Web-Based Human Resource Information System Design AT PT. Cakra Mandala Sakti Surabaya

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Alexander Wirapraja, Rizky Basatha, and Viky Yoviantono

Abstract

Human resources are defined as people who are ready, willing, and able to contribute to the achievement of organizational goals. Every organization has different goals; therefore, the required human resource capabilities will be different for each company. The recording and archiving process at this company is still carried out semi-manually using spreadsheet processing applications such as Excel so that errors are very susceptible to errors both during input and calculations. Judging from the level of urgency of th problems, the company will develop a Web-based human resource information system (HRIS) to optimize the operational management process, especially the management of records and personnel data. This Web site was developed using HTML and PHP scripting with a database using MySQL 5.7, while the development method will use the waterfall method. The results obtained are that by using a Web-based HRIS, employees at the company are very helpful and easy in managing employee data such as the recruitment process, permits, attendance, and KPI assessments.

Keywords

Website · HRIS · Management · Operational

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1 Introduction

Indonesia is currently in the Industrial era 4.0, an era where the role of technology plays an important role in managing information so that it becomes useful information for its users. The process of managing data into accurate, effective, and efficient information is an important thing needed by every company or organization in increasing work productivity, time, and costs.

However, it should also be noted that technology alone is not enough for the role of humans, in this case, HR is a critical point that needs to be considered in ensuring the success of the company's business processes. HR personnel owned by the company must have the ability and competitive power to be able to compete, especially in free competition in the current Industrial 4.0 era. The current condition of Indonesia's HR competitiveness based on a report from the World Economic Forum states that the global competitiveness index of Indonesian human resources in 2019 was ranked 50 out of 141 countries or a decline from the previous position which was at 45. Companies should not only treat HR as employees but also need to think about how they can develop into a workforce that is productive, skilled, and has good performance.

Based on the problems above, for companies, especially PT. Cakra Mandala Sakti needs to change from a manual process to digital-based data management, specifically in the management aspect of human resource management in an effort to increase the effectiveness of data and information as a source of managerial decision making and assist the company's operational management process.

PT Cakra Mandala Sakti itself is a company located on Jalan Romokalisari Bumi Maspion warehouse block A-3 Gresik East Java Indonesia. This company is engaged in the sale of snack products. The initial conditions that exist in this company are the increasing number of employees, incomplete recording of information about employees, the recruitment process, and HR management that has not

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been maximized. This has resulted in the HR department being overwhelmed and struggling to organize and manage human resource management within the company.

2 Theoritical Background

2.1 Human Resources Management

The definition of the term human resource management (HRM) refers to the field of science or art in managing potential, roles, and labor relations in realizing efforts to achieve company goals through the implementation of management policies in the company both from the side of internal employees and external factors such as the community, including function of planning, organizing, effective, and controlling effectively and efficiently (Afifah & Sary, 2020). The quality factor and development of HR management in corporate organizations is a great potential for organization, of course it must be supported by the implementation of good HR management strategies. This is because human resources are increasingly seen as a strategic asset in improving organizational performance to achieve an organization's competitive advantage (Kavanagh & Johnson, 2018). Based on this definition according to Nurjaman et al. (2020), it can be concluded that human resource management (HRM) has the following characteristics:

1. HRM system consisting of various HRM elements such as practices and subsystems of the management system.
2. Employees are considered as a source of sustainable competitive advantage; in other words, they are a strategic resource.
3. From an analytical point of view, all of the above definitions identify subsystems as part of the system in the organization as a whole.
4. The next characteristic is to focus on the fit between HRM and management strategy.
5. Focus on the effects that affect organizational performance.

Menggison et al., in Maghfiroh (2021) provide a definition as the core in the process of developing human resources, namely:

1. **Training:** is a systematic effort to transfer knowledge or expertise from someone who knows and understands to people who do not know or do not understand.
2. **Development:** is a long process carried out by an individual to increase his potential and effectiveness.
3. **Learning:** is a process that aims to change oneself from the original state.
4. **Education:** is seen as a planned learning structure with the aim of training the mind.
5. **Human resource development:** is a term used to describe an integrated and holistic approach to changing work behavior by using learning techniques and strategies as an effort to maintain and improve the company's existence or as an effort to anticipate future business demands.

2.2 The Role of Information Systems in Organizations

The role of information systems in organizations as systems that use the exchange of data and information with the aim of meeting the needs of daily transaction processing. Its purpose is to support the operational management and strategic activities of an organization by providing relevant parties with the necessary reports (Hussein & Kertahadi, 2014). In information management systems, data is an important element including the following definitions: (1) Data is an important element or "lifeblood" of an organization. (2) The quality of data production and data maintenance are important elements that determine the smooth operation of every part of the organization. (3) Data represents the "facts" of transactions that occur especially in daily management operations. (4) A transaction can be considered a consequential event in a procedure such as the process of recruiting and managing new employees for certain positions with certain salaries. (5) The organization will definitely try to capture data (facts) related to each of these transactions such as employee profiles, work dates, names of employees who are hired, positions, departments of new employees will work, and so on, until the data can be stored in the organization's archives so that can be used in the future as part of the decision-making process (Kavanagh & Johnson, 2018).

