

Gap_TOGAF_ADM_s_Role_in_Modernizing_Educational_Institutions.pdf

by Ahmad Faza

Submission date: 06-Oct-2026 01:57PM (UTC+0700)

Submission ID: 3052015558

File name: Gap_TOGAF_ADM_s_Role_in_Modernizing_Educational_Institutions.pdf (999.74K)

Word count: 2642

Character count: 16346



International Journal of Informatics, Information System and Computer Engineering



Bridging the ICT Gap: TOGAF ADM's Role in Modernizing Educational Institutions

Anggita Nauli Marpaung^{**}, Ahmad Faza^{*}

^{**} Faculty of Engineering and Informatics, Universitas Multimedia Nusantara, Indonesia

^{*}Corresponding Email: ahmad.faza@umn.ac.id

ABSTRACTS

In the rapidly advancing world of Information and Communication Technology (ICT), various industries have recognized and started to harness technology's transformative power, especially when it comes to data management and processing. One significant component of this technological evolution is Enterprise Architecture (EA). This offers a structured framework for integrating vast amounts of data across large-scale systems. However, an area that remains somewhat untapped is the application of EA within the educational sector, which presents its own unique set of ICT challenges. This research seeks to address and bridge this knowledge gap. It takes an in-depth look at how EA, utilizing the TOGAF ADM framework, can be implemented in educational settings. Through a series of structured interviews conducted at SMA St. Bellarminus, the research aims to tailor the institution's information systems architecture to its specific and nuanced needs. While there have been previous studies that touched upon organizational systems and structures, our research distinguishes itself by modifying and adapting the TOGAF ADM approach to cater explicitly to educational environments. As the digital realm continues to expand and evolve, it's imperative for educational institutions to have the tools and methodologies in place to stay relevant and efficient in this ever-changing landscape.

© 2021 Tim Konferensi UNIKOM

ARTICLE INFO

Article History:

Received 11 Nov 2023

Revised 1 Feb 2024

Accepted 9 Feb 2024

Available online 04 Mar 2024

Publication date 01 Jun 2024

11

Keywords:

Enterprise Architecture (EA)

TOGAF Architecture

Development Method (ADM)

Educational Institutions

1

1. INTRODUCTION

In the era of rapid advancements in Information and Communication Technology (ICT), industries are harnessing the transformative potential of technology to transcend conventional spatial and temporal boundaries (Fazil & Arifin, 2019). This dynamic is most evident in how ICT is employed for the handling and dissemination of data (Fazil & Arifin, 2019). Within this landscape, Enterprise Architecture (EA) has emerged as a critical solution for seamlessly integrating and managing data in large-scale organizations (Hartono et al., 2020). EA strategically orchestrates ICT, facilitating the planning, design, and management of technological infrastructure and information systems (Hartono et al., 2020). Its significance becomes particularly pronounced during times of organizational change, where it aids in decision-making and enhances adaptability (Putra, 2019). However, the practical application of EA, especially within educational institutions grappling with ICT challenges, remains an uncharted territory (Pramungkas, 2020; Arifin, 2023). Our research endeavors to fill this void by concentrating on the development and implementation of EA within the realm of educational institutions (Sena, 2021). Drawing inspiration from prior research (Setiawan & Yulianto, 2018; Riwanto & Andry, 2019; Geasela & Andry, 2019; Soraya & Sari, 2019; Supriyadi & Amalia, 2019; Anderson & Andry, 2021; Monita, 2021; Wibawa et al., 2021; Geasela & Legowo,

2022; Noviasyah & Hudhori, 2022) we rely on the TOGAF Architecture Development Method (ADM) framework for architectural analysis and design, incorporating a blend of literature reviews, observational data, and interviews. What sets our work apart is our innovative extension of TOGAF into the domain of technology architecture (Monita, 2021), thereby harmonizing architectural design and educational contexts (Geasela & Andry, 2019; Monita, 2021).

