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Workers' Wage Payment Information System Using the Scrum Method

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Abstract: *Employees receive routine services and compensation in the form of salaries as part of their work performance through company operations. However, several companies still rely on manual payroll processing, including those that participated in a recent business exhibition. One such company continues to use Microsoft Office applications to manage payroll data manually. This outdated method significantly slows down the process of generating employee payslips and frequently leads to calculation errors in employee compensation. Furthermore, the Human Resources Department (HRD) is required to manually verify all data before integrating the final salaries of permanent employees into the monthly payroll report. This process is not only time-consuming but also increases the risk of human error and administrative inefficiency. As a response to these challenges, the company developed a web-based employee compensation information system. This system is designed to automate the entire payroll process, from attendance tracking and allowance calculation to deductions and payslip generation. With simultaneous salary data entry and report generation, the system improves business performance, enhances accuracy, and reduces processing time. The final outcome of this study is an automated payroll system that adheres to predefined business rules and allows for easy future updates. Most importantly, it helps reduce human error in payroll calculations by up to 60%, offering a more efficient and reliable payroll management solution.*

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INTRODUCTION

The development of information technology in the digital era has had a significant impact on various aspects of life, including in the world of business and organizations [1]. One of the most fundamental changes occurred in the field of human resource (HR) management, where the dynamics of global competition forced companies to continuously improve efficiency, precision, and accuracy in running business processes [2]. The use of information technology is a key factor in answering these challenges, especially in terms of data management and payroll [3].

However, the reality on the ground shows that there are still many companies, especially small and medium-scale, that survive using conventional payroll systems that are manual or semi-digital based [4]. Such systems rely heavily on human input, which makes them vulnerable to administrative errors, data duplication, delays in information processing, and loss of employee payment history[5]. This reliance on physical documents and manual processes not only reduces productivity but also incurs additional operational costs that can actually be minimized through digitalization [6].

Manual payroll systems, although they sometimes use computers as an additional tool, still have significant drawbacks [7]. Human involvement in the process of calculating

salaries, withholding taxes, benefits, and filing payslips, has great potential for data inconsistencies [8]. Not a few companies have experienced problems due to the mismatch between employee attendance data and payroll data [9]. In addition, manual systems also do not provide adequate data security—payroll data can be accessed by unauthorized parties, potentially leading to internal and external conflicts [10].

In addition, the use of physical documents in the payroll process makes it difficult for companies to conduct audits, track historical data, and when labor disputes occur [11]. This aspect is also an ecological burden that cannot be ignored, given the high use of paper and energy for administrative processes that can actually be transferred to digital formats [12].

CV. Aksi Promo Indonesia as one of the companies engaged in promotion and marketing, realizes the importance of digital transformation in human resource management [1]. Companies began to adopt an integrated digital-based payroll information system [3]. The implementation of this system aims to automate the entire process related to wage payments—from recording attendance, calculating benefits and deductions, to distributing payslips in real-time [5].

The system also provides access flexibility for employees and HRD [6]. Employees can independently monitor attendance data, salary amounts, deductions, and payslip history whenever needed [8]. Meanwhile, from the management side, this system facilitates the preparation of financial statements, internal audits, and integration with other modules such as performance appraisal and employee training [7]. Data security is also a major concern, with the implementation of user rights-based access controls, data encryption, and automated backup systems [10].

The adoption of information technology in the payroll system provides various strategic benefits [1]. First, the time efficiency in data processing has increased dramatically, so that the HRD division can focus more on overall human resource development [13]. Second, the potential for input errors is significantly reduced because most of the processes are done automatically [9]. Third, transparency in salary calculations increases employee trust in the company, which ultimately impacts loyalty and productivity [14].

More than just an administrative tool, web-based digital payroll systems allow companies to scale or develop the system to other HR modules in the future [15]. This is especially important given the ever-evolving and dynamic needs of businesses. The use of digital technology in payroll is also part of the company's strategy in responding to the challenges of the industrial era 4.0, where data is the main asset in decision-making [3].

