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Enterprise Architecture Design of PT Hariansyah Karya Group Information System Using TOGAF ADM

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Abstract— The rapid development of information technology provides great benefits in the business world, but its utilization must be aligned with industry goals to avoid failures arising from lack of planning PT Hariansyah Karya Group is a service provider company with various business units under its auspices facing challenges in selecting and implementing information systems and information technology in accordance with business needs. This research focuses on designing an integrated enterprise architecture using the The Open Group Architecture Framework (TOGAF) framework and the Architecture Development Method (ADM) to meet the business needs of PT Hariansyah Karya Group and analyze business needs and design appropriate architectural solutions. The research includes five main phases of TOGAF ADM: Preliminary Phase, Architecture Vision, Business Architecture, Information Systems Architecture, and Technology Architecture. The results of the research are used as a guide for developing an integrated information system at PT Hariansyah Karya Group that can increase operational efficiency, improve coordination between business units, and support company growth to adapt to technological developments. In addition, this research aims to improve the performance and efficiency of business processes at PT Hariansyah Karya Group after the implementation of the new enterprise architecture. With good enterprise architecture planning and in accordance with business strategy, PT Hariansyah Karya Group is expected to optimize its business processes and reduce the risk of information system implementation failure.

Keywords— Enterprise, Architecture, Information Systems, Information Technology, EAP, TOGAF ADM

I. INTRODUCTION

The role of information systems and technology in carrying out business processes is currently needed(Rifaldi & Dewi, 2022). One of the driving factors for the use of information systems in organizations is the increasing need in the business functions carried out(Putra & Abdulah, 2022). Information technology is the main choice in creating an organization's information system that is resilient and able to create a competitive advantage in the midst of today's increasingly fierce competition(Machmudi, 2019). The rapid development of information technology has caused major changes in the operation of an organization(Irianto et al., 2023). information technology currently has a major beneficial impact on the business and economic world. The use of information systems and technology must be aligned and in accordance with industry goals because there are many cases of failure to achieve goals that are not based on a strategic plan for utilizing information technology(Andry et al., 2022). Without proper governance, large investments in information systems and technology will be in vain(Sarosa, 2021).

PT Hariansyah Karya Group is a company that focuses on services located at Jl. Juanda 1 Samarinda. The company has several business services under its umbrella that provide a variety of services to meet customer needs. For example, Friend Production, which manages various types of events such as gatherings, music concerts, and MICE (Meeting, Incentive, Convention, Exhibition). Meanwhile, OKE Multimedia provides LED screen rental services and other needs for events, HK Food is present as a food provider, Katuju provides news services, HK Technology provides information technology system creation services and game development. HK Teknologi has an application/Start-up called My Events that focuses on virtual event organizing services that provide services such as virtual exhibitions, Virtual streaming Jockey and Creative Design. For organizations, having a business strategy is not enough to face competition among organizations. The business strategy outlined in the business plan must be complemented by an information system strategy or information technology(Kasenda et al., 2014). With the changes and developments in technology in the business world, PT Hariansyah Karya Group often faces various challenges in selecting and implementing technology that suits business needs and aligns business strategies and information technology strategies and applies information systems to support business processes and coordination between various business units and existing business services. The main cause of PT Hariansyah Karya Group's failure in implementing

information systems or information technology is due to the lack of careful planning for the implementation of information systems or information technology. Without a clear design, the investment in information systems or information technology that will be carried out will run without direction and the resulting contribution is not maximized and not in line with the goals to be achieved(Hartanto, 2017), therefore the research at PT Hariansyah Karya Group is focused on designing an enterprise architecture that will provide a framework for making appropriate long-term decisions by considering the interests of PT Hariansyah Karya Group as a whole.