Application and implementation of information systems is a big investment for every business company today. But poor IS selection and implementation can be an obstacle to achieving business goals. When IS does not have the capability and capacity needed to collect, store and transfer important information for business organizations, it can affect decision making such as limited decision-making options, taking wrong steps to lead to losses for the company causing loss of customers (Pearlson et al., 2016).

2.3 Human Resource Information Systems

Literature from Kroenenbaum in 1990 cited by Majeed and Özyer (2016) that the human resource information system is a system used to obtain employee data, carry out

the process of storing and sorting data, manipulating the data if necessary, analyzing data, carrying out the process of changing data and information and distributing-related information about the organization's human resources to users. In addition, Kovach and Cathcart in 1999, cited also in Majeed and Özyer (2016) also has the same opinion in defining HRIS as a systematic procedure in data processing such as collecting, storing, maintaining, data retrieval process, and data validation required by an organization regarding human resource activities including employee activities within the scope of work and characteristics of organizational units.

In Fig. 1, it is shown that in activities in various business companies, the use of human resources information systems (HRIS) has been proven to be able to increase productivity, employee performance, and business competitiveness against competitors (Rusjiana, 2016). Understanding the term relationship between the term employee performance and the use of HRIS emphasizes the demands of mastery of information technology by employees in an effort to increase productivity and quality of their work.

HRIS in practice is also seen as an integrated system designed to improve the efficiency and effectiveness of data processing of company employees by collecting HR data and producing documentation in the form of HR reports that can be useful as a source of information in decision making (Susanto & Andriana, 2019). Especially when companies need information that is informative, relevant, fast, accurate, and available for the decision-making process, this can be seen in most companies that have implemented management information systems in the company's operational activities. Based on this explanation, the thing that needs to be considered for the company is increasing the capability and ability of all company employees to be able to master the concept of information systems and use them according to the needs of the work in their respective departments (Rosadi & Purnomo, 2020).

According to Veithzal Rivai (2009) in (Rusjiana, 2016) the HRIS is formed from various elements. Every element must function properly for this system to benefit the company. The three components that are the main functions of the HRIS are: (1) Input function: Entering information about employees into HRIS, (2) The data maintenance function: is a function where after the data is entered into the application, the maintenance function will update and add new data to the existing database, (3) Output function: Function that produces high value output to the user. Meanwhile, according to Wibawa et al. (2018), in the scope of operational management, HRIS is designed to achieve the following objectives: (1) Offer a reliable, comprehensive, and sustainable information system for users to help complete their work, (2) Provide up-to-date information with optimization of cost feasibility, and (3) To provide data security and privacy functions.

The development of the HRIS in this study will be carried out on a Web-based basis, this is done because the

Fig. 1 HRIS on organizational and global business environments (Kavanagh & Johnson, 2018)

Web site is also a form of digital platform that presents a number of characteristics that explain its appeal as an organizing model. (1) digital platforms contribute to a significant reduction in transaction costs, including distribution, search, contracting and monitoring costs. (2) digital platforms help in organizing and coordinating the development of complementary product technologies through modularity and proper governance structures and (3) Generativity is defined as the technological capability for organizational management to generate new results driven by the presence of a large and heterogeneous volume of users (Asadullah et al., 2018).

2.4 Key Performance Indicator

Good organizational performance refers to good employee performance as well. Good employee performance does not just happen automatically but must be formed. Aspects such as managerial standards, knowledge and skills, commitment, and performance appraisal can affect employee performance. One method of performance appraisal is to use key performance indicator (KPI). KPI is a formal system used by organizations within a certain period of time to assess the work performance of an employee. KPI also has a function to identify, observe, measure, collect data, and see the strengths and weaknesses of employees in carrying out their work. The purpose of this KPI is in order to improve the work performance of employees, and then, the performance appraisal will be designed in such a way according to the circumstances in the company to help the company achieve organizational goals and motivate employee performance (Setiobudi, 2017).

Based on the explanation above, it is known that KPI is important for companies that need to conduct performance appraisals for their employees. According to Dessler in 2008 (Evita et al., 2017), the company's reasons for evaluating employee performance are as follows:

1. In practice, the KPI process can help management make decisions about employee salaries and promotions.
2. Employee performance appraisal has an important role in the performance of the company's process management. KPI assessment can link the company's strategic goals into employee specific goals.
3. Assessment provides input to leaders and their subordinates to develop change plans through efforts to improve deficiencies and strengthen systems or procedures that have been carried out correctly.
4. KPI assessment can be input in doing career planning. The assessment provides an opportunity to review the employee's career plan by taking into account the scope of the employee's strengths and weaknesses.