The steps taken by CV. Indonesia Promo Action reflects the company's commitment to building professional, transparent, and future-oriented human resource governance [1]. This transformation not only improves efficiency and reduces administrative workload, but also creates an adaptive, environmentally friendly, and compliant work ecosystem with modern management standards [12].

With the continued development of technologies such as cloud computing, machine learning, and mobile application integration, the future of payroll systems will be more sophisticated, efficient, and able to provide strategic added value for the Company [15].

LITERATURE REVIEW

This research was conducted through a direct interview with Dede Sujani, as part of Human Resource Development (HRD) at CV. Indonesia Promo Action. The goal is to gain a deep understanding of the problems that occur in the employee payroll system in

the company. CV. Aksi Promo Indonesia is a company that has been established since 2011 and currently has a total of 20 employees with various positions, such as directors, managers, HRD, financiers, technicians, warehouse managers, marketers, guards, and assistants.

Based on the results of the interview, it was found that the management of data related to employees in this company is still carried out separately and has not been integrated [13]. Critical data such as employees' personal data, job titles, attendance, loans, inventory, and bonuses are stored in a variety of different places and often in an unstructured format [15]. As a result, HRD departments have difficulty in terms of accurately and quickly recapitulating total employee earnings [12]. When information is required for evaluation or reporting, the process of searching and verifying data is time-consuming, and prone to human error [2].

The employee attendance process itself has utilized a fingerprint machine that is used twice a day, namely when employees come and go from work. However, this attendance system is not directly connected to the computerized system [20]. HRDs have to manually move attendance data from the fingerprint machine to the computer every month, which of course increases the workload and opens up loopholes for potential input errors [8]. The information from this attendance is very important because it has a direct effect on the salary component that employees receive [10].

The payroll system is implemented at CV. Indonesia Promo Action is based on employee positions. From this position or position, the amount of fixed allowance received each month will be determined. In addition, there are certain deduction rules enforced, such as deductions of meal allowance if employees do not show up for work on certain days. If employees arrive late, they will be subject to a deduction of Rp 20,000 per delay [4].

Employee salaries are paid regularly every month between the 5th and 7th. However, for field employees such as carpenters, payments are made weekly every Friday. The payment process is carried out by the finance department through direct transfers to the accounts of each employee, which shows that the payment system is digital-based although not yet fully integrated [16].

The company also provides incentives in the form of commissions for employees who successfully sell products. The commission given is 3% of the price of the product successfully sold and will be added to the monthly salary. In addition, if the employee has a loan to the company, then the loan amount will be automatically deducted from the salary according to the pre-agreed agreement [9].

This whole process reflects the need for a more modern and integrated payroll information system, so that HR management in CV. Indonesia Promo actions can be carried out efficiently, transparently, and accurately [13][2][9].

RESEARCH METHODS

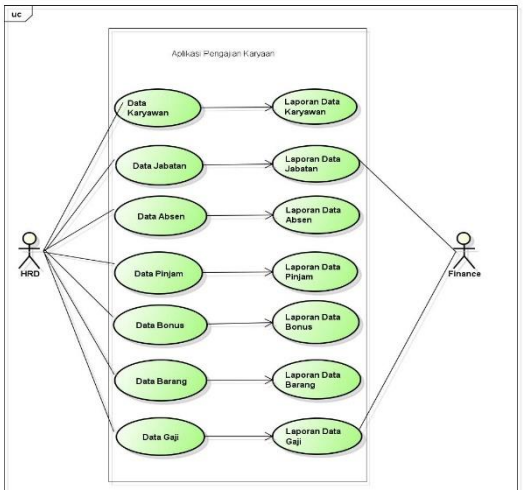
This study uses a descriptive approach with software engineering methods to design and build a web-based employee payroll information system. This approach was chosen to provide an in-depth overview of the system development process, from the identification of needs to the final evaluation stage. The research was conducted directly at CV. Aksi Promo Indonesia located in Jakarta, with a focus on the HRD department as the main user of the system.

