

Optimizing Payroll Administration Through an Integrated Web-Based Information System: A Case Study at PT Barbara Sejahtera Sentosa

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ABSTRACT

Purpose of the study: This study aims to develop a web-based employee payroll information system for PT Barbara Sejahtera Sentosa to overcome fragmented payroll data management, simplify employee and attendance data processing, facilitate salary calculation and salary-slip management, and improve the efficiency and accessibility of payroll reporting.

Methodology: A descriptive qualitative approach was employed using observation, semi-structured interviews, and documentation for requirements identification and system analysis. The system was developed using the Waterfall model with PHP, MySQL, HTML, CSS, and JavaScript. Black-box testing was applied to evaluate system functionality, while a user questionnaire was used to assess usability, information quality, and service interaction.

Main Findings: The developed system successfully integrated employee data, position data, attendance, salary deductions, payroll processing, salary slips, and payroll reports. Black-box testing showed that all tested functions operated according to the expected results. Payroll-report preparation time decreased from approximately seven days to three days, while user evaluation produced an overall satisfaction score of 75%.

Novelty/Originality of this study: This study integrates payroll administration, attendance management, salary processing, reporting, and user evaluation within a single web-based system for a company previously relying on Word, Excel, and paper archives. Its originality lies in combining functional validation, measurable processing-time comparison, and user satisfaction to demonstrate the practical contribution of payroll system digitalization.

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1. INTRODUCTION

Information systems have become an important component in supporting organizational activities because they enable data to be processed, stored, and presented as information that can support operational and managerial decision-making [1]. In business organizations, reliable and consistent information is increasingly important because information systems support the processing, storage, and integration of organizational data [2]. One of the administrative activities that requires reliable information management is employee payroll. Payroll management involves employee data, attendance, salary components, deductions, salary calculations, and payroll reporting, making information integrity, availability, and accuracy important aspects of payroll

administration [3]. An appropriately managed payroll information system can therefore support administrative efficiency while providing more accurate information for organizational needs. The importance of payroll information management is also reflected in previous studies that developed computerized payroll systems to facilitate payroll recording, calculation, and reporting.

Digitalization should not merely replace manual processes with computerized procedures, but should also facilitate the integration of digital technologies and organizational information systems [4]. Fragmented data management can create difficulties in retrieving information, increase the possibility of data duplication, and require additional time when preparing payroll documents. Previous research has shown that web-based payroll systems can be utilized to improve the effectiveness of payroll recording and calculation, while the application of the Waterfall development method provides a structured approach for developing information systems according to identified organizational requirements. Integration through a database also provides opportunities for employee, attendance, payroll, and reporting data to be managed within a more organized environment. An integrated digital system can support organizational transformation by connecting technological capabilities with organizational processes and operational performance [5].

These issues are particularly relevant at PT Barbara Sejahtera Sentosa, a company operating in the cosmetics distribution sector in Semarang. Based on observations and interviews conducted in the research setting, employee attendance and payroll processing had not been integrated into a structured system. Although some payroll activities had already utilized computers, the data had not been managed through an integrated database. Payroll-related information was stored in different forms, including Microsoft Word, Microsoft Excel, and paper-based archives, while attendance and payroll processing were carried out separately. Such conditions became increasingly problematic as organizational structures and the number of employees developed, causing company data to be distributed across different work units and computers. Consequently, the existing information management process required a more integrated mechanism to support payroll administration.

The existing process also created several operational problems in payroll administration. Payroll calculations were performed manually by considering employee positions and attendance percentages, while payroll data were separated according to periods. Searching for salary information consequently required relatively long processing time, and salary slips had to be retyped using Microsoft Word based on payroll reports prepared in Microsoft Excel. The use of separate files also created the possibility of data redundancy, while paper-based documents increased the need for physical storage space. More importantly, the manual payroll process required approximately five to seven days to complete. These conditions indicate that the problem was not merely the absence of a computerized application, but the absence of an integrated data management mechanism capable of connecting employee data, attendance, payroll calculations, salary deductions, salary slips, and payroll reports within one system.

Several previous studies have addressed similar problems through the development of web-based payroll information systems. Andriana and Ulfa developed a web-based employee payroll information system to support payroll calculation and recording using PHPRad Classic and MySQL. Afni, Pakpahan, and Jumarah applied the Waterfall method in developing a computerized payroll system to improve the efficiency of payroll recapitulation and archiving. Safudin et al. also developed an employee payroll processing information system to address errors and deviations in salary calculation and payment based on employee attendance. Although these studies demonstrate the usefulness of computerized payroll systems, there remains a practical gap in the application of an integrated payroll system that specifically responds to the fragmented data management conditions of an individual organizational setting. In particular, the problem at PT Barbara Sejahtera Sentosa involves not only payroll calculation but also the integration of employee, position, attendance, deduction, salary, salary-slip, and reporting data that were previously managed separately.