3 Research Methodology

3.1 Waterfall Method

The application development method used is the waterfall method. The waterfall method is a system life cycle development method which is also known as linear sequential model or a classical system life cycle. The waterfall model starts from the stages of analysis, design, coding, testing, and maintenance given a sequential approach to the software life cycle (Christian, 2020). The essence of the waterfall method is to work on a system that runs sequentially and linearly. Therefore, each step must be completed before moving on to the next step to avoid repeating the step (Lumbangaol & Ridho, 2020). The following are the stages of developing an HR information system at PT. Cakra Mandala Sakti using the waterfall development model:

1. **Analysis:** is the stage where the activities in it include collecting requirements that are carried out intensively to identify the initial requirements of the software such as what is needed by the user. The specification of software requirements is carried out by distributing questionnaires of initial user requirements and equipped with interviews, and the results of questionnaire transcripts and interviews have also been documented in the company archives.
2. **Design:** This is the stage where the activities are carried out after the analysis stage is complete. At this stage, there is a merging process that focuses on the design of making software including data structures, software architecture, interface representation, and coding phases. This stage changes the results of the needs analysis and displays it in the form of a design so that it can be implemented by the developer in the form of software at a later stage. At this stage, it is also necessary to document the design of the software to be developed.
3. **Writing program code:** Pada tahap ini desain yang telah direncanakan pada tahap sebelumnya akan diterjemahkan ke dalam baris kode pada pembuatan perangkat lunak. Hasil dari tahap ini adalah program komputer yang sesuai dengan desain yang telah dibuat. At the coding stage, the developer continues to coordinate and is supervised directly by representatives from PT. The Mandala Sakti Chakra.
4. **Testing:** Pengujian berfokus pada pengujian perangkat lunak yang telah di baut secara logis dan fungsional pada semua bagian dan fitur dalam aplikasi. Pengujian dilakukan untuk meminimalisir kesalahan dan memastikan output yang dihasilkan sesuai dengan yang diinginkan oleh organisasi. Testing of this system is carried out on system users, namely HRD managers and a sample of users, namely employees of PT. The Mandala Sakti Chakra.

5. **Maintenance:** The condition of a software can change when it is implemented by the user. Changes can occur due to errors that were not detected during the testing phase, and this can be caused when the software has to adapt to a new environment. In the maintenance phase, the stages of the development process from specification analysis can be repeated so as to get the changes needed to the existing software. At the maintenance stage, periodic inspections and updates have been scheduled according to the policy of PT. The Mandala Sakti Chakra.

3.2 Context Diagram

In Fig. 2, it is explained what data flow is carried out by each entity (actors or Web site system users) into a Web site system process of PT. The Mandala Sakti Chakra. In the context diagram of the website PT. The Mandala Sakti Chakra there are 5 entities, namely (1) HR managers, (2) employees, (3) prospective employees, (4) accounting, and (5) division heads. The five entities interact directly or indirectly with the website system of PT. The Mandala Sakti Chakra.

In the HR manager entity, the data provided into the system is the main information data provided by the system in the form of employee information, employee assessment results, approval of permits and leave, and the recruitment process. While in the employee role, users will receive notifications on transaction requests and status information including: employee status, attendance information, and recapitulation of absenteeism such as leave or permission that was previously submitted as well as employee assessments that have not been carried out.

This application also provides features for prospective employees or job applicants, where they can view information on job vacancies or the new recruitment process for vacant job positions, so that prospective employees can send personal data such as a biodata form, cover letter, and curriculum vitae which will be assessed later and interviewed by HR manager. Prospective employees will also receive notification whether or not they are accepted at the company.

