Design of a Web-Based Information System for the Registration and Numbering of Notarial and PPAT Deeds

Maulidya Hanifah Sitepu[1)*)], Eko Budiarto[2)], Irfan Afriantoro[3)]

[1)2)3)]Informatics Engineering, Pelita Bangsa University, Indonesia
***)Correspondence author:** Maulidya Hanifah Sitepu, maulidyahanifah4@gmail.com, Indonesia
DOI : https://doi.org/10.37012/jtik.v12i1.3383

Abstract

The rapid advancement of digital technology has transformed nearly every aspect of human life, exerting a substantial impact across multiple sectors, including communication, education, healthcare, and business. In the digital era, the utilization of information technology has become increasingly critical in notarial administration, particularly in the registration and numbering of Notarial and PPAT deeds. Developments in information technology particularly in software and hardware have enabled process automation, rapid data processing, and improved accessibility of information. This study aims to design and develop a web-based information system for notary and PPAT deed numbering registers to replace the manual system. This system aims to improve data management efficiency, speed up searches, and improve the accuracy and consistency of register management. The method used is a qualitative approach with Agile methodology, with data collection through interviews, observation, and documentation studies. System development was carried out iteratively, with testing to ensure system functionality and reliability. The results of the study show that the developed system can manage data more efficiently, reduce manual errors, and improve data accessibility and security. This study concludes that the implementation of a web-based system can improve the efficiency and accuracy of data management, and recommends gradual implementation with a focus on testing and continuous maintenance.

Keywords: *Web-Based Information System, Deed Numbering Register, Notary and PPAT, Agile.*

Abstrak

Kemajuan pesat teknologi digital telah mengubah hampir setiap aspek kehidupan manusia, memberikan dampak substansial di berbagai sektor, termasuk komunikasi, pendidikan, perawatan kesehatan, dan bisnis. Di era digital, pemanfaatan teknologi informasi menjadi semakin penting dalam administrasi notaris, khususnya dalam pendaftaran dan penomoran akta notaris dan akta PPAT. Perkembangan teknologi informasi, khususnya perangkat lunak dan perangkat keras, telah memungkinkan otomatisasi proses, pemrosesan data yang cepat, dan peningkatan aksesibilitas informasi. Studi ini bertujuan untuk merancang dan mengembangkan sistem informasi berbasis web untuk register penomoran akta notaris dan akta PPAT guna menggantikan sistem manual. Sistem ini bertujuan untuk meningkatkan efisiensi manajemen data, mempercepat pencarian, dan meningkatkan akurasi serta konsistensi manajemen register. Metode yang digunakan adalah pendekatan kualitatif dengan metodologi Agile, dengan pengumpulan data melalui wawancara, observasi, dan studi dokumentasi. Pengembangan sistem dilakukan secara iteratif, dengan pengujian untuk memastikan fungsionalitas dan keandalan sistem. Hasil penelitian menunjukkan bahwa sistem yang dikembangkan dapat mengelola data lebih efisien, mengurangi kesalahan manual, dan meningkatkan aksesibilitas serta keamanan data. Studi ini menyimpulkan bahwa implementasi sistem berbasis web dapat meningkatkan efisiensi dan akurasi manajemen data, dan merekomendasikan implementasi bertahap dengan fokus pada pengujian dan pemeliharaan berkelanjutan.

Kata Kunci : Sistem Informasi Berbasis Web, Register Penomoran Akta, Notaris dan PPAT, Agile.

INTRODUCTION

The rapid advancement of digital technology has transformed nearly every aspect of human life, exerting a substantial impact across multiple sectors, including communication, education, healthcare, and business. Developments in information technology particularly in software and hardware have enabled process automation, rapid data processing, and improved accessibility of information. The proliferation of the Internet, cloud computing, and web- and mobile-based technologies has introduced new paradigms for working, interacting, and managing data. Such digital technologies facilitate higher operational efficiency, reduce human error, and enhance service quality in a wide range of domains, including administrative and governmental services.

In the digital era, the utilization of information technology has become increasingly critical in notarial administration, particularly in the registration and numbering of Notarial and PPAT deeds. The implementation of a web-based system allows the recording, numbering, retrieval, and reporting of registers to be conducted more rapidly, accurately, and in a well-documented manner, thereby supporting effectiveness and efficiency within Notary and PPAT offices. In addition to enabling real-time access to information, such a system improves service quality through clearly defined access control and safeguarded data integrity. A structured design that is aligned with applicable legal standards and procedures ensures that the deed numbering process is more orderly, less prone to error, and readily auditable in accordance with organizational requirements [1].

Despite the rapid pace of technological progress, many Notary and PPAT offices continue to manage deed numbering registers using conventional manual procedures. These practices create obstacles such as slow retrieval of deed numbers or files, risks of numbering errors and data loss, and inefficiencies in workflow and operational costs. A study by Lutfi and Rahasti [2] indicates that manual register management prolongs service time and increases administrative burden. Accordingly, a web-based information system for the registration and numbering of Notarial and PPAT deeds is required to standardize recording

workflows, accelerate data retrieval, maintain data integrity and security, and provide accurate and measurable reporting.

Previous studies have broadly discussed the digitalization of Notary and PPAT archives or web-based document systems; however, relatively few have addressed the registration and numbering of Notarial and PPAT deeds as the primary object of study, particularly with an emphasis on sequence control and duplication prevention. Furthermore, many reported development approaches remain oriented toward the waterfall model, whereas practical field requirements increasingly demand rapid iteration and continuous user feedback. This research addresses these gaps by proposing a solution that is specifically focused on the deed numbering register process and is developed iteratively using an Agile approach.

