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## **Designing a Web-Based Management Information System for Incoming and Outgoing Mail at the Public Welfare Bureau of the North Sumatra Provincial Secretariat**

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### ***Abstract***

*The management of incoming and outgoing mail at the Public Welfare Bureau of the North Sumatra Provincial Secretariat is currently done manually by recording it in an agenda book. Mail distribution is also done directly, and mail archiving is collected in one place, which often causes various problems, such as delays in mail distribution, difficulties in finding mail, and the risk of losing important mail. This study aims to design and develop a web-based document management system to support more efficient, faster, and secure administrative processes. The system development method used is the waterfall model. The system is built using the PHP programming language and MySQL database. System testing results indicate that it can simplify the processes of recording, searching, distributing, and reporting incoming and outgoing documents through faster digitalization. With the implementation of this system, it is hoped that the Social Welfare Bureau of the Provincial Government of North Sumatra can manage letters more effectively and efficiently, thereby supporting the central government's digital transformation program.*

***Keywords:*** Design, Information Systems, Mail Management, Incoming Mail, Outgoing Mail, Web

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## **INTRODUCTION**

The development of information and communication technology has progressed rapidly. Digital transformation has brought significant changes to various aspects of life, including office administration. Technology has revolutionized the way organizations and agencies operate, particularly in terms of managing correspondence, which is a vital part of formal communication. According to Suryadi (2019), the use of information technology in correspondence management can improve work efficiency and minimize errors in administrative processes. Furthermore, research by Putra and Hidayati (2021) shows that the implementation of a correspondence management information system in government agencies has a positive impact on service speed and document tracking ease.

Correspondence is one of the important aspects of government administration. As an official means of communication, incoming and outgoing letters are the primary medium for conveying information, making decisions, and documenting organizational activities. In the government environment, effective and efficient letter management is essential to maintain the smooth flow of information between agencies and to support good governance. The Public Welfare Bureau of the Provincial Secretariat (SETDA) of North Sumatra is one of the units responsible for handling various programs and activities related to public welfare. In carrying out its duties, this bureau receives and sends a large number of letters daily, both in physical and digital formats. However, the management of incoming and outgoing correspondence in this bureau is still done manually or semi-manually, such as recording using agenda books or spreadsheet files. This results in several issues, including difficulty in tracking correspondence,

delays in distribution, the risk of document loss, and a lack of transparency in the correspondence disposition process.

This situation highlights the need for innovation in the management of incoming and outgoing correspondence to make it more structured and easily accessible. The use of information technology, particularly web-based information systems, offers a relevant solution to address these challenges. A web-based incoming and outgoing correspondence management system enables the processes of recording, searching, archiving, and disposing of correspondence to be carried out more quickly, accurately, and with proper documentation. Therefore, it is necessary to design a web-based incoming and outgoing letter management information system tailored to the needs of the Public Welfare Bureau of the Provincial Government of North Sumatra. With this system, it is hoped that work efficiency, data accuracy, and the quality of administrative services will improve, while also supporting the implementation of e-government, which is a national priority in the field of public administration.

## RESEARCH METHODS

The development of a web-based incoming and outgoing mail management information system at the North Sumatra Provincial Secretariat's Bureau of Public Welfare uses the Waterfall method. Waterfall is a software development method that uses a linear and sequential approach, whereby each stage must be completed before moving on to the next. This method is often used in software development projects that have clear and well-defined requirements from the outset.

The stages in software development using the Waterfall method can be seen in Figure 1 and the explanation below:

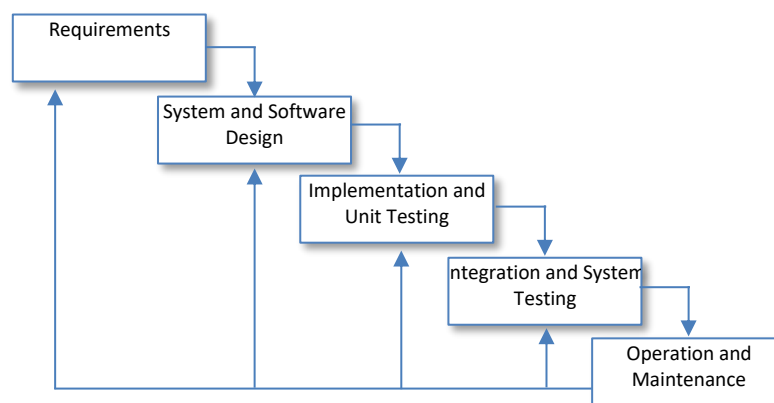


Figure 1. Stages of the Waterfall Method

1. Requirement Definition (Software Requirements Analysis)  
This stage involves design, where the requirements for creating the software are gathered. Analysis is carried out to understand the nature of the software to be created, including its interface.
2. System and Software Design (Design)  
After the initial analysis is complete, the next step is to design the software. This design process translates the requirements or needs that have been analyzed previously, before the code implementation stage begins.
3. Implementation and Unit Testing (Code)  
The design that has been created is then translated into program code using the programming language chosen by the developer.
4. Integration and System Testing (Testing)

Testing is conducted to ensure that potential errors are minimized and the resulting software meets the desired specifications.

5. Operation and Maintenance (Operation and Maintenance)

After launch, the software is continuously monitored by the developers, and if necessary, system services can be enhanced.

#### Data Collection Methods

The data collection methods used in the development of a web-based incoming and outgoing mail management information system at the North Sumatra Provincial Secretariat's Bureau of Public Welfare are as follows:

1. observation

This observation aims to gain a direct understanding of how the current system operates in managing incoming and outgoing correspondence at the Social Welfare Bureau of the Provincial Government of North Sumatra, which is then analyzed based on the problem statement and evaluated according to system requirements.

2. Interviews.

Interviews were conducted directly with parties involved in managing incoming and outgoing correspondence during the observation period to obtain additional supporting information related to system requirements, as well as any challenges or issues faced by administrators managing incoming and outgoing correspondence. The information was then recorded, analyzed, and evaluated.

3. Literature Review.

A literature review is an activity involving the search for and collection of relevant literature related to the incoming and outgoing mail management information system from various sources such as books, journals, papers, articles, the internet, and so on. This data is later used to understand and create the existing data format, in terms of the required information structure, as well as material for system design.

#### System Design

The design of this incoming and outgoing mail management information system was carried out to build a more structured, effective, efficient, and user-friendly system. This design discussion uses the Unified Modeling Language (UML) approach as a standard for describing system processes and structures. UML helps visualize the system from various perspectives, ranging from user interactions to relationships between classes within the system.

UML (Unified Modeling Language) is a visual modeling method used as a means of designing object-oriented systems. UML can also be used as a tool for transferring knowledge about the application system to be developed from one developer to another.

1. Use Case Diagram Design

Use case diagram design to illustrate the relationship and functions of actors in the system, consisting of administrators and managers. The use case diagram design for the web-based incoming and outgoing mail management system at the North Sumatra Provincial Secretariat's Public Welfare Bureau can be seen in Figure 2 below:

Figure 2. Design of the admin use case diagram

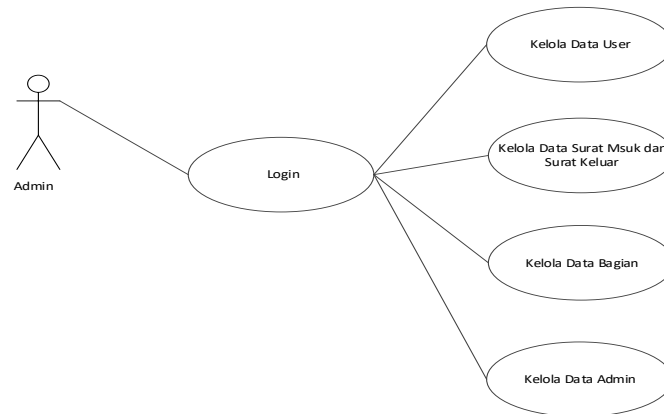


Figure 2. Design of the admin use case diagram

## 2. Activity Diagram Design

The activity diagram design illustrates the workflow or user activities before they can access the functions of the designed web-based incoming and outgoing mail management information system, as shown in Figure 3 below:

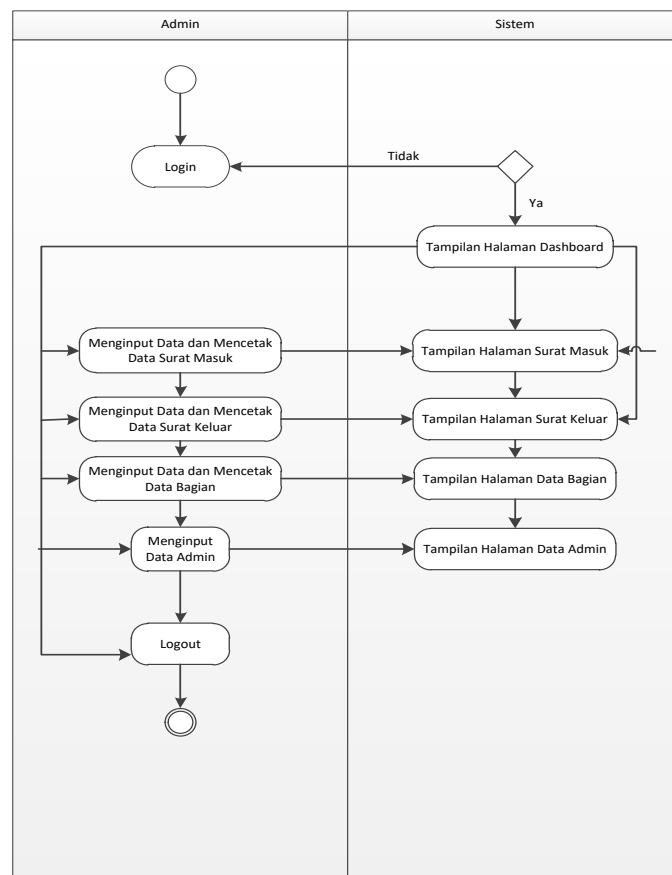


Figure 3. Design of the admin activity diagram

## 3. Sequence Diagram Design

Sequence diagram design is a representation of the flow of interactions between objects in a system, such as the flow of data sent or received. Figure 4 shows the sequence diagram design for a web-based incoming and outgoing mail management information system at the North Sumatra Provincial Secretariat's Public Welfare Bureau.

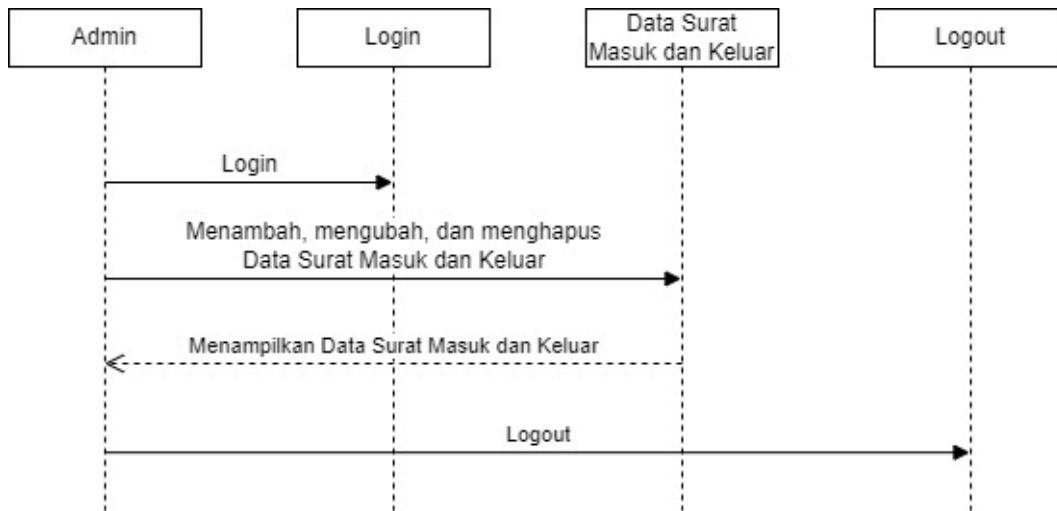


Figure 4. Design of the admin sequence diagram

#### 4. Class Diagram Design

Class diagram design depicts the database structure in a system using class forms. Figure 5 shows the class diagram design for a web-based incoming and outgoing mail management information system at the North Sumatra Provincial Secretariat's public welfare bureau, as shown below.