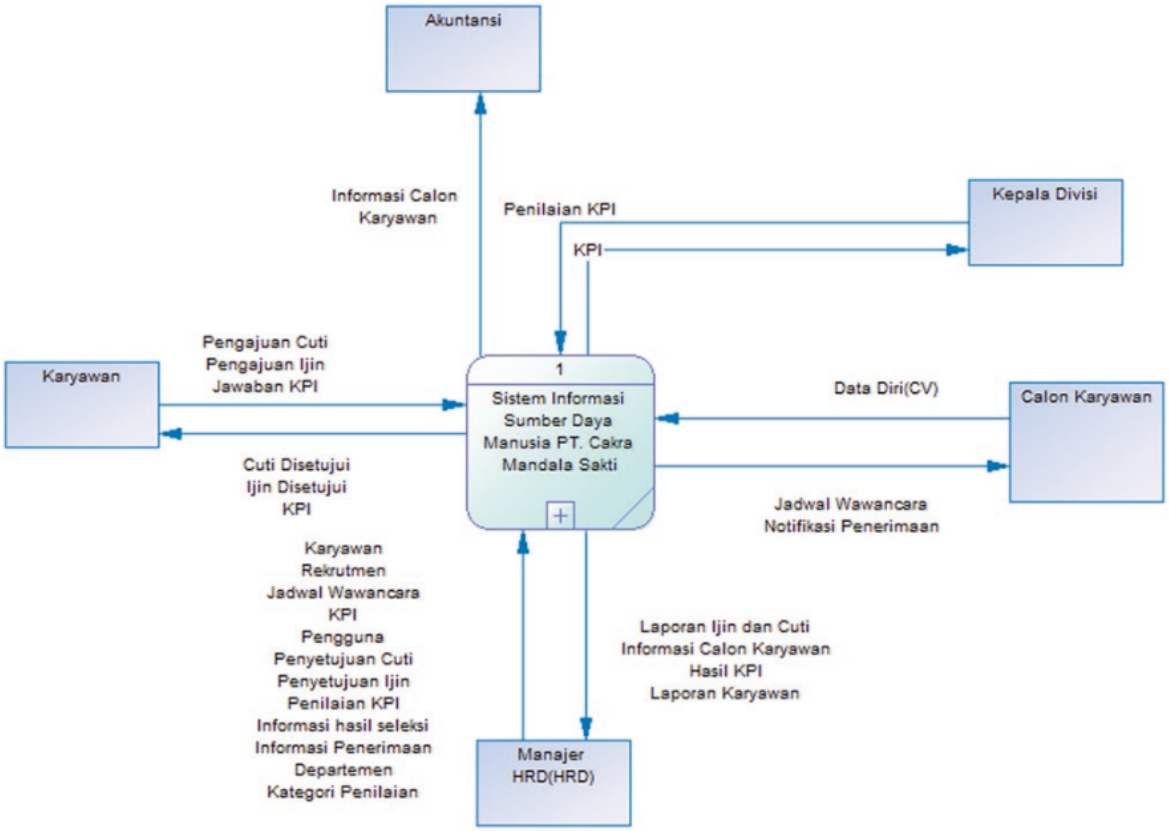


Fig. 2 Context diagram PT. Cakra Mandala Sakti

3.3 Conceptual Data Model (CDM)

In software engineering, software development models often represent sets of activities, objects, and network transformations using a particular notation, syntax, or semantics suitable for computational processing. Application development models are used with the aim of providing visualization of the design process, to assist in idea generation, problem solving, and evaluation and can be used to facilitate interaction and communication (Al-Fedaghi, 2021). Conceptual data model (CDM) is a main concept design of the main database which includes the relationships between tables in the database management system (Irianti et al., 2021).

Modeling with CDM is also one of the most powerful and effective analytical techniques for understanding the information needed to support any organization (Al-Fedaghi, 2021). In general, in the implementation of system development, model design with CDM is the initial stage of database modeling before the original database concept is created. The following is the CDM of the developed system:

Based on Fig. 3, it is known the tables will be used for the needs of the new system. Some of the main tables above require detail tables, which will later be used to record important details. In this conceptual data model, as shown in Fig. 3, there are 12 entities including employees, job titles, KPIs, KPI categories, users, departments, off work, off work categories, work permits, recruitment, attachment candidates, and employee candidates. To create the detailed table, the conceptual data model needs to be converted into a physical data model. If the conceptual data model describes the main tables used, the physical data model describes the detailed tables formed from the main tables.

3.4 Physical Data Model (PDM)

Physical data model is a model that displays a detailed design description of the database model design in physical form (Irianti et al., 2021). A complete PDM will cover all the parts of the database needed to describe the relationships between tables. PDM is usually used to calculate storage estimates, including specific storage allocation details for the database management system used at PT. The Cakra Mandala Sakti Indonesia.

The physical data model as in Fig. 4 provides a logical sequence in forming the basis of the physical model and elaborating on the conceptual model. Physical data models add more detail but usually remain technology neutral, allowing analysts to discuss and agree on the logical structure (Al-Fedaghi, 2021).