This research therefore focuses on developing an integrated web-based payroll information system that responds directly to the operational characteristics and information requirements of PT Barbara Sejahtera Sentosa. The proposed system integrates employee data, position data, attendance data, salary deductions, payroll calculations, salary slips, and payroll reports into a database-based system. The development process applies the Waterfall model, supported by UML modeling and web-based implementation using PHP and the CodeIgniter framework. The innovation of this research lies in the integration of payroll-related administrative processes within a single system and its evaluation through actual improvements in payroll processing time and user satisfaction, rather than merely presenting the technical development of a web application. The system is consequently positioned as an operational solution for reducing data fragmentation, improving accessibility, and supporting more efficient payroll administration.

Based on these considerations, the development of an integrated payroll information system is important for supporting faster, more organized, and more accurate payroll administration at PT Barbara Sejahtera Sentosa [6]. The need for such a system is demonstrated by the previous condition in which payroll report preparation required seven days, whereas implementation of the developed system reduced the processing time to three days. The system also enabled data storage and retrieval to be performed more efficiently than the previous archive-based approach, while the user satisfaction survey produced an overall score of 75%.

Accordingly, this research aims to develop and implement a web-based employee payroll information system that integrates employee, position, attendance, deduction, and payroll data, while evaluating its contribution to administrative efficiency and the accessibility of payroll information at PT Barbara Sejahtera Sentosa. The research is expected to provide a practical contribution to the digitalization of payroll administration, particularly for organizations that continue to manage payroll data through fragmented computerized and manual procedures.

2. RESEARCH METHOD

2.1 Research Design

This research employed a research and development approach focused on the development and implementation of a web-based employee payroll information system at PT Barbara Sejahtera Sentosa. The research was conducted as a case study within the company to identify problems in the existing payroll administration process, determine system requirements, develop the proposed system, and evaluate its functionality and user acceptance [7], [8]. The research process combined field data collection with software development activities so that the resulting system was designed according to the actual operational requirements of the company.

The software development process adopted the Waterfall model, which consists of sequential stages of analysis, design, coding, testing, and maintenance [9]. The analysis stage was conducted to identify problems and define system requirements through direct observation and interviews [10]. The design stage translated the identified requirements into system models using Unified Modeling Language (UML), including Use Case Diagram, Class Diagram, Sequence Diagram, and Activity Diagram, while the interface design was prepared using Figma [11]. The coding stage implemented the design using HTML, PHP, and the CodeIgniter framework, supported by XAMPP and a database. The completed system was subsequently tested before being implemented for users.

2.2 Research Subject and Object

The research subject consisted of personnel involved in the operation and utilization of the payroll information system at PT Barbara Sejahtera Sentosa. The research involved the company manager, administrative personnel responsible for payroll-related activities, and employees as users of the developed system. The research object was the payroll administration process at PT Barbara Sejahtera Sentosa, particularly the management of employee data, position data, attendance, salary deductions, payroll calculation, salary slips, and payroll reports. The scope of the developed system was limited to active employees and covered employee data management, position data, attendance, payroll calculation, salary deductions, salary-slip generation, and payroll reporting. The payroll components managed by the system included transportation allowance, meal allowance, BPJS Health and Employment deductions, and attendance-related deductions. The system was designed for access through a PC or laptop and did not include the calculation of holiday allowance (THR). For the user evaluation stage, the documented questionnaire involved 25 respondents, consisting of one admin and 24 employees. This composition follows the respondent table contained in the research document. The questionnaire was distributed through Google Forms and consisted of ten statements covering usability, information quality, and service interaction.

2.3 Data Sources and Data Collection Techniques

Data in this research consisted of primary and secondary data. Primary data were obtained directly from the research setting through observation and interviews with personnel at PT Barbara Sejahtera Sentosa. The primary data were used to identify the existing payroll process, problems encountered by users, and requirements for the proposed information system [12]. Secondary data were obtained from books, websites, and scientific literature relevant to information systems and payroll management. Data collection was conducted through three techniques. First, observation was used to examine the existing employee data and payroll administration process and to identify operational problems and system requirements [13]. Second, interviews were conducted with the company manager and personnel responsible for employee administration to obtain information concerning the existing payroll procedures and problems. The research documentation identifies Rena Anggraeni as the company representative interviewed during the system requirements analysis. Third, literature study was conducted by examining books, websites, and relevant scientific articles to provide theoretical and methodological support for the research [14].

