JURNAL SISTEM INFORMASI TGD
Volume 4, Nomor 4, Juli 2025, Hal 828-837
P-ISSN : 2828-1004 ; E-ISSN : 2828-2566
https://ojs.trigunadharma.ac.id/index.php/jsi

Design of an IT Asset Monitoring Application: Case Study at PT PLN UITJBT IT Division.

Muhamad Rafli Shidiq[1], Uyu Wachyu Ruchiyat[2]
[1,2] Manajemen Informatika, Politeknik LP3I
Email: [1]ainadanshidiq@gmail.com, [2]Uyuruhiyat95@guru.smp.belajar.id

Abstrak
Abstrak merupakan ringkasan singkat dari makalah untuk membantu pembaca cepat memastikan masalah utama penelitian, solusi dari penyelesaian masalah yang ditemui, tujuan penelitian serta hasil sementara penelitian yang bisa berupa angka/persentase sesuai dengan kebutuhan penelitian. Abstrak harus jelas dan informatif, memberikan pernyataan untuk masalah yang diteliti serta solusinya. Panjang abstrak antara 90 hingga 230 kata. Hindari singkatan yang tidak biasa dan definisikan semua simbol yang digunakan dalam abstrak. Menggunakan kata kunci yang terkait dengan topik penelitian direkomendasikan.
Kata Kunci: Monitoring Aset, *Extreme Programming*, PLN, histori aset, teknologi informasi.

Abstract
Managing the history of IT assets is a crucial need for the IT Systems Division of PT. PLN (Persero) Central Java Transmission Unit. This study aims to design an application for monitoring asset history to improve efficiency and transparency. The Extreme Programming method was utilized, including iterative stages such as requirement analysis, design, testing, and implementation. The application is equipped with key features such as asset history management, data search, and real-time reporting. It allows administrators and users to track the lifecycle of each asset, including its acquisition, usage, maintenance, and disposal. Results indicate that the application enhances reporting speed and accuracy while minimizing data duplication risks. Additionally, the system can generate detailed reports that support decision-making processes, ensuring better planning and resource allocation. In conclusion, the application is expected to support more structured and effective asset management, improving overall productivity and helping PT. PLN's IT Systems Division maintain a more organized asset inventory.
Keywords*: Asset Monitoring, Asset History, Extreme Programming, Information Technology, PLN.*

1. INTRODUCTION

The rapid advancement of information technology (IT) has brought significant changes in how organizations manage their assets. An effective asset management system is crucial to ensuring operational efficiency, especially in large organizations such as PT PLN (Persero). Research shows that the use of manual methods in asset monitoring and management tends to be inefficient and prone to errors, which can lead to delays and inaccuracies in decision-making[1]. Furthermore, the implementation of an IT asset management information system has been proven to enhance the effectiveness and structure of asset management[2]. Additionally, studies emphasize the importance of implementing a web-based asset mapping application to facilitate asset search and real-time monitoring[3].

Research shows that the application of information technology in asset management can improve efficiency and accuracy, while reducing the errors that frequently occur in manual methods[4]. Additionally, the implementation of a web-based asset management system can accelerate information access and facilitate real-time asset monitoring, thereby supporting more accurate decision-making[5]. Therefore, the development of an integrated IT asset history monitoring application based on advanced technology is essential for PT. PLN UITJBT to enhance operational efficiency and accuracy in managing the company's IT assets.

This issue highlights the importance of developing a monitoring application that can provide real-time, accurate, and easily accessible asset history information. One approach that can be adopted in developing this application is the Extreme Programming (XP) method, which offers high flexibility in adjusting to user needs. XP has been widely used in software development that requires quick responses to changes in requirements while ensuring system quality[6].

Previous research has demonstrated the effectiveness of the XP method in developing information systems for asset management. Prastowo and Sanusi[6] developed an inventory information system using XP and found that this method was able to improve efficiency and user satisfaction. Additionally,[7] implemented XP in a public service management system, which successfully resulted in a responsive system tailored to organizational needs.

However, although several studies have discussed asset management using the XP method, there remains a gap in developing a specialized application for monitoring IT asset history within PT. PLN's environment, particularly one that integrates the specific needs of the STI division. Therefore, this study aims to design an IT asset history monitoring application using the XP method, customized to the needs of PT. PLN (Persero) UITJBT. This application is expected to make a significant contribution to the company's operational efficiency.