The proposed solution is the design of a web-based information system for the registration and numbering of Notarial and PPAT deeds. The system is not limited to archiving; rather, it emphasizes the automation and standardization of the deed numbering sequence, the recording of deed metadata, indexing, rapid retrieval, and register reporting. Using an Agile approach, features are developed iteratively, with initial priorities encompassing structured register management, keyword- or parameter-based search, role-based access control, and data backup. This implementation is expected to reduce human error, accelerate service delivery, enhance data security and integrity, and ensure that the deed numbering process operates efficiently in accordance with established standards and applicable standard operating procedures.

RESEARCH METHODS

This study employed a qualitative approach to analyze system requirements and to obtain an in-depth understanding of the operational procedures for the registration and numbering of Notarial and PPAT deeds. Data were collected through direct observation, interviews with the staff member responsible for managing the register, and a review of supporting documents, and were subsequently analyzed descriptively to inform the system design. System development was conducted within an SDLC framework using an iterative

Agile model, thereby enabling the proposed solution to remain responsive to evolving requirements and user feedback.

Methodological Stages

Methodological stages are systematic steps carried out in a research process, starting from data collection to system design and testing. These stages aim to ensure that the research proceeds in a structured manner and produces solutions that address the identified problems.

Data Collection Methods

This study employed several data collection methods to obtain the information required for system development, as follows:

1. Interviews

   conducted directly with staff at the Notary and PPAT Office of Noviyanti Absyari, S.H., M.Kn. to obtain detailed information regarding the deed registration and numbering workflow, the constraints of manual record-keeping, and the expected features of a web-based system.

2. Observation

   carried out by directly observing the deed numbering and recording processes within the office. This activity provided an empirical overview of the manual workflow, including register book entries, deed numbering procedures, and report preparation, thereby enabling the identification of processes suitable for automation.

3. Document Study

   performed by collecting and reviewing supporting documents, such as the deed register book format. These documents served as references for designing the database structure and developing search and reporting features within the proposed web-based information system.

System Development Method Using the SDLC Agile Model

Software Development Life Cycle (SDLC) is a series of structured phases that encompass the definition, development, testing, deployment, operation, and maintenance of software or information systems. One of the methodologies commonly employed within the

SDLC framework is the Agile method. The Agile method is an incremental and iterative approach that emphasizes collaboration, customer feedback, and the rapid delivery of functional software. The following section provides an explanation of each stage in the Agile methodology [22]:

a. Plan: Define project goals and constraints, identify user and business needs, establish the backlog, and select features for the initial sprint.
b. Design: Develop the technical solution, including system architecture, user interface design, and implementation strategy.
c. Develop: Implement features in small iterations, focusing on coding and unit testing, with incremental refinements.
d. Test: Conduct comprehensive testing to verify functionality, identify defects, and ensure product quality and performance.
e. Deploy: Release the developed system/features to the production environment to ensure readiness for end-user access and use.
f. Review: Evaluate outcomes to identify strengths and required improvements, incorporating feedback from end users and stakeholders.
g. Launch: Publish the finalized product/features broadly after applying improvements, ensuring smooth accessibility and usability for end users.

RESULTS AND DISCUSSION

This section presents the results of the design and development process of the web-based information system for the Notary and PPAT deed numbering register. The results include system implementation, user interface displays, and functionality testing to ensure that the system operates in accordance with the research objectives and requirements.

General Overview

This section provides a general overview of the research object and the current system conditions. It briefly describes the organizational background, existing procedures, and the overall framework of the system to be developed as the foundation for further analysis and design.

- **Existing Manual System**

1. Manual register recording

   Deed information is recorded in a physical register book (number, date, type, and related parties), thereby remaining susceptible to recording and numbering errors.

2. Non-automated numbering

   The sequence and format of deed numbers are verified visually by comparing prior entries, creating risks of duplication, sequence gaps, and inconsistent numbering formats.

4. Physical document storage

   Paper-based archives accumulate in filing cabinets, increasing the likelihood of loss or deterioration and complicating data retrieval.

5. Manual report preparation

   Register reports are compiled by manually transcribing and summarizing entries from the register book, which is time-consuming and prone to recapitulation errors.

Overall, the manual system remains limited in terms of efficiency and accuracy, thereby necessitating a more integrated solution.

- **Proposed System to Be Developed**

1. Digital register recording

   A web-based system will record deed data electronically and store it automatically in a database.

2. Automated numbering control

   The system will validate the numbering format and sequence to prevent duplication and sequence gaps.

3. Centralized storage and rapid retrieval

   Data will be maintained in a centralized database and can be retrieved efficiently using keyword-based search.

4. Automated register reporting

   Periodic reports can be generated automatically and exported/printed in PDF format.

The proposed web-based system is expected to improve operational efficiency, data security, and accessibility for authorized users.

Analysis

This section presents the analysis of the existing system and identifies its weaknesses and limitations. It also outlines the system requirements and feasibility considerations as the basis for designing an effective and appropriate solution.