The design of enterprise architecture is carried out to improve the operations and services of organizations and government agencies and to align information and business needs(Maita & Habibah, 2020). An integrated enterprise architecture can produce an architecture that facilitates and improves the efficiency and effectiveness of the company's business. The architecture must be designed by considering the business needs of the organization as well as technical factors(Pratama et al., 2023). Planning and designing enterprise architecture requires a complete and easy-to-use methodology(Sasgita & Assegaff, 2022). When designing an enterprise architecture model, a framework is needed to manage complex systems and can align business with information technology that will be developed in the organization(Firnaldo et al., 2023). This research uses the TOGAF (The Open Group Architecture Framework) methodology as the main foundation. The method used is the Architecture Development Method (ADM). Through this method, it is expected to create a good architectural framework that allows PT Hariansyah Karya Group to optimize business processes, improve efficiency, and better respond to future business challenges. The existing problems were analyzed using TOGAF (The Open Group Architecture Framework) to make proposals for strategic planning of information systems in order to align the vision and mission and support the organization's strategic plan(Entas, 2016). TOGAF ADM states a clear vision and principles on how to develop enterprise architecture(Sofyana, 2017). TOGAF is a framework developed by The Open Group. TOGAF provides methods for designing, evaluating, and building the right architecture for an organization and also for maintaining enterprise architecture. One of the advantages of using the TOGAF framework is that it is flexible and open source. The scope that will be discussed in this research is using TOGAF ADM, which includes five phases, namely Preliminary Phase, Architecture Vision, Business Architecture, Information Systems Architecture and Technology Architecture. The result of this design is to make a strategic planning proposal for information systems that can be the basis for the development of integrated information systems to support the needs of PT Hariansyah Karya Group, especially in service providers.

II. RESEARCH METHOD

In this study, some phases of the TOGAF ADM cycle were not used by researchers because these phases require higher authority or action and coordination because they are related to implementing and managing change. The stages used in this study include:

A. Preliminary Phase

The method carried out at the Preliminary Phase stage includes several aspects, such as determining the scope of PT Hariansyah Karya Group that will be covered in architectural design, determining the framework, tools that will be used in the development of architecture and establishing architectural principles. In the architecture design of PT Hariansyah Karya Group, 5W+1H identification is used to collect the information needed to design an effective architecture and explain the objects involved during architecture design. The object of designing enterprise information system architecture in this research includes who, what, where, when, why, and how as well as determining the principles of designing enterprise information system architecture at PT Hariansyah Karya Group which describes the characteristics and objectives of the information system architecture and information technology to be developed.

B. Requirements Management

In the requirements management phase, the problems that exist in the existing business processes in business services at PT Hariansyah Karya Group began to be carefully identified, including the process of human resource management and business service administration. This stage is to identify the needs of the information system that have not been met and the challenges faced. With a good understanding of the existing problems, the next step is to determine the appropriate information system solution to overcome the problems in the service process at PT Hariansyah Karya Group.

C. Architecture Vision

This phase is the stage of determining the scope of the architecture that has been identified in the previous stage. At this stage, vision definition is carried out by analyzing and understanding the profile of PT Hariansyah Karya Group such as history, vision, mission, and organizational drivers and determining business activities by grouping or mapping business activities at PT Hariansyah Karya Group with value chain diagram analysis. The value chain identifies and connects the various strategic activities of the company(Puspitasari et al., 2020). Value chain analysis at PT Hariansyah Karya Group includes main activities and supporting activities. After analyzing the value chain, identification of stakeholders who play a role in designing the information system architecture at PT Hariansyah Karya Group is carried out. In this Architecture Vision phase, the data generated includes Value Chain Diagram and Stakeholder Map Matrix.

D. Business Architecture

The Business Architecture phase in designing the information system architecture of PT Hariansyah Karya Group is useful for helping to understand how the parts of the company interact with each other, share information, and work together to achieve common goals. To obtain

information about the business architecture at PT Hariansyah Karya Group, the steps taken are identifying business service mappings described in the form of tree diagrams and defining business services, business functions, and business processes that exist in the company.

E. Information Systems Architecture

This stage will discuss the data architecture and application architecture currently running at PT Hariansyah Karya Group and analyze the data architecture and application architecture described by UML. Unified Modeling Language has many diagrams that can accommodate various points of view of a software to be built such as Use Case Diagram, Class Diagram, Activity Diagram and Sequence Diagram(Andrea et al., 2019). The result of this stage is to determine the application architecture and data architecture for the development of information systems in the future.

1. Data Architecture

In this phase, the identification and definition of data entities in the business services of PT Hariansyah Karya Group is carried out as well as analyzing and mapping the relationship between data entities and business functions that will be made based on the processes in each business service that have been determined in the previous phase and then describing the relationship between entities with one another in the form of class diagrams. The results of the proposed data architecture in the design of enterprise architecture information systems at PT Hariansyah Karya Group are described by data entity/data component catalog, data dissemination diagram, and class diagram.