JURNAL SISTEM INFORMASI TGD
Volume 4, Nomor 4, Juli 2025, Hal 828-837
P-ISSN : 2828-1004 ; E-ISSN : 2828-2566
https://ojs.trigunadharma.ac.id/index.php/jsi

2. METHODOLOGY

2.1 Research Flow

The stages of this research are divided into 4 parts, namely planning, design, coding, testing. Details of the research flow will be detailed in Figure 1.

Figure 1. Stages of the Extreme Programming

2.2 Explanation of Research Stages

The methodology used in this study is Extreme Programming (XP), a software development method that emphasizes close collaboration between developers and users, as well as rapid development iterations [8]. XP was chosen for its ability to accommodate changing requirements throughout the development process, making it suitable for developing an efficient and flexible IT asset monitoring system application[9]. Figure 1 shows the stages of the Extreme Programming (XP) method. The explanation of these stages is as follows:

a. Planning

This process involves a system requirements analysis conducted through interviews with the STI Division of PT. PLN (Persero) Unit Induk Transmisi Jawa Bagian Tengah. The collected data includes functional and non-functional requirements, as well as challenges in the current IT asset management. Based on this analysis, user needs are then formulated into user stories, which describe the desired features and serve as the foundation for system development[10].

b. Design

During the design phase, system modeling is carried out based on the results of the needs analysis. Additionally, a database model is created to illustrate the relationships between data. This process includes a simple application design, which involves a single modeling approach, namely:

- UML (Unified Modeling Language)

  Unified Modeling Language (UML) is a visual modeling language represented in the form of diagrams or graphics. UML serves to provide an overview, specification, and documentation in the development of object-oriented systems. It establishes a standard for creating system blueprints, covering business process concepts, class design that can be implemented in various programming languages, database design, and the essential components required for system development[11].

c. Coding

Coding or programming is the process of translating system design into a programming language that can be understood by computers. In this study, the application is divided into two parts: front-end and back-end. The front-end development is carried out using the ReactJS programming language, while the back-end utilizes ExpressJS. The database used in this system is MongoDB.

d. Testing

Unit testing is conducted alongside a series of universal tests, including integration and validation testing. The purpose of this testing is to detect errors early so they can be fixed more quickly, reducing the time needed for corrections. In this stage, the researcher applies the black box testing method for unit testing. The goal of this method is to observe the application's response based on the input and output produced without needing to understand the code structure or programming logic[12].

3. RESULT AND DISCUSSION

3.1 Planning

At this stage, there are two parts to the analysis method, namely the Observation Method and the Interview Method. The explanation of each analysis method is as follows:

a. Observation Method

JURNAL SISTEM INFORMASI TGD
Volume 4, Nomor 4, Juli 2025, Hal 828-837
P-ISSN : 2828-1004 ; E-ISSN : 2828-2566
https://ojs.trigunadharma.ac.id/index.php/jsi

The observation method is carried out by recording data based on direct observation of the research object. In this study, observations were conducted on IT asset transaction processing, including data confirmation, asset check-in/check-out, and real-time asset report generation. This observation aims to understand the workflow of the asset management system implemented at PT. PLN (Persero) Unit Induk Transmisi Jawa Bagian Tengah (UITJBT) and identify potential issues in the process.

b. Interview Method

The interview method is used to obtain additional data from individuals directly involved in IT asset management. Interviews were conducted with the System and Information Technology Division (STI) of PT. PLN UITJBT to gather information regarding the history of the asset management system, the types of IT assets being managed, and how the previous system functioned before the development of this application. Through these interviews, a deeper understanding of user needs and challenges faced in the existing system is expected to be obtained.

3.2 Design

Then, the next step is to create the design using Unified Modeling Language. Unified Modeling Language (UML) provides a clear and structured visual representation of the system or software design.

3.2.1 Use Case Diagram

Figure 2. Use Case Diagram

The use case diagram above shows that there are 3 actors, namely Admin, Technician and Management. Each actor has different access rights according to the role that has been given as shown in the image above.

3.2.2 Activity Diagram

Activity diagrams serve to visualize the various stages of an activity, including business processes and user scenarios. These diagrams not only depict the sequence of steps taken but also indicate the actions that will be performed once a process is completed. Thus, an activity diagram provides a clear representation of the various processes that take place within a system.

