

Analysis Design and Development of a Web-Based Human Resource Information System Using Agile Methodology at CV XYZ

Stefanie Quinevera¹, Desta Ovilini², Desiana Dian Malasari³
Universitas Widya Dharma Pontianak, Indonesia

Abstract: This study aims to analyze and design a web-based Human Resource Information System (HRIS) at CV XYZ, a company engaged in the distribution of fast moving consumer goods. The current human resource management process is still conducted manually, leading to inefficiencies, data inconsistencies, and delays in report generation. Data were collected through interviews, observation, documentation review, and literature study. The collected data were analyzed using a descriptive analysis approach to identify system requirements and existing problems. The system was developed using the Agile software development approach and modeled using Unified Modeling Language (UML). The results of this study produce an integrated HRIS that supports employee data management, attendance, payroll, leave, and shift scheduling within a single platform. Functional testing was conducted using the black-box testing method, and the results showed that all implemented features operated according to the defined system requirements. The proposed system provides a structured solution for managing human resource data and demonstrates the potential to improve efficiency, accuracy, and accessibility of information. The system can also serve as a reference model for similar organizations facing comparable human resource management challenges.

Keywords: *Information System, Human Resource Management, Agile, UML*

Article Info:

Received: February 5th 2026 | **Revised:** April 18th 2026 | **Accepted:** May 30th 2026

DOI:

¹ Email: stefanieq.2206@gmail.com (*Correspondence Author*)

² Email: destaovilini18@gmail.com

³ Email: desianadian594@gmail.com

1. INTRODUCTION

The rapid advancement of digital technology in the era of the Industrial Revolution 4.0 has significantly influenced how organizations manage information and conduct their operations. This transformation not only affects production processes but also reshapes how organizations manage human resources. As a result, companies are required to adopt digital solutions, particularly in managing employee-related data and processes, to improve efficiency and organizational performance.

Management Information Systems (MIS) are computer-based systems designed to collect, process, store, and distribute information to support planning, control, and decision-making activities (Muslim, Wibowo, & Nofandi, 2021). In the context of human resource management, the implementation of a Human Resource Information System (HRIS) enables organizations to manage employee data in a structured, accurate, and integrated manner. HRIS supports various human resource activities, including employee data management, attendance tracking, payroll processing, performance evaluation, and reporting (Arin & Sumanti, 2024).

CV XYZ, a company engaged in the distribution of Fast Moving Consumer Goods (FMCG), currently manages its human resource data manually. This approach leads to several challenges, including errors in data recording, data inconsistencies, delays in report generation, and the risk of data loss. These limitations reduce the effectiveness and efficiency of human resource management processes and highlight the need for a more integrated system.

Previous studies have shown that the implementation of web-based Human Resource Information Systems (HRIS) can improve operational efficiency and support organizational decision-making processes (Lestari et al., 2019; Sinaga et al., 2025). However, most existing studies primarily focus on system implementation and evaluation, while limited research discusses the analysis, design, and development of integrated HRIS specifically tailored for small and medium-sized distribution companies with shift-based employee management. In addition, many studies do not comprehensively integrate attendance, payroll, leave management, and shift scheduling into a single platform. Therefore, this study addresses this gap by proposing the analysis, design, and development of a web-based HRIS using the Agile methodology at CV XYZ.

Therefore, this study aims to analyze the existing human resource management process at CV XYZ and develop a web-based Human Resource Information System to address the identified problems. The proposed system is developed using the Agile methodology and modeled with Unified Modeling Language (UML) to produce a structured and flexible system design. The contribution of this study lies in the design of an integrated HRIS that supports employee data management, attendance, payroll, leave management, and shift scheduling within a single system. The proposed system is expected to provide a structured solution for improving data management and can serve as a reference model for similar organizations facing comparable human resource management challenges.

2. LITERATURE REVIEW

A system is a group of elements or subsystems that interact with each other to achieve specific goals. According to Ardian et al. (2021), broadly speaking, a system is a collection of integrated components and elements, organized and working together to realize particular objectives. In line with this, Nurdianti et al. (2022) state that a system is a set of interconnected mechanisms with specific goals, one of which is to provide fast and accurate information. Information itself is the result of data processing obtained through combination, analysis, and processing with the assistance of computer-based information systems. Nisa et al. (2024) explain that information is data that has been processed so that it becomes meaningful and useful for its recipients, especially in decision-making. This is further supported by Laudon & Laudon (2020), who state that information is processed data that possesses meaning and utility for its users in supporting decision-making.

Furthermore, Dessler (2024) defines human resource management as the process of acquiring, training, evaluating, and compensating employees, as well as managing labor relations, occupational health and safety, and fairness within the organization. Hasibuan (2019) states that human resource management is both a science and an art in organizing relationships and the roles of the workforce to be effective and efficient in supporting the achievement of organizational, employee, and societal goals. Effective HR management requires systematic planning and control to maximize employee contributions. Therefore, the effective management of HR functions will enhance employee performance and support overall organizational success. Moreover, human resource management can be understood as a system, since a human resource management information system serves to collect, record, store, and manage employee data in order to produce useful information for decision-making.

The next theoretical review concerns human resource management information systems. According to Dessler (2020) a human resource management information system assists HR management in recording employee data and supports recruitment and other human resource processes. A human resource management information system is an integrated system comprising technology, procedures, and people to efficiently collect, manage, store, and analyze employee data. This system provides accurate HR information for planning, performance management, compensation, and HR-related decision-making. Furthermore, Rizal et al. (2021) state that computerized systems are superior to manual systems, as they operate more effectively and efficiently, and create a more conducive data management environment. HR information systems overcome the delays in report delivery caused by the large volume of tasks performed manually.

Based on these opinions, it can be concluded that a human resource information system is a system composed of information technology, procedures, and people, designed to manage data and information related to employees within an organization. Furthermore, Widaningsih et al. (2021) state that an HR information system is a system that can be used to manage employee recruitment and training processes, as well as facilitate administrators in managing employee data. Meanwhile, Sutinah et al. (2021) argue that the development of an HR information system to meet HR needs more effectively

and efficiently is essential to avoid errors in data recording and to reduce processing time.

The next theoretical review discusses the components of a human resource information system. According to Dessler (2020), the components of an HR information system are: 1) Database: a collection of data that stores comprehensive information about employees, such as personal data, educational background, work experience, positions, attendance, performance evaluations, and payroll information; 2) Software: applications or systems used to manage HR data in a computerized manner, covering processes such as recruitment, selection, training, performance evaluation, payroll, and compensation administration; 3) Hardware: physical facilities such as computers, servers, networks, and other supporting devices used to run the system, process, and store HR data; 4) HR Procedures: rules and procedures that govern how HR data is input, processed, and used to ensure that the information produced is accurate, consistent, and in accordance with organizational policies; 5) Human Resources: the individuals involved in operating the system, including HR staff, managers, and employees who use the HRIS to support HR management activities.

The study by Lestari et al. (2019) shows that the use of web-based information systems not only enhances operational efficiency but also supports decision-making processes and strengthens organizational competitiveness. Furthermore, Hasian et al. (2025) found that the implementation of cloud-based (web-enabled) HRIS positively impacts the efficiency of human resource management, including cost efficiency, work cycle time, and data accuracy. Meanwhile, Sinaga et al. (2025) demonstrate that the implementation of computerized HR information systems, including web-based systems, has improved the efficiency of employee data management and decision-making processes.

Furthermore, according to Safitri et al. (2024), a human resource information system (HRIS) is a system designed to manage information related to human resources within an organization. In addition, an HRIS serves to support decision-making, enhance operational efficiency, and facilitate the effective management of employee data within a company.

The next theoretical review focuses on system development methods. According to Setiyanto et al. (2019), system design is a process for defining what will be implemented using various techniques, involving the description of system architecture, component details, and potential limitations that may be encountered during implementation. Hatta et al. (2023) explain that the objectives of system design include meeting requirements, optimizing performance, ensuring scalability and flexibility, maintaining system quality and reliability, and ensuring compliance with applicable standards and regulations.

