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A Development of the Go Village Application for Guminirejo Village Using a Web-Based Waterfall Method

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Abstract

Digital transformation has become a strategic step in improving the efficiency and transparency of village bureaucracy. This study focuses on developing the Go Village application to enhance the effectiveness of administrative services in Guminingrejo Village. The research employed the Waterfall model, with data collection techniques carried out through observation and interviews with village officials as well as local residents.

The Go Village application offers several key features that support the digitalization of village administrative services. In addition to providing online document submissions such as ID cards, police clearance certificates (SKCK), domicile certificates, family cards (KK), and public complaint services, the application also includes a letter tracking system to monitor the status of requests in real time. For administrators, an automated letter generation feature is provided using TinyMCE, while the village head can apply a digital signature based on barcode scanning to accelerate the document legalization process. Moreover, the application implements Progressive Web App (PWA) technology to improve accessibility across devices and integrates a complaint service feature that enables citizens to provide feedback on service quality.

The findings show that the Go Village application successfully accelerates administrative processes, increases service accessibility, and reduces queues at the village office. The letter tracking system further enhances transparency for citizens. However, limitations in the community's digital literacy remain a challenge that needs to be addressed in future development.

Keywords: *Digital Transformation, Village Administration, Go Village, Effectiveness, Digitalization*

1. Introduction

The process of digitalization has brought significant transformation across various sectors of life, including government administration. Digitalization enables the improvement of public service quality through the utilization of information technology, accelerating administrative processes, enhancing efficiency, and expanding access to information for society. In *The Fourth Industrial Revolution*, Schwab emphasizes that technological revolutions have reshaped global economic, social, and governmental structures [1]. Furthermore, the Ministry of Communication and Information Technology of Indonesia has stated that the government has launched various digital public service applications such as *PeduliLindungi*, *E-KTP*, and *Mobile JKN* as part of efforts to accelerate technology-based public service transformation [2].

However, despite the increasing expansion of digital innovations, the reality at the village level presents different challenges. According to a report by Bappenas, many villages in Indonesia still rely on manual administrative systems, from data archiving to letter and document services. This condition often results in slow, inefficient, and error-prone public service processes, which in turn hinder transparency and community participation [3].

This issue is reinforced by the statement of Tulus Iman Fitroni, a village secretary in Lamongan Regency, who noted that *"manual administration slows down the delivery of village services."* Similarly, a study entitled *"Training on Administrative Management Systems for Public Services in Lenteng Timur Village"* highlights that manual administration of documents (such as family cards and ID cards) often leads to disorganized records, difficulty in retrieval, confusion among staff, and ultimately suboptimal service. In addition, the lack

of human resources (HR) skills presents a major challenge to digitalization at the village level. Many village officials lack adequate information technology competencies, which frequently slows down or even hampers the adoption of digital solutions [4].

This condition requires serious attention from various stakeholders, both through providing technical training for village officials and ensuring adequate digital infrastructure. Synergy between the community and village administration is also essential, particularly through regular socialization activities aimed at improving understanding and participation in the use of digital systems.

With this background, the present study focuses on the development of a digital-based village administration system as a solution to improve the efficiency of public services. The system will be developed using the Waterfall method, which is considered appropriate for projects with clearly defined requirements from the outset. Before discussing the implementation in greater detail, it is important to first understand the characteristics of the Waterfall model as outlined in existing literature.

In the journal *Simulating the Software Development Lifecycle: The Waterfall Model*, it is stated that the Waterfall model is one of the most well-known classical software engineering models. It is considered the oldest software development life cycle model that continues to be used until today, serving as the foundation for subsequent development models [5].

Furthermore, according to the article *Using Waterfall Method to Design Information System of SPMI STIMIK Sepuluh Nopember Jayapura* published in the *International Journal of Computer and Information System*, the Waterfall approach involves several sequential stages, including analysis, design, implementation, testing, and maintenance. These clearly defined phases support the development of a more structured system, which in the context of this study, is applied to create an efficient village administration system aimed at improving public services. Each stage in the Waterfall method must be fully completed before progressing to the next phase, thereby minimizing the possibility of errors at later stages. With this approach, the system development process becomes more controlled and easier to evaluate at every phase [6].