1. Activity Diagram of Managing User Data

In this section, the admin manages user data. The following activity diagram shows the steps taken by the admin when managing user data. This can be seen in Figure 3.

JURNAL SISTEM INFORMASI TGD
Volume 4, Nomor 4, Juli 2025, Hal 828-837
P-ISSN : 2828-1004 ; E-ISSN : 2828-2566
https://ojs.trigunadharma.ac.id/index.php/jsi

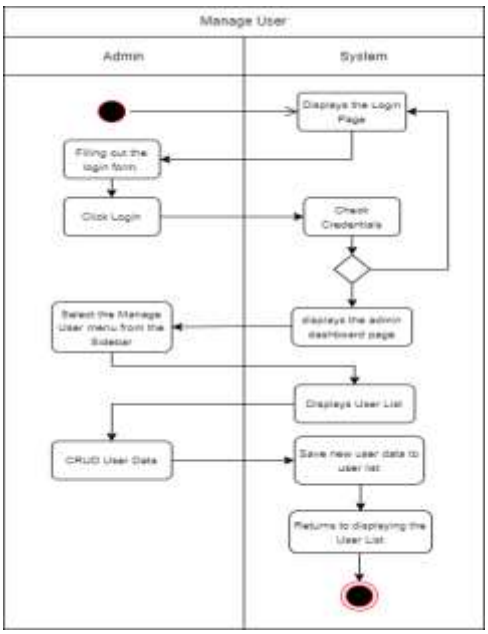


Figure 3. Activity Diagram of Managing User Data

2. Activity Diagram of Managing Asset Data

In this section, the admin manages asset data. The following activity diagram shows the steps taken by the admin when managing asset data. This can be seen in Figure 4.

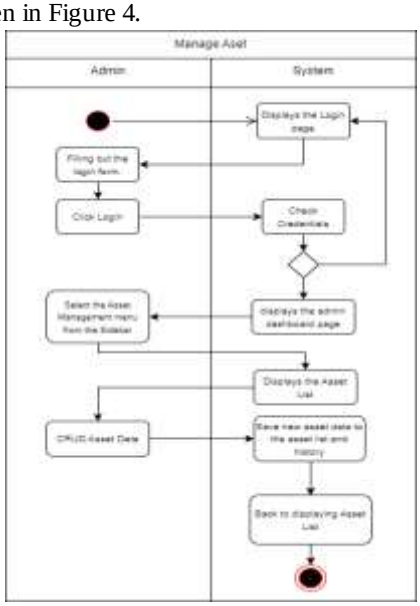


Figure 4. Activity Diagram of Managing Asset Data

3. Activity Diagram of Managing History Asset Data

In this section, the admin manages history asset data. The following activity diagram shows the steps taken by the admin when managing history asset data. This can be seen in Figure 5.

JURNAL SISTEM INFORMASI TGD
Volume 4, Nomor 4, Juli 2025, Hal 828-837
P-ISSN : 2828-1004 ; E-ISSN : 2828-2566
https://ojs.trigunadharma.ac.id/index.php/jsi

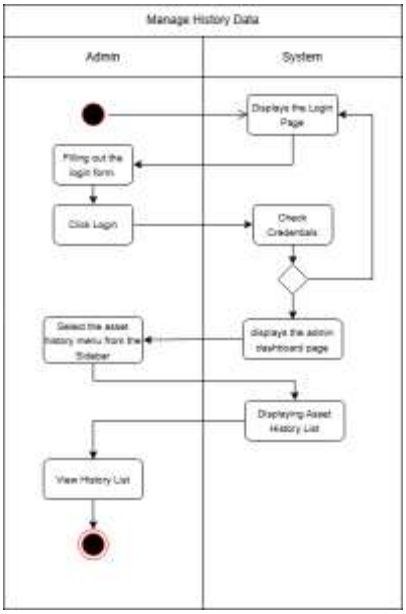
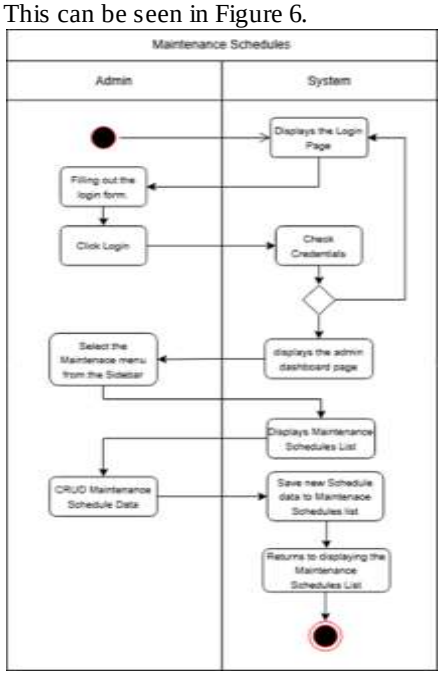