2. Application Architecture

The application architecture is identified and defined based on the needs of the information system at PT Hariansyah Karya Group to manage data and support decision making in each business function and exchange information between business functions. This stage will define the functions of the applications needed by PT Hariansyah Karya Group and describe the functionality of the system and the actors involved, according to predetermined needs in the form of use case diagrams.

F. Technology Architecture

The Technology architecture phase is a stage in the development of information systems and information technology where the components of PT Hariansyah Karya Group's business services that have been described in the previous phase begin to be designed and adjusted into technological components such as software, hardware, and networks. At this stage, identification and analysis are carried out on which technology will be applied which is tailored to the needs of the company.

III. RESULT AND DISCUSSION

A. Technology Architecture

This Preliminary Phase will define the objects involved, the basic principles of architecture design, and the framework used to design the enterprise architecture of information systems at PT Hariansyah Karya Group. In determining the principles of architecture, PT Hariansyah Karya Group refers to the needs of the company based on four main principles, namely the principles of business, data, applications, and technology. The principle of designing the enterprise architecture of the information system of PT Hariansyah Karya Group is described by the principle calatog in table 1.

Table 1. Principle Catalog

Principle Category	Architectural Principles
Business Principles	Alignment to Vision and Mission
	Flexibility in Response to Market Changes
	Integration between business entities
Data Principle	Data Security and Protection
	Data Consistency and Quality
Application Principle	Scalability and Flexibility
	Operating in an integrated manner
Technology Principle	Adoption of Latest Technology
	Efficiency and Performance
	Changes based on business needs

B. Requirement Management

From the results of observations and analysis of services and business processes at PT Hariansyah Karya Group, a description of the problems that exist in the company's services and business processes is obtained. A description of the problems that exist in the services and business processes of PT Hariansyah Karya Group as follows:

1. In the current business process, PT Hariansyah Karya Group uses Microsoft Office and WhatsAppas business support applications, resulting in a number of serious problems in terms of work efficiency, coordination between sections and related to data management, such as inaccurate data, difficulty in meeting information needs quickly, and the risk of losing important data.
2. The manual management of event reports caused delays in the flow of data to the client. In addition, due to its manual nature, data is vulnerable to damage and loss, which can result in inaccurate information and obstacles in business operations.
3. Not having a dedicated system to manage employee data and a payroll system integrated with the finance department, causing various operational issues including delays in salary processing, risk of miscalculation, and obstacles in effectively monitoring employee performance.

C. Architecture Vision

This phase is a determination of the scope of the architecture that has been identified in the previous stage. The parts identified are activities that run at PT Hariansyah Karya Group. These activities are described by mapping the needs within the scope of the main activities and supporting activities in the form of a value chain diagram, which can be seen in Figure 1.

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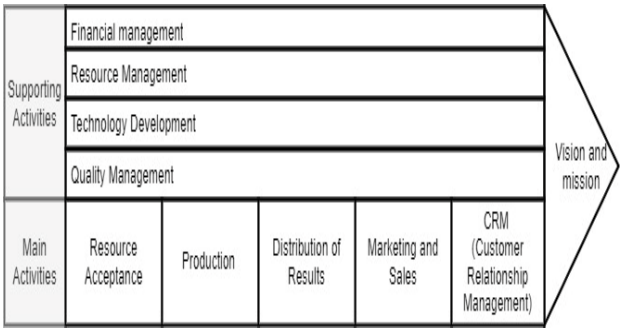

Figure 1. Value Chain Diagram

D. Business Architecture

The Business Architecture phase describes the current business services and the interactions between various business processes and business functions at PT Hariansyah Karya Group. The mapping of service provider business services currently running at PT Hariansyah Karya Group is depicted in the form of a tree diagram for a better understanding of the company's business structure and operations. The Tree Diagram of the current service provider business service mapping at PT Hariansyah Karya Group can be seen in Figure 2.