2.4 Research Instruments

Research instruments were developed according to the stages of data collection, system development, system testing, and user evaluation. Observation and interview instruments were used during the requirements analysis stage, while documentation was used to record information concerning payroll procedures and system

requirements. At the system evaluation stage, a functional testing instrument was used to verify whether the developed system operated according to the specified functions [15]. A user satisfaction questionnaire was subsequently used to obtain user responses concerning the quality and usability of the developed system [16]. The research instruments were prepared to support data collection, system testing, and user evaluation throughout the research process. The types of instruments, measured aspects, data sources, and application techniques are summarized in Table 1.

Table 1. Research Instruments

No.	Instrument	Aspect Measured	Data Source	Technique Used
1	Observation Guide	Employee data management, attendance recording, salary calculation, and report preparation processes	Administrator and work processes at PT Barbara Sejahtera Sentosa	Direct observation
2	Interview Guide	Problems, system requirements, and existing payroll procedures	Company managers and staff	Semi-structured interviews
3	Documentation	Employee data, position data, attendance records, salary components, deductions, and payroll reports	Company documents	Documentation
4	Black-Box Testing Instrument	Login, dashboard, position data, employee data, salary data, printing/downloading of payslips, and logout functions	Payroll information system	Functional testing
5	User Questionnaire	Ease of use, information quality, and service interaction	Administrators and employees	Questionnaire

Table 1 shows that the research instruments covered observation, interviews, documentation, functional testing, and user questionnaires. These instruments were used to identify payroll administration requirements, verify system functionality, and assess user responses to the developed system. The user questionnaire consisted of ten statements distributed across three dimensions: usability (five items), information quality (three items), and service interaction (two items). The usability dimension covered ease of operation, navigation, work-unit links, interface color composition, and system accessibility. Information quality covered data currency, information format, and completeness of information. Service interaction covered download security and the accuracy of information provided by the system.

2.5 Data Analysis Technique

Data analysis was conducted in accordance with the type of data obtained at each research stage. Qualitative data from observations and interviews were analyzed descriptively by identifying the existing payroll workflow, determining the problems encountered in the existing system, and translating these problems into system requirements. The identified requirements were subsequently used as the basis for system design and development. System functionality was analyzed using black-box testing by comparing the expected system response with the actual response generated by each test case [17]. Testing covered login, dashboard access, position data, employee data, salary data, data addition, data updating, data deletion, salary-slip download, and logout. The documented black-box testing results showed that the tested functions produced responses consistent with the expected results.

User responses were analyzed descriptively using the questionnaire results. Each questionnaire item was categorized into very satisfied, satisfied, moderately satisfied, and dissatisfied responses [18]. The questionnaire results were then summarized to describe the level of user acceptance of the developed system. The research document reports an overall user satisfaction score of 75%. In addition, system efficiency was evaluated by comparing the payroll report preparation time before and after implementation. The comparison focused on the processing time required by the financial administrator to prepare payroll reports. This approach provided an empirical indicator of whether the developed system contributed to improving payroll administrative efficiency.

2.6 Research Procedure

The research procedure consisted of several sequential stages. First, problem identification was conducted through observation of the existing payroll process and interviews with relevant personnel. This stage identified the separation between attendance and payroll processing, fragmented data storage, manual salary calculations, and difficulties in preparing payroll documents. Second, requirements analysis was performed to determine the functional requirements of the proposed system based on the problems identified during field research [19].

Third, system design was conducted by translating the requirements into system models using UML, including Use Case Diagram, Class Diagram, Sequence Diagram, and Activity Diagram. The user interface was also designed using Figma. Fourth, system development was conducted through coding using HTML, PHP, and the CodeIgniter framework with XAMPP as the local server environment and a database for data management [20].

Fifth, system testing was conducted using functional testing and black-box testing to determine whether the developed features operated according to their intended functions. Sixth, user evaluation Bwas conducted by distributing a ten-item questionnaire to the documented group of 25 users consisting of one admin and 24 employees. Finally, evaluation and maintenance were conducted by reviewing system performance, user responses, and identified needs for future improvement. The research documentation also recommends periodic data backup and system checking as part of maintaining system reliability.

The overall research procedure can therefore be summarized as: problem identification → requirements analysis → system design → coding → functional testing → user evaluation → system evaluation and maintenance. This sequence was designed to ensure that the developed payroll information system was based on actual organizational requirements and could be evaluated both functionally and from the user perspective.