This study focuses on the development of the "GO Village" application for Guminingrejo Village. The village requires a more efficient administrative system, particularly for managing village information, administrative services, and public complaints. Administrative services such as applications for ID cards (KTP), family cards (KK), moving certificates, business domicile letters, SKCK requests, and general domicile letters, which are currently still processed manually, often consume significant time and effort for both village officials and the community. The application also includes modern features such as barcode-based digital signatures, real-time tracking of application progress, and Progressive Web App (PWA) technology to enhance accessibility. By implementing the web-based "GO Village" application, administrative services in Guminingrejo Village are expected to become more integrated, accessible, and faster. The system will not only provide administrative services but also deliver village information and complaint handling features, thereby improving transparency and the overall quality of public services. The Regent of Lamongan, Yuhronur Efendi, has also emphasized the importance of digital transformation at the village level to accelerate public service delivery..

The "GO Village" application will be developed using the Waterfall method, consisting of the stages of requirements analysis, system design, implementation, testing, and maintenance. According to the Head of Guminingrejo Village, Kasmolan, S.Sos, the application will facilitate community access to administrative services, making the process faster and more effective. By leveraging web-based technology, this application is expected to enhance the accessibility and effectiveness of village administration services, accessible anytime and anywhere, while significantly reducing dependency on manual processes.

2. Research Methodology

This study employs the Waterfall Model method. The Waterfall Model is one of the earliest and most widely used software development methodologies, known for its simplicity and clarity. It follows a linear and structured approach, where each phase of the development process must be completed before proceeding to the next stage [7]. Each phase in the Waterfall Model produces a clear output, which serves as the foundation for the subsequent stage, as illustrated in Figure 1.

Fig. 1: Desain Waterfall

2.1 Stages in the Waterfall Method

a) Requirements Analysis
In this stage, developers collaborate with stakeholders to gather and document the complete system requirements. A detailed requirement specification is produced to guide the subsequent stages of software development.
b) System Design
Once the requirements have been identified, the next stage is designing the system architecture. This includes the design of the database, user interface, and other necessary software components. The design serves as a blueprint for the implementation stage.
c) Implementation
At this stage, developers begin coding according to the agreed design. Each software component is built and tested individually to ensure that it functions properly (Boehm, 1988).
d) Testing
After implementation is completed, the software undergoes a series of tests to ensure that all functionalities work as expected and meet the specifications. Testing is carried out to detect and fix any bugs before the software is released to users.
e) Maintenance
Once the software is released, the maintenance phase begins. In this stage, developers perform bug fixes, updates, and add new features based on user feedback.

2.2 Use Case

This Use Case illustrates the interaction scenarios between users and the Go Village application, which is designed to facilitate residents of Guminingrejo Village in accessing various administrative services. Each Use Case identifies the user (actor), the objectives, and the sequence of steps or interactions that occur within the application. Moreover, the Use Case serves as a guide in designing a system that aligns with the actual needs of users in the field. By documenting the interaction flow clearly, developers can enhance efficiency in the application development process, as illustrated in Figure 2.