2. METHOD

In the study conducted at SMA St. Bellarminus, structured interviews were employed as the primary data collection method, targeting the principal and vice-principal of student affairs as informants. This choice of structured interviews, where questions are pre-prepared and presented based on a specific guideline, ensures reproducibility and consistency in data collection. The interview guide itself was meticulously crafted, drawing inspiration from the requirements of TOGAF artifacts and insights from previous research (Geasela & Legowo, 2022). The overarching goal of this data analysis was to elucidate the nuances of the information system architecture, aligning it with the specific business needs of the school. To achieve this, the study leaned on the TOGAF ADM framework, a recognized method for architectural design, guiding the research from the preliminary phase right through to the opportunities and solutions stage.

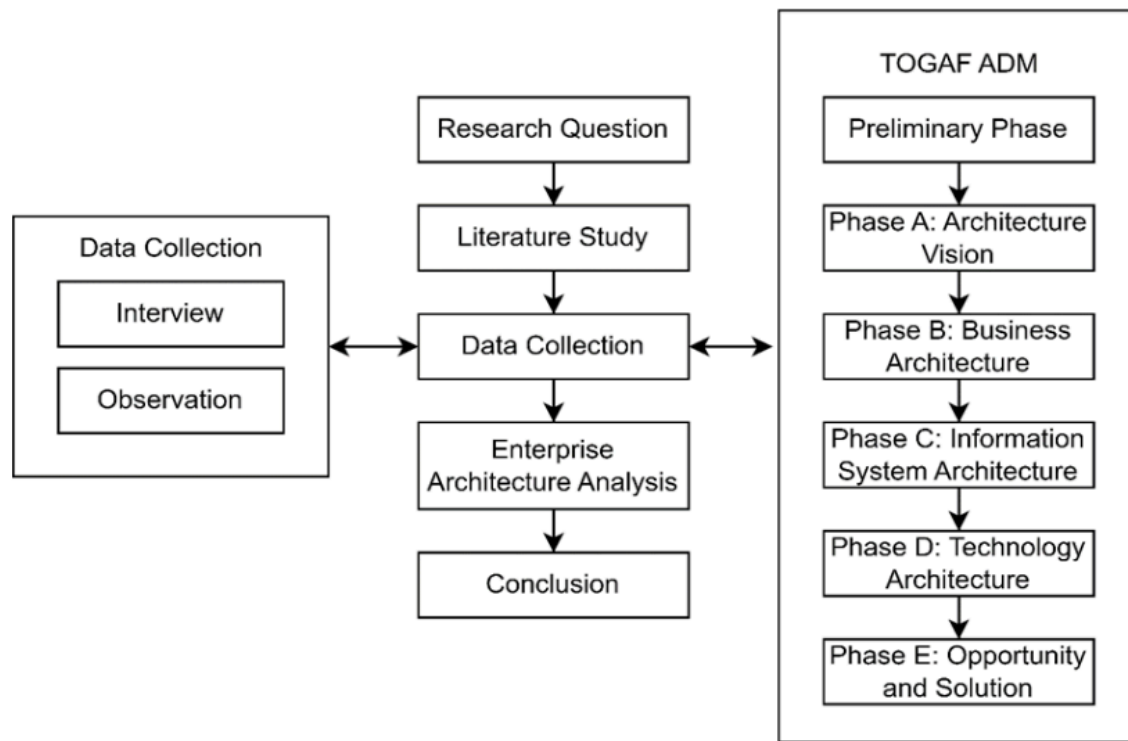


Fig. 1. Research Method

Figure 1 provides a visual representation of the research method employed in this study. While the methodology provides a clear trajectory for the research, it would be beneficial to delve deeper into aspects such as ethical considerations, potential limitations, and any modifications made to the established methods to ensure a comprehensive understanding of the research process.

Table 1. Requirement Catalogue

No	Business Requirements
1	An integrated information system among teachers, parents, and students.
2	A neat and real-time data system.
3	Including business resources in system development.
4	Requires a large capacity for data storage.

3. RESULTS AND DISCUSSION

3.1. Preliminary Phase

The system emphasizes an integrated information platform connecting teachers, parents, and students. It prioritizes organized, real-time data management, incorporates business resources during its development, and necessitates substantial storage capacity.