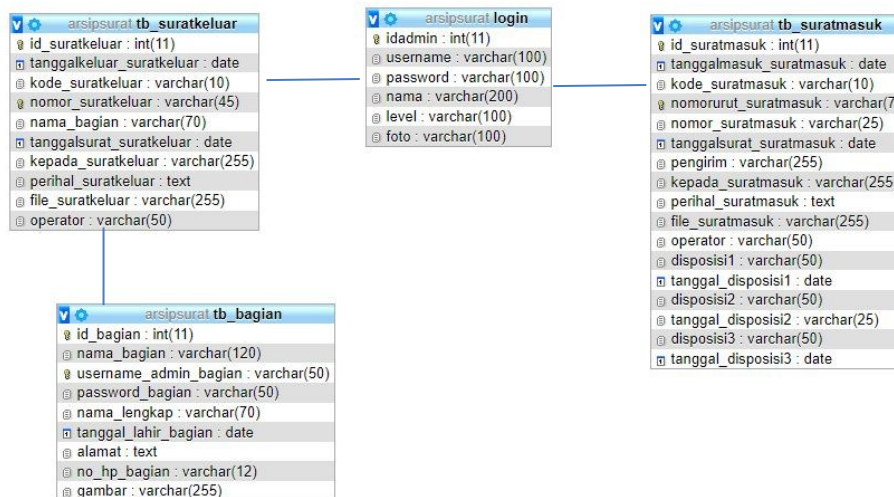


Figure 5. Designing a class diagram

## RESULTS AND DISCUSSION

Based on the results of the design of a web-based incoming and outgoing mail management information system at the Bureau of Public Welfare of the North Sumatra Provincial Secretariat, the following discussion can be seen below.

1. Home Page Interface

The Home Page is the page that appears when accessing the incoming and outgoing mail management information system of the Social Welfare Bureau of the North Sumatra Provincial Secretariat. This page is used to view the information available in the profile menu and directs users to log in to the system using their username and password, as shown in Figure 6.



Figure 6. Home Page Interface

2. Login Page Interface

The login page is designed to grant users access rights to manage and use the system. Users who can use the system are administrative staff and the Head of the North Sumatra Provincial Secretariat's Public Welfare Bureau. The login page contains a username and password form. Figure 7 shows the login page interface.

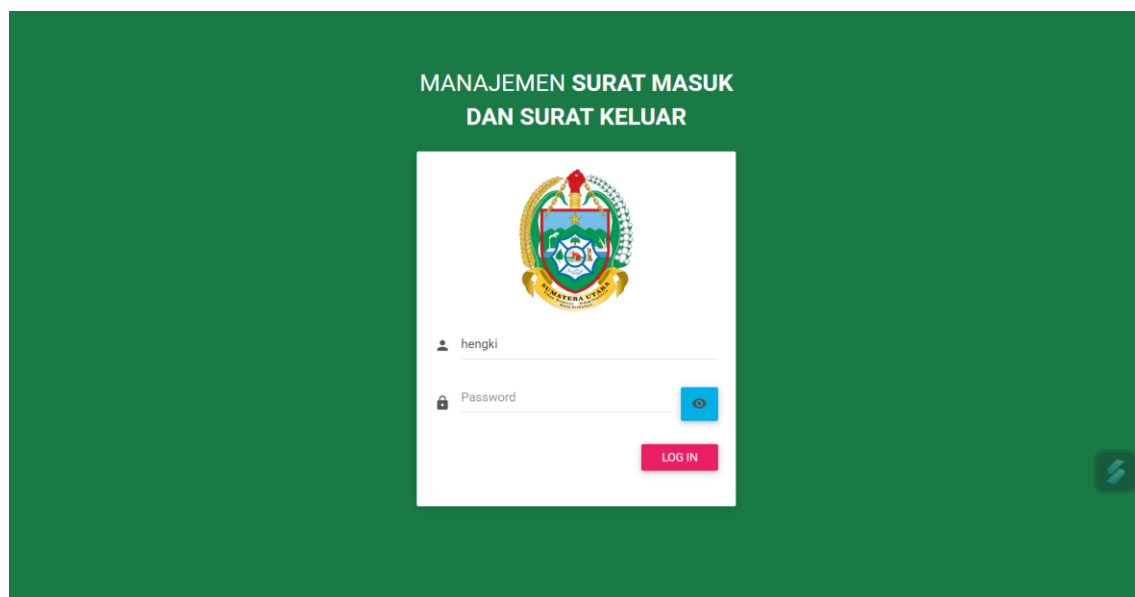


Figure 7. Login Page Interface

### 3. Admin Home Page Interface

The admin home page is the first page that appears when the admin successfully logs in. This page is used to manage the information system, which includes incoming mail, outgoing mail, department data, and admin data. Figure 8 shows the admin home page interface.

