diversifying digital offerings using data analytics to address evolving market demands and enhance consumer experience. This solution guarantees that Enterprise Architecture facilitates digital transformation within the banking sector by implementing digital ecosystems across its service products.

DISCUSSIONS

The research process involved collecting information via a literature analysis of prior studies on Enterprise Architecture, specifically emphasizing TOGAF. Primary data was obtained via interviews and observations at investment service providers, specifically commercial banks in Indonesia. The architecture was subsequently developed via TOGAF ADM steps A to D, visualized with the ArchiMate tool and augmented by SWOT analysis in phase E, culminating in an architecture blueprint.

Data was gathered through interviews and observations, augmented by a literature review to obtain scientific insights on Enterprise Architecture. The study delineated the current procedures in Mutual Fund services on the

*name of corresponding author

e-ISSN : 2541-2019
p-ISSN : 2541-044X

mobile banking platform, including SID registration, acquisition of Mutual Fund products, redemption of Mutual Fund products, and the process for transferring funds between products. The results encompass 21 information technology architecture notations and 33 technology architecture notations, all depicted within the ArchiMate model. This study was conducted via a literature evaluation of prior research on Enterprise Architecture with an emphasis on TOGAF.

Ultimately, recommendations for the advancement of banking products, particularly mutual fund investment services in Indonesia, are derived from the SWOT analysis encompassing strengths, weaknesses, opportunities, and threats. These proposals encompass the use of novel technology, the management of reliance on external entities, the navigation of current market rivalry, and the enhancement of resilience within the banking sector to optimize customer service delivery.

Analysis

This research emphasizes the significance of TOGAF in formulating Enterprise Architecture for the integration of Mutual Fund services, wherein TOGAF offers strategic solutions for incorporating these services into the digital channel ecosystem within the banking sector. This design represents the incorporation of digital technology into business processes, radically altering organizational operations and customer value delivery.

This procedure involves at least three elements. First organizations, particularly in the banking sector's Enterprise Architecture process, can assess the holistic business model by prioritizing customer experience, bolstering trust, and uncovering new opportunities through innovation. Secondly, organizations require banks to transform their organizational culture by adopting new work practices and cultivating abilities and skills that correspond with the demands of the digital era. Thirdly, technology requires the use of innovative technologies and skills pertaining to data extraction and exchange to support decision-making processes for digital investment goods and to trigger activities that improve the company's performance and reach.

Additionally, addressing how architectural elements can be synchronized to meet business requirements and adhere to regulations, TOGAF integrates all components (business architecture, applications, data, and technology) in alignment with organizational needs, particularly for banks offering investment product services, which are essential products that must also conform to regulatory standards and compliance requirements.

Moreover, the integration challenge can be addressed through a thorough architectural solution by recognizing the reliance on legacy systems, associated risks, and integration complexities inside the TOGAF framework to facilitate the resolution of this issue.

CONCLUSION

The TOGAF framework offers direction for this research regarding the incorporation of a service into an established ecosystem, specifically focusing on the upgrading of digital mutual fund investment products. The methodology offers organized phases to aid banks in enhancing efficiency in the creation and administration of enterprise architecture. TOGAF is significant for promoting the adoption of standards and best practices in architecture development.

This research generates an architecture that effectively aligns business requirements with integrated technology by adhering to the TOGAF phases from A to E. The ArchiMate paradigm enables the visualization of strategic and technical components, allowing all stakeholders to comprehend and execute the suggested architecture.

This research has discovered strengths, including solid and reliable infrastructure, regulatory compliance, robust data security, and the provision of real-time data, by integrating TOGAF with SWOT analysis. Nonetheless, it is imperative to acknowledge the vulnerabilities stemming from a heavy reliance on legacy systems, which may diminish flexibility; insufficient expertise in embracing new technologies; incomplete integration in certain mutual fund service modules; and the persistence of manual processes in various operational activities.

This study identified external factors that present opportunities for the adoption of digital banking services for the public, including partnerships with technology providers and fund managers to enhance services, regulatory support for digital banking transformation, growing public interest in investment products, and the potential to create a more extensive digital banking ecosystem through product innovation.