- **Analysis of System Weaknesses**

  In the management of the Notarial and PPAT deed registration and numbering register, which is currently performed manually, several factors adversely affect operational efficiency. The issues were identified using a SWOT analysis, as follows:

  1. Strengths: Physical archives can be fully controlled, and documents may be accessed directly without reliance on digital devices.
  2. Weaknesses: Document retrieval is time-consuming paper-based records are susceptible to loss or damage due to external events (e.g., disasters) or human error; and the absence of computerized processing reduces staff efficiency while increasing operational costs associated with physical storage.
  3. Opportunities: The adoption of a web-based system presents an opportunity to improve efficiency by enabling faster, more organized document retrieval, management, and archiving.
  4. Threats: Continued dependence on outdated manual procedures may degrade service quality and diminish the office's competitiveness.

  Based on this analysis, the proposed solution is a web-based information system aimed at reducing reliance on physical archives, accelerating document management and retrieval, and enhancing security through improved access control.

- **System Requirements Analysis**

  This section describes the identification and specification of system requirements, including functional and non-functional requirements. It defines the features, constraints,

and performance expectations necessary to ensure that the system effectively meets user needs and supports organizational objectives.

1. Functional requirements: to support register recording and archiving, enable efficient document retrieval, generate reports, and provide status monitoring, with security enforced through role-based access control.
2. Non-functional requirements: to ensure data security (e.g., encryption and routine backups), maintain adequate system availability to support operational activities, and provide scalability to accommodate growth in the number of documents and users.

This web-based system is expected to improve both the efficiency and security of managing the registration and numbering register for Notarial and PPAT deeds.

- **User Requirements**

  User requirements specify the parties involved in operating and managing the proposed Web-Based Information System for the Registration and Numbering of Notarial and PPAT Deeds, along with their respective roles and responsibilities. In this study, two user categories were identified:

  a. Administrator (Staff Member)

     One (1) individual responsible for entering and verifying deed numbering data, validating numbering sequences, managing system access rights, and preparing periodic register reports. The administrator also ensures that the system operates properly during office activities.

  b. System Developer (Developer)

     One (1) individual responsible for designing, developing, and testing the web-based system using the Agile approach, as well as performing system maintenance following initial implementation.

  This role allocation is intended to ensure that the system operates effectively and remains well-controlled, while also supporting sustainability and operational stability.

System Design

System design was conducted subsequent to the requirements analysis in order to define the system structure in accordance with user needs. In this study, a web-based Information System for the Registration and Numbering of Notarial and PPAT Deeds was designed using an Object-Oriented Programming (OOP) approach and UML-based modelling as a reference prior to implementation. The main system components are as follows.

a. Login and Authentication: to validate user identity prior to granting access to the system.
b. PPAT Data Management: to record PPAT deed data (deed number, deed type, related parties, deed date, and remarks).
c. Notary Data Management: to record notarial deed data (deed number, deed type, related parties, deed date, and remarks).
d. Search and Reporting: to retrieve data based on deed number or client name and to generate reports in PDF format.
e. User Data Management: to create, update, and delete system user accounts.

This design is expected to produce a structured, efficient, and maintainable system, thereby enabling a more systematic implementation using OOP-based PHP and a MySQL database.

- **Process Design**

  This section explains the design of system processes, including workflows and interactions between users and the system. It outlines how data is processed, managed, and controlled to ensure that system operations run efficiently, accurately, and in accordance with defined requirements.

a. Use Case Diagram

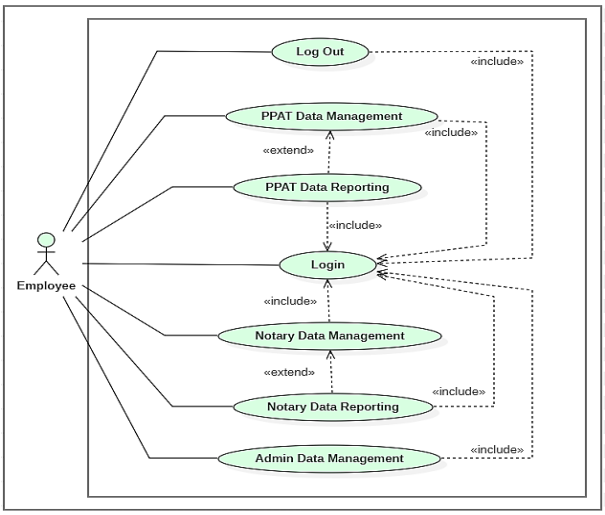

Figure 1. Use Case Diagram

The Use Case Diagram illustrates the Staff Member as the primary actor who must perform a login procedure before accessing the system's functionalities. Upon successful authentication, the Staff Member is authorized to manage PPAT data, Notary data, and administrator data, as well as to generate PPAT and Notary reports as the system's outputs. The interaction is concluded through the logout function to terminate the session.

b. State Chart Diagram

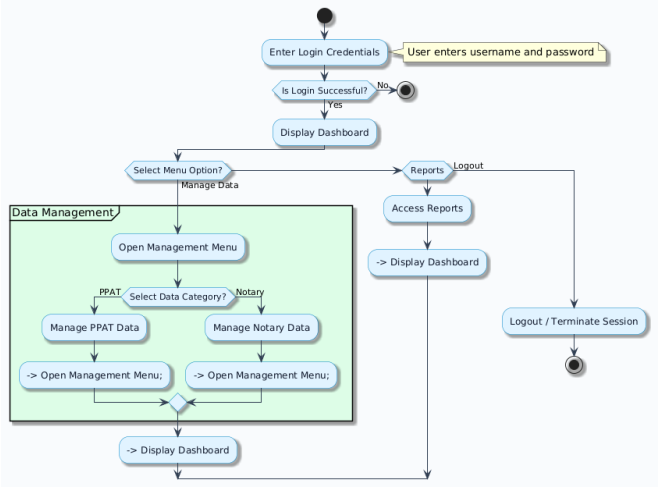

Figure 2. State Chart Diagram

The State Chart Diagram depicts the system flow from the login state to the dashboard state upon successful authentication. From the dashboard, the user may proceed to the data management module (selecting either PPAT or Notary data and returning as needed), access the reporting module and subsequently return to the dashboard, or terminate the process by selecting Logout or Finish.

