ENTERPRISE ARCHITECTURE OF AN APPLICATION OF MOBILE REFERRAL MARKETING IN CONSUMER FINANCE COMPANY WITH TOGAF FRAMEWORK

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ABSTRACT

This study was conducted on a mobile referral marketing application owned by a consumer finance company. The purpose of this research is to design an Enterprise Architecture Information System model for the company which can be applied to mobile referral marketing applications and produce an IT roadmap recommendation that can be used as a reference in developing the Enterprise Architecture Information System for mobile referral marketing applications. The data is taken from the interview process of the Department Head of Enterprise and Digital Solution as a resource person, analyzing the condition of the current system by using TOGAF framework from the Preliminary Analysis, Architecture Vision, Business Architecture, Information System Architecture, Technology Architecture. The design results obtained are in the form of data integration, adding online-chat features, implementing the Google Map API, reducing data redundancy, and implementing docker. It can be concluded that the design made can reduce existing problems and improve the mobile referral marketing business process so that it will provide additional value and produce recommendations for the consumer finance company as a reference in the development of Enterprise Architecture Information Systems for mobile referral marketing applications.

Keywords: Enterprise Architecture, Information Systems, Mobile Referral Marketing, TOGAF ADM, Consumer Finance Company.

1. INTRODUCTION

Technology is a reference in the progress of a company. With technology, what is done will become easier, more effective, and efficient. In this way, the productivity and development of the company increases. The usage of technology and information is not only felt by the company, but also felt by customers to make it easier to obtain real-time information about the products offered, purchases, payments, and even in the delivery of feedback. One of the areas of the company that is still following developments in technology and information is multi-finance which provides loan funds to debtors or customers to purchase goods or services.

In 2019, multi-finance industry was only able to grow by a percentage of 3.53% year-on-year (yoy) due to consumer changes in the use of online transportation. According to a report by the Financial Services Authority (OJK), car financing was only able to record growth of 4.36% year-on-year (yoy). Therefore, OJK asks every multi-finance company to improve performance by compiling a sustainability business plan and improvement of business process infrastructure, a business plan for multi-finance companies must be adaptive, which means being careful in projecting the national economy, completing business lines with government priority segments, and adapting to phenomena in society. In addition, anticipatory steps can be prepared so that the company's business plan survives as well as supports an adaptive attitude in the existing situation. Along with responding to the dynamic economic situation, multi-finance companies have begun to think about financial product innovations that are in line with the needs of the community. With that, multi-finance companies are able to expand diversification in their financing portfolios.

Along with the growing use of mobile devices, mobile applications are increasingly being used with the aim of making it easier for every company to sell their products to customers and build customer trust in using the product. Mobile applications are believed to access information faster than using a mobile website. Not only that, but it also expands the reach of its customers in a very short time by reducing its marketing costs. Therefore, the development of mobile applications needs to be done to create new and innovative ways of using information technology [1].

Referral marketing is one of the best marketing strategies for all types of businesses in the digital marketing era. Referral marketing works based on customer trust and satisfaction. So, if the company is able to achieve good customer experience, then referral marketing will have a significant effect. The interesting
Enterprise Architecture has various frameworks, one of which is The Open Group Architecture Framework (TOGAF) which is based on Architectural Development Method (ADM). TOGAF is a framework for enterprise architecture that provides methods and tools to design, plan, implement and manage enterprise architecture information [5]. TOGAF ADM allows companies to find out specific architectures by conducting an assessment of business needs, development methods, and tools used in architectural development [6]. The ability of TOGAF ADM is to integrate conventional management and IT infrastructure to be more integrated [7], map the components in running a business process and information technology [8], and assist in adaptive IT infrastructure planning, resulting in core business activities, support activities, and developed applications that are integrated with others [9]. Along with the dynamics of the multi-finance market, EA with the TOGAF framework as well as Enterprise Architecture with the TOGAF framework provide a way for companies or institutions to run businesses that are able to respond to a dynamic market [10]. Not only that, but also TOGAF ADM is designed and implemented to provide a blueprint guide for future IS/IT development that is carried out to connect information dissemination and develop mobile application-based businesses [11] and for Android-based mobile application development [12].