A. Research Steps

The first step in this study is to make direct observations of the ongoing payroll process in the company. Next, an in-depth interview was conducted with HRD, namely Mr. Dede Sujani, to find out information about the problems that occurred, system needs, and existing workflows. The data collected is in the form of organizational structure, type of position and benefits, attendance data, loans, as well as a system for calculating commissions and salary deductions.

After the needs data is collected, an analysis is carried out to formulate system specifications. This research uses a Scrum-based system development approach, which is an agile method that emphasizes gradual (iterative) development through team collaboration and direct end-user involvement. The Scrum process in this study is divided into several stages, namely:

a. Product Backlog: Compile all feature needs from the results of the problem analysis.
b. Sprint Planning: Determines the features to be developed in a single sprint cycle.
c. Sprint (duration 2 weeks): The development of the system is carried out in stages based on the agreed backlog.
d. Daily Scrum: A daily brief discussion to evaluate progress and obstacles.
e. Sprint Review & Retrospective: Evaluation of sprint results and process improvements for the next sprint



Picture 1. Proposal Diagram of Use Cases

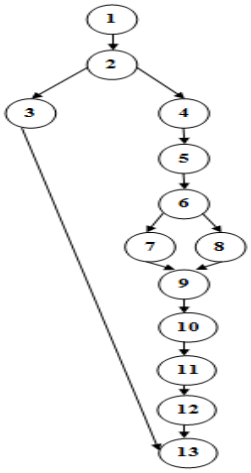
The image above is a Use Case Diagram of an employee payroll information system application that shows the relationship between external actors (HRD and Finance) and the main functions in the system. In this diagram there are two actors. HRD acts as the main user who has full access to all functions, including the management of employee data, job titles, attendance, loans, bonuses, goods, and salaries. In addition, HRD can also view and generate reports from each of these data. Finance has limited access that only includes monitoring and printing reports, specifically for financial needs and payroll administration.

Each key function in the system is described in the form of a use case (green ellipse), which includes data management processes and reports. This diagram visually illustrates how the two actors interact with the system, while representing the scope of functional

needs that have been analyzed and forming the basis for the compilation of product backlogs in the Scrum method.

B. Data and Sources

The data used in this study includes primary and secondary data. Primary data is obtained through direct interviews and observations in the field, while secondary data is in the form of internal company documents such as organizational structure, payslips, attendance reports, and payroll policies. In addition, supporting software such as XAMPP (for on-premises servers), MySQL (for database management), and PHP (for system backend development) are used.



Picture 2. Flow charts or stream chart control

The image above is a flow chart or control flow chart of the program section in a payroll system, which is commonly used in the white-box testing process. This flow graph shows the logical sequence of program execution, starting from nodes 1 to 13, with various branches and branches of logic among which nodes represent the instruction blocks in the program, arrows (directions) indicate the flow of program execution from one instruction to the next, it can be seen that in node 6 there are branches to nodes 7 and 8, which then meet again at node 9. It indicates the presence of a logical (if-other) condition or decision-making in the program, the path from node 3 directly to node 13 indicates the existence of a shortcut or initial termination condition. These flow charts are essential in white-box testing, especially for calculating cyclomatic complexity and determining the independent paths that must be tested in order for the entire program logic to be properly validated.

C. System Evaluation

The evaluation was carried out after the system was developed in several sprints. The researcher used the black box testing method to test the functionality of the system according to the initial specifications. In addition, a User Acceptance Test (UAT) was carried out involving CV HRD staff. Indonesia Promo Action to ensure that the system meets the needs of users. Evaluation criteria include ease of use, accuracy of salary calculation, speed of data access, and information security.

Through this structured approach, it is hoped that the results of the research will not only be able to answer the problems faced by the company, but also produce an efficient, transparent, and easy payroll system to be further developed[11].

RESULTS AND DISCUSSION

Research This research succeeded in developing a web-based employee payroll information system using software engineering methods with *a Scrum approach*. This approach was chosen because of its ability to handle changing needs flexibly and quickly. The implementation of the system is done in stages through *two-week sprint development* for each iteration, which allows the development team to conduct continuous evaluation and improvement. The result of this process is a system that can manage payroll data in an integrated manner, from recording employee data, attendance, loans, bonuses, to calculating and printing payslips.

The system developed consists of two main user categories, namely HRD as the main data manager and Finance as a user who focuses on accessing payroll reports. Each functional module, such as the management of attendance data, payroll, position, bonuses, and salary reports, is designed with the workflow that has been running in the company so that users have no difficulty adapting. In addition, the system interface is designed to be simple and intuitive to ensure ease of use, especially for users from non-technical backgrounds. This design also refers to the direct input from the *User Acceptance Test* (UAT) process carried out during the implementation phase.

The evaluation of the system is carried out through two main approaches, namely *black box testing* and *User Acceptance Test.* Black-box testing is used to ensure that all key features—such as data input, search, storage, and payslip printing—function according to the initial specifications. Meanwhile, UAT is carried out with the HRD team who are direct users of the system. The results of the UAT show a very high level of satisfaction with the speed of access, ease of use, and accuracy of the system in calculating salaries and benefits.

As a complement to *the black box test*, white box testing *is also performed* to evaluate the program's logic on several important functions such as user login and bonus data processing. This test is done using *the flowchart analysis method*, where each logical path in the code is mapped and analyzed to avoid anomalies, logical errors, or unexpected conditions. The login flow diagram shows the existence of several complex execution paths, but all of them have been tested and no errors have been found in the program's control structure.

Overall, the system built has been able to answer the needs of users in the payroll process which was previously carried out semi-digitally. With support for PHP, MySQL, and on-premises frameworks such as XAMPP, the system can be run on a local server and ready to be further developed to the cloud system if needed. The implementation of this web-based payroll information system not only improves the efficiency and accuracy of the process, but also strengthens transparency, accountability, and trust in human resource management in the CV environment. Indonesia Promo Action.

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Table 1. User Acceptance Test (UAT) Results

Yes	Aspects Assessed	Maximum Score	User Score	Percentage (%)	Information
1	Ease of Use	5	4.8	96%	Superior
2	Access Speed	5	4.6	92%	Good
3	Salary Calculation Accuracy	5	4.9	98%	Superior
4	Interface Display	5	4.5	90%	Good
5	Report Printing Facility	5	4.7	94%	Superior

Overall, the system built has been able to answer the needs of users in the payroll process which was previously carried out semi-digitally with many limitations. Now, the entire process from data input to payslip printing can be done faster, more accurately, and more efficiently. With support for *PHP, MySQL,* and on-premises frameworks such as *XAMPP*, the system runs stably on local servers and can be upgraded to a cloud system if needed in the future. The implementation of this system also increases transparency, minimizes miscalculations, and builds trust in HR management in CVs. Indonesia Promo Action.

Implementation of a digital-based payroll information system at CV. The Indonesian Promo Action has yielded significant results in terms of efficiency, speed, and accuracy in the process of managing employee salaries. The system not only replaces the semi-manual payroll methods used previously, but also introduces a more structured, automated, and user-friendly approach. With a digital system, all payroll components—from attendance, position, loans, to bonuses and incentives—are integrated into a single platform that is easily accessible and managed by HRD and finance.

According to various industry reports, payroll system automation can reduce processing time by up to 80%, and lower the administrative error rate by up to 95%. This effect is seen directly in CV surgery. Indonesia Promo Action, where the process was previously carried out manually for hours, now only takes a short time. In addition to increasing efficiency, digitalization also strengthens data accuracy and productivity of internal teams. Errors in calculating benefits, taxes, or deductions are now virtually eliminated thanks to the automated validation system embedded in the platform.

Manual payroll processes are particularly susceptible to human error, especially in data inputs such as attendance counts, delays, or the calculation of bonuses and deductions. Even a small mistake, such as one wrong number, can have a big impact on an employee's trust in the company. By adopting an automated system, the processing time that previously took up to 14 hours can now be cut to just one hour. Other research has also shown that payroll automation is able to reduce miscalculations by up to 80%, and has a positive impact on employee satisfaction and trust in company management.

Digital payroll system at CV. Aksi Promo Indonesia also aligns employee attendance data with automatic salary calculations. All data is stored in one centralized database, which ensures that there is no discrepancy between attendance data and the amount of salary paid. This is important to maintain transparency and avoid administrative errors that can lead to conflicts. Findings from various studies state that the integration of attendance and payroll systems in one HRIS (Human Resource Information System) is able to speed up workflows and maintain data consistency across HR functions.

In terms of data security, the system comes with a variety of essential features such as role-based access control, data encryption, and automatic backups. This is done to ensure that only the authorities can access sensitive data, such as payslips and employee loan information. This practice is not only important in terms of security, but also to maintain the integrity of the system and increase user trust. In a study conducted by Deloitte, it was stated that up to 79% of employees feel more motivated to work when they believe that their personal data and salary are managed securely and transparently.

HRD work efficiency has also increased drastically. Previously, most of HRD's time was spent handling administrative matters such as entering attendance data, creating payroll reports, and checking deductions. With this digital system, all data is consolidated in one interactive dashboard. This allows HR to shift its focus to strategic aspects, such as employee competency development, training planning, and overall performance

evaluation. Studies from various industry sectors note that companies that automate their payroll systems experience an increase in HR productivity of up to 30%.

No less important, digitally stored payroll documentation also facilitates the audit process and traces historical data. When there is an employment dispute or an examination by a regulator, the company can easily display complete and accurate records. This is important to ensure legal compliance and good corporate governance. In addition, digitalization also supports environmentally friendly practices, as it reduces the need to use physical documents such as printed payslips, manual archives, and other paper forms.

The use of an integrated web-based system not only offers easy access for management and employees, but also opens up the potential for development to cloud-based systems in the future. The system is flexible and can be developed according to the company's needs, for example by adding a leave submission module, training management, or an award and performance appraisal system. This means that this digital payroll system is not only an administrative tool, but also the foundation of a larger and more sustainable digital transformation of human resources.

Overall, the results obtained from the implementation in CV. Aksi Promo Indonesia strengthens the argument that information technology is a concrete solution to overcome various conventional administrative constraints. This system not only improves the technical aspects of payroll, but also supports the formation of a more transparent, efficient, and professional work culture. This transformation proves that digitalization is not just a trend, but an urgent need to realize adaptive, modern, and future-oriented human resource management.

CONCLUSION

Introduction of a desktop-based design system in CV. Aksi Promo Indonesia has the main goal of improving the accuracy and accuracy of the employee payroll reporting process. So far, salary management is still carried out manually or using a simple system that is prone to errors. This error can come from recording attendance data, calculation of working hours, allowances, deductions, and total salary received by employees. If done manually, the risk of human error is quite high and can harm the company and the employees themselves.

With the implementation of a desktop-based digital payroll system, the entire data processing process will be carried out automatically and in a structured manner. This system not only helps in calculating payroll quickly and accurately, but also makes it easy to store data neatly, centrally, and securely. Payslip data and monthly reports can be accessed at any time if needed, both for internal audits and other administrative purposes.

Another advantage of this system is the efficiency of staff working time, as processes that previously took a long time can now be done in a shorter time. Thus, this application is expected to be able to provide an effective and reliable solution in supporting more professional and modern employee payroll management.

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