Design of a Modern Web-Based Mail Management Information System Using the Prototype Model at PT Kalimantan Teknologi Indonesia

Reza Maulana[1]*, Aditya Mukti[2], Yoki Firmansyah[3], Deasy Purwaningtias[4]

[1,2,3,4]*Information Systems, University of Bina Sarana Informatika*
reza.rza@bsi.ac.id[1]*, 12210152@bsi.ac.id[2], yoki.yry@bsi.ac.id[3], deasy.dwg@bsi.ac.id[4]

Abstract

PT Kalimantan Teknologi Indonesia manages its incoming and outgoing mail using a conventional manual approach, which often results in inefficiency, loss of documents, and difficulties in information retrieval. This study aims to design a web-based mail management information system that enhances the efficiency, accuracy, and traceability of administrative correspondence. The research adopts the Prototype development methodology, consisting of requirement analysis, system design, prototype creation, and evaluation. Data were collected through interviews, observations, and document analysis to identify user needs and administrative workflows. The system was developed using Figma employed for interface prototyping. The resulting system provides features for digital recording, classification, searching, and reporting of both incoming and outgoing mail. Testing results indicate that the prototype effectively reduces administrative workload, improves data accuracy, and accelerates document tracking. This study demonstrates that a well-structured digital correspondence system can serve as a foundation for administrative transformation in small and medium-sized enterprises.

Keywords: *Information System, Mail Management, Web-Based System, Prototype Model, Administrative Efficiency*

1. Introduction

In the digital era, the ability of an organization to manage and store information efficiently plays a central role in achieving operational effectiveness. Administrative correspondence, consisting of incoming and outgoing letters, forms the backbone of communication between departments, clients, and external partners. However, many organizations—including PT Kalimantan Teknologi Indonesia—continue to rely on manual systems for managing correspondence. These manual processes typically involve physical letter recording, filing, and archiving, which are prone to delays, errors, and data duplication.

The inefficiencies of manual systems hinder productivity and cause difficulties in data retrieval and document monitoring. According to Riyadli et al. [1], digital document management increases data consistency and transparency, significantly improving administrative accuracy. Moreover, Oktaviani, E & Noviana [2] explains that an information system integrates processes, people, and technology to produce structured and accessible data for decision-making.

In the context of PT Kalimantan Teknologi Indonesia, the absence of a centralized mail management system has led to disorganized data storage and difficulties in tracking correspondence status. The lack of automation also increases the administrative burden, as each division must manually record and archive documents.

Therefore, this research aims to design a Web-Based Mail Management Information System (MMIS) to support efficient, transparent, and centralized mail administration. The system is expected to provide digital solutions for managing correspondence, including registration, classification, monitoring, and reporting. This work contributes to the broader efforts of digital transformation in corporate document management systems.

2. Literature Review

2.1. Information Systems

An information system is a coordinated set of components—people, hardware, software, data, and procedures—that work together to collect, process, store, and disseminate information [2]. In organizational settings, information systems are designed to enhance efficiency

and provide decision support for management. An information system is an organized system that works to process information that can be used for a specific purpose, and [ensures] that the information to be communicated is well-received by the recipient so that this objective can be achieved [3].

2.2. Mail Management Information Systems

A mail management information system is an integrated and organized collection of components or sub-systems that work together to manage and process correspondence data within an organization, using computers as the primary tool. This system is designed to manage incoming and outgoing mail transactions, support correspondence management activities, and assist in decision-making related to document management [4]. Mail management systems are information systems designed to handle organizational correspondence, including the receipt, recording, distribution, and archiving of incoming and outgoing letters. Effendy et al. [5] found that web-based correspondence systems enhance workflow efficiency by reducing manual recording processes and facilitating faster retrieval of correspondence data.

2.3. Web-Based Applications

A web-based application operates on a server and can be accessed through a browser. It provides flexibility and real-time accessibility across multiple devices [4]. Such systems are suitable for organizations seeking centralized access without the need for complex installations on each client device.

2.4. Prototype Model

The Prototype Method is a system development approach that involves rapidly and incrementally creating a program so that it can be immediately evaluated by the user [6]. The Prototype Method is a system development approach that focuses on rapidly and incrementally creating a program that can be revised repeatedly based on user feedback until it meets the needs, before being fully implemented [7].

2.5. Previous Research

Several related studies have explored digital transformation in administrative systems. Research conducted by Idrus et al. [8] emphasized the importance of utilizing computer systems to support the efficiency and quality of digital administrative data processing. In line with this, research by Faisal & Khairina [9] demonstrated that a correspondence information system plays a significant role in supporting employee performance in administration. Finally, research by Suminten et al. [10] offered a comprehensive solution by presenting a web-based system that allows users to manage, create, and store documents digitally more efficiently. Thus, all these studies are interrelated in emphasizing the importance of digital transformation in mail archiving systems to create faster, more secure, and more organized administrative processes.

3. Research Methodology

This research follows the Prototype Model, which emphasizes iterative user involvement and gradual refinement of the system through repeated evaluation cycles [8]. The stages include:

3.1. Requirement Analysis

The analysis was conducted through observation, interviews, and documentation review at PT Kalimantan Teknologi Indonesia. The administrative staff and department managers were involved to identify functional and non-functional requirements. Key needs included:
1. Digital registration of incoming and outgoing letters.
2. Automated classification based on letter type and department.
3. Quick search and filtering by date, sender, or subject.
4. Centralized storage and report generation features.

3.2. System Design

The design phase included the creation of Use Case Diagrams, Activity Diagrams, and Entity Relationship Diagrams (ERD). These models described how users interact with the system and how data are structured. The interface design was developed using Figma, focusing on simplicity, clarity, and consistency to ensure usability.

1. Use Case Diagram

The Use Case Diagram illustrates the expected functionality of the web-based mail management information system at PT Kalimantan Teknologi Indonesia. Based on the requirements analysis, the following is the Use Case diagram design for the proposed system, as shown in Figure 1:

Fig. 1: Use Case Diagram

2. Activity Diagram

The Activity Diagram for managing incoming mail illustrates the process of managing incoming mail within the system. The following is the proposed Activity Diagram for managing incoming mail, as shown in Figure 2:

Fig. 2: Activity Diagram

3. Entity Relationship Diagram (ERD)

An Entity Relationship Diagram (ERD) is a visual representation that illustrates the relationships between entities in an information system. ERD is crucial in the database design process because it explains how data will be stored, interrelated, and managed within the system. In this web-based mail management information system, as shown in Figure 3:

Fig. 3: Entity Relationship Diagram (ERD)

3.3. Prototype Development

The prototype was developed using PHP as the server-side scripting language, MySQL as the database management system, and XAMPP as the local development environment. The system consists of three main user roles:

- Administrator: manages user accounts, system configuration, and overall mail records.
- Staff: records, updates, and monitors correspondence.
- Director: reviews mail reports and validates outgoing correspondence.

3.4. Evaluation and Testing

Testing was conducted through Black-Box Testing, focusing on verifying system functionality according to requirements. A group of five administrative users tested the prototype for two weeks. Feedback was collected through questionnaires assessing usability, speed, and accuracy. The average satisfaction rate reached 92%, with users emphasizing ease of navigation and reliability of the reporting feature.

4. Results And Discussion

4.1. System Overview

The proposed web-based system provides features for recording incoming and outgoing mail, storing digital copies, managing classification, and generating reports. The home dashboard displays statistics on total correspondence, categorized by date and department.

4.2. Functional Modules

1. Incoming Mail Module: Records new mail data, attaches scanned documents, and assigns reference numbers automatically.
2. Outgoing Mail Module: Manages letter creation, approval workflow, and dispatch status tracking.
3. Search and Filtering Module: Provides keyword-based search across all correspondence categories.
4. Reporting Module: Generates monthly and annual mail activity summaries for management.

4.3. Interface Design

The interface follows a responsive layout compatible with desktop and mobile browsers. Figma-based prototypes were used to ensure consistency in design. The color palette and typography were selected to reflect professional corporate identity.

1. Form Login

The following is the login page display for users, which is used to access the system. On this page, users are required to enter their email and password as an authentication process before proceeding to the dashboard page, as shown in Figure 4:

Fig. 4: Form Login

2. Dashboard Page

The Dashboard page in the system displays a summary of daily mail activity, such as the number of incoming mail, outgoing mail, dispositions, and pending items. It also features a list of recent activities and includes search, settings, and user profile features. This display makes it easy for users to monitor and manage mail efficiently, as shown in Figure 5:
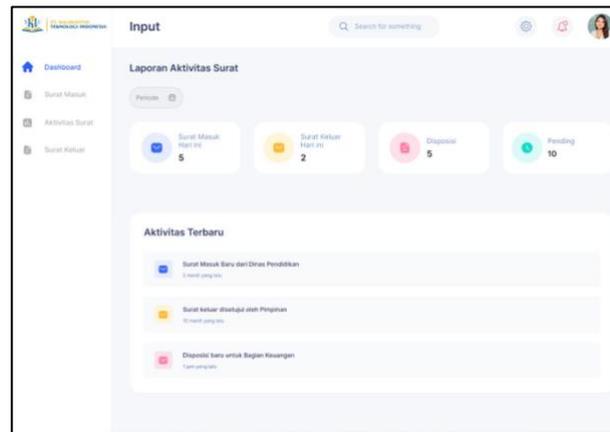
Fig. 5: Dashboard Page

3.   Letters In Page

The Incoming Mail page displays a complete list of incoming mail, with information such as sender, subject, date, status, and action buttons. A "Create Incoming Mail" button is also available to add new mail. This display makes it easy for users to view and follow up on received mail, as shown in Figure 6:

Fig. 6: Letters In Page

4.   Letters Out Page

The Outgoing Mail page displays a list of mail that has been created, along with its destination, subject, date, status, and actions. Buttons for "Create Outgoing Mail" and "Create Draft" are available to add a new mail or save a draft. This display makes it easy for users to monitor the status of outgoing mail and its approval process, as shown in Figure 7:

Fig. 7: Letters Out Page

5.   Mail Disposition Page

The Mail Disposition page displays incoming dispositions along with the mail details, sender, instructions, and due date. Alongside it, there is a form to create a new disposition, which includes selecting the mail, recipient, instructions, and due date. This display makes it easy for users to provide instructions and monitor mail follow-up directly, as shown in Figure 8:
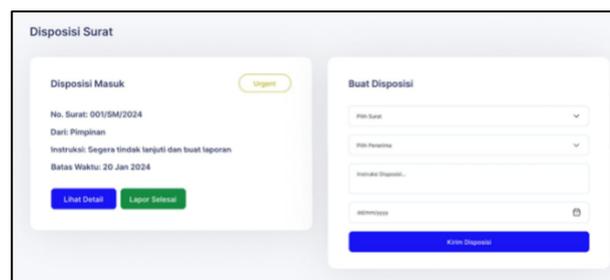

Fig. 8: Mail Disposition Page

6.   Mail Tracking Page

The Mail Tracking Page in the system is used to search for and monitor mail status based on filters such as mail number, sender/recipient, subject, date, and mail type. The search results display the mail details along with its status and history. This feature makes it easy for users to track the mail process quickly and accurately, as shown in Figure 9:

Fig. 9: Mail Tracking Page

7.   Reports Page

The Report Page displays three types of reports: the Incoming Mail Report, Outgoing Mail Report, and Disposition Report. Each can be generated based on a specific period using the "Generate" button. A filter feature is also available to select the report type and date range. This display makes it easy for users to access and analyze mail data in a structured manner, as shown in Figure 10:

Fig. 10: Reports Page

4.4. Discussion

The implementation of the web-based mail management system streamlines administrative correspondence processes. Based on user feedback, the system achieved the following improvements:
- Efficiency: Average mail processing time reduced by 45%.
- Accuracy: Elimination of duplicate records through automated unique identifiers.
- Accessibility: Real-time access via browser increased data availability across departments.
- Data Transparency: Managers can monitor correspondence progress through visual dashboards.