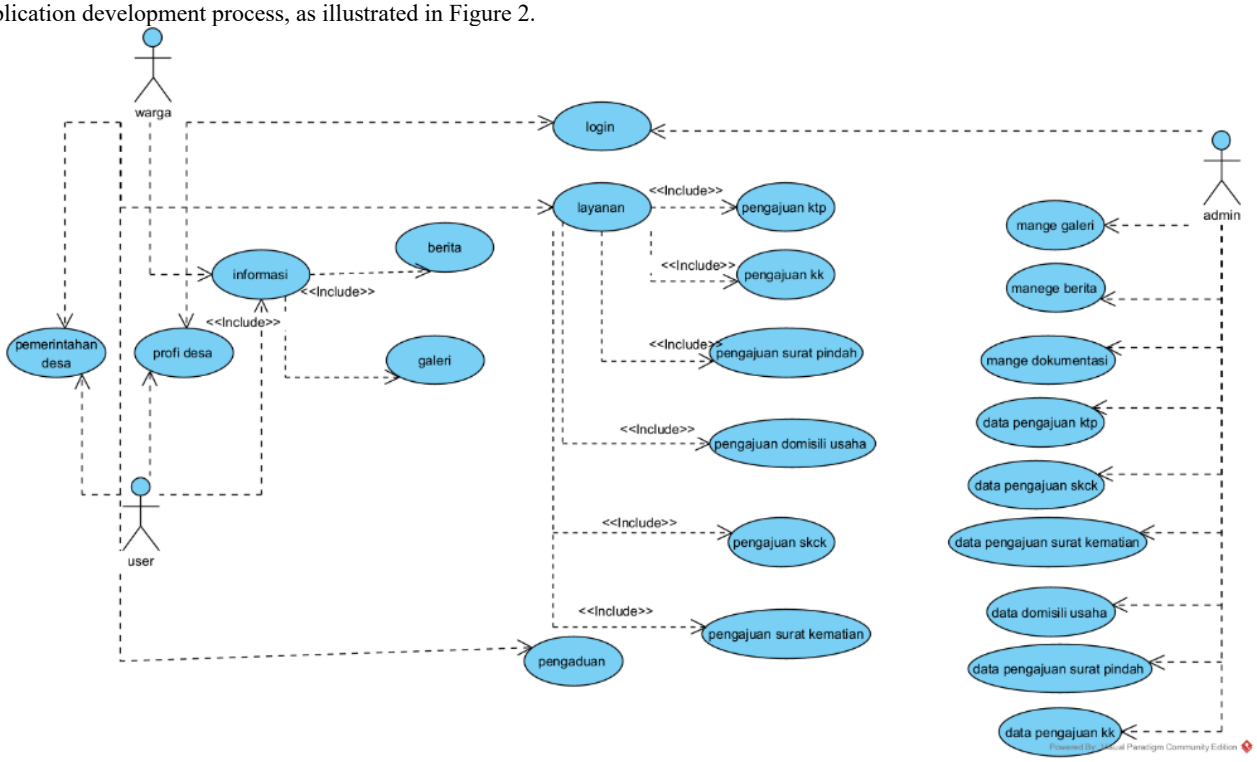

Fig. 2: Design Use Case

2.3 Application Design

The design of the Go Village application developed by the author is illustrated in the following figures:
a. Login and Registration Form Page

Fig. 3: Login Page

Figure 3 shows the interface design of the Admin Login page in the application. This page functions as the authentication gateway for administrators to access system management features. It consists of two main components: input fields for entering the username and password, designed in a simple and user-friendly manner. In addition, a registration link is provided for users who do not yet have an account, making the system flexible in supporting the registration process. This mechanism is crucial for maintaining application security, as only verified users are allowed to access and manage data within the system.

b. Main Page for Users Before Login

Fig. 4: Main Page for Users Before Login

Figure 4 presents the interface design of the main page before the user performs the login process. At the top, there is a navigation bar containing several main menus: Home, Profile, Government, Information, and Login. These menus are designed to provide quick access to general information that can be accessed without authentication, such as village profiles, government information, and the latest news.

c. Main Page for Users

Fig. 5 : Main Page for Users

Figure 5 shows the design of the main page after the user has successfully logged into the system. At the top, the navigation bar provides access to the main menus: Home, Profile, Government, Information, Downloads, and Services. This navigation structure allows users to explore the application features more quickly and systematically.

In the main content section, information about village governance is displayed in the form of several information cards. Each card contains a summary or brief explanation of a specific topic, accompanied by a Detail button to display more comprehensive information. This design aims to ensure that users can immediately view key information in a concise format, while still having the option to explore data more deeply according to their needs.

3. Conclusion

The Go Village web-based application for Guminingrejo Village, developed using the Waterfall method, has been successfully built and implemented. The application improves the efficiency of village services and facilitates community access to information. Future development may include the integration of online payment features and a community complaint service.

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