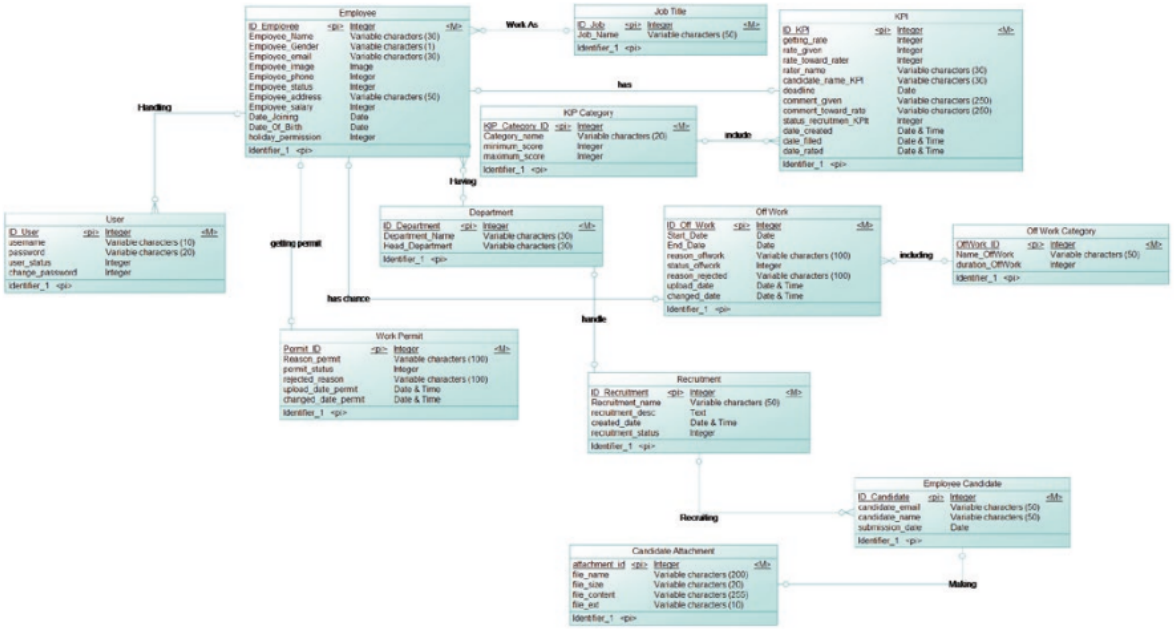


Fig. 3 Conceptual data model at PT. Cakra Mandala Sakti

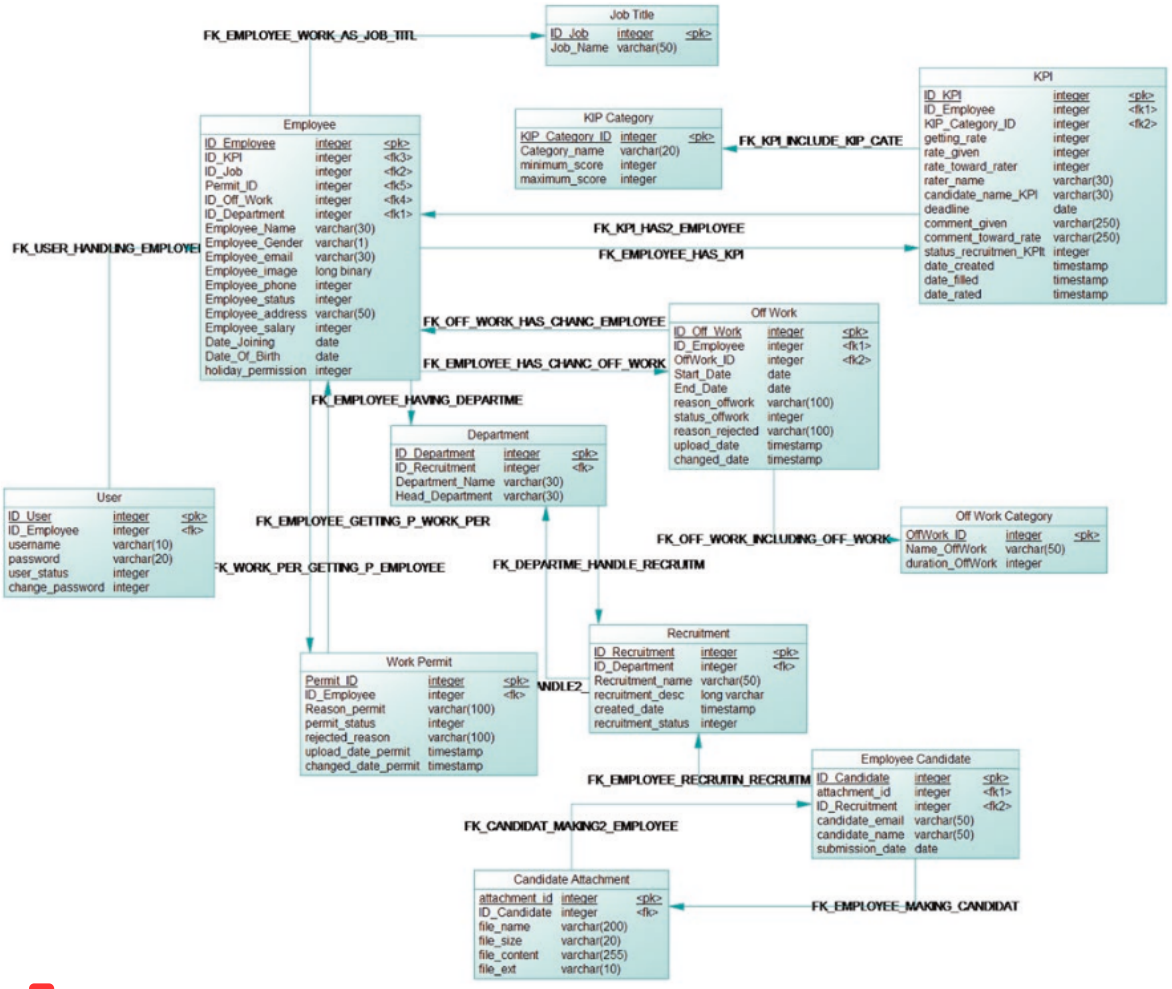


Fig. 4 Physical data model at PT. Cakra Mandala Sakti

3.5 Architectural Design

Architectural design is used to explain the client–server architecture used in building the HR information system of PT. The Mandala Sakti Chakra. Determining the right design is a consideration in building a system. Network structure and relationship between HRD manager (admin), employees, HR department, and Web server on HR information system of PT. Chakra Mandala Sakti can be seen in Fig. 5:

3.6 User and System Requirements

In this key performance indicator information system, the main access of the system is divided into two roles, namely:

- Employees: Users who use several features on the Web site include applying for permits, applying for leave, and filling out reviews that are addressed to them.
- HR Department: Includes HR managers and users in the HR department who manage the entire HRIS Web site of PT. Cakra Mandala Sakti includes inserting, updating, and deleting employee data, users, and assessment criteria data, approving requests for permission and employee leave and creating and opening recruitment processes.