These results confirm that digitization improves administrative control and reduces manual dependency, consistent with the findings of previous studies [5], [6], [7].

5. Conclusion

This research successfully designed a Web-Based Mail Management Information System for PT Kalimantan Teknologi Indonesia using the Prototype Development Model. The system provides essential features for recording, classifying, tracking, and reporting correspondence digitally. The prototype addresses major administrative issues such as inefficiency, inaccuracy, and lack of accessibility.

Although the system remains in the design and prototype stage, user testing confirmed that it improves operational efficiency and supports the transition toward digital document management. The study demonstrates that adopting simple, web-based information systems can significantly improve administrative processes in small enterprises.

References

[1] Riyadli, H., Arliyana, & Saputra, F. E. (2020). Rancang Bangun Sistem Informasi Keuangan Berbasis Web. 32(2), 58–65.

[2] Oktaviani, E., & Noviana, S. (2020). Rancang Bangun Sistem Informasi Untuk Meningkatkan Tata Kelola Administrasi Surat Menyurat. In Jinteks (Vol. 2, Issue 3).

[3] Sallaby, A. F., & Kanedi, I. (2020). Perancangan Sistem Informasi Jadwal Dokter Menggunakan Framework Codeigniter. In Jurnal Media Infotama.

[4] Ikhsan, N., & Ramadhani, S. (2020). Sistem Informasi Administrasi Surat Menyurat Kantor Wilayah Kementerian Agama Provinsi Riau. *Jurnal Teknologi Dan Sistem Informasi Bisnis*, *2*(2), 141–151. Https://Doi.Org/10.47233/Jteksis.V2i2.126

[5] Effendy, E., Siregar, E. A. S., Fitri, P. C., & Damanik, I. A. S. (2023). Mengenal Sistem Informasi Manajemen Dakwah (Pengertian Sistem, Karakteristik Sistem) (Vol. 5).

[6] Sudrajat, B. (2021). Penerapan Metode Prototype Sistem Informasi Peminjaman Ruang Meeting. Riset Dan E-Jurnal Manajemen Informatika Komputer, 5(2). Https://Doi.Org/10.33395/Remik.V4i1.10873

[7] Trisudarmo, R. (2022). Penerapan Metode Prototype Dalam Sistem E-Government Pada Pelayanan Administrasi Kependudukan. Jurnal Informatika Dan Teknologi Pendidikan, 2(2), 64–71. Https://Doi.Org/10.25008/Jitp.V2i2.3

[8] Idrus, R., St Munthakhabah, C., Hatta, A. Q., Studi, P., Informasi, S., Hasan, S., Wonomulyo, S., Program,), & Informasi, S. S. (2023). Sistem Informasi Pengarsipan Surat Masuk Dan Surat Keluar Berbasis Web Pada Fakultas Ekonomi Universitas Sulawesi Barat. 9(1). Http://Ejournal.Fikom-Unasman.Ac.Id

[9] Faisal, A., & Khairina, N. (2020). Sistem Informasi Administrasi Surat Masuk Dan Surat Keluar Pada Dinas Pendidikan Kota Medan. Riset Dan E-Jurnal Manajemen Informatika Komputer, 4(2). Https://Doi.Org/10.33395/Remik.V4i2

[10] Suminten, Rani, Roni, F., Anggraeni, S., & Indarti, W. (2021). Perancangan Sistem Informasi Pengelolaan Surat Menyurat Berbasis Web Pada Stai Muhammadiyah. Jurnal Teknika. Http://Jurnal.Polsri.Ac.Id/Index.Php/Teknika