c. Activity Diagram

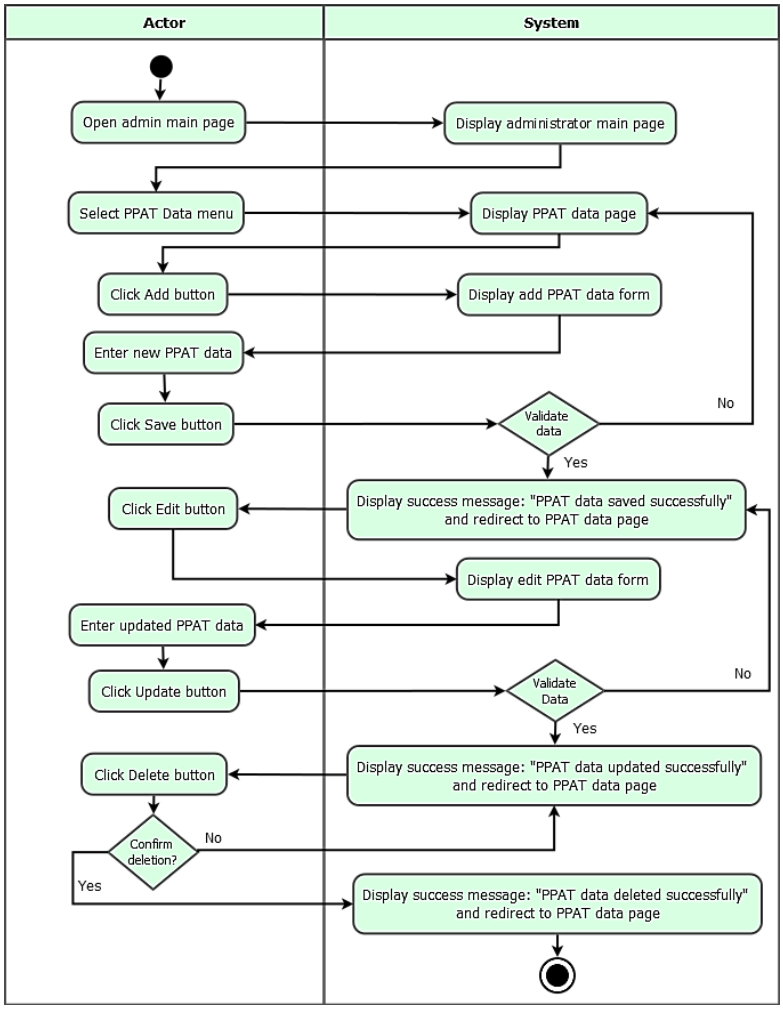

Figure 3. Activity Diagram PPAT Data Management

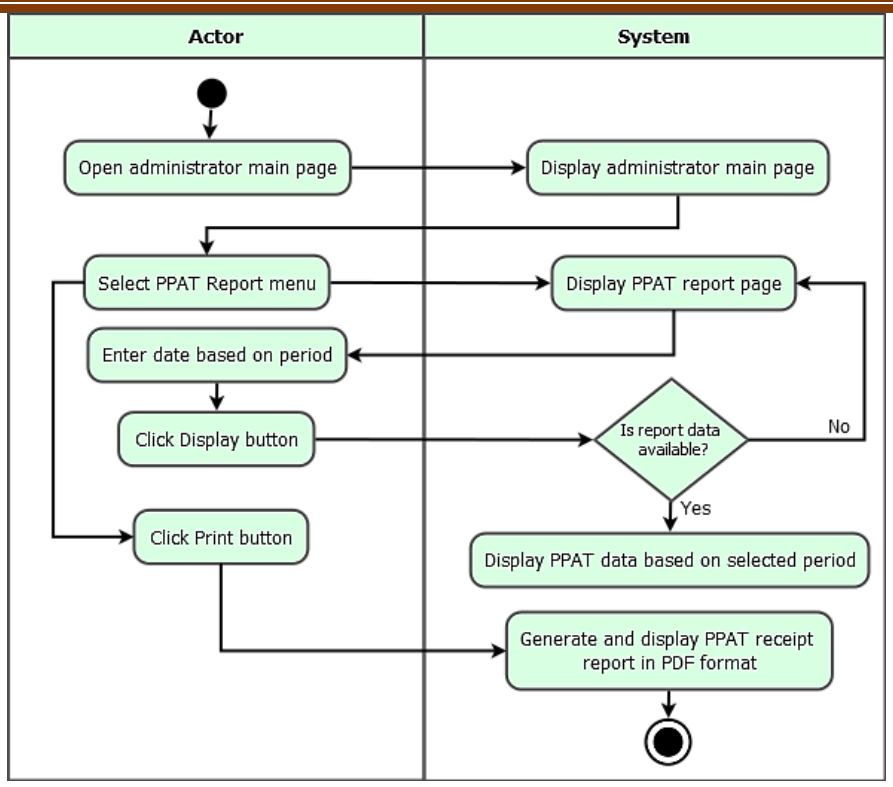

Figure 4. Activity Diagram PPAT Data Reporting

This activity diagram illustrates the workflow for managing and generating PPAT data reports within the system. It covers processes such as adding, editing, and deleting PPAT data, as well as selecting report criteria, processing data, and displaying or exporting reports. The diagram ensures that both data management and reporting activities are carried out in a structured and systematic manner.