HR information system at PT. This Mandala Sakti Cakra has several system features and capabilities that can be divided based on needs including functional requirements and non-functional requirements as follows:

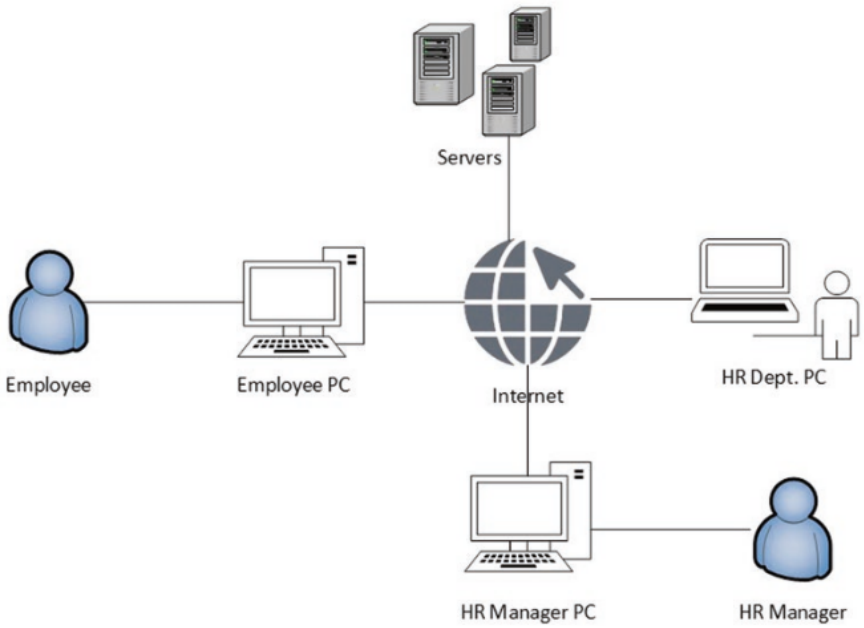


Fig. 5 Architectural design in PT. Cakra Mandala Sakti

3.6.1 Functional Requirements

1. Have admin page access rights.
2. The system can handle the process of employee recruitment, employee management, leave and permits, and personal employee information.
3. Has a confirmation feature before taking actions related to changes to the database.
4. Has a leave application feature.
5. There is a KPI assessment feature for employees.
6. The system is able to generate individual assessment reports and employee information reports.

3.6.2 Non-functional Requirements

1. Information: Provide up-to-date information about employees.
2. Economics: The system is intranet, and the data used is not too large, so the system will help companies, especially in the efficiency of managing operational costs.
3. Control: Admin, in this case the HR department, has full control over the data in the system.
4. Efficiency: Operations are more efficient, as the system has moved from semi-computerization to system integration.
5. Security: The system requires the user to login before being able to perform activities. Each page provides security conditions so that the URL cannot be accessed if the user is not logged in, even though the user knows the URL on a particular page.

4 Results and Discussion

This section is the final result of the design and implementation of HR information systems at PT. Chakra Mandala Sakti Surabaya. This section also shows the interface of the Web site that is used to interact between employees and the admin and human resources department. This system is used for internal companies, so the first time a user accesses the site, the initial display is a login form as shown in Fig. 6a and b:

On this page, the admin and employees when logging in using the default password for the first time will be asked to change the password on the change password page as shown in Fig. 6b so that for subsequent logins the user will use their own password personally to maintain data security.

After successfully logging in, the user will be faced with a dashboard page where on this page the user can perform several processes related to personal data management such as applying for permits and leave, providing KPI assessments, and maintaining personal information data.

The application display as shown in Fig. 7 is a page that can be used by employees to apply for the leave process by entering the type of leave, leave start date, and leave end date along with the reasons stated for taking leave, and after the data is input by the user, this application is made, will be done, and verified whether the requested leave is approved or disapproved by the employee's department head through the human resources department.