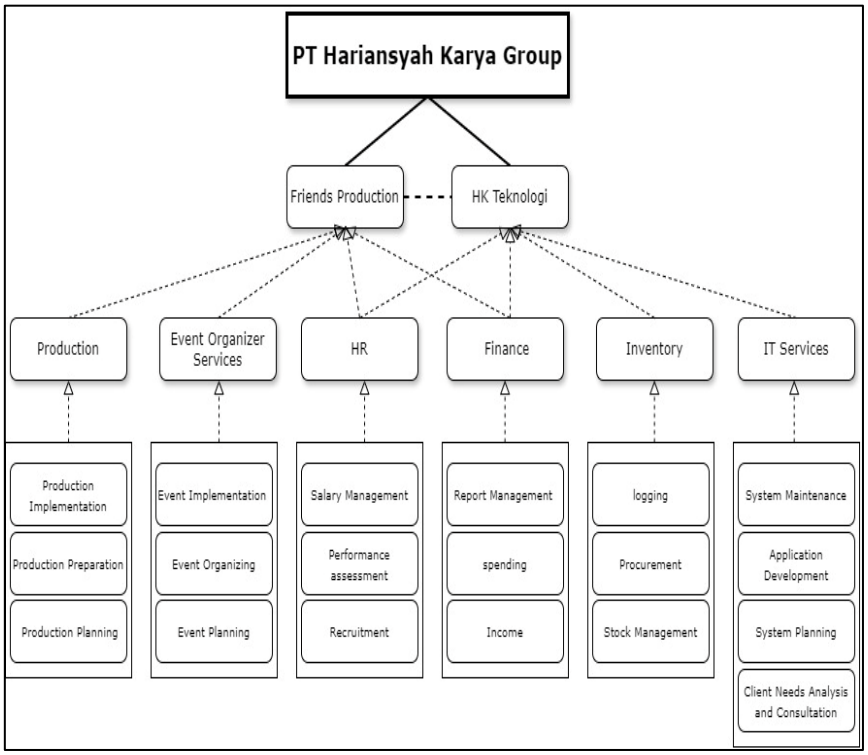

Figure 2. Tree Diagram of service provider business service mapping at PT Hariansyah Karya Group

E. Information System Architecture

The results of the analysis of the Information System Architecture Phase in this architectural design are described into two main architectures, data architecture and application architecture.

1. Data Architecture

Data architecture design is made by considering data from each business process in business services at PT Hariansyah Karya Group. Data entities in this phase are obtained from observations at PT Hariansyah Karya Group with reference to the current running conditions.

a. Data Dissemination Diagram

Data Dissemination Diagram describes how data in the business processes of PT Hariansyah Karya Group is disseminated or distributed into various business services and information systems or applications. Data Dissemination Diagram in the design of PT Hariansyah Karya Group information system architecture can be seen in Figure 3.

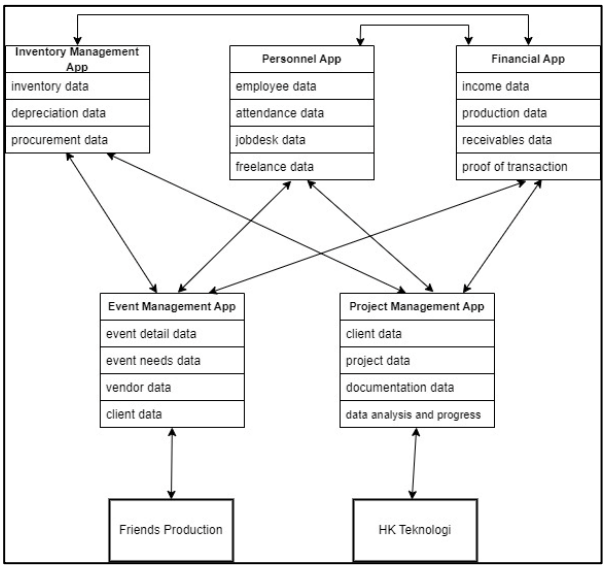

Figure 3. Data Dissemination Diagram

b. Class Diagram

Defining the data architecture of PT Hariansyah Karya Group at this stage is described using a class diagram, intended to describe the relationship between data entities that have been defined previously. Here is the class diagram of on the proposed data architecture of PT Hariansyah Karya Group's business services:

1. Class Diagram of Friends Production Business Services

This Class Diagram has six main classes including Event Details, Client Information, Vendor Information, Event Needs, Finance, and Reports. Class diagram in the data architecture phase on Friends Production business services can be seen in Figure 4.