Moreover, digital products face challenges from fierce rivalry within the financial sector, encompassing both banks and financial technology; risks associated with regulatory compliance that may fluctuate unpredictably; cybersecurity hazards linked to data breaches and fraud; and reliance on third-party entities.

The author offers recommendations for enhancing technological infrastructure to meet the demands of banking services, particularly in digital mutual fund investments, by benchmarking comparable products to identify the most suitable and efficient technology to support the company's operational activities. Furthermore, the advancement of digital banking transformation must facilitate consumer transaction activities through process automation and the application of Artificial Intelligence (AI) for personalization.

The author aspires for the sustainable implementation of a digital ecosystem in banking to facilitate new product development through this developed mutual fund investment product service architecture.

*name of corresponding author

e-ISSN : 2541-2019
p-ISSN : 2541-044X

REFERENCES

Abu, I., Azizah, N., & Isma, A. (2023). Enterprise Architecture Design Using TOGAF ADM at Apotek Kimia Farma. *Indonesian Journal of Enterprise Architecture*, *1*(1), 27–38. https://doi.org/10.61220/IJEA.V1I1.0234

Cipta, H., & Hatamar, H. (2023). The Potential Synergy of Halal Industry and Islamic Banking in Bangka Belitung Province: SWOT Analysis. *Integrated Journal of Business and Economics*, *7*(1), 309–324. https://doi.org/10.33019/IJBE.V7I1.510

Crosley, N., Indrajit, R. E., & Dazki, E. (2023). TOGAF Framework For an AI-enabled Software House. *Sinkron : Jurnal Dan Penelitian Teknik Informatika*, *7*(2), 1140–1152. https://doi.org/10.33395/SINKRON.V8I2.12390

Desky, H., & Maulina, I. (2022). Digital Transformation in Islamic Banking. *International Journal Of Multidisciplinary Research And Analysis*, 3616–3622. https://doi.org/10.47191/ijmra/v5-i12-42

Goyal, D. S., Harahap, E. P., & Santoso, N. A. (2022). Analysis of Financial Technology Implementation on The Quality Of Banking Services in Indonesia: SWOT Analysis. *IAIC Transactions on Sustainable Digital Innovation (ITSDI)*, *4*(1), 77–82. https://doi.org/10.34306/ITSDI.V4I1.573

Muthalib, A., & Hasan, A. (2023). SWOT: Implementasi Aplikasi Mobile Banking Terhadap Kualitas Layanan Bank Muamalat. *FINANSIA : Jurnal Akuntansi Dan Perbankan Syariah*, *6*(2), 121–130. https://doi.org/10.32332/FINANSIA.V6I2.7127

Prawira, K. T., Hindarto, D., & Indrajit, E. (2023). Application of Enterprise Architecture in Digital Transformation of Insurance Companies. *Sinkron : Jurnal Dan Penelitian Teknik Informatika*, *7*(2), 856–865. https://doi.org/10.33395/SINKRON.V8I2.12302

Suja, I. K., Dantes, G. R., & Indrawan, G. (2020). Information Technology Blue Print Design Using Enterprise Architecture Planning in Politeknik Negeri Bali. *Logic : Jurnal Rancang Bangun Dan Teknologi*, *20*(3), 182–189. https://doi.org/10.31940/LOGIC.V20I3.1984

Susatyo, R. W. I., Indrajit, E., & Dazki, E. (2024). An Enterprise Architecture in the Construction Management Software using the Business Model Canvas. *Sinkron : Jurnal Dan Penelitian Teknik Informatika*, *8*(3), 1953–1966. https://doi.org/10.33395/SINKRON.V8I3.13877

The ArchiMate® Enterprise Architecture Modeling Language. (n.d.). Retrieved December 15, 2024, from https://www.opengroup.org/archimate-forum/archimate-overview

The Open Group. (n.d.). Retrieved December 14, 2024, from https://www.opengroup.org/togaf

The TOGAF® Standard, Version 9.2. (n.d.). Retrieved December 14, 2024, from https://pubs.opengroup.org/architecture/togaf92-doc/m/

Torkjazi, M., Davila-Andino, A. J., Alghamdi, A., & Zaidi, A. K. (2022). UAF Strategic Planning for Enterprises. *IEEE Access*, *10*, 123549–123559. https://doi.org/10.1109/ACCESS.2022.3224456

*name of corresponding author