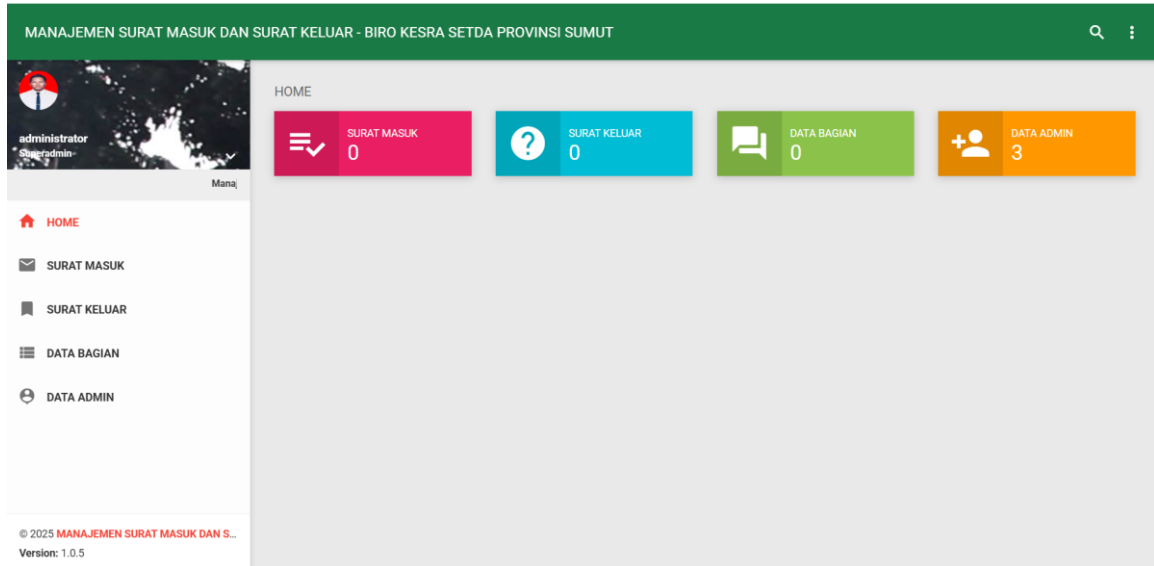


Figure 8. Admin Home Page Interface

### 4. Inbox Menu Page Interface

The inbox menu page interface is a system page display that functions as an interface between users and the system for managing incoming mail. This page is designed to make it easy for users to view, add, edit, delete, and search for incoming mail data received from other agencies or organizations. The inbox interface contains information such as mail number, mail date, sender, subject, date received, and disposition. In Figure 9, the inbox menu page interface can be seen.