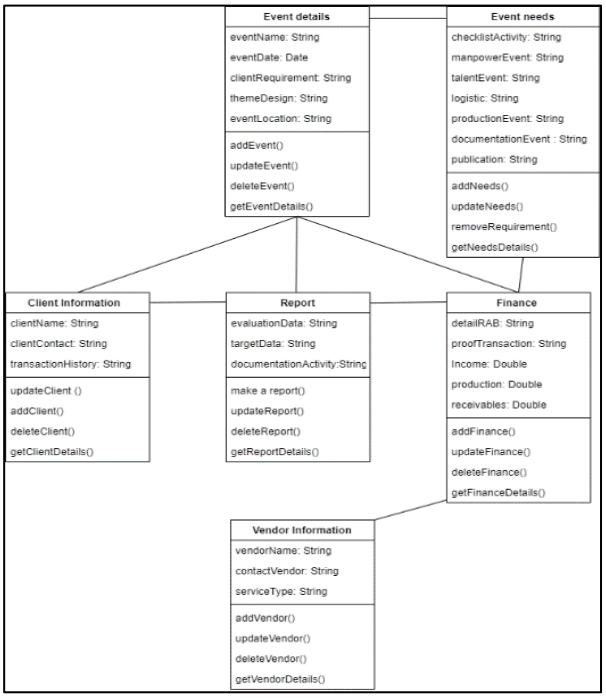

Figure 4. Class Diagram of Friends Production Business Services

2. Class Diagram of HK Technology Business Services

This Class Diagram consists of five main classes including System Specifications, Client Data, Finance, Resources, and Reports. Class diagram on HK Technology business services can be seen in Figure 5.

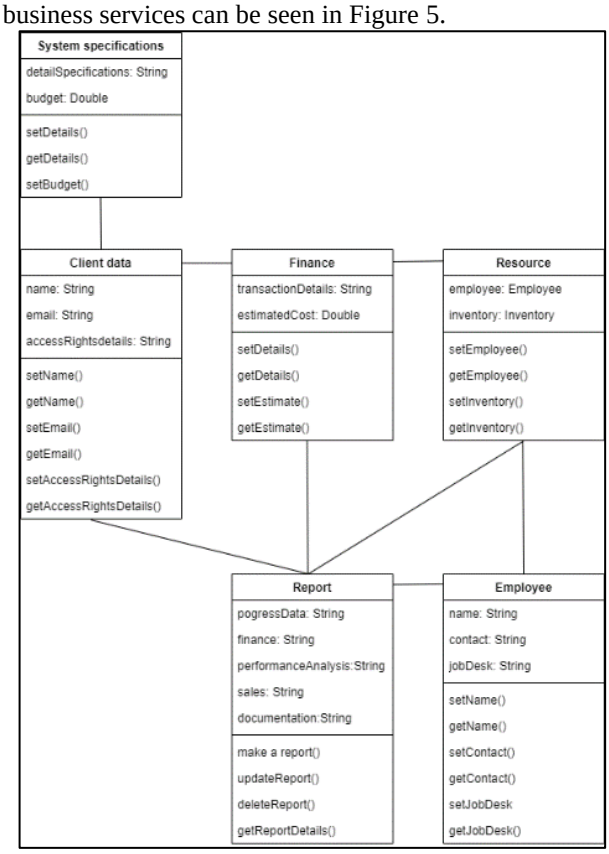

Figure 5. Class Diagram of HK Technology Business Services

2. Application Architecture

In this application architecture phase, a list of proposed technologies and an overview of the processes that exist in the proposed Information System using the Application portfolio catalog and use case diagram tools are made.

a. Application portfolio catalog

Application portfolio catalog describes the relationship between applications that will be implemented with existing business services at PT Hariansyah Karya Group. Application portfolio catalog in the architecture design of PT Hariansyah Karya Group is described in table 2.