Therefore, this organization requires an enterprise architecture design to be used in solving problems that occur in the Mobile Referral Marketing application. Thus, an Enterprise Architecture design using the TOGAF framework needs to be done.

1.1. Research Question
Based on the problems statement that have been described, is the TOGAF framework can be applied in designing an Enterprise Architecture for the application of mobile referral marketing application?

2. LITERATURE REVIEW
2.1. Enterprise Architecture
Enterprise Architecture is a concept or practice for improving company performance that provides an integrated and standardized organizational logic for business processes and information technology consisting of long-term company processes, systems and technologies. To describe an enterprise architecture, a plan is needed to define and identify business, data, application, and technology requirements that can describe an enterprise architecture [13]. With a function as a blueprint for a system to be built, Enterprise Architecture shows how the components of an organization carry out business processes, organizational responsibilities, service technology and platform information (work plans), so that they can adapt to create a strong mechanism to fit the organization that is being used. run in a structured manner. In addition, blueprints are defined systematically on an organizational
environment coupled with processes for development and maintenance [14].

By using Enterprise Architecture (EA) with the hope of providing solutions and desired, explanation and documentation between business and information technology in which the baseline architecture and target architecture are described so that harmony will be created between business strategy and ICT strategy. A structured Enterprise Architecture is able to operate innovation projects with more synergy and flexibility, because enterprise architecture acts as a reflection for business processes in organizations that provide opportunities to modify and coordinate business [15]. Although EA is related to information system architecture and development, it is an approach to a comprehensive enterprise architecture modeling, in which standard information system components are provided, and the organization and software model architecture embedded in information systems will be implemented [16].

2.2. TOGAF ADM

TOGAF ADM is a detailed method or framework for planning, designing, implementing, managing, evaluating and implementing governance for the improvement of company performance in an integrated manner.

TOGAF ADM defines eight consecutive phases (A to H) and two other specific phases: the preliminary phase and the requirements management phase. Figure 1 shows the most commonly referred to the TOGAF diagram, which summarizes this approach through solving its four parts, which are business, information technology (IT), planning, and change. The following are the phases in TOGAF ADM [17]:

1) Preliminary Phase

The Preliminary phase is an initial phase which is preparation before planning an enterprise architecture. The sequence of steps in the preliminary phase and the time they start and finish formally must be adjusted to the existing situation in accordance with the existing architectural governance. The purpose of this phase is to prepare the company to realize architectural work and to enable the company to master the management and transformation of the architecture to be designed.

2) Requirement Management Phase

Requirement Management is an activity that involves rationalizing, hierarchical organization, and monitoring of a series of requirements grouped together in a special repository. The objectives of this phase are to translate the objectives of the architecture in concrete terms, organize architectural requirements based on criteria to make them easier to analyze objectively, and facilitate the identification and maintenance of relationships to other architectural elements which can be of assistance in making valuable decisions. In the requirement phase, the Phase A to Phase H sequence is broken down as follows:

a) Phase A: Architecture Vision

This stage determines the scope, stakeholders, objectives, requirements, and principles when designing the enterprise architecture. Phase A has two objectives, namely developing and enriching the elements produced in the initial phase and preparing for the next phase by providing a general representation of the baseline architecture and target architecture.

b) Phase B: Business Architecture

This stage describes the development of the business architecture to support the agreed architectural vision. The purpose of the business architecture stage is to describe the basic business architecture, determine to develop a business architecture target, and analyze the gap between the current state and the business architecture target. If this is developed properly, then the target solution can be carried out and the conclusion can be observed.

c) Phase C: Information System Architecture

This stage describes the information system by identifying the existing data and application components. The goal of Phase C is to develop a target architecture that includes one or more data and application systems. Information systems architecture focuses on defining the applications and data that support an organization's business architecture.

d) Phase D: Technology Architecture

This stage describes the mapping of application components defined in the
application architecture phase into technology components, software and hardware components that are configured in the technology platform for the architectural solution to be planned. The purpose of stage D is to carry out technology design by identifying existing technology components and determining the requirements needed by the company in the future.