d. Sequence Diagram

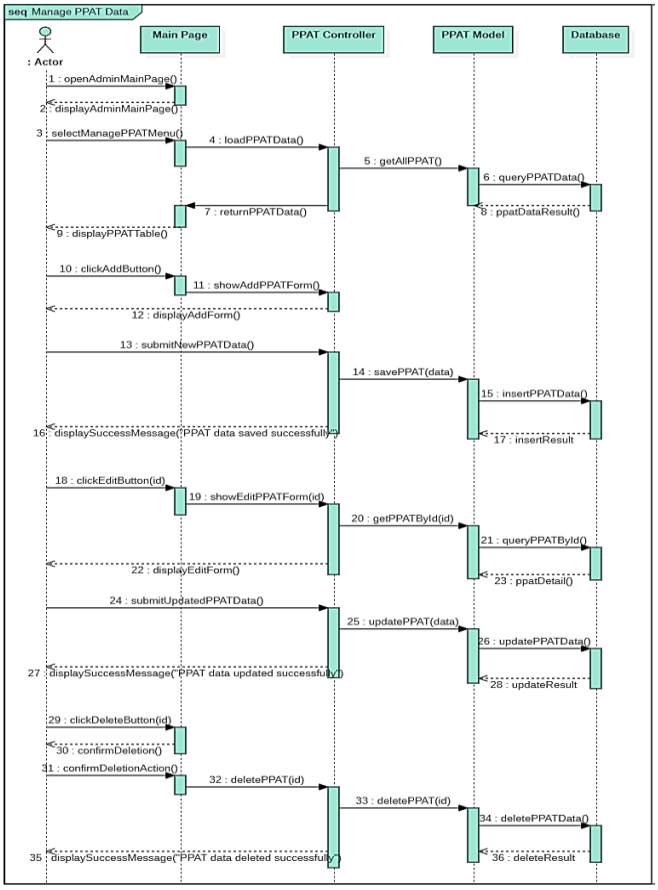

Figure 5. Sequence Diagram PPAT Data Management

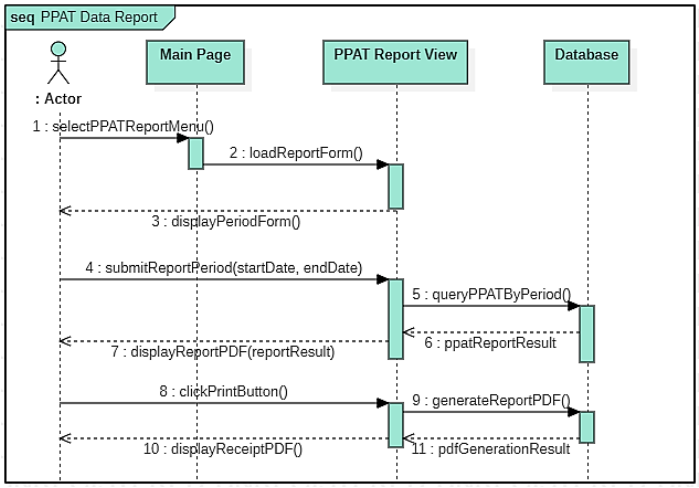

Figure 6. Sequence Diagram PPAT Data Reporting

This sequence diagram illustrates the interaction between users and system components in managing and generating PPAT data reports. It describes the message flow from user requests such as adding, updating, or deleting PPAT data to the system's validation and database processing. Additionally, it shows the sequence of actions when generating reports, including selecting criteria, retrieving data from the database, and displaying the results. The diagram ensures clear interaction flow and proper coordination among system objects.

System Implementation

This section describes the implementation of the developed system, including the deployment of features, user interface realization, and system configuration. It explains how the designed system is applied in a real environment to support the management of the Notary and PPAT deed numbering register effectively and efficiently.

- **General User Interface Display**

a. Website Main Page

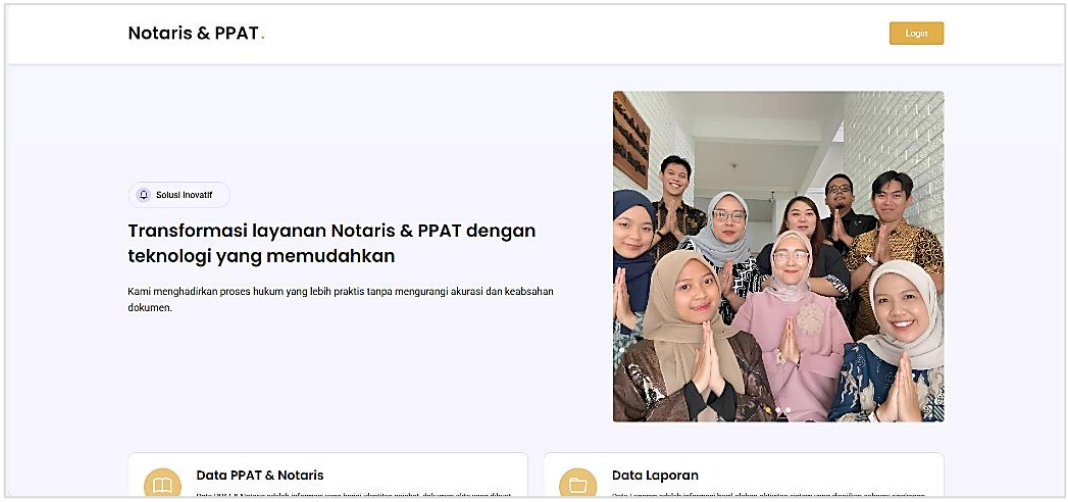

Figure 7. Website Main Page

The Website Main Page serves as the primary interface that presents general information about the system and the services provided. It offers an overview of key

features, organizational profile, and essential details, giving users a clear introduction to the website and its functions.