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Table 2. Application portfolio catalog

Application	Description
Event Management Information System	This application is used by Friend Production to manage the event planning, execution and evaluation process. Its main features include event scheduling, managing client data, managing event production needs, participant management, vendor and sponsor data management, accommodation management, budget management, managing detailed event data and event content, activity promotion, activity recap reports, documentation, and evaluation material reports.
Profile Website System	The company profile website system is designed to provide complete information about the company to the public and stakeholders. The website serves as the company's official communication tool and includes various features to support user engagement and information dissemination. Its main functions and features include Homepage, About Us Page, Available Services, News and Events, Company Contacts, Career, Blog/Articles, Company History and Vision and Mission.
Project Management System	This application is used by HK Technology to manage software development and system integration projects. Its main features include client data management, project data management, resource management, progress tracking, documentation management, budget management, performance analysis, team collaboration management and backup and recovery.
Human Resource Management	A system to manage employee data, freelance data, volunteer data, job descriptions, and performance evaluations. Key features include hiring management, job desk management based on business service categories, performance appraisal, employment contract management, attendance and absence tracking, leave and work permit applications, and integration with financial systems related to employee salary payments.
Financial Management System	This application is used to manage the company's finances and accounting, including expenses, income, and debt and credit management. This financial management system is integrated with other information systems in the business processes in the company's business services including inventory management and human resource management systems. Key features include financial report generation, budget monitoring, and periodic analysis.
Inventory Management System	This application is used to manage inventory of goods and supplies for all business entities in PT Hariansyah Karya Group. Key features include stock management, real-time stock tracking, procurement scheduling, communication with suppliers, availability monitoring, depreciation management and periodic inventory reports.

b. System Use case Diagram

Use Case Diagrams are used to describe who are the actors involved in each proposed application that will be developed at PT Hariansyah Karya Group, what can be done by each application, and show the interaction of each actor with the use cases in each application.

1. Use Case of Event Management Information System

The event management information system application is designed to support the Friends production business process so that the event data management process becomes more efficient by optimizing features that are easy to understand. Use Case of event management information system on Friends production business services at PT Hariansyah Karya Group can be seen in figure 6.

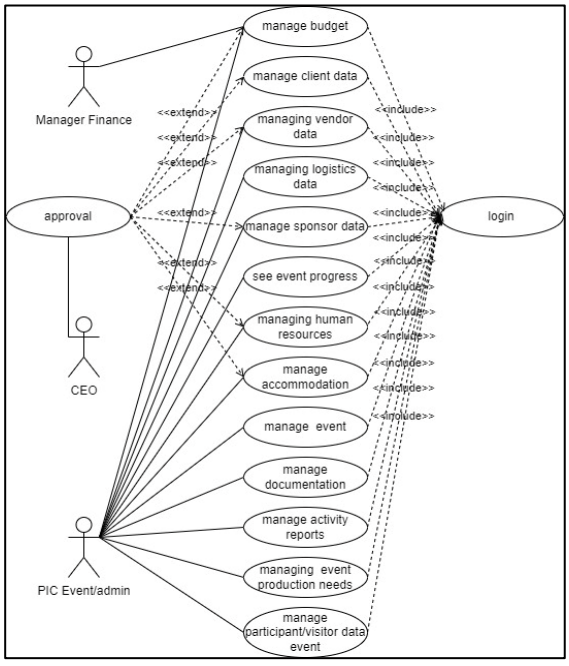

Figure 6. Use Case of Event Management Information System

2. Project Management System Use Case

This project management system is designed to support business processes in HK Technology business services that are integrated with project management systems, finance, and human resources. Use Case Project management system on HK Technology business services at PT Hariansyah Karya Group can be seen in figure 7.