Table 1. provides a detailed requirement catalogue for the system.

3.2. Phase A: Architecture Vision

SMA St. Bellarminus Bekasi's value chain comprises main activities like student admissions, promotions, academic implementations, and alumni graduation. Concurrently, supporting activities focus on personnel, facilities, information systems, and financial

management, ensuring the school's holistic and efficient operation. Fig. 2 provides a visual representation of the value chain diagram for SMA St. Bellarminus Bekasi.

3.3. Phase B: Business Architecture

Table 2 presents the challenges and targeted business architecture objectives for SMA St. Bellarminus Bekasi.

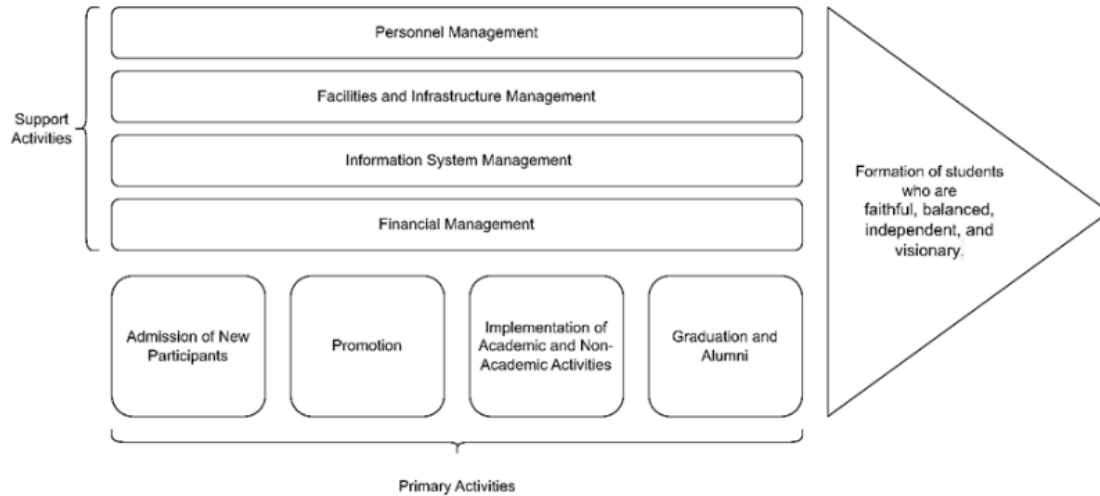


Fig. 2. Value chain diagram

Table 2. Business Architecture Conditions and Targets.

Current Business Activities	Problem analysis	Target Business Architecture
Manual attendance report	Manual student attendance requires daily teacher input, delaying parent notifications.	Integrated system for teachers and parents for easier attendance and real-time data.
School fee info is emailed only	School fee reminders via email are often missed by parents.	System connecting to parents' WhatsApp for easy information dissemination.
Full file collection	Student uploads can overload laptop storage.	Dedicated storage for assignments and exams to save laptop space.
Lack of data security and secure data storage	Data is accessed with just email and password, requiring security measures	Need for exclusive admin-accessible data storage for security and organization.

Recognizing these challenges and aiming to mitigate their negative impacts, a solution concept diagram was formulated as an output from the enterprise architecture vision phase. As

detailed in Table 3, SMA St. Bellarminus Bekasi provides business services in areas such as student affairs, finance, and personnel. These services cater to various stakeholders including students, parents,

and the government. The school utilizes 'Sakrotes' for tasks like assessment, attendance, and finance, benefiting from features like specialized storage and real-time updates via WhatsApp. Additionally, the 'LMS' system manages teaching materials and exams for grades 10 and 11, optimizing laptop memory usage. For grade 12 students, 'Zenius' offers specialized exams, ensuring broad accessibility and functionality. This comprehensive approach is visually represented in Fig. 3, which showcases the solution concept diagram based on the needs analysis. The functional decomposition diagram, based on the value chain diagram, assesses organizational capabilities related to architecture. This is presented in Fig. 4.