- **Administrator Interface Design**

a. Administrator Main Dashboard

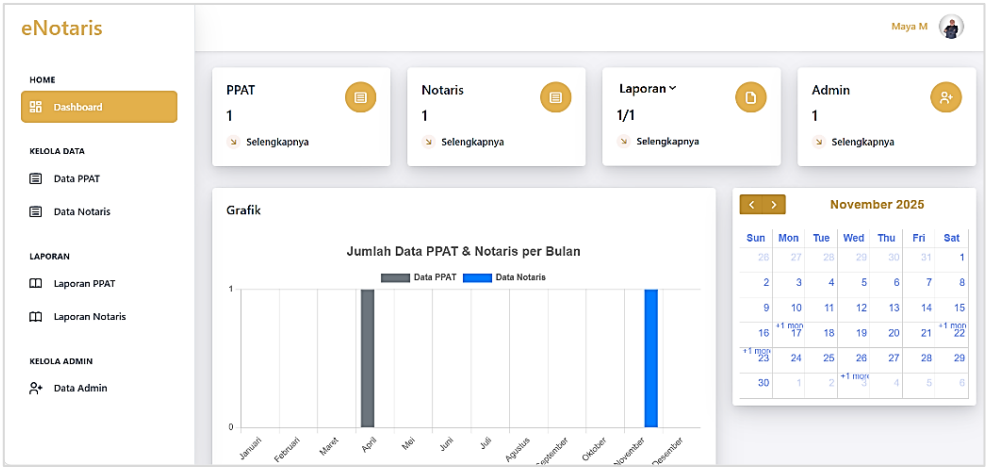

Figure 8. Administrator Main Dashboard

The Administrator Main Dashboard provides a concise overview of system activities and PPAT data within the platform. It displays key information, summaries, and quick access menus to facilitate efficient data management and monitoring by the administrator.

b. PPAT Data Page

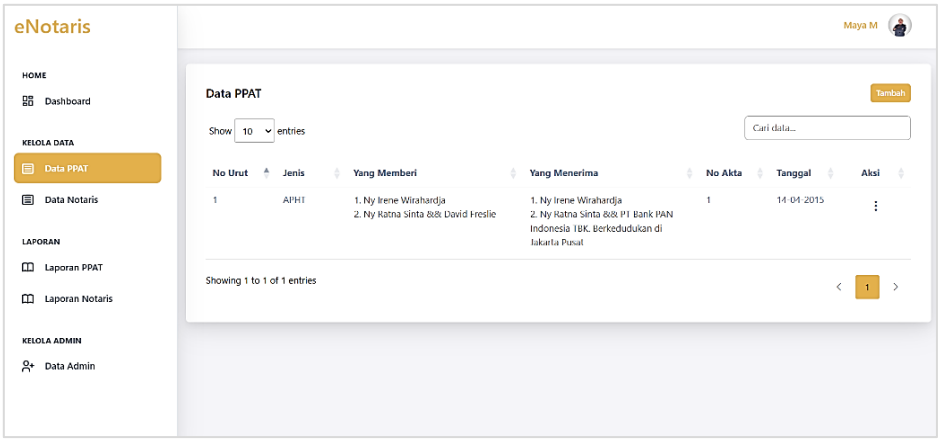

Figure 9. PPAT Data Page

The PPAT Data Page displays a structured list of all registered PPAT data within the system. It provides detailed information in tabular form, along with features such as search, edit, and delete options to facilitate efficient data management. This page enables administrators to monitor, update, and maintain PPAT records accurately and systematically.

