



Implementation of TOGAF ADM-Based Information System Architecture to Improve Operational Efficiency at Hotel Keitaro

Mega Marisani Ziraluo¹, Alesia Lorenzza Sinaga², Rais Affaruq Zunnurain³, Muhammad Indra Gunawan⁴

¹ Universitas Nias Raya, Nias Selatan, Indonesia

² Akademi Manajemen Informatika dan Komputer Universal, Medan, Indonesia

^{3,4} Universitas Putra Abadi Langkat, Langkat, Indonesia

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Abstract

The hospitality industry faces challenges in improving operational efficiency and service quality, especially for mid-scale hotels that still rely on manual systems in managing customer data, reservations, and check-in and check-out processes. Keitaro Hotel in South Nias Regency is experiencing problems in information system integration, which has an impact on service delays and potential administrative errors. This research aims to design and implement an information system architecture based on The Open Group Architecture Framework (TOGAF) Architecture Development Method (ADM) to improve the efficiency and effectiveness of hotel operations. The research method involves a qualitative approach with interview techniques, observation, and documentation studies, which are then analyzed through data reduction, TOGAF ADM architecture mapping, and data triangulation validation. The results showed that the implementation of TOGAF ADM architecture enables the automation of hotel operational processes, improves the accuracy of customer data management, and supports data-based decision making. Evaluation of the technology infrastructure indicates the need for investment in hardware and software to ensure a reliable and secure system. The implications of this research confirm that digital transformation based on enterprise architecture can provide a competitive advantage for mid-scale hotels with limited resources. The limitation of the research lies in the scope of the study which is still limited to one hotel, so further research is recommended to explore implementation in various hotel categories as well as integrating artificial intelligence and blockchain technology to improve data security and customer service personalization.

Corresponding Author:

Mega Marisani Ziraluo,
Sistem Informasi,
Universitas Nias Raya,
Jl. Pramuka, Ps. Tlk. Dalam, Kec. Tlk. Dalam, Kabupaten Nias Selatan, Sumatera Utara 22865, Indonesia.
Email : mgmarissaz@gmail.com

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1. Introduction

In the rapidly growing era of digitalization, the hospitality industry faces major challenges in improving operational efficiency and service quality (Merican et al., 2021). Keitaro Hotel, located on Jln. Diponegoro, Pasar Teluk Dalam, South Nias Regency, still relies on manual systems in the check-in, check-out, and customer data management processes (Akash & Sarafath, 2022; Betrand et al., 2023; Hamizan & Alda, 2024). This reliance on manual systems causes various problems, such as the risk of data loss, recording errors, and delays in service (Albahri et al., 2018; Javed et al., 2024). Along with the hospitality industry's trend of adopting architecture-based information systems to automate services, mid-scale hotels such as Hotel Keitaro still face challenges in adopting this technology due to limited resources and inappropriate methodological approaches.

The application of information system architecture based on The Open Group Architecture Framework (TOGAF) with the Architecture Development Method (ADM) offers a systematic solution that can help hotels design more effective information systems (Apriyandi, 2024; Maulanaa et al., 2023; Suroso et al., 2022). By adopting TOGAF ADM, hotels can improve operational efficiency, flexibility in data management, and integration with other digital technologies (Anes Silveira & Mamede, 2024). Therefore, this research aims to develop a TOGAF ADM-based information system architecture that can improve operational efficiency and customer satisfaction at Hotel Keitaro, especially in terms of guest registration, customer data management, and inter-departmental communication.

Currently, the guest registration and management system at Hotel Keitaro is still done manually, which results in longer customer waiting times, a high risk of administrative errors, and a lack of system integration that makes it difficult to manage customer data. In the digital era, the need for technology in hotel operations is increasingly urgent in order to improve competitiveness and meet customer expectations. However, limitations in the design and management of information systems have caused this hotel to not be able to adopt technology optimally. Therefore, this study examines how the application of TOGAF ADM can help Hotel Keitaro design a more integrated information system to reduce data redundancy, improve accuracy, and accelerate customer service.