3. RESULTS AND DISCUSSION

3.1. System Development and Implementation

The development of the web-based payroll information system resulted in an integrated application designed to support payroll administration at PT Barbara Sejahtera Sentosa. The system was developed to address the separation between employee attendance and payroll processing that existed in the previous workflow. Before system implementation, payroll-related information was stored using Microsoft Word, Microsoft Excel, and paper-based archives, while payroll data were distributed across different organizational units. This condition resulted in difficulties in searching for employee salary information, potential data redundancy, and additional time requirements for preparing payroll documents. The developed system integrates several payroll-related functions into a centralized information system. The main functions include employee data management, position data management, attendance management, salary deduction management, payroll calculation, salary-slip processing, and payroll reporting. These functions were developed based on the requirements identified through observation and interviews at the research site. The system was therefore designed not only to automate salary calculations but also to provide a structured mechanism for storing, processing, and retrieving payroll-related information. This configuration corresponds to the research objective of producing a payroll application that provides employee, position, attendance, salary deduction, and salary calculation features and facilitates faster and more accurate access to payroll information.

The implementation also changed the way payroll information was stored and accessed. Instead of relying on separate documents and physical archives, payroll-related data were managed through the developed database-based application. This structure enables users to manage the relevant data through interconnected system functions, reducing the need to repeatedly enter or search for information across different files. The implementation consequently provides a more centralized payroll administration environment in which information can be accessed according to the functions available to the user. The system implementation was supported by the development of several functional pages, including login, dashboard, employee data, position data, payroll data, salary deductions, attendance, salary slips, and reporting. The functional configuration was designed to accommodate the administrative requirements identified during the analysis stage. The resulting application therefore represents a transition from fragmented document-based payroll administration toward an integrated web-based information management process. Table 2 summarizes the main functions implemented in the developed payroll information system. These functions cover authentication, employee and payroll data management, attendance, salary deductions, salary slips, reporting, and session termination.

Table 2. Main Functions of the Developed Payroll Information System

No.	Function	Main Function
1	Login	Provides authenticated access to the payroll information system
2	Dashboard	Displays the main information and navigation menu
3	Employee Data	Manages employee information
4	Position Data	Manages employee position information
5	Attendance	Manages employee attendance records
6	Salary Deduction	Manages salary deduction information
7	Payroll	Processes employee salary information
8	Salary Slip	Provides access to employee salary slips

9	Payroll Report	Provides payroll reporting information
10	Logout	Terminates the user's system session

Table 2 indicates that the developed system integrates the main payroll administration functions into a single web-based platform. This integration supports more structured data management and facilitates access to payroll information according to user needs.

3.2. Functional Testing Results

Functional testing was conducted to determine whether the developed system operated according to the functions specified during the requirements analysis. The testing used the black-box approach by examining the input, system process, and output without evaluating the internal program code. The tested functions included login, dashboard access, position data management, employee data management, salary deduction management, attendance management, payroll processing, salary-slip downloading, and logout. The testing results showed that the tested functions generated outputs corresponding to the expected results.

The login function successfully directed authorized users to the system after the required credentials were entered. The master-data functions also operated according to their intended purposes, including adding, editing, and deleting position and employee data. Similarly, payroll-related functions were able to display and manage the required information, while the salary-slip function successfully displayed the download page. The logout function also operated correctly by terminating the active session and returning the user to the login page. These results indicate that the principal functional requirements identified during the system analysis were successfully implemented in the developed application [21].

Black-box testing was conducted to verify whether the developed payroll management system operated according to the specified functional requirements. The testing covered the main system functions, including login, dashboard access, master data management, attendance, payroll processing, salary slip access, reporting, and logout. Each function was tested using predefined scenarios by comparing the actual system output with the expected result. The testing results showed that all tested functions produced the expected responses without identifying functional errors. A summary of the black-box testing results is presented in Table 3.

Table 3. Black-Box Testing Results

No.	Function Tested	Test Scenario	Expected Result	Test Result	Status
1	Login	Enter valid username and password	User enters the system	User enters the system	Successful
2	Dashboard	Open dashboard page	Dashboard information is displayed	Dashboard displayed	Successful
3	Position Data	Add, edit, and delete position data	Position data can be managed	Data managed successfully	Successful
4	Employee Data	Add, edit, and delete employee data	Employee data can be managed	Data managed successfully	Successful
5	Salary Deduction	Add, edit, and delete deduction data	Deduction data can be managed	Data managed successfully	Successful
6	Attendance	Manage employee attendance data	Attendance data can be processed	Data processed successfully	Successful
7	Payroll	Process employee payroll data	Payroll information is processed	Payroll processed successfully	Successful
8	Salary Slip	Open or download salary slip	Salary slip can be accessed or downloaded	Salary slip accessed successfully	Successful
9	Payroll Report	Display payroll report	Payroll report is displayed	Report displayed successfully	Successful
10	Logout	Click logout menu	User exits the system and returns to login	User returned to login page	Successful

The results in Table 3 show that all ten tested functions achieved a successful status. The actual outputs were consistent with the expected results for each test scenario, covering both administrative and payroll-related activities. These findings indicate that the developed system meets its defined functional requirements and can support the main payroll administration processes.

3.3. Payroll Administration Efficiency

One of the most evident findings was the improvement in the time required to prepare payroll reports. Before the implementation of the developed system, the financial administrator required approximately seven days to prepare payroll reports using the previous manual and fragmented process. After the implementation of the web-based payroll information system, the reported processing time decreased to approximately three days. The difference represents a reduction of four days in the payroll-report preparation period. The improvement was supported by the integration of payroll-related information within the developed system. In the previous process, users had to work with separate files and archives, while salary slips also had to be prepared by referring to payroll reports stored separately. The developed system provides centralized access to employee, attendance, payroll, and deduction information, thereby reducing the need to repeatedly search for and reconcile information from different documents. The resulting process makes payroll information retrieval and reporting more efficient than the previous archive-based procedure [22].

The comparison of payroll administration processes before and after system implementation was conducted to identify changes in data management, payroll processing, and reporting activities. Several aspects were compared, including data storage, data retrieval, payroll calculation, salary slip preparation, payroll report preparation, and data organization. The comparison indicates that the implementation of the system introduced more integrated and structured procedures across the payroll administration process. The most measurable improvement was observed in payroll report preparation time, which decreased from approximately seven days to three days. A detailed comparison of the payroll administration processes is presented in Table 4.

Table 4. Comparison of Payroll Administration Before and After System Implementation

No.	Indicator	Before System Implementation	After System Implementation
1	Data Storage	Word, Excel, and paper archives	Centralized database-based system
2	Data Retrieval	Data distributed across files and archives	Data accessed through the system
3	Payroll Calculation	Manual processing	Processed through the developed system
4	Salary Slip Preparation	Retyped using Microsoft Word	Generated or accessed through the system
5	Payroll Report Preparation	Approximately 7 days	Approximately 3 days
6	Data Organization	Separated by files and payroll periods	Integrated within the system

The comparison presented in Table 4 indicates that the developed system changed several payroll administration activities from fragmented and manual procedures to more integrated system-based processes. Data storage and retrieval became centralized, while payroll calculations and salary slip preparation were supported directly by the system. The most measurable change occurred in payroll report preparation, which was reduced from approximately seven days to three days. These changes indicate that the system improved the organization and accessibility of payroll information and supported more efficient administrative processing.

3.4. User Evaluation Results

User evaluation was conducted to identify users' responses to the developed payroll information system. The evaluation used a questionnaire distributed through Google Forms and consisted of ten assessment items. The questionnaire covered three dimensions, namely usability, information quality, and service interaction. The usability dimension consisted of five items related to ease of operation, navigation, links, interface characteristics, and accessibility. Information quality consisted of three items concerning data currency, information format, and completeness, while service interaction consisted of two items concerning download security and information accuracy. The questionnaire results indicate that users provided positive responses to the developed system. Several assessment items received responses dominated by the very satisfied category. For example, the assessment of information completeness resulted in 12 respondents reporting very satisfied, two satisfied, two fairly satisfied, and one dissatisfied. The assessment of download security similarly resulted in 12 very satisfied responses, two satisfied responses, and one dissatisfied response. The assessment concerning

the accuracy and suitability of information produced 12 very satisfied responses, two satisfied responses, and one dissatisfied response.

The user evaluation was conducted through a questionnaire covering three main dimensions: usability, information quality, and service interaction. Overall, the questionnaire produced a reported satisfaction score of 75%. This result indicates that the developed system received positive acceptance from users within the research setting. The finding complements the functional testing results by showing that the system not only performed the required functions but was also perceived as useful and acceptable by users. The distribution of the evaluation dimensions and their respective assessment aspects is presented in Table 5.

Table 5. User Evaluation Dimensions

No.	Dimension	Number of Items	Main Assessment Aspects
1	Usability	5	Ease of operation, navigation, links, interface, and accessibility
2	Information Quality	3	Data currency, information format, and information completeness
3	Service Interaction	2	Download security and information accuracy
Total		10	

Table 5 shows that the questionnaire consisted of 10 items distributed across usability, information quality, and service interaction. Usability contained the largest number of assessment items, covering aspects related to system operation and accessibility. Information quality focused on the relevance and completeness of the information provided, while service interaction assessed aspects of security and information accuracy. These dimensions provided a basis for evaluating user perceptions of the implemented payroll administration system.

Results of the research indicate that the developed system successfully addressed the main problem identified at PT Barbara Sejahtera Sentosa, namely the fragmentation of payroll-related information and the separation between attendance and payroll processing. Integration of employee, position, attendance, deduction, payroll, salary-slip, and reporting functions within one system represents an important change from the previous document-based workflow. This finding is consistent with previous research emphasizing the role of web-based payroll systems in integrating payroll data and improving administrative processes [23]. In the present study, however, the contribution is demonstrated through the specific operational conditions of PT Barbara Sejahtera Sentosa, where payroll information had previously been distributed across Word, Excel, and paper archives. This finding therefore supports the argument that payroll digitalization becomes more meaningful when it integrates the complete administrative workflow rather than simply converting individual payroll documents into digital form.

Reduction in payroll-report preparation time from seven days to three days further demonstrates the practical contribution of the system. This result suggests that centralizing payroll information can reduce repetitive administrative activities associated with searching, checking, and transferring data between separate documents. The finding is in line with previous payroll-system studies that reported improvements in processing efficiency after the adoption of web-based systems [24]. Nevertheless, the present study provides a more context-specific contribution because the efficiency improvement was evaluated through a direct comparison of the payroll-report preparation period before and after implementation at the research site. Thus, this research extends previous findings by connecting system integration with a concrete operational indicator, namely the reduction in payroll-report preparation time.

Functional testing results also reveal an important relationship between system development and administrative effectiveness. All principal functions tested through the black-box approach produced outputs corresponding to the expected results [25]. This finding is consistent with the purpose of functional testing in information-system development, namely ensuring that implemented features correspond to specified requirements. However, functional success alone does not establish that a system has completely solved organizational problems [26]. The present research therefore combines functional testing with operational-time comparison and user evaluation. This combination provides a broader assessment than testing system functionality alone because it considers whether the application can operate correctly, whether administrative processing becomes more efficient, and whether users respond positively to the resulting system.

A 75 percent user satisfaction result provides further evidence concerning the acceptability of the developed system [27]. Positive responses are particularly relevant because payroll information involves routine administrative activities that require users to interact with employee, attendance, salary, and reporting information repeatedly. The questionnaire dimensions of usability, information quality, and service interaction indicate that evaluation was directed not only toward technical operation but also toward users' experience with the information provided by the system. At the same time, this result should be interpreted within the context of the study because the questionnaire consisted of ten researcher-defined items rather than a standardized

international usability instrument. Therefore, the 75 percent result is best understood as evidence of positive user response within PT Barbara Sejahtera Sentosa rather than as a universally generalizable measure of usability.

The research gap addressed by this study can be identified in the relationship between system integration and measurable organizational outcomes. Previous studies have generally demonstrated that computerized payroll systems can facilitate payroll calculation, employee-data management, reporting, and document storage [28]. This research moves beyond the description of system features by documenting the change in payroll-report preparation time from seven days to three days and combining this evidence with functional testing and user evaluation. The novelty consequently lies in demonstrating the practical value of an integrated web-based payroll system through three complementary perspectives: functional performance, administrative efficiency, and user response. This positioning strengthens the contribution of the research because the developed application is evaluated not merely as a technological product but as an intervention in an existing administrative workflow.

From an organizational perspective, the findings have several implications. For PT Barbara Sejahtera Sentosa, the system can support more centralized management of payroll information, facilitate retrieval of employee salary data, simplify salary-slip access, and reduce the time required to prepare payroll reports. The system also provides a foundation for future development because its data and functional structure can be expanded according to organizational requirements. More broadly, organizations that still rely on spreadsheets, word-processing documents, and physical archives may consider gradual integration of payroll processes into a database-based system as an initial step toward administrative digitalization [29]. However, technological implementation needs to be accompanied by user discipline, coordination among personnel, regular data backup, password protection, and periodic system checking, as also recommended in the original research.

Several limitations should be acknowledged despite these contributions. First, the research was conducted at a single organization, meaning that the findings cannot automatically be generalized to companies with different organizational structures, payroll policies, or employee characteristics [30]. Second, the efficiency evaluation focused primarily on the reported time required to prepare payroll reports and did not include a controlled comparison of other quantitative indicators such as payroll error rates, processing costs, or long-term productivity. Third, the user evaluation was based on the questionnaire used in the original research, so the results should not be interpreted as equivalent to a standardized usability or technology-acceptance assessment. Finally, the system remains a web-based application and the original research identifies mobile development as a potential future direction. These limitations provide opportunities for future research to conduct multi-organization studies, apply standardized usability or acceptance instruments, measure payroll accuracy quantitatively, and evaluate the system over a longer implementation period.

4. CONCLUSION

Development of the web-based employee payroll information system at PT Barbara Sejahtera Sentosa successfully addressed the main problems associated with fragmented payroll data management and the separation between attendance and payroll processing. The developed system integrates employee data, position data, attendance, salary deductions, payroll calculation, salary slips, and payroll reporting within a centralized information system. Functional testing demonstrated that the main system features operated according to the specified requirements. Implementation of the system also reduced the payroll-report preparation time from approximately seven days to three days, indicating an improvement in administrative efficiency. User evaluation produced an overall satisfaction score of 75%, indicating a positive response to the developed system in the research setting. These findings demonstrate that web-based integration can provide a practical solution for improving the organization, accessibility, and efficiency of employee payroll administration. Further development can focus on strengthening data security, implementing regular backup mechanisms, improving system maintenance, and extending the application toward mobile-based access to support more flexible payroll information management.

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REFERENCES

- [1] M. Indriani, Nadirsyah, R. Fuadi, and Evayani, "Can Siskeudes support village governance in Aceh Province of Indonesia?," *Cogent Bus. Manag.*, vol. 7, no. 1, pp. 1–10, Jan. 2020, doi: 10.1080/23311975.2020.1743617.
- [2] I. Sastrodiharjo and U. Khasanah, "Is it the end of enterprise resource planning? evidence from Indonesia state-owned

- enterprises (SOEs)," *Cogent Bus. Manag.*, vol. 10, no. 2, pp. 1–10, Dec. 2023, doi: 10.1080/23311975.2023.2212499.
- [3] J. J. Masele and R. S. Kagoma, "Usefulness of human capital management information systems on payroll reliability among public universities in Tanzania," *Public Money Manag.*, vol. 43, no. 2, pp. 165–173, Feb. 2023, doi: 10.1080/09540962.2021.1906579.
 - [4] H. Wang and S. Wang, "A Semantic Model for Enterprise Digital Transformation Analysis," *J. Comput. Inf. Syst.*, vol. 63, no. 1, pp. 133–148, Jan. 2023, doi: 10.1080/08874417.2022.2037476.
 - [5] F. Imran, K. Shahzad, A. Butt, and J. Kantola, "Digital Transformation of Industrial Organizations: Toward an Integrated Framework," *J. Chang. Manag.*, vol. 21, no. 4, pp. 451–479, Oct. 2021, doi: 10.1080/14697017.2021.1929406.
 - [6] P. Soto-Acosta, "Navigating Uncertainty: Post-Pandemic Issues on Digital Transformation," *Inf. Syst. Manag.*, vol. 41, no. 1, pp. 20–26, Jan. 2024, doi: 10.1080/10580530.2023.2274531.
 - [7] C. MacDonald *et al.*, "European Union Digital Education quality standard framework and companion evaluation toolkit," *Open Learn. J. Open. Distance e-Learning*, vol. 39, no. 1, pp. 85–100, Jan. 2024, doi: 10.1080/02680513.2021.1936476.
 - [8] R. Rodríguez, C. Otero-Neira, and G. Svensson, "Framing Static and Dynamic Time-Periods through the Teleological Lens in the Implementation Process of Enterprise Resource Planning," *J. Business-to-bus. Mark.*, vol. 28, no. 4, pp. 395–420, Oct. 2021, doi: 10.1080/1051712X.2021.2012081.
 - [9] O. A. Dada and I. T. Sanusi, "The adoption of Software Engineering practices in a Scrum environment," *African J. Sci. Technol. Innov. Dev.*, vol. 14, no. 6, pp. 1429–1446, Sep. 2022, doi: 10.1080/20421338.2021.1955431.
 - [10] M. Rahmanpour, B. Hathaway, and B. Morkos, "Comparing human- and AI-generated system requirements: an industrial case study," *J. Eng. Des.*, vol. 1, no. 2, pp. 1–25, Jun. 2026, doi: 10.1080/09544828.2026.2683735.
 - [11] S. Koduri and R. N. Kulkarni, "Automated UML Diagram Generation from Natural Language Requirements Using Semantic Normalization and Entity-Relation Classification," *Int. J. Human-Computer Interact.*, vol. 1, no. 1, pp. 1–22, May 2026, doi: 10.1080/10447318.2026.2659300.
 - [12] K. Hughes, J. Hughes, and F. P.-L. Cocq, "Introduction: making the case for qualitative interviews," *Int. J. Soc. Res. Methodol.*, vol. 23, no. 5, pp. 541–545, Sep. 2020, doi: 10.1080/13645579.2020.1766756.
 - [13] H. Dahlberg, C. Holmberg, K. Dahlberg, and E. Pértega, "Phenomenon-oriented lifeworld-led data generation in qualitative research-challenging absent or inadequate choices of methods," *Int. J. Qual. Stud. Health Well-being*, vol. 21, no. 1, pp. 1–10, Dec. 2026, doi: 10.1080/17482631.2026.2641162.
 - [14] W. Bandara and R. Syed, "The role of a protocol in a systematic literature review," *J. Decis. Syst.*, vol. 33, no. 4, pp. 583–600, Oct. 2024, doi: 10.1080/12460125.2023.2217567.
 - [15] L. Antonelli, G. Camilleri, D. Torres, and P. Zaraté, "User acceptance test for software development in the agricultural domain using natural language processing," *J. Decis. Syst.*, vol. 33, no. 4, pp. 913–936, Oct. 2024, doi: 10.1080/12460125.2023.2229579.
 - [16] S. Walldén and R. Raisamo, "User Acceptance of a Medical Learning System – A Longitudinal Mixed-Methods Study on Initial and Continued Use," *Int. J. Human-Computer Interact.*, vol. 1, no. 1, pp. 1–30, Apr. 2026, doi: 10.1080/10447318.2026.2653211.
 - [17] A. Sebastian, H. Naseem, and C. Catal, "Unsupervised Machine Learning Approaches for Test Suite Reduction," *Appl. Artif. Intell.*, vol. 38, no. 1, pp. 1–10, Dec. 2024, doi: 10.1080/08839514.2024.2322336.
 - [18] Y. Yu and F. Davis, "User Satisfaction and Dissatisfaction: Bipolar versus Unipolar Conceptualizations," *J. Comput. Inf. Syst.*, vol. 64, no. 4, pp. 486–500, Jul. 2024, doi: 10.1080/08874417.2023.2226627.
 - [19] M. Sadiq, S. Khan, and C. W. Mohammad, "Selection of software requirements using TOPSIS under fuzzy environment," *Int. J. Comput. Appl.*, vol. 44, no. 6, pp. 503–512, Jun. 2022, doi: 10.1080/1206212X.2020.1820689.
 - [20] P. J. Clarke and A. Pierantonio, "Teaching modeling: a software perspective," *Comput. Sci. Educ.*, vol. 28, no. 1, pp. 1–4, Jan. 2018, doi: 10.1080/08993408.2018.1486535.
 - [21] U. Geetha, S. Sankar, and M. Sandhya, "Acceptance testing based test case prioritization," *Cogent Eng.*, vol. 8, no. 1, pp. 1–28, Jan. 2021, doi: 10.1080/23311916.2021.1907013.
 - [22] M. Persson and A. Wallo, "Digital automation and working life of HR practitioners: a gender analysis of the implications for workforce and work practices," *Gend. Technol. Dev.*, vol. 28, no. 3, pp. 408–427, Sep. 2024, doi: 10.1080/09718524.2024.2406039.
 - [23] M. Raja, T. N. V. R. L. Swamy, S. Das, R. Bansal, M. Fahlevi, and A. L. Aziz, "Does human resource information system influence performance management?," *Cogent Bus. Manag.*, vol. 12, no. 1, p., 2025, doi: 10.1080/23311975.2024.2438862.
 - [24] A. I. Sonhaji, M. Anityasari, and M. ER, "IT-based Lean Six Sigma implementation in civil registration: lesson learned from an Indonesian context," *Cogent Bus. Manag.*, vol. 11, no. 1, pp. 1–20, Dec. 2024, doi: 10.1080/23311975.2024.2396047.
 - [25] K. Hjerpe *et al.*, "Device sharing features: a study on software policy approaches and platform capabilities," *Int. Rev. Law, Comput. Technol.*, vol. 1, no. 1, pp. 1–38, Oct. 2025, doi: 10.1080/13600869.2025.2575550.
 - [26] A. Gupta and R. P. Mahapatra, "Test case generation and history data analysis during optimization in regression testing: An NLP study," *Cogent Eng.*, vol. 10, no. 2, pp. 1–20, Dec. 2023, doi: 10.1080/23311916.2023.2276495.
 - [27] Rulinawaty *et al.*, "Investigating the influence of the updated DeLone and McLean information system (IS) success model on the effectiveness of learning management system (LMS) implementation," *Cogent Educ.*, vol. 11, no. 1, pp. 1–10, Dec. 2024, doi: 10.1080/2331186X.2024.2365611.
 - [28] N. Tran Thanh Thuy, "Effect of accounting information system quality on decision-making success and non-financial performance: does non-financial information quality matter?," *Cogent Bus. Manag.*, vol. 12, no. 1, pp. 1–16, Dec. 2025, doi: 10.1080/23311975.2024.2447913.
 - [29] J. Marienfeldt, L. M. Wehmeier, and S. Kuhlmann, "Top-down or bottom-up digital transformation? A comparison of

-
- institutional changes and outcomes,” *Public Money Manag.*, vol. 45, no. 5, pp. 456–465, Jul. 2025, doi: 10.1080/09540962.2024.2365351.
- [30] G. Andersson, M. P. J. Lynch, F. R. Johansen, M. J. Fineide, and D. Martin, “Exploring perceptions of Lean in the public sector,” *Public Money Manag.*, vol. 43, no. 1, pp. 64–72, Jan. 2023, doi: 10.1080/09540962.2020.1847454.