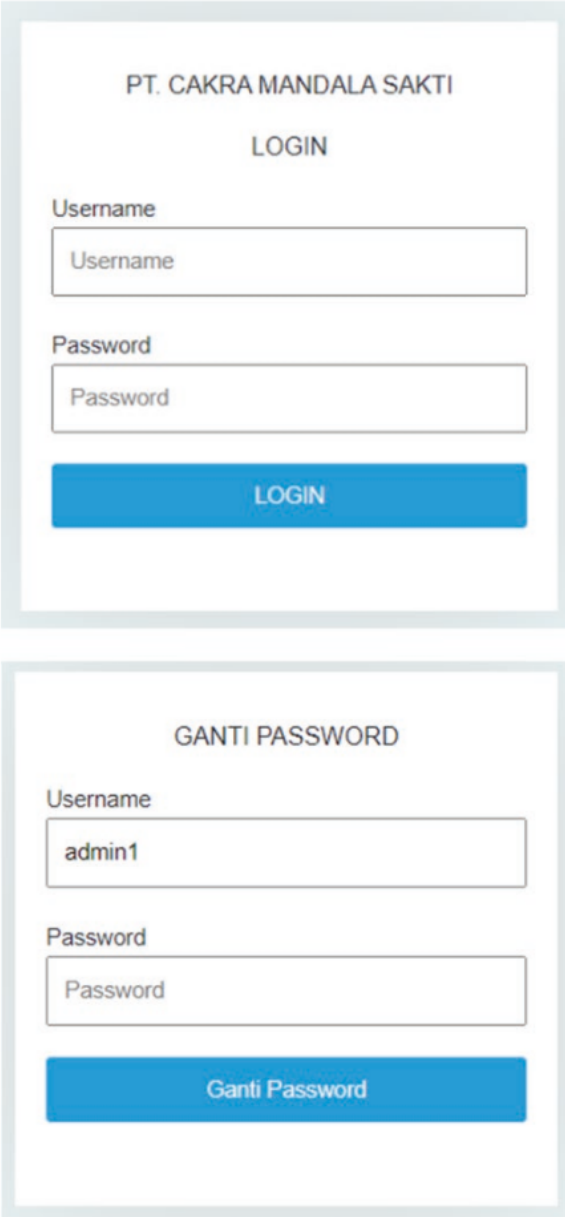


Fig. 6 **a** Login form. **b** Change password form

Figure 8 shows the display of the employee leave application page, where on this page there is also a validation process for employees who wish to apply for leave, the difference is determined based on gender, and both men and women each have a different type of leave. On this leave application page, there is also a validation of the date chosen to meet the allotted leave given or not, if the leave taken exceeds the annual leave allowance according to company policy, the user will not be able to take leave, but if the number of days selected is less or equal to the leave allowance given, the system will direct the user to choose another schedule.

The initial stage before carrying out the assessment process is usually the HR department; admin will provide a page on this application Web site that contains the criteria for the assessment to be carried out. As shown in Fig. 9, the following contains the page used by the admin to be able to add KPI categories that are used as preparation for the assessment that will be carried out on employees.

The KPI assessment process at PT. Cakra Mandala Sakti uses the point method where the HR department of the company gives points to employees who are rated between 0 and 100. The technical filling in the performance appraisal in accordance with company policy is carried out directly by the supervisor of the assessed employee, and the filling page for the assessed employee can be seen in Fig. 10.

Figure 10 shows that the form for filling out the assessment/review will be carried out by the department head from the employee being assessed, on this KPI assessment page, the department head fills in the minimum and maximum values, and the system has determined the deadline for the assessment. In this system, to maintain credibility, a two-way assessment is also carried out between the management and employees.

Figure 11 shows a page that is used by the admin in order to be able to manage the list of employees in the company by adding, editing, or deleting employee data. This page can only be accessed by the company admin based on the approval of the company leadership.

5 Conclusion

Based on the research and implementation that has been done, several conclusions are obtained from the process of making the HRIS Web site at PT. The Mandala Sakti Chakras includes:

1. Implementation of the HRIS Web site of PT. Cakra Mandala Sakti has made it easier for management and HRD to manage employee data working in the company, both in the process, including: submitting and approving employee permits and leave, providing performance appraisals for employees, and managing the process of recruiting new employee candidates.
2. The Web site is developed using an intranet network, with the consideration that the Web site is not easily accessed by networks outside the company network.
3. This human resource information system Web site has succeeded in displaying up-to-date information. In daily operations, the admin can manage and access the Web