e) Phase E: Opportunities and Solutions
This stage reviews the gap analysis from the business architecture phase, the information systems architecture phase and the technology architecture phase. New business opportunities from the architecture in the previous stages that may arise will be identified which will form the basis of the implementation plan needed to achieve the architectural design objectives.

f) Phase F: Migration Planning
This stage makes a migration plan, including job priorities. The objective of this stage is to select several implementation projects based on priority. It aims to create an architectural design timeline in the form of a roadmap.

g) Phase G: Implementation Governance
This stage establishes an architectural contract with the implementation of the project which is for the review of the suitability of the project. This stage aims to develop implementation management, including compiling and formalizing a team, compiling project management, making a communication management of the project in order to create alignment of goals between business and information technology to achieve the goals set by the organization.

h) Phase H: Architecture Change Management
This stage handles the management of the architecture that is being used, namely change management or change management, including the evaluation of change requests that have an impact on the architecture. This stage is an important stage because the IT infrastructure will continue to develop according to existing business needs. The purpose of this stage is to build a change management process architecture for the new baseline architecture that is carried out after the implementation management stage is carried out.

2.3. Mobile Application

The mobile application is an application that allows for mobility where users can make transactions and obtain information. Basically, mobile applications are used to facilitate the service process so that users can access the system in real-time. Therefore, mobile applications are more convenient and easier to use on smartphones and tablets than using applications on other devices. The increasing role of a mobile application from being just an entertainment application to being an application that acts as a personal system makes a mobile application an indispensable thing. This is evidenced by higher download rates and longer educational time and some statistics showing that people are increasingly dependent on mobile applications.

Due to the benefits of mobility, mobile applications are becoming a popular marketing tool for many companies and create a better understanding of how various mobile application features impact consumer engagement [4]. To build a relationship with customers, it is important to understand how design applications based on customer preferences. The results indicate that feature perception such as design solutions and information quality will result in higher engagement which leads to continuous usage of mobile applications. In addition, consumer engagements positively affect user intention or user intention to use the mobile application [5].

2.4. Customer Relationship Management

Customer Relationship Management (CRM) is a strategy carried out to manage interactions between companies and customers to help improve business performance, customer satisfaction and retention and optimize customer value for current and future companies. CRM is considered a key factor in organizational success due to its task of analyzing customer history data with companies that focus on ways to retain customers and helping sales growth. This results in higher profits through increased business from the company's customer base. CRM plays a major role in increasing market share, increasing productivity, increasing employee morale which means increasing in-depth customer knowledge and also higher customer satisfaction to increase customer loyalty the company will also have clear information as to what their customers are, what their needs are, and what will make them more satisfied [18]. Even so, the success of CRM is strongly influenced by the use of information technology, customer orientation, organizational capabilities, and customer knowledge management [19]. Companies that successfully implement CRM will reap rewards in customer loyalty and long-term profitability. However, successful implementation is difficult for many companies to understand, largely because they do not understand that CRM requires business process reengineering that is customer-focused across the company, cross-functional, and customer-focused [20].

2.5. Customer Referral Program

Customers acquired through referral programs show higher margins and lower churn action than customers acquired through other means [21]. The main advantages of the referral program consist of greater credibility towards the recommendation of relatives for paid advertising, easier access to new customers, and better matching of referred customers for a good or service [22]. Two mechanisms in the referral program, namely
better matching and social styling, enable companies to leverage their customer network to acquire new customers over a long period of time and convert social capital into economic capital. To encourage customer referral behavior and expand the customer base, providers of innovative products and services often use customer referral reward programs (CRP). Referral programs with higher rewards strengthen attitudes and behaviors, while smaller rewards only affect the behavioral dimensions [23]. Rewarded referrals can reduce the risk of customer churn [24] and the strongest and most significant driver of successful referral reward program participation is metaperception (i.e. the process by which individuals determine the possible impressions of them and their behavior) followed by the attractiveness of gifts [25]. Consequently, customers believe that the incentive referral doesn't look bad (or even looks good) and that the incentive is considered attractive.