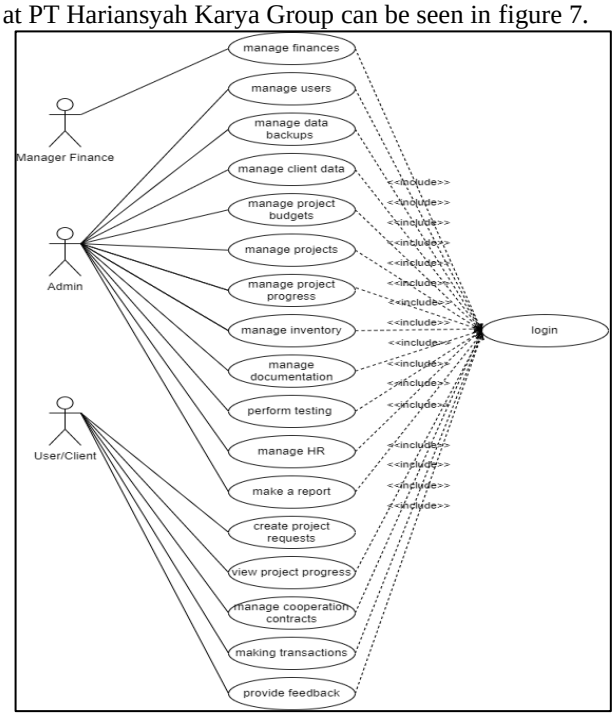

Figure 7. Project Management System Use Case

3. Use Case System Website Profile

Website Profile System improvement is proposed to support the business process of PT Hariansyah Karya Group. Use Case of Profile Website System in the business service process of PT Hariansyah Karya Group can be seen in Figure 8.

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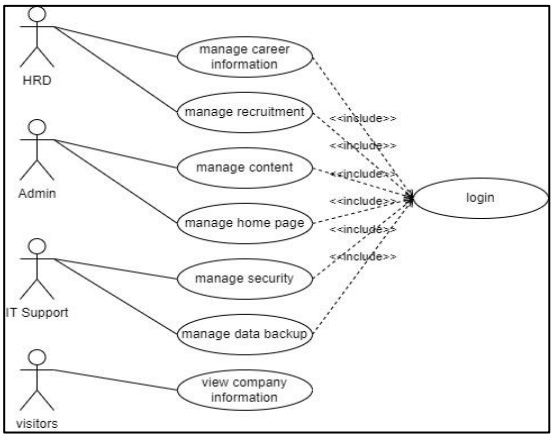

Figure 8. Use Case System Website Profile

4. Management System Use Case

The financial management system is designed to help manage finances at PT Hariansyah Karya Group efficiently and effectively, especially in terms of project budget management. The Use Case of the financial management system in the PT Hariansyah Karya Group business process can be seen in figure 9.

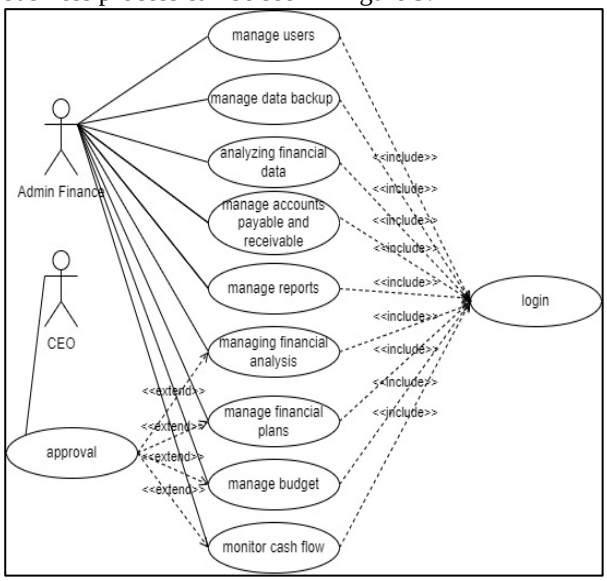

Figure 9. Management System Use Case

5. Inventory Management System Use Case

The proposed inventory management system application is designed to manage goods, requests, and stock items. With features such as item management, request management, reporting, and maintenance and repair. Use Case of the inventory management system at PT Hariansyah Karya Group can be seen in figure 10.

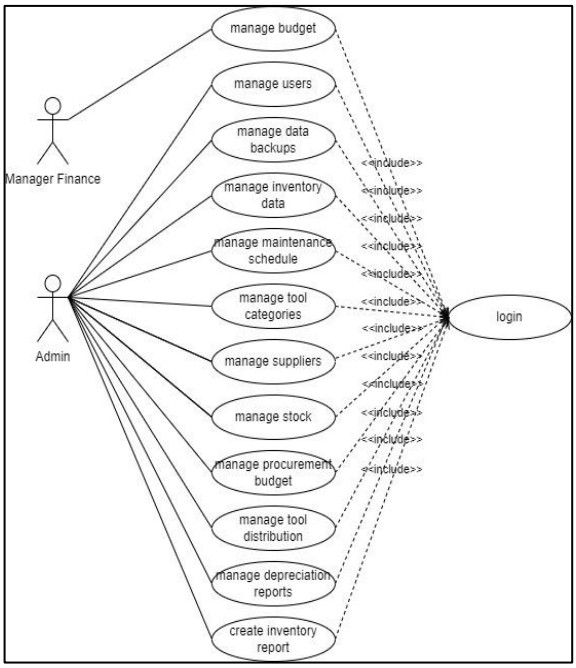

Figure 10. Inventory Management System Use Case

6. Human Resources Management System Use Case

The Human Resources Management application is used to manage employee and freelancer data in the business services of PT Hariansyah Karya Group which is integrated with the financial system application related to salary payments. The Use Case of the Human Resources Management system in the PT Hariansyah Karya Group business process can be seen in figure 11.

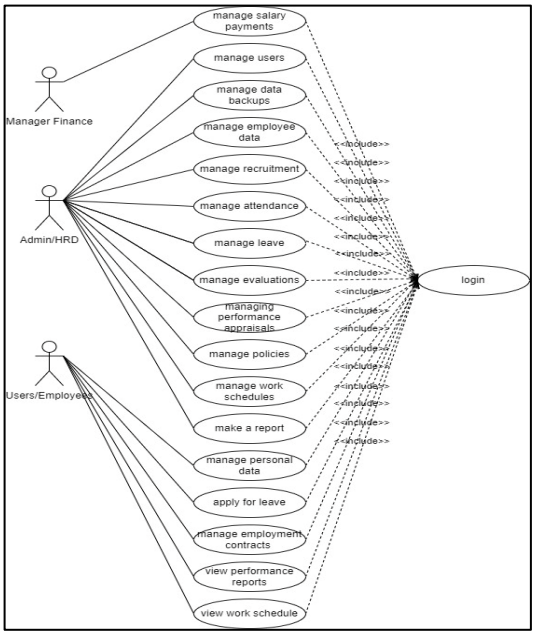

Figure 11. Human Resources Management System Use Case

F. Technology Architecture

Based on the observations that have been made and the results obtained in the previous phase, PT Hariansyah

Karya Group requires the application of appropriate technology to support the application of information systems in its business activities. In planning the technology architecture for PT Hariansyah Karya Group, a Network Infrastructure Diagram is proposed that is able to support the use of internet-based applications effectively and efficiently. This Network Infrastructure Diagram will describe the environmental conditions and location of the technology that will be applied at PT Hariansyah Karya Group. The proposed Network Infrastructure Diagram at the Technology Architecture stage in designing the enterprise architecture of PT Hariansyah Karya Group's information system can be seen in figure 12.

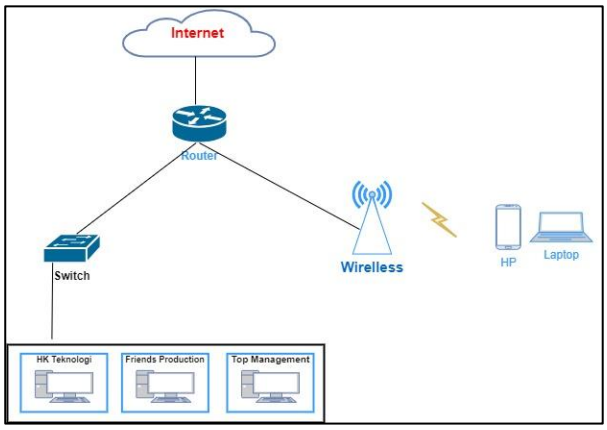

Figure 12. Network Infrastructure Diagram

IV. CONCLUSION

In this study, an enterprise architecture design of information systems was produced using the stages of the TOGAF ADM cycle which includes five stages, namely Preliminary Phase, Architecture Vision, Business Architecture, Information Systems Architecture, and Technology Architecture to align business activities with the development of information systems and information technology as well as proposals for developing information system applications that are integrated into each business service and optimize the use of information systems and information technology and data management in business processes at PT Hariansyah Karya Group and at the technology architecture stage a proposed hardware and software design is given that is tailored to future business needs to support the running of applications in business processes at PT Hariansyah Karya Group. For further development in the next research, it is necessary to develop a design at the next stage in the TOGAF ADM cycle, including Opportunities and Solution, Migration Planning, Implementation Governance, and Architecture Change Management and PT Hariansyah Karya Group needs to periodically evaluate the company's business needs and ensure that its information system architecture is still in accordance with the company's long-term business goals.

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