Furthermore, according to Daraojimba (2024), Agile methodology has revolutionized the project management landscape, offering a dynamic and flexible approach that is markedly different from more rigid traditional methods. Originating in the software development industry, Agile has since expanded into various sectors with the promise of enhancing efficiency, adaptability, and customer satisfaction. According to Dingsøyr et al. (2012), the main stages in the Agile methodology include initial planning, requirement backlog, sprint planning, sprint execution, testing, sprint review and retrospective, and continuous improvement.

The system development tools used in this study include the Unified Modeling Language (UML). According to Taufiq et al. (2023), UML is a visual modeling language employed in the analysis and design of information systems based on an object-oriented approach. Narulita et al. (2024) also state that UML is one of the modeling tools that can be used to assist in describing and designing systems, particularly in object-oriented programming. In addition, this study utilizes PlantUML as a supporting tool to create various system diagrams, including use case diagrams, activity diagrams, and sequence diagrams, which facilitate a more structured and visual representation of system design.

3. RESEARCH METHOD

Research Method

This study is classified as an applied system development research that focuses on the analysis, design, and development of a web-based Human Resource Information System (HRIS) using the Agile approach. The objective of this research is to develop a technological solution that improves the efficiency and accuracy of human resource management processes, including employee data management, attendance, payroll, leave management, and shift scheduling at CV XYZ.

The study was conducted as a case study at CV XYZ to obtain a comprehensive understanding of the organization's operational environment, existing workflows, and system-related problems. Data were collected through interviews, direct observation, documentation review, and literature study. Interviews were conducted with HRD staff and system administrators to identify user requirements, operational challenges, and expected system features. Observation was carried out to analyze current business processes and identify inefficiencies in the manual system, while documentation review was used to validate operational data and organizational records.

To ensure that the system requirement analysis was conducted systematically, this study applied the SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis framework. The framework was used to identify internal and external factors affecting the existing human resource management process at CV XYZ, including operational weaknesses, organizational needs, and potential opportunities for system improvement. The results of the SWOT analysis were used as the basis for determining system requirements and formulating the proposed HRIS design.

Furthermore, business process analysis and system design were represented using Unified Modeling Language (UML) diagrams, such as use case diagrams, activity diagrams, and sequence diagrams, to illustrate user interactions and system workflows in a structured manner.

System Development Method

The Agile Development method is a software development approach within the Software Development Life Cycle (SDLC) that emphasizes iterative processes, where development is continuously refined based on agreed rules and solutions. This method is characterized by its flexibility, responsiveness, and adaptability to changing user requirements, making it effective for designing software according to desired specifications (Hendra, Wahyuningsih, & Mahendrasusila, 2024). Agile was selected because it allows incremental system

development and enables continuous adjustments to evolving user requirements. The stages of Agile development applied in this study are as follows:

a. Planning

This initial stage focuses on defining the system concept and identifying problems, as well as determining appropriate solutions based on user needs and organizational conditions.

b. Design

At this stage, the collected ideas and concepts are translated into system designs in the form of mockups and initial models to represent the system interface and functionality. System modeling is also carried out using UML diagrams to describe system processes and user interactions.

c. Development

In this stage, the system design is implemented through programming. The development process focuses on building the system based on predefined rules and user requirements. This stage also involves continuous evaluation, allowing adjustments and improvements during development.

d. Testing

The testing stage is conducted to evaluate the functionality of the system before proceeding to implementation. Black Box Testing was applied to verify whether each system feature operated according to the defined functional requirements. The testing process focused on validating system inputs, processes, and outputs to ensure that the developed features functioned properly.

e. Documentation

This stage involves recording the system development process, including system results and evaluation outcomes related to system performance and development activities.

f. Deployment

In this final stage, the system that has been evaluated by both the development team and the organization is deployed, allowing it to be accessed and used by users.

4. ANALYSIS AND DISCUSSION

Based on the analysis results, it was identified that human resource management at CV. XYZ involves several key aspects, including employee data, departments, positions, attendance, leave, payroll, and shift scheduling. However, the current system still has several limitations that affect the efficiency of HR operations.

To support the system requirement analysis, a SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis was conducted to identify internal and external factors affecting the existing human resource management process at CV XYZ. The results of the SWOT analysis are presented in Table 1.

Table 1. SWOT Analysis of the Existing Human Resource Management System at CV XYZ

Aspect	Description
Strengths	CV XYZ already has organized employee operational data and an established HR administrative process that supports system implementation. The company also has clear operational workflows related to attendance, payroll, leave management, and employee administration.
Weaknesses	Human resource management processes are still handled manually using separate tools, resulting in fragmented data management, data inconsistencies, and inefficiencies in report generation. In addition, shift scheduling and attendance monitoring for shift-based employees are difficult to manage accurately, which also complicates payroll calculation and increases the risk of salary calculation errors.
Opportunities	The implementation of a web-based HRIS provides opportunities to improve operational efficiency, centralize employee data management, support faster decision-making, and enhance the management of attendance, shift scheduling, and payroll processes. The increasing adoption of digital technology also supports the implementation of computerized HR systems.
Threats	Potential threats include data security risks, dependence on system availability, and user adaptation challenges when transitioning from manual processes to a computerized system.

Source: CV XYZ

Based on the identified problems and the results of the SWOT analysis, a web-based HRIS was designed to integrate all human resource management processes into a single platform. The system is modeled using UML to represent system functionalities and user interactions. The use case diagram of the proposed system can be seen in Figure 1.

The use case diagram represents the interaction between the user and the system in the proposed HRIS. It illustrates the functional requirements of the system by showing the actions that can be performed and how the user interacts with each function. The diagram provides an overview of the system behavior from the user's perspective.

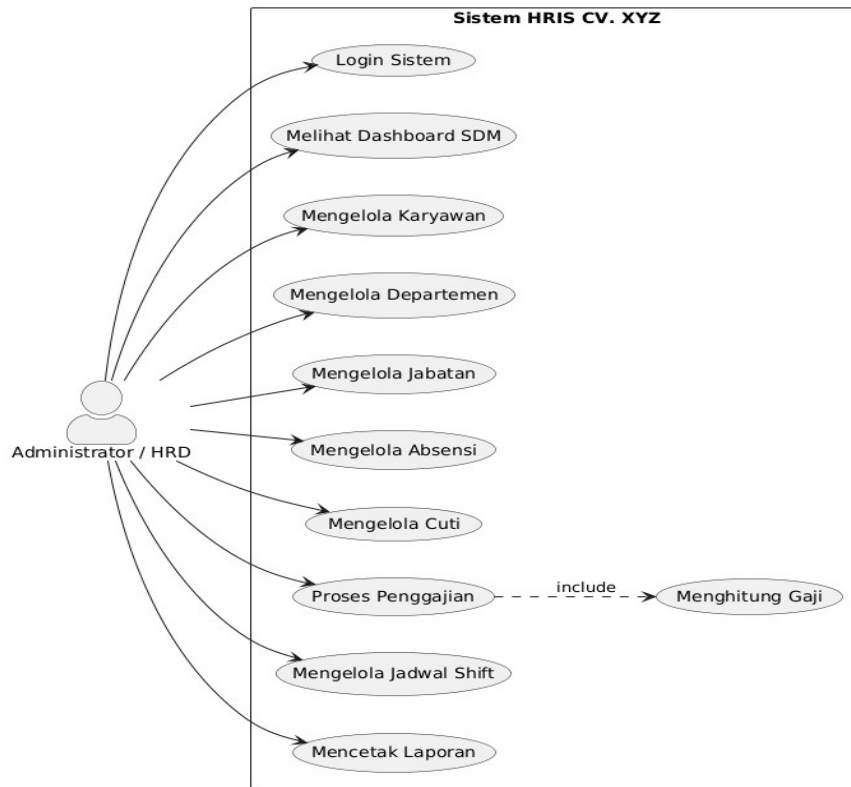


Figure 1.
Use Case Diagram

The system has a single primary actor, namely the Administrator/HRD, who has full access to all features. The diagram shows that the actor can perform various operations, such as login, managing employee data, departments, positions, attendance, leave, payroll, and shift schedules, as well as viewing the dashboard and generating reports. It also indicates that the payslip printing process includes salary calculation as part of the system functionality.

To provide a more detailed explanation of how the system operates, activity diagrams were created to represent the detailed actions in the HRIS of CV XYZ. These diagrams provide a clear visualization of how the Administrator/HRD performs essential tasks, illustrating the step-by-step workflow and decision points involved in each process. The Login System activity diagram depicts the authentication process, where the HR Administrator enters credentials, the system verifies them, and grants access to the dashboard upon successful validation. Once logged in, the View HR Dashboard activity presents a summary including total employees, active employees, total departments, active leaves, employees present today, employees who are late today, those working overtime today, and a brief overview of recent leave activities, enabling quick and comprehensive monitoring for effective decision-making. The process of login is shown in Figure 2.

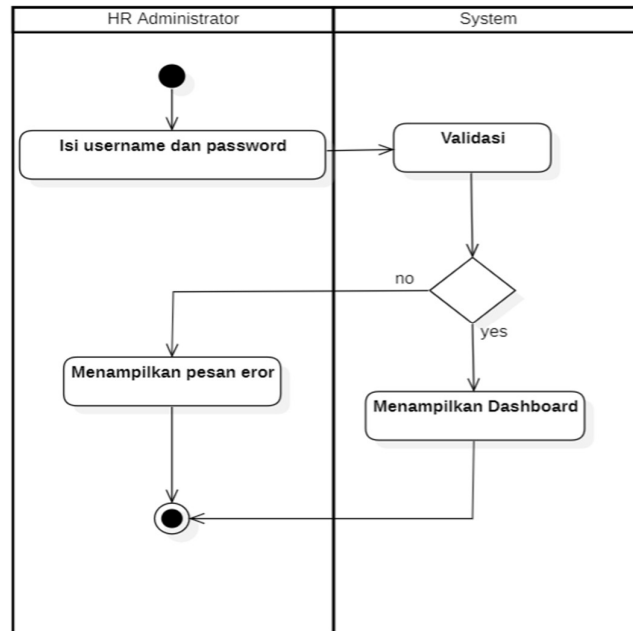


Figure 2.
Login System Activity Diagram

The Manage Employee Data activity diagram illustrates the process of inputting and maintaining employee records. The HR Administrator can add, view, edit, and delete employee data as part of the data management process. The system allows the administrator to input new employees and access detailed employee information, including personal identification, job position, and associated documents. The document management component tracks the completeness of required workplace documents, such as KTP, driver's license (SIM), diplomas, and other relevant certifications, ensuring that all employee records are accurate and up-to-date. The process of adding a new employee is shown in Figure 3.

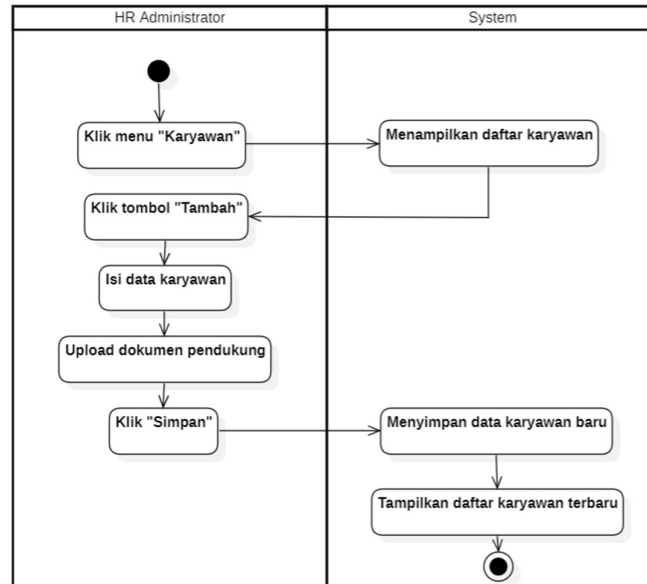


Figure 3.
Adding A New Employee Activity Diagram

The Manage Attendance activity diagram illustrates the process of recording and monitoring daily employee attendance, including status indicators such as On Time, Late, and Overtime. The system also supports importing attendance data from card machines and provides attendance summaries and statistical reports to facilitate monitoring and decision-making. The process of import attendance is shown in Figure 4.

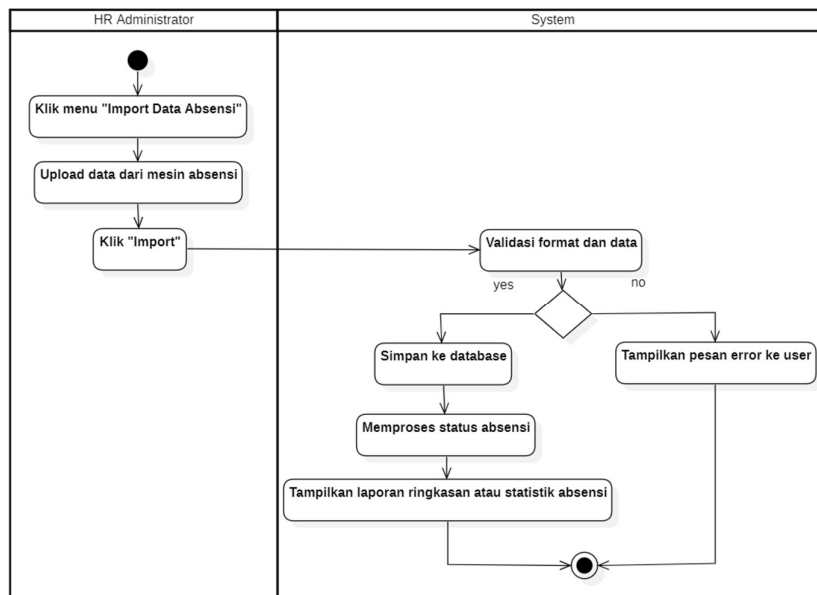


Figure 4.
Import Attendance Activity Diagram

The Manage Leave activity diagram represents the workflow for employee leave management, where HR inputs leave requests on behalf of employees and can view the status of each leave request, whether it has been completed, is in process, or has not yet started (pending). This allows HR to track leave activities accurately and maintain up-to-date records. The process of leave data input is shown in Figure 5.

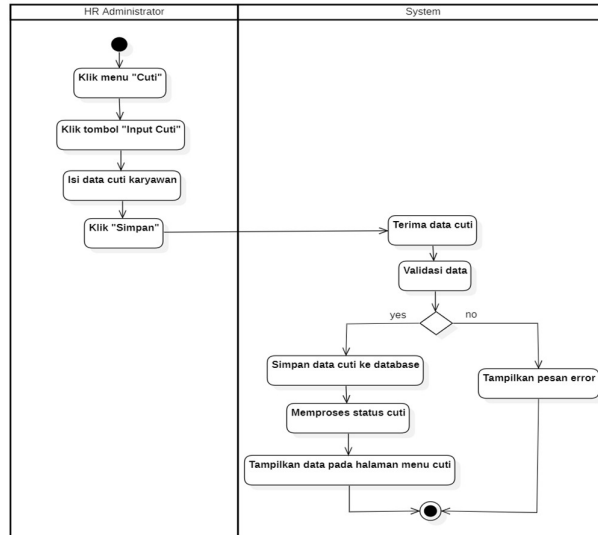


Figure 5.
Leave Data Input Activity Diagram

The Manage Shift Schedule activity diagram demonstrates the management of work shifts specifically for warehouse employees, divided into Morning, Afternoon, and Night shifts. This ensures continuous operation of FMCG warehouse distribution, accommodates flexible operational hours, and rotates staff shifts to prevent fatigue during peak periods. The process of shift schedule management is shown in Figure 6.

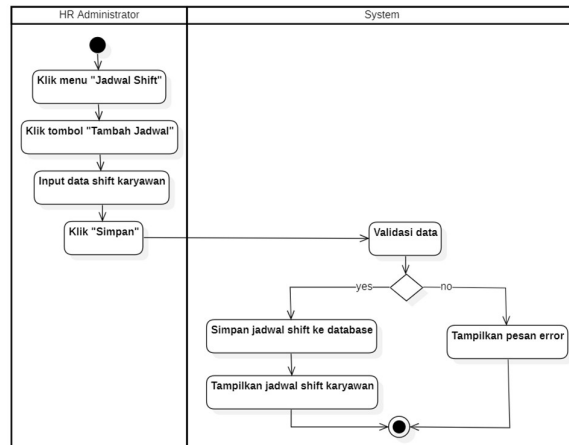


Figure 6.
Manage Shift Schedule Activity Diagram

The Payroll Processing activity diagram depicts the payroll workflow, including salary component calculation, payment processing, and payslip generation. The generated payslips are then submitted to the finance department for payment, ensuring that employee compensation is processed accurately and efficiently. The process of generate salary slip is shown in Figure 7.

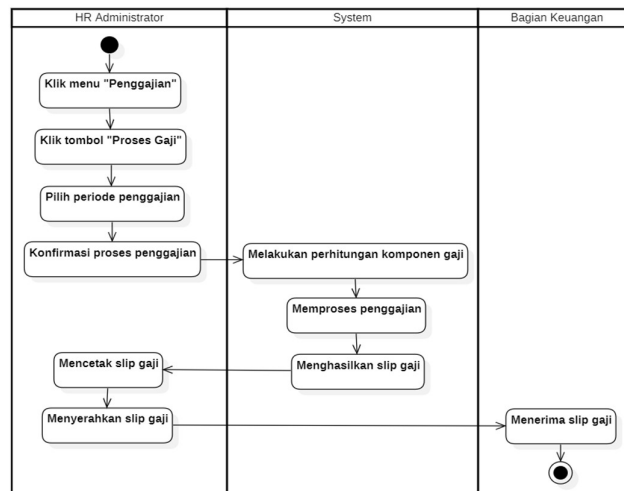


Figure 7.
Payroll Processing Activity Diagram

After describing the system workflows through activity diagrams, the design is further detailed using sequence diagrams. In the proposed HRIS, the sequence diagram illustrates the interaction between system components and the flow of messages exchanged during the execution of specific processes. The login sequence diagram shown in Figure 8 illustrates the interaction of the Boundary-Control-Entity (BCE) components during the authentication process. The Login Page acts as the Boundary by presenting the login form and sending the user credentials to the Auth Controller (Control), which queries the Tabel_Akun (Entity) to verify the credentials. The diagram shows two possible outcomes using an alt frame. If the credentials are valid, the Controller creates a session and redirects the user to the Dashboard through the Boundary. If the credentials are invalid, an error message is returned and displayed to the user. This BCE interaction pattern is consistently applied across all modules in the system to ensure structured and maintainable system behavior.

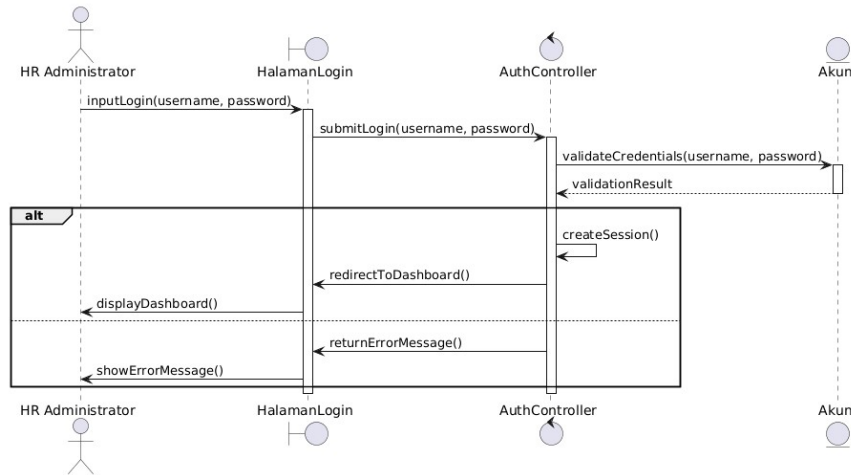


Figure 8.
Login Sequence Diagram

The sequence diagram illustrates the process of adding a new employee, starting when the HR Administrator accesses the employee page and selects the add employee option. The system displays a form where the user inputs employee data and uploads required documents. After submission, the data is sent to the controller for validation to ensure all required fields are properly filled.

If the validation is successful, the system generates a unique employee ID and stores the data in the database through the entity. Once saved, the system updates the employee list and shows a success notification. However, if validation fails, an error message is returned, allowing the user to correct the input without leaving the form. The sequence diagram of adding a new employee is shown in Figure 9.

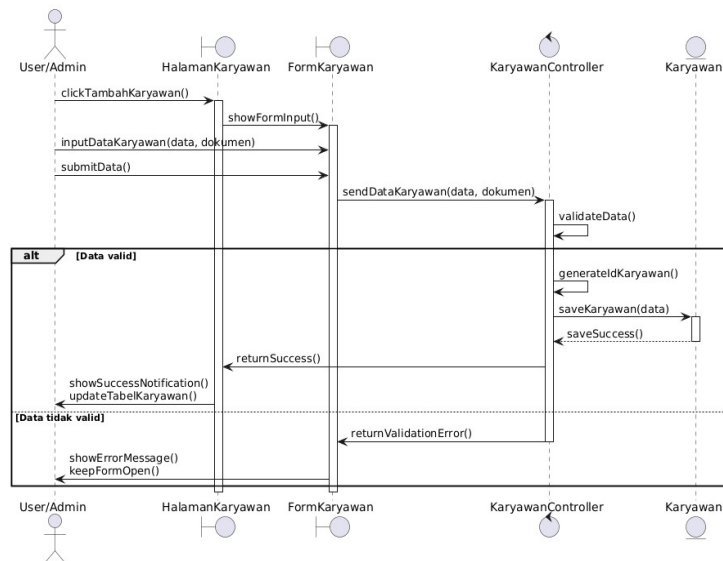


Figure 9.
Adding A New Employee Sequence Diagram

The sequence diagram describes the attendance data import process, which starts when the HR Administrator uploads an attendance file through the Attendance Page. The system sends the file to the controller, where it is first validated. If the file is valid, the system saves the attendance data into the database and retrieves the list of active employees.

Next, the system checks each employee's attendance for the current day. If no record exists, it generates and stores new attendance data based on the uploaded file. After all data is processed, the system updates the attendance table and statistics, then displays a success notification. If the file is invalid, the system instead shows an error notification indicating the upload has failed. The sequence diagram for the attendance data import process can be seen in Figure 10.

The sequence diagram for the leave data input process can be seen in Figure 11. It begins when the HR Administrator clicks the input leave button on the Leave Page, triggering the display of the leave input form. The HR Administrator fills out the form with details such as employee, leave type, start date, end date, and reason, then submits it. The submitted data is sent to the CutiController for validation. If the data passes validation, the controller saves the leave record with a default status to the Cuti entity and automatically calculates the leave status. The controller then updates the leave table on the Leave Page and displays a success notification to the HR Administrator. If validation fails, an error message is returned to the form, allowing the user to correct the input. This sequence ensures that leave data is accurately captured, validated, and managed within the system.

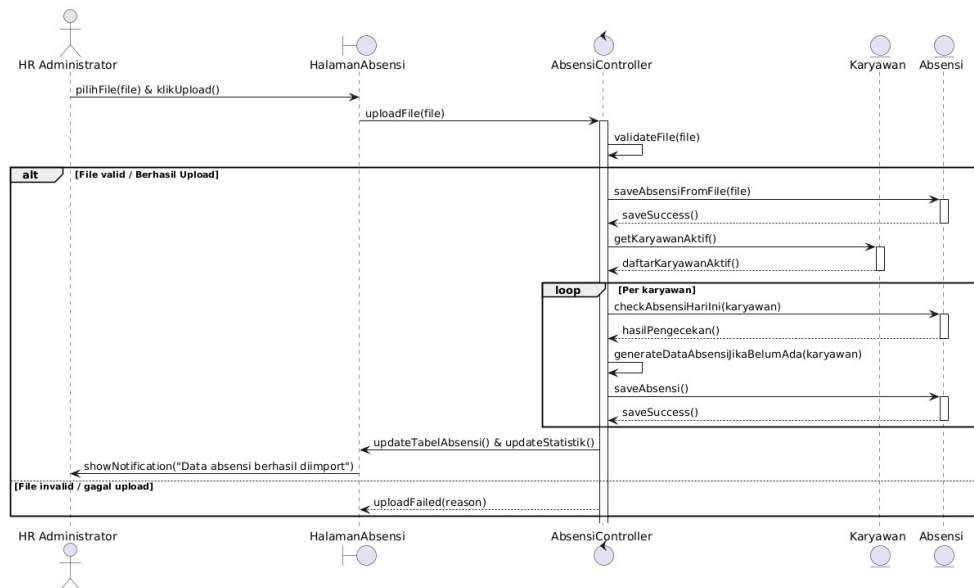


Figure 10.
Attendance Data Import Sequence Diagram

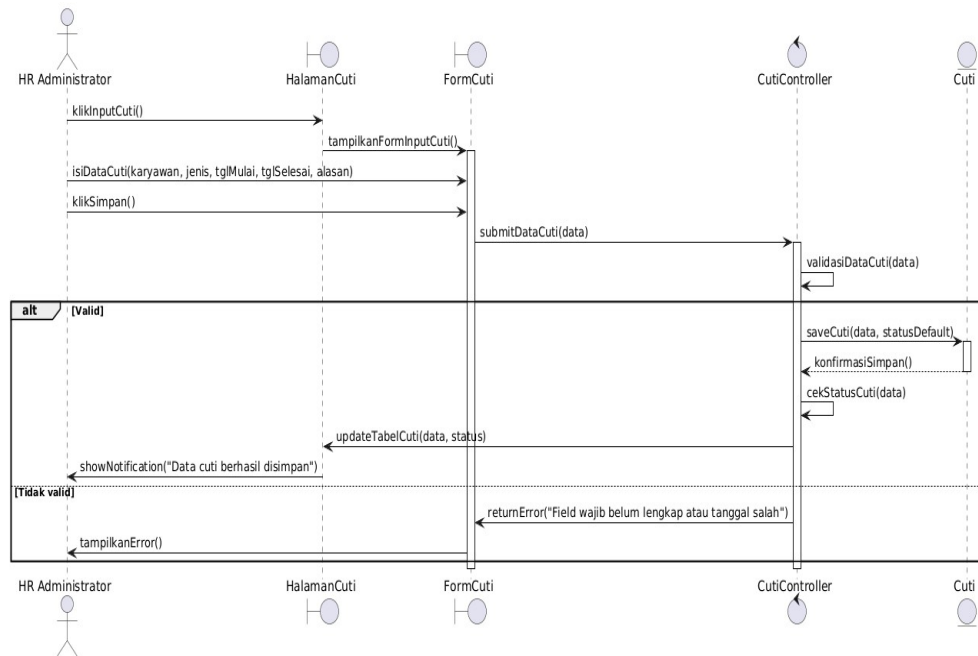


Figure 11.
Leave Data Input Sequence Diagram

The sequence diagram for salary slip generation begins with the HR Administrator. The process starts when the administrator opens the payroll form and selects the salary period (month and year). The system retrieves a list of active employees and checks for each whether a salary slip for the selected period already exists. For employees without existing slips, the system collects data such as base salary and allowances from the Position entity, attendance records, and shift schedules. These inputs are used to calculate salary components, including additions and deductions, and the resulting salary slip is saved to the payroll database. The HR Administrator can then perform bulk actions, such as marking selected slips as paid or viewing and printing individual slips. This process ensures accurate and efficient payroll management aligned with employee attendance and position data. The sequence diagram for generate salary slip is shown in Figure 13.

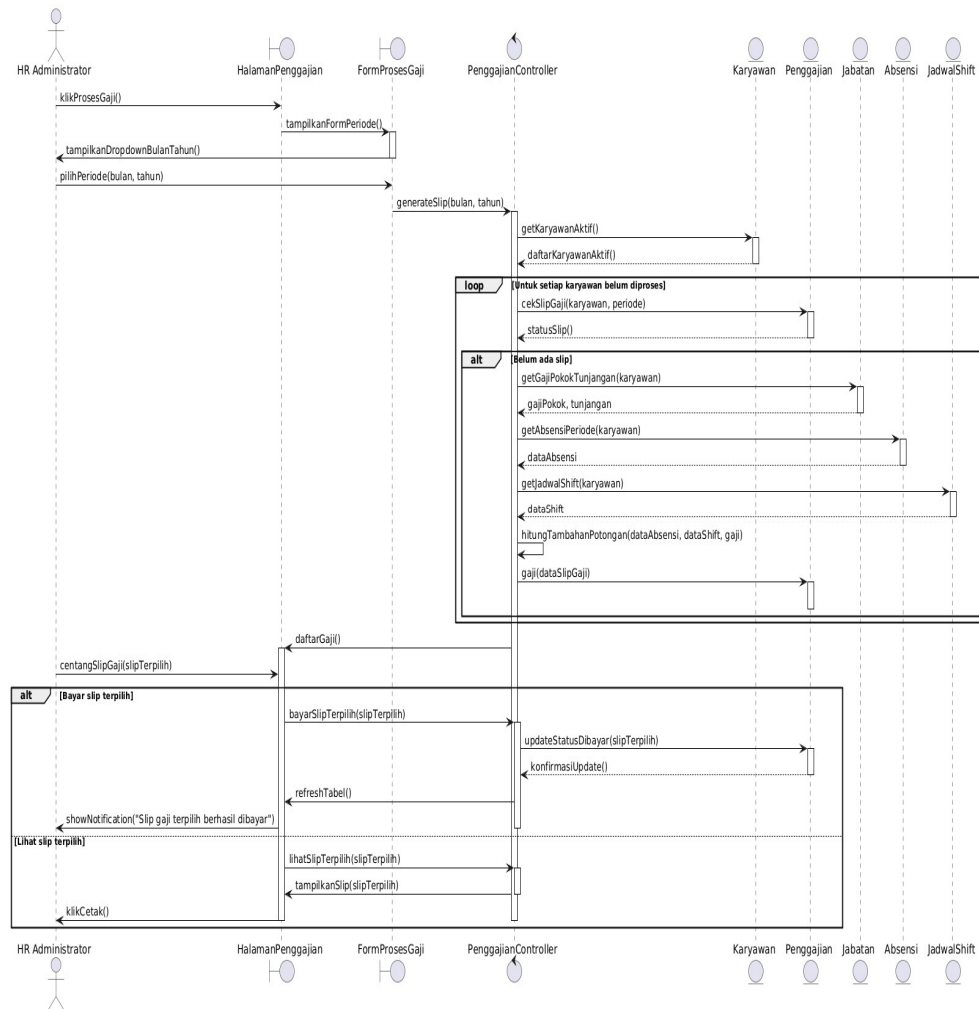


Figure 12.
Salary Slip Generation Sequence Diagram

The process of adding a shift schedule begins when the HR Administrator clicks the add schedule button on the Shift Schedule Page, prompting the system to display the input form along with a dropdown list of employees. The HR Administrator fills in the shift schedule details, including employee, date, shift type, and additional notes, then submits the form. The ShiftController validates the data and checks for duplicate schedules by querying the Shift Schedule entity. If no duplication is found, the controller maps the shift hours, saves the schedule to the database, updates the schedule table on the page, and displays a success notification. If a duplicate schedule exists for the employee on the specified date, the controller returns an error to the form, which is shown to the HR Administrator for correction. This flow ensures accurate and conflict-free shift scheduling within the system. The sequence diagram for adding a shift schedule can be seen in Figure 12.

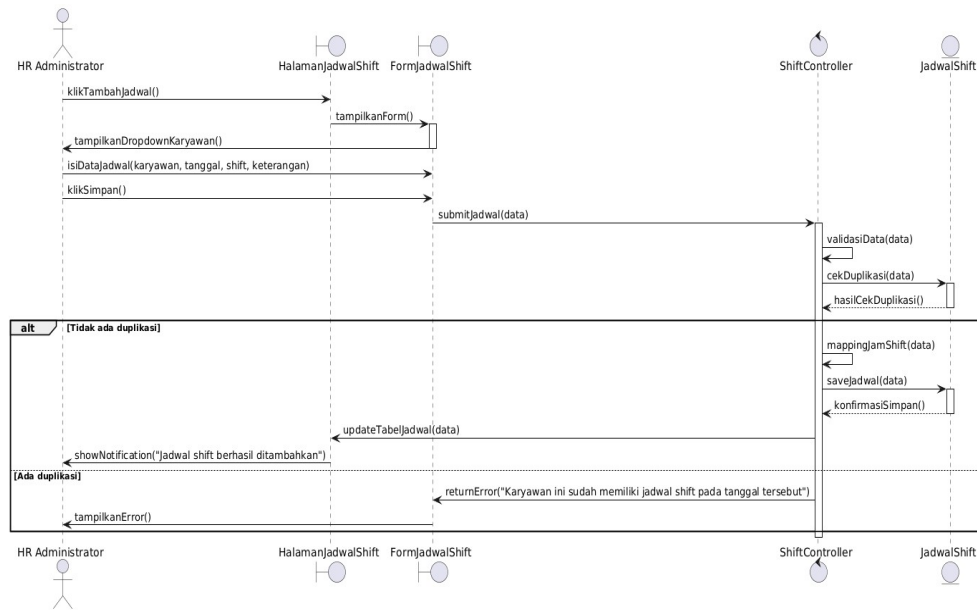


Figure 13.
Adding A Shift Schedule Sequence Diagram

After detailing the interaction between system components in the sequence diagrams, the following section illustrates the user interface design. This design provides a general overview of how the system will appear and interact visually with users. The primary focus is to create an intuitive, consistent, and user-friendly interface that enhances comfort and efficiency in using the system.

The UI design emphasizes a clean layout, color schemes aligned with the company's identity, and clear, informative visual elements. All interface components are integrated cohesively to enable users to access the system's features efficiently and effectively. A responsive design approach is also implemented to ensure the interface adapts well to different devices and screen sizes. Overall, the UI design of the system aims to provide an optimal user experience while supporting the system's overall functionality.

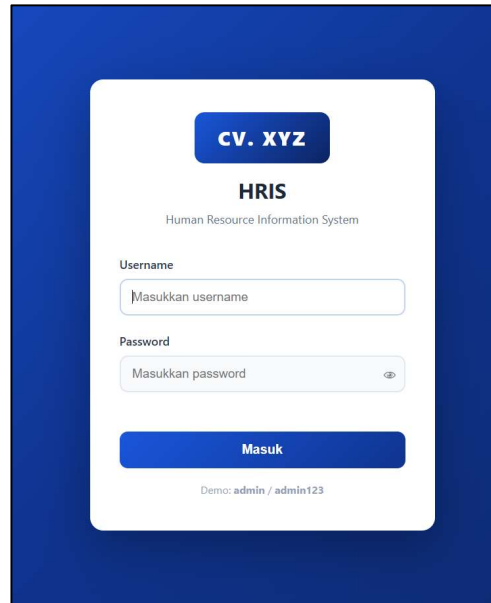


Figure 14.
Login Page Design

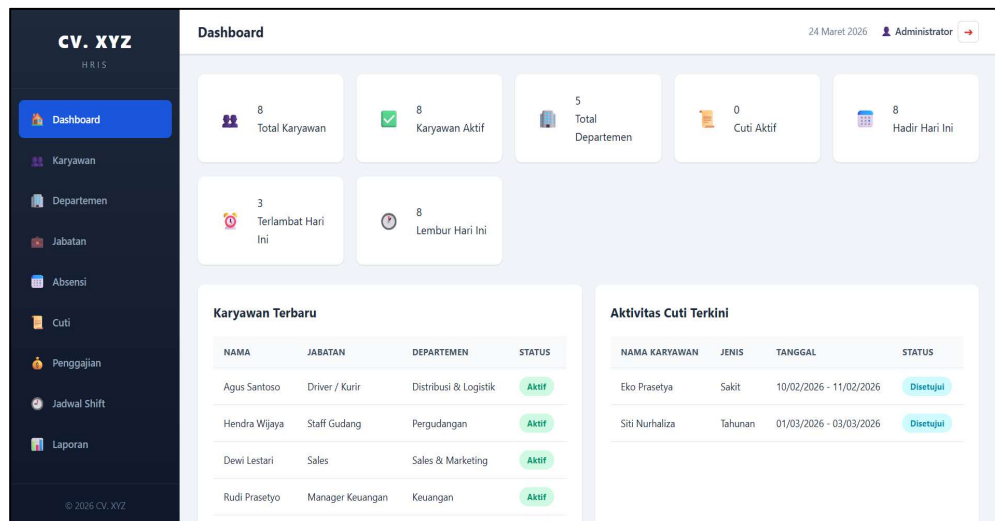


Figure 15.
Dashboard Page Design

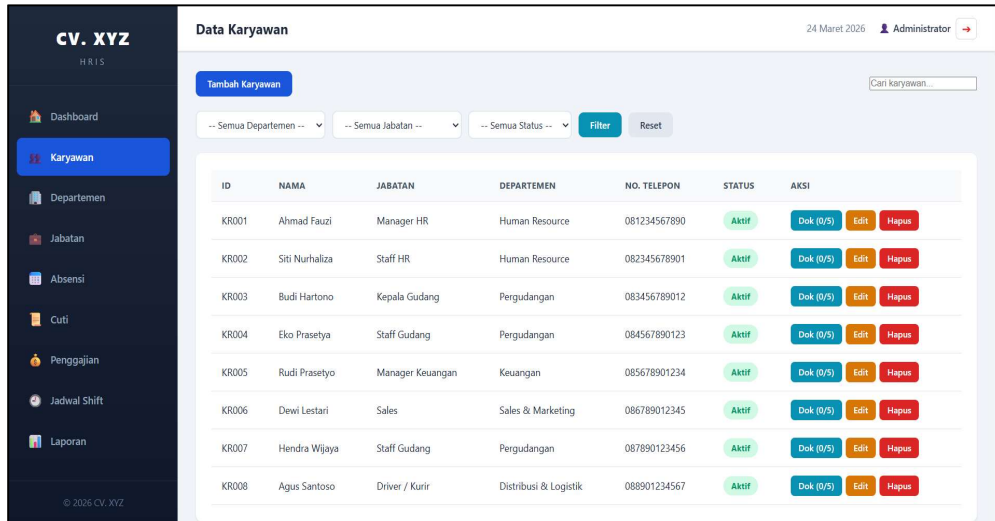


Figure 16.
Employee Data Page Design

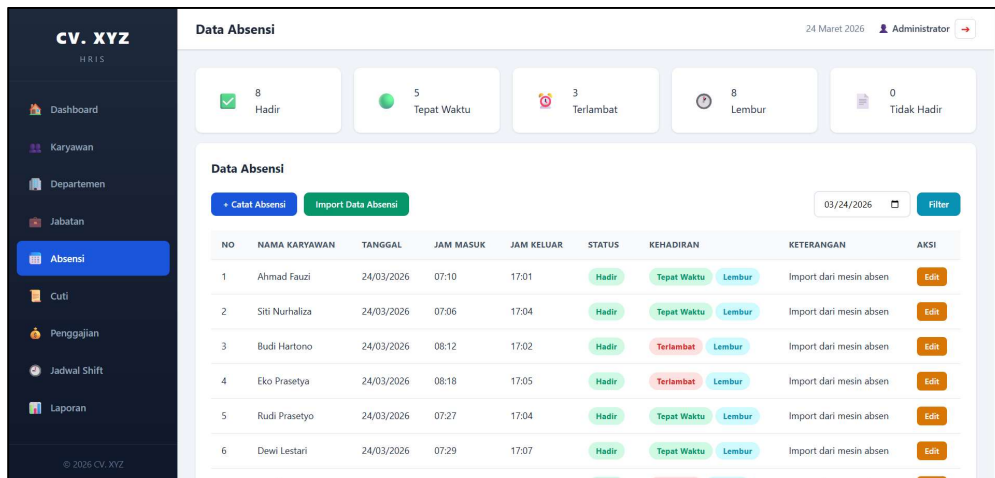


Figure 17.
Attendance Data Page Design

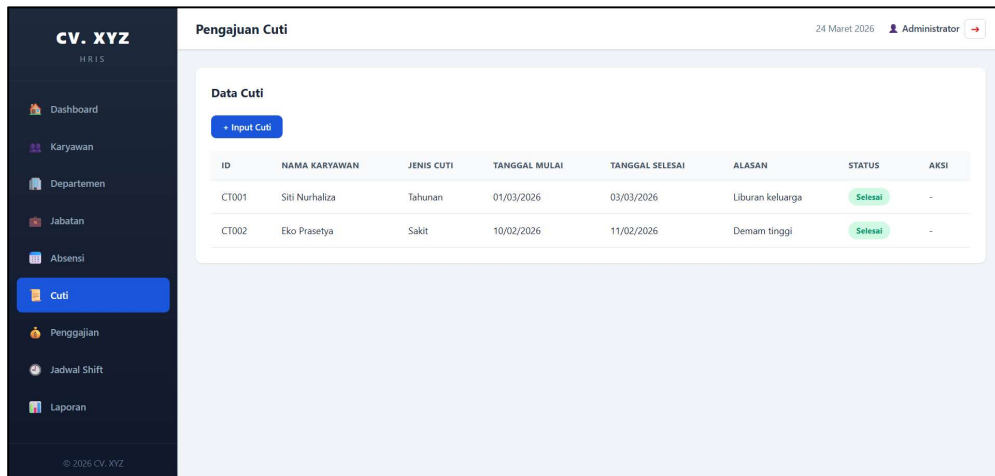


Figure 18.
Manage Leave Page Design

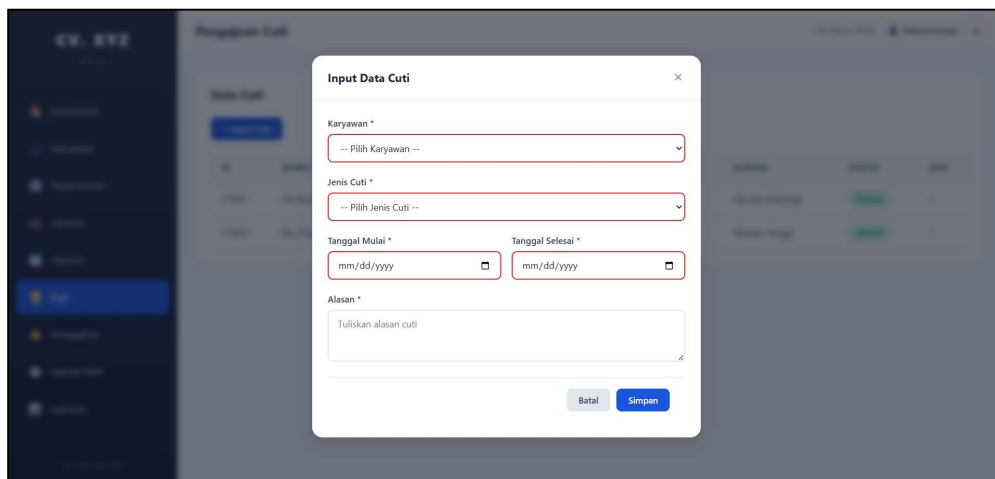


Figure 19.
Leave Data Input Page Design

CV. XYZ
HRIS

Dashboard
Karyawan
Departemen
Jabatan
Absensi
Cut
Penggajian
Jadwal Shift
Laporan

© 2026 CV. XYZ

Penggajian 24 Maret 2026 Administrator

Data Penggajian

+ Proses Gaji Rekap Penggajian -- Bulan -- -- Tahun -- Filter

ID	NAMA KARYAWAN	JABATAN	PERIODE	TOTAL GAJI	TGL DIBUAT	STATUS
PG001	Ahmad Fauzi	Manager HR	Januari 2026	Rp 14.500.000	30/01/2026	Dibayar
PG002	Siti Nurhaliza	Staff HR	Januari 2026	Rp 7.750.000	30/01/2026	Dibayar
PG003	Budi Hartono	Kepala Gudang	Januari 2026	Rp 12.800.000	30/01/2026	Dibayar
PG004	Eko Prasetya	Staff Gudang	Januari 2026	Rp 6.600.000	30/01/2026	Dibayar
PG005	Rudi Prasetyo	Manager Keuangan	Januari 2026	Rp 14.500.000	30/01/2026	Dibayar
PG006	Dewi Lestari	Sales	Januari 2026	Rp 6.300.000	30/01/2026	Dibayar
PG007	Hendra Wijaya	Staff Gudang	Januari 2026	Rp 6.450.000	30/01/2026	Dibayar
PG008	Agus Santoso	Driver / Kurir	Januari 2026	Rp 7.050.000	30/01/2026	Dibayar

Figure 20.
Payroll Page Design

CV. XYZ
HRIS

Dashboard
Karyawan
Departemen
Jabatan
Absensi
Cut
Penggajian
Jadwal Shift
Laporan

© 2026 CV. XYZ

Jadwal Shift 24 Maret 2026 Administrator

Jadwal Shift

+ Tambah Jadwal

ID	KARYAWAN	TANGGAL	SHIFT	JAM	KETERANGAN	AKSI
SH001	Budi Hartono	17/02/2026	Pagi	07:00 - 15:00	Kepala Gudang - supervisi pagi	Hapus
SH002	Eko Prasetya	17/02/2026	Pagi	07:00 - 15:00	Staff Gudang	Hapus
SH003	Hendra Wijaya	17/02/2026	Siang	15:00 - 23:00	Staff Gudang	Hapus
SH004	Budi Hartono	18/02/2026	Siang	15:00 - 23:00	Kepala Gudang - supervisi siang	Hapus
SH005	Hendra Wijaya	18/02/2026	Pagi	07:00 - 15:00	Staff Gudang	Hapus
SH006	Eko Prasetya	18/02/2026	Siang	15:00 - 23:00	Staff Gudang	Hapus

Figure 21.
Shift Schedule Management Page Design

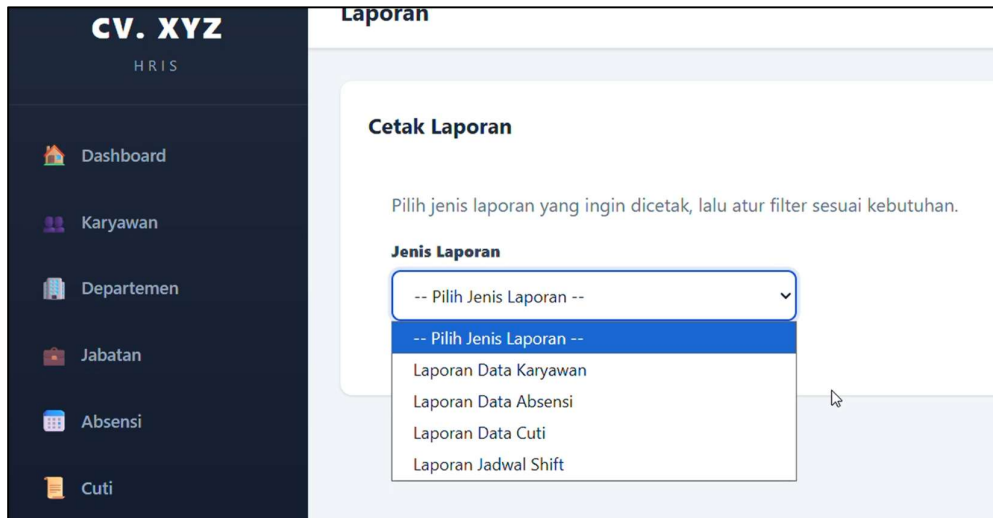


Figure 22.
Report Page Design

Based on the developed user interface and system design, the proposed Human Resource Information System (HRIS) provides an integrated platform that centralizes various human resource management activities at CV XYZ. The system integrates employee data management, attendance, payroll, leave management, shift scheduling, and reporting into a single web-based platform to support more structured and efficient HR operations.

The development of the system using the Agile methodology allowed the system to be designed and refined iteratively according to user requirements identified during the analysis and development stages. Through this approach, system features could be continuously adjusted and improved based on operational needs and workflow conditions within the organization. In addition, the use of UML diagrams and the BCE pattern contributed to a more structured system architecture by separating interface, business logic, and data management components

To evaluate the functionality of the developed system, Black Box Testing was conducted on the main system features to validate whether each function produced outputs according to the expected requirements. The testing focused on major modules, including login authentication, employee data management, attendance processing, leave management, payroll generation, shift scheduling, reporting, and system security. The details of the tested features and testing results are presented in Table 2.

Table 2. Black Box Testing Results

No	Feature	Expected Result	Test Result
1	Login	User successfully logs into the system using a valid username and password	Valid
2	Dashboard	Summary of total employees, attendance, leave, and recent activities is displayed correctly	Valid
3	Employee Data Management	Employee data can be added, edited, deleted, searched, and displayed successfully	Valid
4	Department Management	Department data is successfully saved and displayed in the list	Valid
5	Position Management	Position data is successfully saved and displayed in the list	Valid
6	Attendance Recording	Employee attendance is successfully recorded and displayed according to date	Valid
7	Attendance Import	Attendance data is successfully imported from the attendance machine into the system	Valid
8	Leave Management	Leave requests are successfully processed (Pending → Approved/Rejected) and displayed	Valid
9	Payroll Processing	Salary slips are successfully generated per period including allowances and deductions	Valid
10	Salary Slip Print	Individual and bulk salary slips are successfully printed / exported to PDF	Valid
11	Shift Scheduling	Employee shift schedules are successfully saved and displayed for the selected period	Valid
12	Report Generation	Reports (employees, attendance, leave, shifts) are successfully displayed and printable	Valid
13	Logout	User successfully logs out of the system and is redirected to the login page	Valid

Source: Author's Processed Data

Based on the testing results, all major system functions operated properly and produced outputs according to the expected functional requirements. The testing results indicate that the developed HRIS is capable of supporting integrated human resource management processes in a more structured and systematic manner compared to the previous manual process used at CV XYZ.

Compared to the existing system, the proposed HRIS provides several improvements, particularly in data integration, process automation, reporting efficiency, and information accessibility. Previously, most human resource management activities were performed manually using separate tools and physical documents, which increased the risk of data inconsistency, input errors, and delays in report preparation. Through the proposed system, employee data, attendance, leave management, payroll, and shift scheduling are integrated into a centralized database and accessible through a web-based platform. The

comparison between the existing system and the proposed system is presented in Table 3.

Table 3. Comparison Between Existing System and Proposed System

Aspect	Existing System	Proposed System
Employee Data Management	Recorded manually in spreadsheets/paper	Centralized & integrated database with search, add, edit, delete
Department & Position	Maintained in separate files	Integrated module linked to employee records
Attendance	Fingerprint device only, recap done manually	Integrated and importable directly from attendance machine
Leave Management	Paper-based manual approval	Digital submission with Pending → Approved/Rejected workflow
Payroll Processing	Manual calculation per employee	Automated generation including allowances and deductions
Salary Slip Distribution	Printed manually, distributed physically	Auto-generated, printable/exportable to PDF (single or bulk)
Shift Scheduling	Manual scheduling via paper roster	Digital shift schedule per employee per period
Reporting	Delayed, compiled manually each period	Real-time reports (employee, attendance, leave, shift, payroll)
Data Accuracy	Prone to human error and duplication	Validated input and consistent data across modules
Access & Availability	Limited to physical documents	Web-based, accessible anytime via browser
Security	Documents easily lost or unauthorized access	Login authentication (username & password)

Source: CV XYZ

The findings of this study are also consistent with previous research emphasizing the importance of integrated Human Resource Information Systems in improving operational efficiency and supporting organizational decision-making processes. Previous studies conducted by Widaningsih et al. (2021) and Rizal et al. (2021) primarily focused on basic employee management and administrative functions. However, several important features, such as integrated payroll processing, shift scheduling, dashboard monitoring, attendance import, and documented system testing, were not comprehensively discussed.

In contrast, the proposed HRIS in this study provides a more integrated approach by combining employee administration, attendance management, payroll processing, leave management, shift scheduling, reporting, and dashboard monitoring within a single web-based platform. In addition, this study also documents the application of Agile development methodology and Black Box Testing as part of the system development and validation process. The comparison between previous studies and the proposed system is presented in Table 4.

Table 4. Comparison Between Previous Studies and Proposed System

Aspect	Widaningsih et al. (2021) <i>Oidokids Convection</i>	Rizal et al. (2021) <i>Pusdikkes Primary Clinic</i>	Proposed System <i>HRIS CV. XYZ</i>
Employee Data Management	Available	Available	Available (CRUD + search)
Department Management	Unavailable	Available (division menu)	Available (Department module)
Position Management	Unavailable	Available (position & promotion menu)	Available (Position module)
Attendance	Manual daily attendance input	Manual attendance input	Attendance input + import from attendance machine
Leave / Permission Management	Unavailable	Available (employee leave/permission)	Available with leave status, approval, and reason tracking.
Payroll Management	Automatic based on attendance x daily wage	Unavailable	Automatic (basic salary + allowance – deduction)
Payslip	Unavailable	Unavailable	Generate individual payslips
Shift Scheduling	Unavailable	Unavailable	Available (Shift Schedule module per period)
Reporting	Basic periodic reports	Employee, contract, permit, and evaluation reports	Consolidated reports (employees, attendance, leave, shifts) + PDF export
Summary Dashboard	Unavailable	Unavailable	Available (employee statistics, attendance, leave, recent activities)
System Testing	Unavailable	Unavailable	Documented black-box testing

Source: Author's Processed Data

5. CONCLUSION

This study focuses on the analysis, design, and development of a web-based Human Resource Information System (HRIS) at CV XYZ using the Agile development approach. The analysis results showed that the existing human resource management process still relied on manual procedures and separate tools, causing inefficiencies, data inconsistencies, reporting delays, and difficulties in managing employee information.

To address these issues, this study developed an integrated HRIS that combines employee data management, attendance, payroll, leave management,

shift scheduling, and reporting within a single web-based platform. The system was modeled using Unified Modeling Language (UML) and implemented with the Boundary-Control-Entity (BCE) design pattern to support a structured and maintainable system architecture.

The Agile methodology enabled the system to be developed iteratively and adaptively according to organizational requirements. Black Box Testing results showed that all major system features, including login authentication, attendance processing, payroll generation, leave management, shift scheduling, and report generation, functioned properly according to the expected requirements.

Compared to the previous system, the proposed HRIS improves data integration, process automation, information accessibility, and reporting efficiency. In addition, the system contributes an integrated HRIS model suitable for small and medium-sized distribution companies with shift-based employee management.

However, this study is limited by the absence of quantitative performance measurement and user acceptance evaluation in real operational environments. Therefore, future research is recommended to conduct implementation evaluation, usability testing, performance analysis, and user satisfaction assessment to measure the effectiveness of the proposed system more comprehensively.

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