3. **RESEARCH METHOD**

![Research Method Framework](image)

**3.1. Identifying Problems**

The author understands the background of the development of the consumer finance sector in Indonesia and the problems that are occurred at the company, especially in the mobile referral marketing.

**3.2. Method of Collecting Data**

1. **Literature Study**

Literature studies are carried out by referring to references such as papers that are in related with research, books and websites related to solutions to solve problems that occur in mobile referral marketing.
Method of Designing EA with TOGAF ADM:

1. Preliminary phase
   This phase aims to determine and define appropriate principles to establish the basis for managing the application architecture in the future by determining the scope of the enterprise architecture design for mobile referral marketing.

2. Architecture Vision
   This phase aims to define goals, stakeholder involvement, identify activities to be carried out, and evaluate SWOT on EA design for mobile referral marketing.

3. Business Architecture
   This phase aims to identify the current state of the application by determining the requirements needed by the company's business in the future. Requirements are used to design the business architecture for the target architecture in the EA design for mobile referral marketing.

4. Information System Architecture
   This phase aims to design an information system by identifying existing data and application components by determining the requirements needed by the company in the future. Requirements are used to design the target architecture in the EA design for mobile referral marketing.

5. Technology Architecture,
   This phase aims to carry out technology design by identifying existing technology components and determining the requirements needed by the company in the future. Requirements are used to design the target architecture for the technology architecture in the EA design for mobile referral marketing.

3.4. Defining Conclusion
The conclusions that will be given after the enterprise architecture design with TOGAF ADM in the mobile referral marketing application that contains the result of the identify and design process of the architectural principles.

4. RESULT AND DISCUSSION
4.1. Determining Current Systems
1. Application of Mobile Referral Marketing
   Reference for Regular Product Submission can be made by all types of users (general users and employees). This process is used to view lists or lists of regular and multipurpose financing products. After the user fills out the list, the user sends his credit application which is then considered as an order. On this page there are three choices of financing products, namely:
   a) Reference for Regular Product Loans (Cars, Motorcycles, and Multipurpose Financing).
   b) Reference for Car and Motorcycle Loan Packages
   Car & Motorcycle Loan Package menu that can be done by employees. This process is used to see the availability of car loan packages specifically for users. The packages are categorized by car brand. After the user fills the package, the user sends his loan application which is then considered as an order.
   c) Reference for Motorcycle Loan Program Packages
   Motorcycle Loan Program Package that can be carried out by users who are registered as employees of the company. This process is used to see the availability of a motorcycle loan program package specifically for employees. After the user fills out the package, the user sends his loan application which is then considered as an order.
   d) Browse Order
   Browse Order menu can be performed by all types of users (general users and employees). This process is used to view the status of orders that have been submitted previously based on the time period of the order.

2. Application of Sales Traffic Coordinator
   This application system is used by internal parties in the Business Relations section in monitoring and assigning orders to branches that have been submitted by users of customer-based applications, such as this mobile referral marketing application in following the development of credit application status made by external parties.
3. Application of Survey

This application system is an Android mobile-based application that is used to assist in conducting online surveys of customers to submit orders for motor vehicle financing.

4. Application of Account Acquisition

The Account Acquisition application is an application to manage, manage, and monitor submissions that are being processed. One of the modules used in the account acquisition application for the mobile referral marketing application is the data entry module. Data Entry is used to complete customer data from the survey application.

4.2. Analyzing Current System

Mobile referral marketing was developed to get orders from consumer finance on a referral basis targeting the digitally literate market. The application system that has been implemented in 2017 has input from users that the performance of this mobile application is still not good and not informative so that users of this application have not felt helped in making referrals. In addition, users say that the mobile referral marketing application does not update regularly, causing bugs and errors so that users feel uncomfortable using it.

When observing the application, the mobile referral marketing application does not yet have an online chat feature to assist users in making submissions and does not have real-time notifications regarding the status of the submission made. Meanwhile, the database observation is still redundant.

The omnichannel applied describes a consistent and coordinated strategy, especially for interacting with customers and prospective customers and providing the best service to customers and potential customers. A strong omnichannel strategy remains an effective and sustainable way to retain customers and increase sales.