c. Add PPAT Data Form

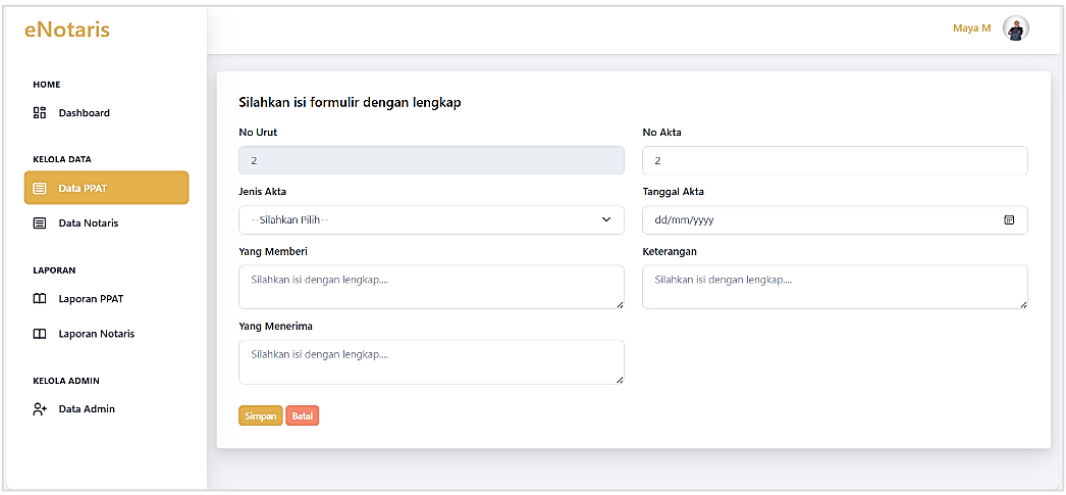

Figure 10. Add PPAT Data Form

The interface shown represents the Add PPAT Data Form page in the eNotaris system, which is used by the administrator to input deed numbering register data in a structured manner. On the left side, there is a navigation menu consisting of Dashboard, Data Management (PPAT Data and Notary Data), Reports, and Admin Management, which facilitates user access to system features. The main section of the page displays a form containing several essential fields, namely Serial Number, Deed Number, Type of Deed, Deed Date, Grantor, Grantee, and Remarks. Each field is designed to ensure that deed data is recorded completely and systematically. At the bottom of the form, there are Save and Cancel buttons, where the Save button stores the data in the database after validation, and the Cancel button aborts the input process. This page aims to enhance efficiency, accuracy, and security in managing web-based PPAT deed register data.

d. PPAT Data Report Page

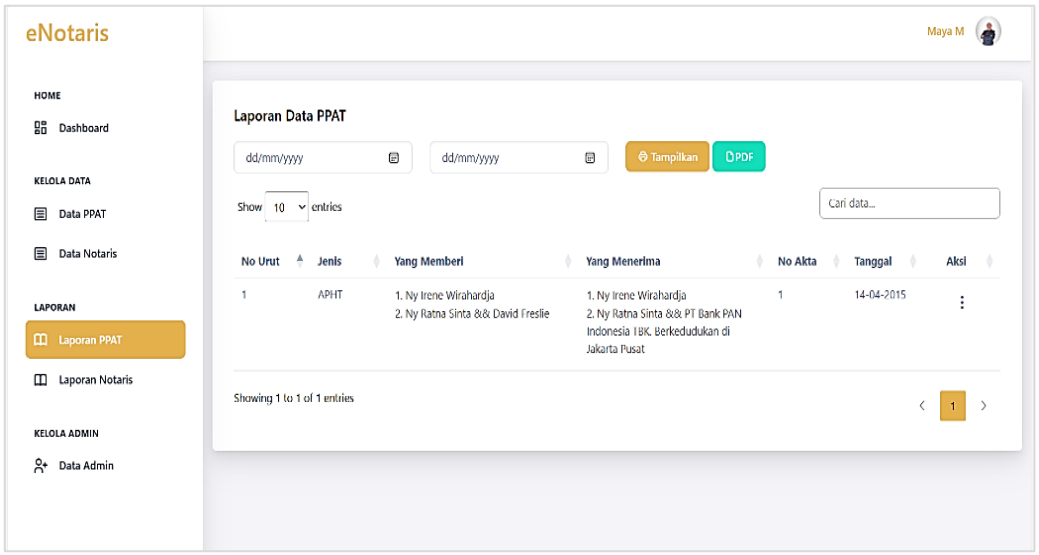

Figure 11. PPAT Data Report Page

This page presents a recapitulation of PPAT data that can be filtered by a specific date range, displayed in a structured format to facilitate monitoring, and equipped with a PDF export feature to support documentation and reporting purposes.

- **Testing Results**

  System testing was conducted using the black-box method to evaluate core functionalities, including login, data management, search, and reporting features. The results of the testing are as follows:

Table 1. Black Box Testing

No.	Module	Core Test Scenario	Expected Outcome	Status
1	Home Page	Access the system's main page and select the Login menu	The home page is displayed and the system navigates to the login page	Pass
2	Login	Perform valid login, invalid login, and empty-field submission	Valid credentials redirect to the dashboard; invalid/empty inputs are rejected with validation messages	Pass
3	Dashboard	Access the dashboard and navigate to PPAT/Notary/Report modules	Dashboard components are displayed and navigation functions operate without errors	Pass
4	PPAT Data	View data, create, update, delete, and perform search	PPAT CRUD and search functions execute correctly and the data list is updated accordingly	Pass
5	Notary Data	View data, create, update, delete, and perform search	Notary CRUD and search functions execute correctly and the data list is updated accordingly	Pass
6	PPAT Report	Apply date-range filtering and export to PDF	Data are displayed according to the selected period and the PDF report is generated successfully	Pass
7	Notary Report	Apply date-range filtering and export to PDF	Data are displayed according to the selected period and the PDF report is generated successfully	Pass
8	Admin Data	View data, create, update, delete, and perform search	Admin management functions execute correctly and changes are stored as expected	Pass
9	Logout	Terminate the session	The session is terminated and the system returns to the login page	Pass

The findings indicate that the development of a web-based Information System for the Registration and Numbering of Notarial and PPAT Deeds contributes to improved operational efficiency, faster data retrieval, and stronger accuracy and consistency in register management when compared to manual procedures. The system was developed using a qualitative approach and implemented iteratively through an Agile model, thereby enabling user requirements to be accommodated more adaptively throughout the development process.