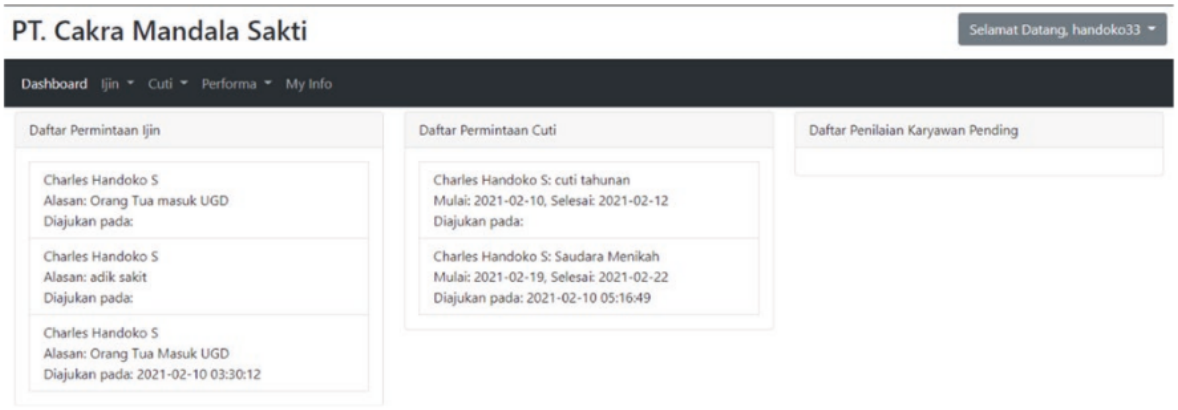


Fig. 7 Dashboard page PT. Cakra Mandala Sakti

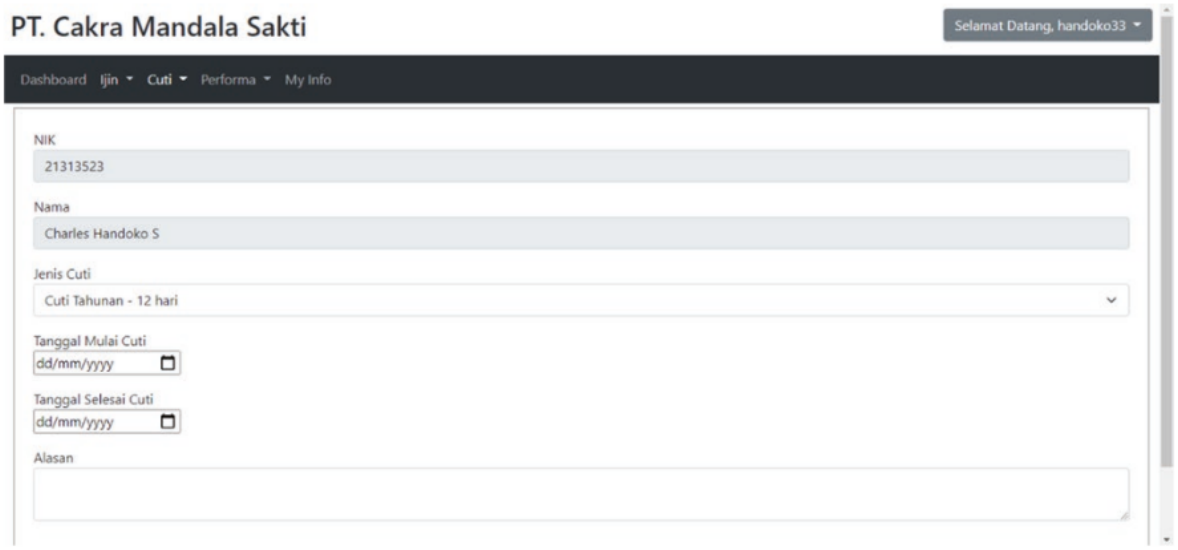
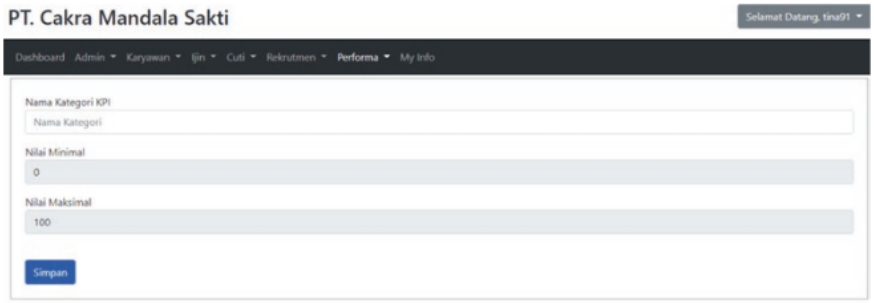


Fig. 8 Employee leave application page

Fig. 9 Category page of employee performance assessment



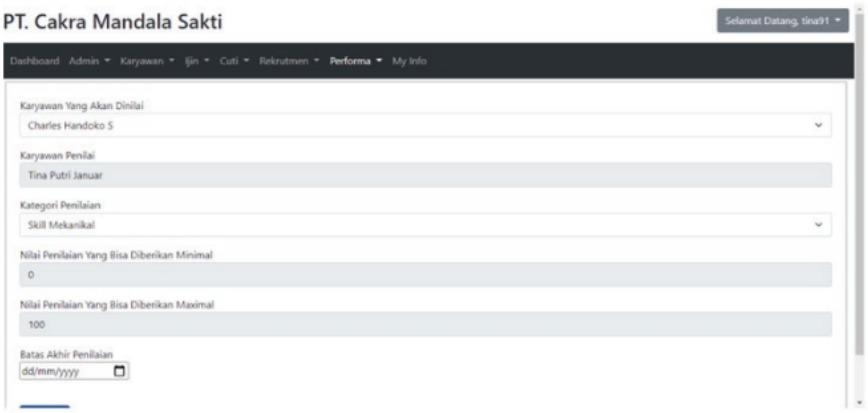


Fig. 10 Employee performance assessment page

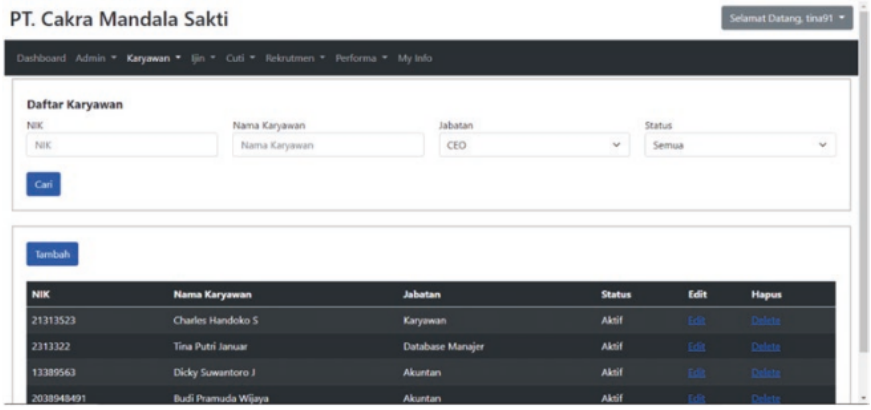


Fig. 11 Employee list page

site through various devices, either with a personal laptop or with a mobile display as long as it is connected to the company intranet.

4. The system has integrated the existing HR management system at PT. Cakra Mandala Sakti with the HRIS Web site that has been developed to achieve effectiveness and efficiency in the development of the company's business processes.

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