Figure 5. Activity Diagram of Managing History Asset Data

4. Activity Diagram of Managing Schedule Maintanace Asset

In this section, the admin manages history asset data. The following activity diagram shows the steps taken by the admin when managing history asset data. This can be seen in Figure 6.



3.3 Implementation

At the software design implementation stage, the entire system design process is carried out comprehensively, including identifying hardware and software requirements. Several key components are included in this stage, such as the login, which is used to implement the user login mechanism, and Dashboard.jsx, which serves as the main application and acts as the initial user interface. Additionally, User.jsx is a script that stores user information, including passwords, while Aset.jsx is responsible for displaying and managing asset data. Furthermore, HistoryAset.jsx contains a record of asset data history, and Jadwal.jsx is used to schedule asset maintenance. At this stage, the primary focus of implementation is the development and maintenance of the system to ensure it functions according to the defined requirements.

1. Login

On this page, users are required to authenticate before accessing certain functions in this application based on their respective roles.

JURNAL SISTEM INFORMASI TGD
Volume 4, Nomor 4, Juli 2025, Hal 828-837
P-ISSN : 2828-1004 ; E-ISSN : 2828-2566
https://ojs.trigunadharma.ac.id/index.php/jsi

Figure 6. View Login

2. Dashboard

This page is the main display of the IT Asset History Monitoring application. Here 3 Actors (users) can carry out their respective authorities according to the role taken. These authorities include viewing, updatting, adding, and deleting data in this application.

Figure 7. View Dashboard

3. Asset Management

The Asset Management page is one of the main features in the IT Asset Monitoring System, designed to display a complete list of all registered assets. This page features an informative and interactive user interface that presents asset data in a structured table format, including details such as asset name, category, location, vendor, and purchase date.

The page is equipped with a search function to help users quickly locate specific assets, along with options to export the data into Excel or PDF formats to support documentation and reporting needs.

Access rights on this page are restricted based on user roles. Only users with the admin role are granted full access to add, edit, or delete asset data. Meanwhile, users with the roles of manager and technician are limited to viewing asset information without permission to make any modifications. This access control is implemented to maintain data integrity and ensure secure asset data management.

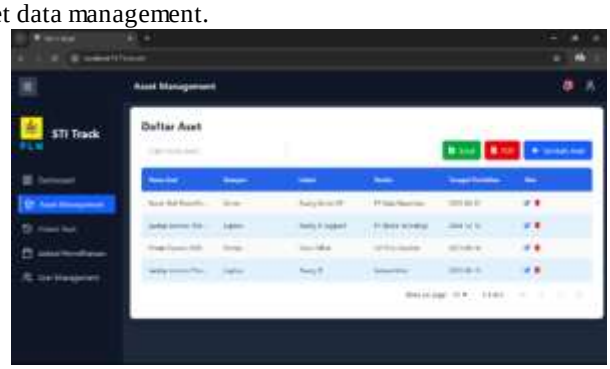


Figure 8. View Asset Management

4. Asset History

The Asset History Page functions as an audit log that records all user activities related to asset data management. Actions such as adding, editing, or deleting records are automatically logged and displayed in a structured table.

The page provides key information including asset name, username, type of action (e.g., created, updated), description, and timestamp. This feature enhances transparency, accountability, and facilitates tracking of asset-related changes, contributing to data integrity and system oversight.