In comparison with previous studies, most prior works primarily emphasize the digitalization of notarial archives and web-based administrative services, while comparatively few explicitly position the deed numbering register as the main focus, particularly with respect to sequence control and the prevention of duplication or sequence

gaps. This tendency is observed in studies by Lutfi and Rahasti [2], Wilda and Aninda [4], and J. JIS Siwirabuda et al. [1], which predominantly address archiving or administrative service improvement, whereas mechanisms for systematically controlling deed numbering remain limited. Furthermore, Hasanah et al. [6] developed a deed creation system; however, the numbering procedure remained manual, thus leaving the risk of sequence disorder unresolved. This study addresses the aforementioned gap by designing a system that emphasizes numbering control and validation, which is also practically relevant given the importance of deed numbering procedures in the administrative context of PPAT, as discussed by Saskia Adha and Silviana [10].

From a development-methodology perspective, several earlier studies continue to adopt the Waterfall model, whereas field conditions often require rapid iteration and sustained user feedback. Accordingly, the selection of Agile in this study is considered appropriate and is consistent with findings reported by Hidayah Nova et al. [9] and Mustopa et al. [5], which highlight the relevance of Agile for efficient and adaptive web-based system development. System evaluation was conducted using black-box testing to verify functional behavior based on input–output relationships, and the results show that the main scenarios executed as expected (Pass), thereby supporting the feasibility of the sys tem for operational use.

CONCLUSION

This study successfully designed and implemented a web-based Information System for the registration and numbering of Notarial and PPAT deeds to replace the existing manual process by providing structured digital recording, numbering sequence control to minimize duplication and sequence gaps, faster data retrieval, and periodic reporting with PDF export. Development was conducted iteratively within an SDLC framework using the Agile model, and black-box testing confirms that the system's core workflows from login and PPAT/Notary/admin data management to reporting and logout operate as intended. In practical terms, the system enhances operational efficiency, administrative orderliness, and

data traceability through centralized storage and role-based access control; however, the study remains limited to a single case setting and primarily functional evaluation. Accordingly, future work is recommended to incorporate broader user acceptance testing (UAT), performance and security assessments, and strengthened audit-trail and backup mechanisms.

REFERENSI

Aljawarneh, S., Aldwairi, M., & Yassein, M. B. (2018). Anomaly-based intrusion detection system through feature selection analysis and building hybrid efficient model. *Journal of Computer Science, 25*(1), 152–160. https://doi.org/10.1016/j.jocs.2017.03.006

Al-Saqqa, S., Sawalha, S., & AbdelNabi, H. (2020). Agile software development: Methodologies and trends. *International Journal of Computer Science and Information Security*. https://www.academia.edu/download/89193198/7405.pdf

Ahmad, J., Hasan, A. ul, Naqvi, T., & Mubeen, T. (2019). A review on software testing and its methodology. *Management Journal of Software Engineering, 13*(1), 32–38. https://doi.org/10.26634/jse.13.3.15515

Anifa, M., Ramakrishnan, S., Kabiraj, S., et al. (2024). Systematic review of literature on agile approach. *NMIMS Management Review*. https://doi.org/10.1177/09711023241272294

Guo, Y., Han, S., Li, Y., Zhang, C., & Bai, Y. (2018). K-nearest neighbor combined with guided filter for hyperspectral image classification. In *Proceedings of the International Conference on Identification, Information and Knowledge in the Internet of Things* (pp. 159–165).

Handoko, D. (2023). *Decision support system for scholarship using simple additive weighting (SAW)*. Universitas Jenderal Soedirman.

Hayward, S. (2021). *The agile leader: How to create an agile business in the digital age*.

Kurniawan, Y. I., Rahmawati, A., Chasanah, N., & Hanifa, A. (2019). Application for determining the modality preference of student learning. In *Journal of Physics:*

Conference Series (Vol. 1367, No. 1, pp. 1–11). https://doi.org/10.1088/1742-6596/1367/1/012011

Kurniawan, Y. I., Soviana, E., & Yuliana, I. (2018). Merging Pearson correlation and TAN-ELR algorithm in recommender system. In *AIP Conference Proceedings* (Vol. 1977). https://doi.org/10.1063/1.5042998

Kuhrmann, M., Tell, P., Hebig, R., Klünder, J., et al. (2021). What makes agile software development agile? *IEEE Transactions on Software Engineering*. https://ieeexplore.ieee.org/abstract/document/9496156/

Low, C. (2015). *NSL-KDD dataset*. https://github.com/defcom17/NSL_KDD

Magistretti, S., & Trabucchi, D. (2025). Agile-as-a-tool and agile-as-a-culture: A comprehensive review of agile approaches adopting contingency and configuration theories. *Review of Managerial Science*. https://doi.org/10.1007/s11846-024-00745-1

Mergel, I., Ganapati, S., & Whitford, A. B. (2021). Agile: A new way of governing. *Public Administration Review*. https://doi.org/10.1111/puar.13202

Neumann, O., Kirklies, P. C., & Schott, C. (2024). Adopting agile in government: A comparative case study. *Public Management Review*. https://doi.org/10.1080/14719037.2024.2354776

Shams, E. A., & Rizaner, A. (2018). A novel support vector machine based intrusion detection system for mobile ad hoc networks. *Wireless Networks, 24*(5), 1821–1829. https://doi.org/10.1007/s11276-016-1439-0

Shore, J., & Warden, S. (2021). *The art of agile development*.

Sridevi, M., Aishwarya, S., Nidheesha, A., & Bokadia, D. (n.d.). *Anomaly detection by using CFS subset and neural network with WEKA tools*. Springer Singapore.