Therefore, this method is needed to implement mobile referral marketing by implementing customer service on social media and online-chat to make it easier for users to contact internal parties, making it easier for users to carry out business processes. In addition, API embedding will be carried out from the website to forward promo information and the latest news from available websites.

It can be seen that to fill in the user's address is still manual. This is less efficient in filling in the address and postal code fields. Google Maps API is used as a feature that performs functions related to mapping applications. This will make it easier for customers to input data, namely address data. Google Maps API embeds are built with Javascript.

For now, consumer finance company plans to migrate to technology containers that previously used virtual machines. This is done so that developers have a consistent development environment on the workstation by packaging the results of development and configuration into an image file. These files can be sent and run on the destination storage server environment. In addition, mobile referral marketing is planned to be integrated from the core system that has been developed.

4.3. Designing Future Systems using TOGAF ADM

After analyzing the current system, the following is the design of the enterprise architecture using the TOGAF framework:

1) Preliminary Analysis

Preliminary Analysis is the initial phase of the TOGAF ADM framework in defining appropriate principles for managing business needs in the enterprise architecture on which mobile referral marketing is made. This phase consists of the following stages:

a. Scope of the Enterprise Organization Impacted

The enterprise architecture design carried out by the author will have an impact on the organization in carrying out mobile referral marketing business processes. The applications involved include the Sales of Traffic Coordinator Application, the Survey Application, and Account Acquisition application.

b. Confirm Governance and Support Frameworks

The process of designing enterprise architecture on mobile referral marketing uses the TOGAF ADM framework.

c. Define and Establish Enterprise Architecture Team and Organization

The enterprise architecture design process for mobile referral marketing was carried out with the support of the Department of Enterprise and Digital Solution.

d. Identify and Establish Architecture Principles

The process of designing enterprise architecture in mobile referral marketing requires identification of the principles to be achieved. This stage will produce a principle catalog which can be determined as follows:

<table>
<thead>
<tr>
<th>No</th>
<th>Principles</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Utilizing services</td>
<td>Business Principles</td>
</tr>
<tr>
<td>2</td>
<td>Providing benefits for companies based on referral</td>
<td>Business Principles</td>
</tr>
<tr>
<td>3</td>
<td>Business continuity based on referral</td>
<td>Business Principles</td>
</tr>
<tr>
<td>4</td>
<td>Transparent</td>
<td>Business Principles</td>
</tr>
<tr>
<td>5</td>
<td>Data as an Asset</td>
<td>Data Principles</td>
</tr>
<tr>
<td>6</td>
<td>Trusted Data</td>
<td>Data Principles</td>
</tr>
<tr>
<td>7</td>
<td>Integrated Data</td>
<td>Data Principles</td>
</tr>
<tr>
<td>8</td>
<td>Accessed Data</td>
<td>Data Principles</td>
</tr>
<tr>
<td>9</td>
<td>Secured Data</td>
<td>Data Principles</td>
</tr>
<tr>
<td>10</td>
<td>Ease-of-Use</td>
<td>Application Principles</td>
</tr>
<tr>
<td>11</td>
<td>Implementing Online-Chat</td>
<td>Application Principles</td>
</tr>
<tr>
<td>12</td>
<td>Implementing Platform-as-a-service (PaaS)</td>
<td>Technology Principles</td>
</tr>
</tbody>
</table>
e. Tailor TOGAF and, if any, Other Selected Architecture Framework(s)

There is no identification related to the enterprise architecture framework used before, because this company does not use the framework in developing mobile referral marketing applications.

f. Implement Architecture Tools

In this study, there are several tools used to support the design of enterprise architecture on mobile referral marketing applications, namely Microsoft Office, explaining business process models with Business Process Modeling Notation (BPMN) using Visual Paradigm, and Unified Modeling Language (UML) using Visual Paradigm.

2) Architecture Vision

1. Value Chain Analysis

In Figure 4 is the Value Chain Analysis of the consumer finance company. Value Chain Analysis includes support activities and primary activities in it.