JURNAL SISTEM INFORMASI TGD
Volume 4, Nomor 4, Juli 2025, Hal 828-837
P-ISSN : 2828-1004 ; E-ISSN : 2828-2566
https://ojs.trigunadharma.ac.id/index.php/jsi

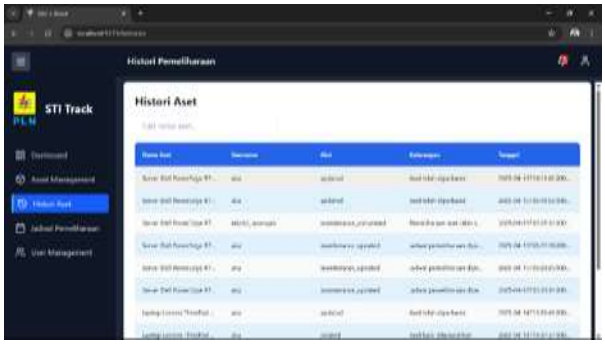


Figure 9. View Asset History

5. Maintenance Schedule

The Maintenance Schedule Page is a feature designed to organize routine maintenance schedules for IT assets. This page displays a table containing asset information, maintenance dates, assigned technicians, asset locations, descriptions, execution status, and action buttons for data management.

Scheduling can be performed by users with admin and manager roles, while technicians have limited access to view schedules and update the status upon completion. Once the maintenance task is completed, the technician is required to change the status to "Completed" as a form of job reporting.

This feature is also supported by an interactive calendar view, allowing users to visually manage and monitor maintenance tasks, thus improving coordination and scheduling efficiency.

Figure 10. View Maintenance Schedule

6. User Management

The User Management Page is an exclusive feature accessible only to users with the Admin role. Its main function is to manage user accounts within the system, including creating, editing, and deleting users.

The table on this page lists all registered users along with essential information such as username, email, role, and available actions. Admins have full control to add new users via the Add User button, as well as to modify or remove existing accounts. A search bar is also provided to help quickly find users by their username.

This feature plays a key role in managing user access and authorization, ensuring system security and orderliness.

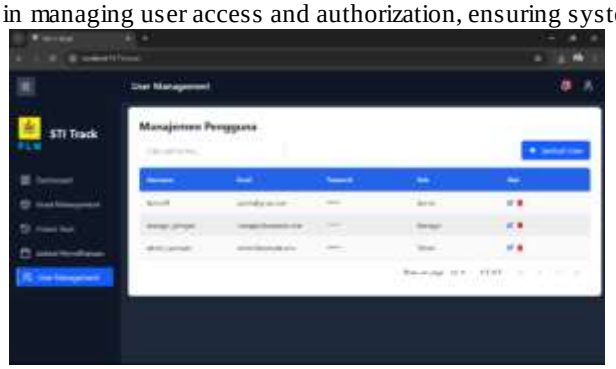


Figure 11. View User Management

3.4 Testing

System testing is the fourth phase after implementation, aiming to verify whether the system meets its functional requirements. It also helps identify bugs or defects that may affect performance.

This project uses the Black Box Testing method, which evaluates the system based on input and output without knowing the internal code. The goal is to ensure each function behaves as expected from the user's perspective. Test results are presented in a table to show the accuracy of system responses. Here is the result of the system testing using the Black Box method, as shown in Table 1.

JURNAL SISTEM INFORMASI TGD
Volume 4, Nomor 4, Juli 2025, Hal 828-837
P-ISSN : 2828-1004 ; E-ISSN : 2828-2566
https://ojs.trigunadharma.ac.id/index.php/jsi

Table 1. Testing Black Box

Test ID	Description	Expected Result	Test Result	Conclusion
1	Successful Login: Open the login page, enter valid credentials (e.g., username: AdminIT, password: password123), and click the login button.	The system verifies credentials and, if valid, redirects the user to the dashboard page. The dashboard displays key options and the user's name at the top.	The system redirects to the dashboard with user information visible.	Valid
2	Failed Login (Invalid Data): Open the login page and enter an invalid username and/or password (e.g., username: wrongUser, password: wrongPass) and click login.	The system detects invalid credentials and displays an error message such as "Username or password incorrect." The login page remains.	Error message is displayed correctly, and user stays on login page.	Valid
3	Empty Fields: Attempt to login with both fields empty and click the login button.	The system displays a validation message indicating that username and password are required.	Validation message is displayed for required fields.	Valid
4	Access Dashboard Without Login: Try accessing the dashboard URL directly without logging in.	The system redirects to the login page, restricting access to unauthorized users.	Redirected to login page. Access denied.	Valid
5	Login with Non-Active User (if implemented): Try logging in with an account that has been deactivated.	The system displays a message such as "Account is not active" and prevents login.	Message displayed and login prevented.	Valid
6	View Dashboard: After login, click the Dashboard menu	The dashboard page is displayed with statistics, notifications, and main menu	Dashboard is displayed with all elements	Valid
7	View Asset List	Displays a list of assets with name, code, category, location, etc.	Asset data is displayed completely	Valid
8	Search Asset	Type a keyword, matching results should be shown	Filtered results are displayed accordingly	Valid
9	Add New Asset	Fill the form and click save	New asset is added to the list	Asset successfully added
10	Edit Asset	Edit asset data and click save	Asset data is updated	Changes saved and reflected in the table
11	Delete Asset	Click delete and confirm	Asset is removed from database and table	Asset deleted from the list
12	View History List	Displays history of actions performed on assets	History data is displayed properly	Valid

JURNAL SISTEM INFORMASI TGD
Volume 4, Nomor 4, Juli 2025, Hal 828-837
P-ISSN : 2828-1004 ; E-ISSN : 2828-2566
https://ojs.trigunadharma.ac.id/index.php/jsi

13	Search by Asset Name	Enter asset name in the search input	Filtered results are shown matching the name	Filter works correctly
14	Data Format	Date and time displayed in common readable format	Example: Apr 16, 2025 14:30	Format is correct
15	View Calendar	Calendar displays with scheduled maintenance events	All events are visible on interactive calendar	Valid
16	Add Maintenance Schedule	Click a date, fill the form, click save	Schedule is added to the calendar	Schedule saved and displayed
17	Edit Schedule	Click an event, update details, click save	Schedule is updated on calendar	Changes applied successfully
18	Delete Schedule	Click event, click delete, confirm	Schedule is removed from calendar	Event deleted successfully
19	View User List	Displays list of users with username, role, etc.	User data shown completely	Valid
20	Add User	Fill the add user form and click save	New user appears in the list	User successfully saved
21	Edit User	Click edit, update data, click save	User data updated in the list	Changes reflected
22	Delete User	Click delete and confirm	User is removed from list	User deleted successfully

4. CONCLUSION

The design and development of the Web-Based IT Asset History Monitoring Application were carried out based on a case study during the internship at PT PLN (Persero) UIT JBT, specifically in the Information Technology Systems Division. The results of the analysis in the field showed that the process of recording and monitoring IT assets was still being carried out manually, which posed several issues, including inefficiency, a high risk of human error, and the absence of real-time visibility regarding asset history and maintenance activities.

Through this application, the asset management process becomes more structured, centralized, and digitized. Every change or movement of an asset is automatically recorded in the system, allowing for better traceability and accountability. In addition, the system provides features for scheduling and tracking maintenance activities using an interactive calendar, thereby supporting preventive maintenance. The implementation of role-based access control ensures that only users with appropriate authority can perform specific actions, thus increasing data security and integrity. The dashboard also serves as a visual summary of asset status and recent activities, which supports decision-making processes for stakeholders.

Overall, this system has proven to improve the efficiency, accuracy, and transparency of IT asset management processes. It is hoped that this application can be continuously developed by adding features such as automated notifications, integration with inventory systems, and mobile platform support to meet broader operational needs.

ACKNOWLEDGEMENTS

1. To Mr. Roni Nixon Fernando Tampubolon, Assistant Manager of the STI Division at Jabar II, for entrusting me with the opportunity to create and complete the research on the design of a web-based IT asset history monitoring application, which has now been successfully developed and can be used effectively.
2. To Mr. Uyu Wachyu Ruchiyat, M.Kom, as my thesis advisor, for his valuable guidance and support throughout the process of designing the application and completing this research journal article.

REFERENCES

[1] A. Zein, B. Waseso, F. I. Komputer, and U. M. Buana, "Sistem Informasi Manajemen Aset TI Dengan Metode Analytical Hierarchy Process (AHP) Untuk Mendukung Pengambilan Keputusan Pengadaan Aset TI di Perusahaan Manufaktur *) Corresponding Author," vol. 16, no. 2, pp. 131–146, 2024.

[2] F. B. Priyanti and A. F. Wijaya, "Analisis Kinerja Sistem Informasi Manajemen Aset Menggunakan IT Balanced Scorecard Studi Kasus: Unit Pengelolaan Pendapatan Daerah Kota Salatiga," *J. Inf. Syst. Informatics*, vol. 3, no. 1, pp. 45–56, 2021, [Online]. Available: http://journal-isi.org/index.php/isi

[3] A. Lumowa, "Rancang Bangun Aplikasi Pemetaan Aset PT PLN (Persero) Unit Pelaksana Pelayanan Pelanggan UP3 Manado," *Ranc. Bangun Apl. Pemetaan Aset PT PLN Unit Pelaksana Pelayanan Pelangg. UP3 Manad.*, vol. 18, no. 1, p. 10, 2023, doi: https://doi.org/10.35793/jti.v18i1.50442.

[4] M. Djasuli, P. S. Akuntansi, U. T. Madura, K. Bangkalan, and P. J. Timur, "Implementasi Teknologi Informasi dalam Pengelolaan Aset atau Barang Milik Daerah Badan Pendapatan , Pengelolaan Keuangan dan Aset Daerah Kabupaten Sampang," vol. 1, no. 2, pp. 478–484, 2024.

[5] P. R. Maharani, I. D. Jaya, R. F. Palembang, and S. Selatan, "Analisis Efektivitas Pengelolaan Aset IT Pada Website Jira Wilmar PT . Sinar Alam Permai Wilmar Group Palembang Menggunakan Pieces Framework," vol. 3, no. 1, pp. 13–24, 2024.

[6] A. T. Prastowo and S. Sanusi, "Implementasi Metode Pengembangan Extreme Programming Pada Sistem Informasi Pengelolaan Inventaris Aset Kantor," *Insearch Inf. Syst. Res. J.*, vol. 3, no. 01, 2023, doi: 10.15548/isrj.v3i01.5861.

[7] R. Rahman, F. Satrya, and F. Kusumah, "Design and Development of a Website-Based Power Bank Rental Monitoring System Using a Framework and Blackbox Testing Method," vol. 7, no. 4, pp. 1439–1450, 2024, doi: 10.32493/jtsi.v7i4.43215.

[8] R. P. Aji, R. Waluyo, R. Andika, and N. Hani, "Implementasi Metode Extreme Programming untuk Pengembangan Sistem Inventory Sarana dan Prasarana pada Universitas Amikom Purwokerto," vol. 7, no. 4, pp. 1566–1573, 2024, doi: 10.32493/jtsi.v7i4.44861.

[9] J. B. Ardika and N. Ratama, "Implementasi Qr Code Menggunakan Google Application Programming Interface (API) dalam Membangun Sistem Informasi Warehouse dengan Metode Extreme Programing Berbasis Web (Studi Kasus: PT Bell Flavors & Fragrances Indonesia)," *J. Teknol. Sist. Inf. dan Apl.*, vol. 5, no. 1, p. 47, 2022, doi: 10.32493/jtsi.v5i1.16165.

[10] F. Azhary, "Penerapan Metode Extreme Programming dalam Pengembangan Sistem Pemantauan Konstruksi Kapal Berbasis Web Fadlin Azhary Penelitian yang dilakukan oleh Ahmad Ali Mutezar dan Umniy Salamah dari Universitas dengan menerapkan metode Extreme Programming (XP)," vol. 3, pp. 1–13, 2025.

[11] Siska Narulita, Ahmad Nugroho, and M. Zakki Abdillah, "Diagram Unified Modelling Language (UML) untuk Perancangan Sistem Informasi Manajemen Penelitian dan Pengabdian Masyarakat (SIMLITABMAS)," *Bridg. J. Publ. Sist. Inf. dan Telekomun.*, vol. 2, no. 3, pp. 244–256, 2024, doi: 10.62951/bridge.v2i3.174.

[12] R. Rudianto, "Penerapan Metode Extreme Programming Dalam Pembangunan Aplikasi Sistem Penunjang Keputusan," *J. Sist. Inf. dan Bisnis Cerdas*, vol. 16, no. 1, pp. 21–30, 2023, doi: 10.33005/sibc.v16i1.6.