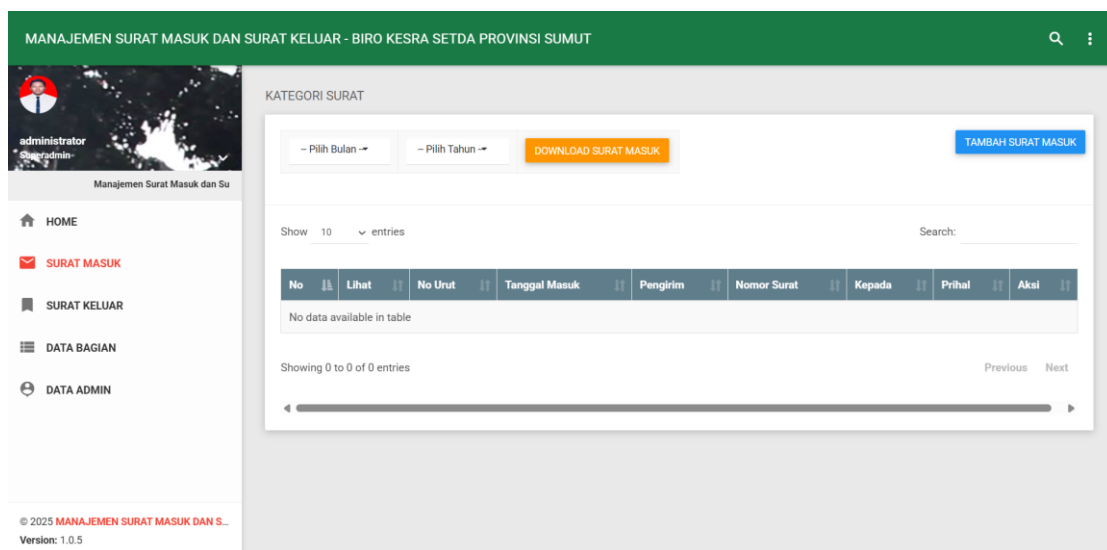


Figure 9. Inbox Menu Page Interface

## 5. Outgoing Mail Menu Interface

The outgoing mail menu page is a system page for managing outgoing mail from the North Sumatra Provincial Secretariat's Public Welfare Bureau to external agencies or organizations. This page is designed for outgoing letter activities such as recording, searching, and managing outgoing letters sent to external parties. The outgoing letter interface includes information such as the outgoing letter number, letter date, recipient or addressee, subject of the letter, and date of dispatch. Figure 10 shows the interface of the outgoing letter menu page.

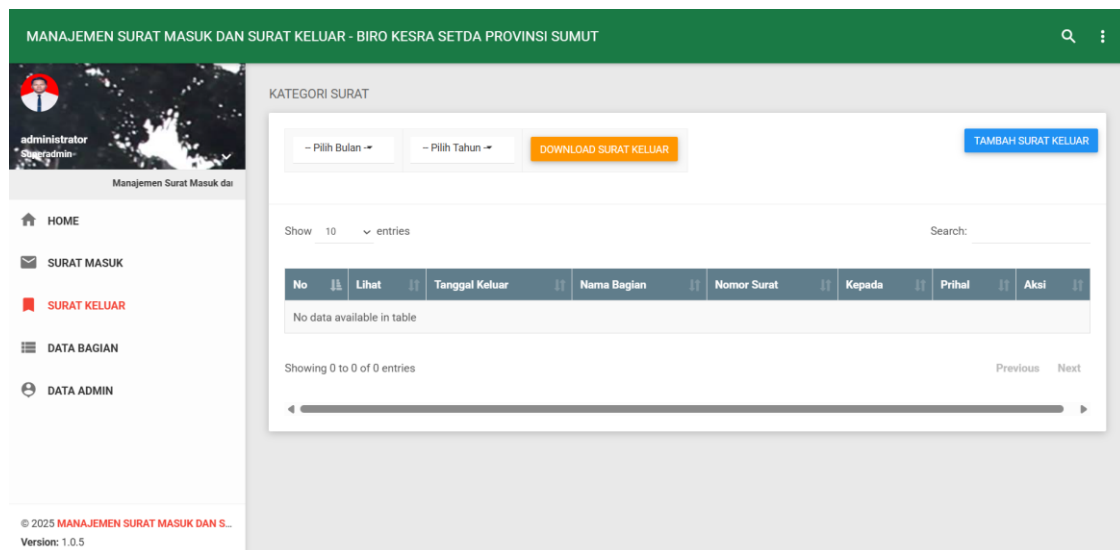


Figure 10. Outgoing Mail Menu Page Interface

## CONCLUSION

Based on the results of the research and design that has been carried out, it can be concluded that the development of an incoming and outgoing mail management information system has provided a comprehensive solution to the problem of mail administration management at the North Sumatra Provincial Secretariat's Bureau of Public Welfare. The designed system is capable of optimizing the processes of recording, searching, storing, and tracking letters, including disposition, in a fast, structured, and efficient manner compared to the manual methods previously used. The system design has taken into account user needs and the entire workflow of correspondence, and is equipped with essential features, including correspondence data input, category- or date-based search, grouping, and digital document storage. The implementation of this system has proven effective in minimizing the risk of data loss, processing delays, and recording errors, while accelerating the disposition workflow.

Furthermore, the implementation of this information system supports the central government's policy in improving transparency, accountability, and administrative performance effectiveness, while strengthening the bureaucratic digitization initiative towards the realization of good governance.

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