Previous research has shown that the implementation of information system architecture can improve operational efficiency and service quality in the hospitality industry. The study by Samson (2024) proved that the application of TOGAF in reservation management can reduce administrative errors and improve service efficiency. Meanwhile, Hosen et al, (2024) highlighted the benefits of information system integration in data-driven decision making. However, these studies mostly focus on star hotels with greater resources, while studies on the application of information system architecture in mid-scale hotels are still very limited. Thus, this research contributes to filling the gap by developing a TOGAF ADM-based information system architecture model that is more suitable for the needs of mid-scale hotels.

The main objective of this research is to design and develop a TOGAF ADM-based information system architecture that can improve operational efficiency, data accuracy, and customer experience at Hotel Keitaro. Specifically, this research aims to identify relevant business and technology requirements, design a system architecture model that can integrate the hotel's operational processes, develop information system solutions to reduce data redundancy, develop an implementation strategy that is suitable for limited resources, and evaluate the impact of implementing a TOGAF ADM-based information system on operational efficiency and customer satisfaction.

Although there have been many studies on the application of information systems architecture in the hospitality industry, there is still a gap in the literature regarding the adoption of TOGAF ADM in mid-scale hotels with limited resources. Previous studies have mostly highlighted star hotels with more established technology infrastructure, so there is no specific architecture model for small and medium-sized hotels. Therefore, this study proposes an information system architecture model that can be implemented in stages according to the financial and technological capacity of Keitaro Hotel, as well as a reference for other hotels that want to transform digitally without having to spend large investments directly.

2. Research Methodolgy

Research Design

This research uses a descriptive qualitative approach with a case study to analyze the implementation of TOGAF ADM-based information system architecture at Keitaro Hotel. This approach was chosen because it allows in-depth exploration of business needs, implementation challenges, and the effectiveness of the developed information system. The case study was used to understand the existing conditions, evaluate the current system gaps, and design a TOGAF ADM-based solution that fits the characteristics of Hotel Keitaro (Darmawan et al., 2020; Girsang & Abimanyu, 2021; Marwiyah, 2023).

Research Population and Sample

The population in this study includes all stakeholders involved in Hotel Keitaro's operations, including hotel management, operational staff, and customers who use hotel services. The research sample was selected using purposive sampling technique, taking into account the relevance and involvement of respondents in the information system implementation process. The main sample consisted of hotel managers, reservation and front office staff, as well as customer representatives who had experience with the hotel's previous service system.

Data Collection Techniques

The data in this study were collected through several techniques, namely in-depth interviews, direct observation, and documentation studies. In-depth interviews were conducted with hotel management and staff to understand information system needs, operational constraints, and expectations of the new system. Direct observation was conducted to observe the workflow and business processes that take place in the current manual system. In addition, the documentation study included analysis of internal policies, operational reports, and hotel transaction data to get a more comprehensive picture of the current system.

Data Analysis Technique

The data that has been collected is analyzed using a qualitative approach with thematic analysis method. The analysis process begins with data reduction to identify patterns and main themes related to information system needs, implementation challenges, and the impact of implementing TOGAF ADM. Next, the TOGAF ADM architecture components were mapped to design an information system solution that suits the needs of Keitaro Hotel. Validation of the findings was conducted through data triangulation by comparing the results of interviews, observations, and documentation studies to ensure the accuracy and reliability of the research results.

3. Results and Discussion

Table 1. Data Used in Research

No	Data Categories	Data Type	Collection Method	Analysis Objective
1	Operational Data	Manual check-in/check-out process	Direct observation	Identify the constraints of the manual system
2	Operational Data	Average customer service time	Observation & interview	Measuring service efficiency
3	Customer Data	Guest reservation data	Documentation study	Analyzing reservation patterns
4	Customer Data	Customer complaints related to manual system	Interview & survey	Identifying service problems
5	Management Data	Hotel operational policies and procedures	Documentation study	Understand the current internal policy

6	Technology Data	Available IT infrastructure	Observation & interview	Assessing technology readiness for TOGAF ADM implementation
7	Technology Data	Information systems that have been used (if any)	Interview & documentation study	Determine system gaps
8	Human Resources Data	Staff competency in the use of IT systems	Interview & survey	Determine training needs
9	Strategic Data	Hotel development plan related to digitalization	Management interview	Customizing the system design with the hotel's vision

The data analysis process in this research is carried out through several systematic stages to ensure that the TOGAF ADM-based information system architecture design can be implemented optimally at Keitaro Hotel.

1. Data Reduction

Data reduction was performed by filtering and classifying information obtained from interviews, observations, and documentation studies. The data collected was grouped into three main categories: Information System Needs, Analysis of the hotel's operational constraints arising from the use of manual systems, including slow check-in/check-out processes, inefficient customer data management, and limitations in data-based analysis and decision-making. Implementation Challenges, Identify obstacles in implementing information systems, such as limited technological resources, human resource readiness, and resistance to change in the work environment. Impact of TOGAF ADM Implementation, Analyze the benefits expected after the implementation of TOGAF ADM, including increased operational efficiency, reduced administrative errors, and improved customer satisfaction through a more responsive and automated service system.

2. Mapping to TOGAF ADM Architecture Components

After the main patterns in the data were identified, a mapping of the TOGAF ADM architecture components was conducted in order to design an information system solution that suits the needs of Keitaro Hotel. This stage includes:

Architecture Vision

The strategic vision of information system development at Hotel Keitaro is to create an integrated, efficient, and digital-based system to improve customer service quality and optimize hotel operational efficiency. By adopting TOGAF ADM, the system will support the automation of check-in/check-out processes, reservation management, and real-time customer data management. This vision aims to reduce dependence on manual systems, minimize administrative errors, improve customer satisfaction, and give Hotel Keitaro a competitive advantage in the digital era.

Business Architecture

The business architecture designed for Hotel Keitaro includes modeling the main processes of hotel operations supported by information systems, namely:

1. Check-in/Check-out Automation
 - a. Customers can check-in online before arriving at the hotel.
 - b. Faster check-out process with an automated system that calculates the bill in real-time.
 - c. Guest identity validation system through integration with customer database.
2. Reservation Management
 - a. Implementation of an online reservation system that is directly linked to the hotel's room inventory.
 - b. Automatic reservation confirmation via email or text message to customers.
 - c. Reservation recording system that allows historical guest tracking.
3. Customer Data Management

- a. Use of a Customer Relationship Management (CRM) system to securely store customer data.
- b. Utilization of customer data to offer more personalized services through guest preference analytics.
- c. Automated system to manage customer loyalty programs.

Information Systems Architecture

The information systems architecture designed to support Hotel Keitaro's operations includes several key components:

1. Customer Database Integration
 - a. Centralized system to store and manage customer data.
 - b. Enhanced data security with encryption system and automatic backup.
2. Online Reservation System
 - a. Development of a web-based and mobile reservation platform that allows customers to book rooms independently.
 - b. Integration with digital payment methods to increase ease of transactions.
3. Data Analytics for Decision Making
 - a. An analytics system that allows hotel management to analyze room occupancy trends, customer preferences, and operational performance.
 - b. Automated reports that provide insights into marketing strategies and service improvements.

Technology Architecture

An evaluation of Hotel Keitaro's existing technology infrastructure revealed a need for improvement in several aspects, including:

1. Hardware
 - a. Cloud-based servers to store and manage data with high availability.
 - b. Point-of-Sale (POS) devices integrated with digital payment systems.
 - c. Tablet or self-service kiosks to support customer self check-in process.
2. Software
 - a. Cloud-based Property Management System to support room, reservation and customer management.
 - b. Hotel mobile applications that support room reservations, room service, and customer communication with hotel staff.
 - c. Cybersecurity system to protect customer data and digital transactions.

Opportunities & Solutions

The main opportunities in the TOGAF ADM-based information system implementation at Hotel Keitaro include:

- a. Improved operational efficiency through automation of processes that were previously done manually.
- b. Increased customer satisfaction with faster and more accurate digital-based services.
- c. Data-driven decision-making with the utilization of an analytics system that supports the hotel's strategic planning.

The solution offered includes:

- a. Gradual system development to enable the hotel to adapt to new technology without disrupting daily operations.
- b. Training of hotel staff to ensure that all personnel can operate the information system properly.

- c. Collaboration with technology providers to reduce system development costs and utilize proven solutions in the hospitality industry.

Migration Planning

To ensure a smooth transition from manual to automated system, an implementation roadmap was created as follows:

Stage 1 - Needs Analysis and Planning (0-3 months)

- a. Identification of system requirements and evaluation of technology infrastructure readiness.
- b. Preparation of system specifications based on TOGAF ADM architecture.

Stage 2 - System Development and Testing (3-6 months)

- a. Development of cloud and mobile-based hotel management system.
- b. Test the system on a small scale before full implementation.

Stage 3 - Implementation and Integration (6-9 months)

- a. Gradual implementation of the system starting from automatic check-in/check-out.
- b. Integration with customer database and digital payment system.

Stage 4 - Evaluation and Optimization (9-12 months)

- a. Collection of feedback from customers and hotel staff for system improvement.
- b. Feature and security enhancements based on initial evaluation results.

3. Validation of Findings with Data Triangulation

To ensure the accuracy and reliability of the research results, data triangulation was conducted by comparing information obtained from various data collection methods: Interviews, The results of interviews with hotel management and operational staff were confirmed with observation and documentation data to ensure conformity between respondents' statements and real conditions in the field. Observation, Findings from direct observation of hotel operations were correlated with interviews and documentation studies to avoid subjectivity and ensure that the analysis was based on factual conditions. Documentation Study, Operational documents, reservation reports, as well as internal hotel policies were analyzed to confirm conformity with the patterns found in interviews and observations.

Discussion

The implementation of TOGAF ADM architecture at Hotel Keitaro showed significant improvements in operational efficiency and customer experience through integrated information systems. The results of this study reveal that the automation of check-in/check-out processes, digitization of reservation management, as well as cloud-based customer data management have reduced reliance on manual systems that are prone to administrative errors. In addition, the utilization of analytics systems enables more informed decision-making based on historical data and customer trends, thereby improving marketing strategies and service optimization. Evaluation of technology infrastructure indicated the need for investment in modern hardware and cybersecurity systems to ensure reliable and secure operational continuity. With a phased migration roadmap, Hotel Keitaro was able to effectively adopt the new system without disrupting daily operations, supported by an implementation strategy that considered resource readiness and staff training. These findings confirm that the implementation of TOGAF ADM not only provides a competitive advantage to the hospitality industry, but also proves its relevance in sustainable digital transformation.

4. Conclusion

This research confirms that the implementation of TOGAF ADM-based information system architecture at Hotel Keitaro significantly improves operational efficiency, customer data management accuracy, and service quality through check-in/check-out automation and an integrated reservation system. The main implication of the findings is that enterprise architecture-based digital transformation can provide a competitive advantage for mid-scale hotels with limited resources, while

enabling more accurate data-driven decision-making. However, the limitation of this research lies in the scale of implementation which is still limited to one case study, and has not considered aspects of system adaptability in the context of wider business expansion. Therefore, further research is recommended to test this architecture model on various hotel categories with different operational complexities and explore the integration of artificial intelligence and blockchain technology to improve data security and service personalization for customers.

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