Table 3. Business Interaction Matrix

		Providing Business Services		
		Student Affairs	Finance	Human Resources
Consuming Business Services	Student	Offering academic and non-academic support aligned with curriculum standards	Scholarships based on student performance.	Delivering quality knowledge and behavioral education
	Parent		Financial aid for needy students	Entrusting educators with teaching responsibilities
	Headmaster	Schools undergo accreditation and adhere to curriculum standards for teaching	Transportation support for needy students	Specialized training for school educators

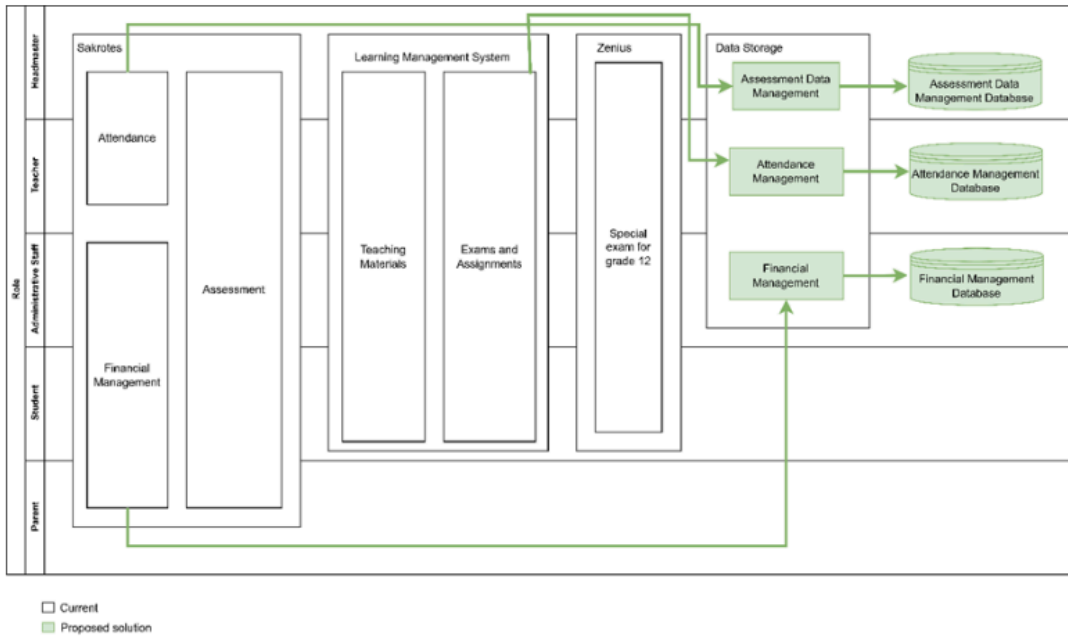


Fig. 3. Solution Concept Diagram

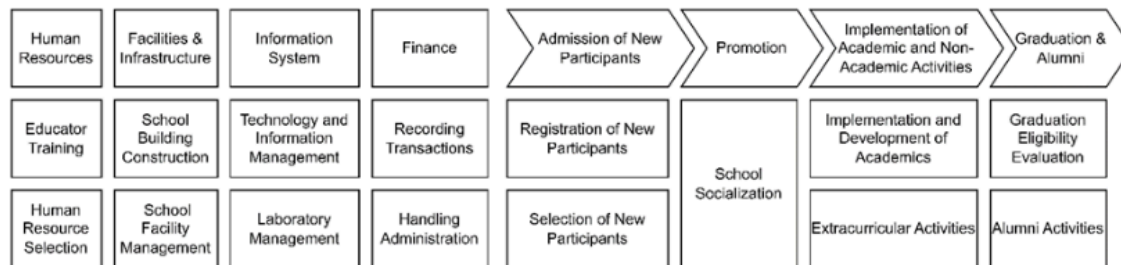


Fig. 4. Functional Decomposition Diagram

3.4. Phase C: Information System Architecture

The ERD depicts the Sokrates system's data structure and is shown in Fig. 5. SMA St. Bellarminus uses Sokrates, LMS, and Zenius apps for academic and non-academic tasks but needs updates for real-time, integrated data in attendance, finance, and assignments. Current gaps include non-integration with WhatsApp and limited download options. A use case diagram, with green indicating existing features and white for

new ones, will depict roles of principal, educators, students, parents, and staff in Sokrates. This use case is illustrated in Fig. 6.

3.5. Phase D: Technology Architecture

This phase focuses on creating technology architecture aligned with business needs and documenting the system's technological aspects. The Technology Architecture covers the application's hardware and network. Designing begins with a gap analysis comparing current technology to

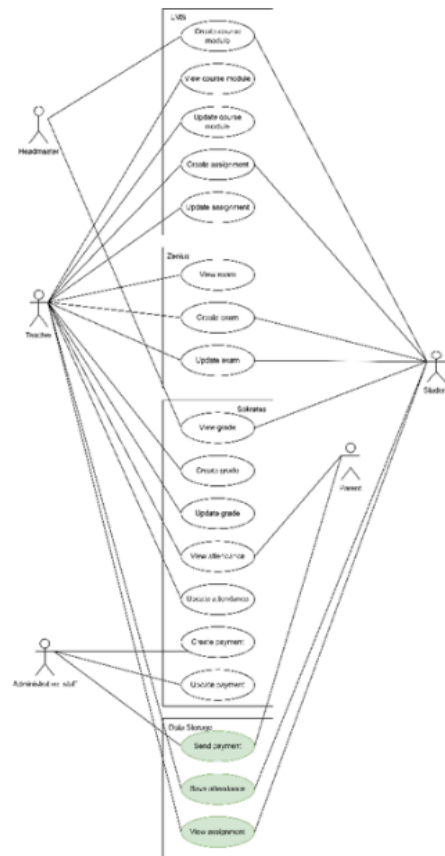


Fig. 6. Use Case Diagram

Table 4. Technology Gap Analysis

Target	Laptop/PC	Printer	Application Server	Database Server	Router	Switch
Baseline						
Laptop/PC	Included					
Printer		Included				
Application Server			Gap: Additional capacity for new or modified system			
Database Server				Gap: Additional capacity for new or modified system		

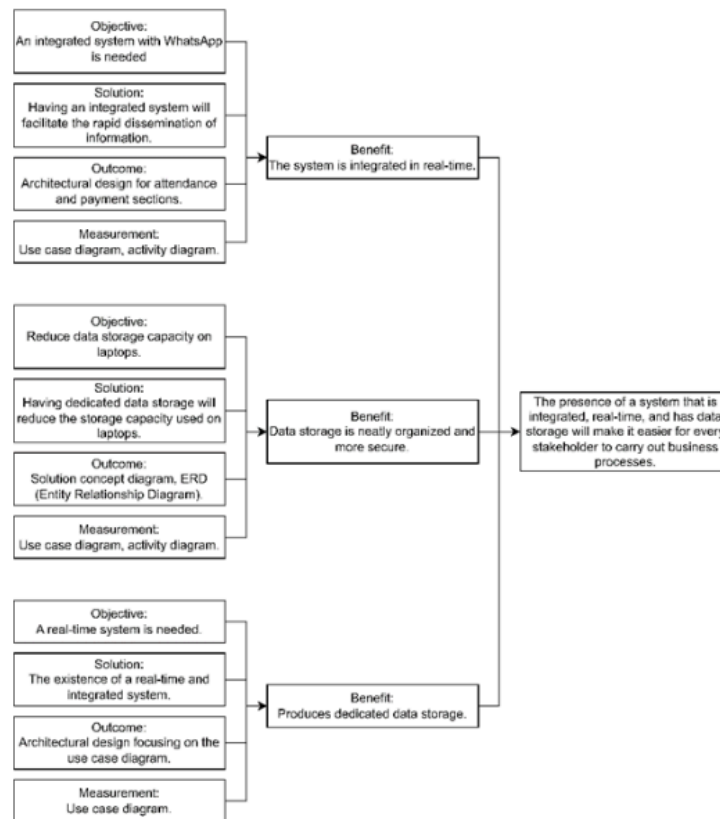


Fig. 7. Benefit Diagram

Including enhanced business agility and integration (Fallmyr & Bygstad, 2016; Harrell & Sage, 2010; Niemi, 2006; Pessi et al., 2011; Ross et al., 2006; Tamm et al., 2011). While differing from studies focusing on value chains and stakeholder mapping, the study offers a unique perspective on EA implementation through the application of the TOGAF ADM framework. In conclusion, addressing governance issues and involving CIOs strategically can help organizations leverage EA's benefits to achieve strategic objectives.

4. CONCLUSION

In light of the swift advancements in Information and Communication Technology (ICT), the transformative potential of technology, particularly in

data management and dissemination across industries, is profound. Enterprise Architecture (EA) has risen to prominence as a crucial instrument, adeptly guiding ICT to streamline the planning, design, and oversight of technological infrastructure and information systems. This research delves into the lesser-explored realm of EA's application in educational institutions, with a specific focus on the TOGAF Architecture Development Method (ADM) framework. While foundational insights have been provided by earlier studies into organizational activity analysis, our research stands out by adapting the TOGAF ADM framework to the distinct challenges and intricacies of the educational sector. This novel approach not only introduces new viewpoints but

also acts as a nexus, merging broad organizational studies with the specific hurdles and prospects of the sector. As we progress further into the digital age, such bespoke approaches will be instrumental in navigating the evolving landscape.

ACKNOWLEDGMENTS

The contribution of Universitas Multimedia Nusantara is acknowledged and greatly appreciated.

REFERENCES

- Anderson, R., & Andry, J. F. (2021). Perancangan Enterprise Arsitektur Menggunakan Framework Togaf. *Ultima InfoSys: Jurnal Ilmu Sistem Informasi*, 12(1), 58-66.
- Arifin, Z. (2023). Pengantar Arsitektur Enterprise. <https://pustaka.ut.ac.id/lib/wpcontent/uploads/pdfmk/MSIM4311-M1.pdf>
- Fallmyr, T., & Bygstad, B. (2011). Enterprise architecture to enhance organizational agility? An exploratory study.
- Fazil, M., & Arifin, A. (2019). Pemanfaatan Teknologi Informasi Dan Komunikasi Pada Pemerintahan Gampong (Desa) Di Wilayah Pesisir Kota Lhokseumawe. *Jurnal Jurnalisme Volume*, 9(1).
- Geasela, Y. M., & Andry, J. F. (2019). Design Enterprise Architecture In Cpo Industry Using Togaf Adm Framework. *ICTACT Journal On Soft Computing*, 10(01), 2022-2027.
- Geasela, Y. M., & Legowo, N. (2022). Designing Information System Architecture Based on Education 4.0 Case Study: Senior High School Institutions of Indonesia. *Journal of Computer Science*, 18(7), 622-637.
- Harrell, J. M., & Sage, A. P. (2010). Enterprise architecture and the ways of wickedness. *Information Knowledge Systems Management*, 9, 197-209.
- Hartono, H., Meylovsky, R., & Andry, J. F. (2020). Arsitektur Enterprise pada BMKG dengan Framework TOGAF ADM. *Infotech: Journal of Technology Information*, 6(2), 63-68.
- Monita, K., Erfina, A., & Warman, C. (2021, September). Perancangan Enterprise Architecture Menggunakan Framework TOGAF Architecture Development Method (TOGAF-ADM) Pada SMK Bina Mandiri 2. In *Prosiding Seminar Nasional Sistem Informasi dan Manajemen Informatika Universitas Nusa Putra*, 1(1), 327-334.
- Niemi, E. (2008). Enterprise architecture benefits: Perceptions from literature and practice. *Tietotekniikan tutkimusinstituutin julkaisu*, 18, 1236-1615.
- Noviansyah, B., & Hudhori, I. A. (2022). Aplikasi Untuk Evaluasi Implementasi Arsitektur Enterprise Menggunakan TOGAF. *JURIKOM (Jurnal Riset Komputer)*, 9(3), 770-776.

- Olsen, D. H., & Trelsgård, K. (2016). Enterprise Architecture adoption challenges: An exploratory case study of the Norwegian higher education sector. *Procedia Computer Science*, 100, 804–811.
- Pessi, K., Magoulas, T., & Hugoson, M.-Å. (2011). Enterprise Architecture Principles and their impact on the Management of IT Investments. *Electronic Journal Information Systems Evaluation*, 14, 53–62.
- Pramungkas, P. R. (2020). Sistem Informasi Manajemen Sekolah Berbasis Information Communication Technology (ICT) Dalam Peningkatkan Mutu Pendidikan Siswa Di Lingkungan Pesantren. *AFKARINA: Jurnal Pendidikan Agama Islam*, 3(2), 1-18.
- Putra, A. J. (2019). Evaluasi Kelengkapan Arsitektur Enterprise Menggunakan Zachman pada Sistem Informasi Akademik.
- Riwanto, R. E., & Andry, J. F. (2019). Enterprise Architectures Enable of Business Strategy and IS/IT Alignment in Manufacturing using TOGAF ADM Framework: -. *International Journal of Information Technology and Business*, 1(2), 7-7.
- Ross, J. W., Weill, P., & Robertson, D. (2006). Enterprise architecture as strategy: Creating a foundation for business execution. Harvard Business Press.
- Sena, A. (2021). Perencanaan Enterprise Architecture Menggunakan TOGAF ADM 9 (Architecture Development Method).
- Seppänen, V., Heikkilä, J., & Liimatainen, K. (2009). Key issues in EA-implementation: case study of two Finnish government agencies. *Proceedings, Commerce and Enterprise Computing*, 2009. CEC'09. IEEE Conference On.
- Setiawan, A., & Yulianto, E. (2018). E-Government Interoperability and Integration Architecture Modeling Using TOGAF Framework Based On Service Oriented Architecture. *The Asian Journal of Technology Management (AJTM)*, 11(1), 26–43.
- Soraya, V., & Sari, W. S. (2019). Perancangan Enterprise Architecture Sistem Informasi dengan Menggunakan Framework TOGAF ADM pada CV. Garam Cemerlang. *JOINS (Journal of Information System)*, 4(2), 148–156.
- Supriyadi, H., & Amalia, E. (2019). Development of enterprise architecture in senior high school using TOGAF as framewrok. *Universal Journal of Educational Research*, 7(4), 8–14.
- Tamm, T., Seddon, P. B., Shanks, G., & others. (2011). How does enterprise architecture add value to organisations? *Communications of the Association for Information Systems*, 28, 141–168.
- Wibawa, M. B., & TB, D. R. Y. (2021). Perancangan arsitektur sistem informasi manajemen absensi sekolah menggunakan togaf adm pada kabupaten aceh tenggara. *Journal of Informatics and Computer Science*, 7(1), 17–21.

Ylimäki, T. (2006). Potential critical success factors for enterprise architecture. *Journal of Enterprise Architecture*, 2, 29–40.

ORIGINALITY REPORT

6%

SIMILARITY INDEX

5%

INTERNET SOURCES

2%

PUBLICATIONS

0%

STUDENT PAPERS

PRIMARY SOURCES

1	www.malque.pub Internet Source	1%
2	www.tandfonline.com Internet Source	1%
3	Adhelio Reyhandro, Ahmad Faza. "Detecting Evergreen Articles: Comparing Word Embeddings for Hybrid Bidirectional GRU and LSTM Model on Indonesian News Portal", 2025 5th International Conference on Electronic and Electrical Engineering and Intelligent System (ICE3IS), 2025 Publication	1%
4	docplayer.net Internet Source	1%
5	jddtonline.info Internet Source	1%
6	www.alexandria.unisg.ch Internet Source	<1%
7	backend.orbit.dtu.dk Internet Source	<1%
8	ejournals.umn.ac.id Internet Source	<1%
9	journal.gpp.or.id Internet Source	<1%
10	ntnuopen.ntnu.no Internet Source	<1%
11	sismatik.nusaputra.ac.id Internet Source	<1%

Exclude quotes

On

Exclude bibliography

On

Exclude matches

< 7 words