2. SWOT Analysis

Table 2. SWOT Analysis

<table>
<thead>
<tr>
<th>Strength</th>
<th>Weakness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is a finance company from a state-owned enterprise</td>
<td>Financing company that has only been running for 5 years</td>
</tr>
<tr>
<td>Have a good work culture</td>
<td>Limitations in terms of information technology</td>
</tr>
</tbody>
</table>

Opportunities

<table>
<thead>
<tr>
<th>Opportunities</th>
<th>Threat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reach out through business partners</td>
<td>Customer dissatisfaction</td>
</tr>
<tr>
<td>Have a referral marketing concept in consumer finance</td>
<td>Decreased transactions</td>
</tr>
</tbody>
</table>

In table 2, the following is a SWOT analysis of the mobile referral marketing application.

3) Business Architecture

The future business architecture includes:

a) Inputting Address using Google Map API

With google map API user tends to input the address easier than using manual input.

b) Have online-chat platform

Mobile Referral Marketing is still not using Online Chat. This is important to maintain the customer relationship.

4) Information System Architecture

a) Data Architecture
Figure 5. Future Data Architecture

In Figure 5 is the Future Data Architecture which redundancies has been minimalized by using generalization and primary keys.

b) Application Architecture

The future application in carrying out the operations of the Mobile Referral Marketing application is CRM Omnichannel Chat. This application helps business people to communicate in real-time with potential customers who are interested in business products in the form of chats and forms that customer can asked out to provide questions or complaints.

The following functions exist in omnichannel chat:

1. Customer Support Channel

   Customer Support Channel is a feature to connect agents with customers as a support channel for customers. In this feature, the customer support channels they have are as follows:

   a) Email-based Conversation

   With email-based conversations, customers can contact agents via email.
b) Online-chat
With online-chat, agents can help customers with live chats that facilitate real-time conversations.

c) Online-messaging Social Channel
With online-messaging social channels, agents can help customers with live chats that facilitate real-time conversations by connecting this application with applications that have direct messaging features.

d) Call center
With the phone, agents can connect with customers to keep users in touch with their needs.

2. Ticketing Systems
This feature is used to accommodate customer needs such as certain requests, questions, or complaints so that the settlement process is easier to track in the form of a ticket.

5. Reporting and Analysis
This feature integrates data from each channel to provide insights in graphical form

5) Technology Architecture
The Future Technology Architecture includes:

a) Topology of Docker-Container Architecture

![Figure 6. Topology of Docker Container Architecture](image)

In Figure 6, there is a topology of docker container architecture for target mobile referral marketing application. From the infrastructure running the Linux Redhat operating system and distribution to Docker located in the cloud. Some containers will perform binary/library functions, and related applications such as mobile referral marketing applications, sales traffic coordinator applications, survey applications and acquisition applications.

b) Topology of Server Target

![Figure 7. Topology of Server Target](image)

In Figure 7, there is a target server topology on the mobile referral marketing application. It can be seen from the image that the web server and web application are in a Docker container. Meanwhile, all database servers are outside the container. Web servers and web applications can be stored there in the form of images that will support mobile referral marketing applications, sales traffic coordinators, surveys, and acquisitions.

5. CONCLUSION
After this research has been conducted, it can be concluded that TOGAF can be used as a framework for designing enterprise architecture of mobile referral marketing application that is used to design, plan, implement, and manage enterprise architecture information by conducting an assessment of business needs, development methods, and used tools. In the development of an architecture that can respond to a dynamic market and provides blueprint for future IS/IT developments that are carried out to connect information dissemination and develop an android-based mobile application business.

Based on the process of elaborating and identifying the architectural principles of the TOGAF framework which consists of Preliminary Phase, Architecture Vision, Business Architecture, Information Systems Architecture, Technology Architecture, it can be explained that the author can design an Enterprise Architecture information system model for the consumer finance company that can be applied to mobile referral marketing applications with the application of TOGAF.

The process of elaborating the TOGAF framework can reduce problems related to application development and application performance that is less informative and improve the mobile referral marketing business process so that it can provide additional value for the company which is a guideline for the development of enterprise architecture on mobile referral marketing applications in
the future and assisting other research aimed at improving the quality of IS/IT.

REFERENCES:


