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## Analysis of Management Information System Design in Pre-Recruitment HR Planning Based on Flowchart

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### Abstract

**Research aim :** This study aims to design and develop an effective management information system to support the pre-recruitment planning process in Human Resources (HR) management using a flowchart-based approach.

**Design/Method/Approach :** This study uses the Research and Development (R&D) method with the ADDIE model, which includes five stages: analysis, design, development, implementation, and evaluation. Data were collected through interviews and literature studies to identify needs and challenges in pre-recruitment HR planning.

**Research Findings :** The results of the study indicate that the developed system can integrate candidate data management, job analysis, and job description preparation systematically. The use of flowcharts as a visualization tool improves understanding and efficiency in the pre-recruitment HR planning process.

**Theoretical contribution/Originality :** This study contributes to the literature on management information systems by emphasizing the importance of information technology integration in the pre-recruitment HR planning process, as well as demonstrating how flowcharts can be used to visualize HR planning workflows.

**Practitioner/Policy implications:** This research provides practical guidance for organizations to improve efficiency and accuracy in candidate data management and formulate more effective and transparent recruitment strategies.

**Research limitations:** This research focuses on system design and does not include the direct implementation stage, so the results need to be tested further in real practice.

**Keywords :** Management Information System, HR Planning, Pre-Recruitment, Flowchart, Information Technology.

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### 1. Introduction

In today's digital era, human resource (HR) management is increasingly complex and requires a technology-based approach. Technology in Human resource management (HRM) can improve efficiency and accuracy in the recruitment process. By implementing an HR management information system and data analysis tools, companies can simplify the recruitment process, ensure faster and more consistent decision making, and ultimately improve overall operational effectiveness [1]. Information Systems Management (MIS) has emerged as a leading solution for managing various aspects HR, including HR recruitment . The application of information technology such as Applicant Tracking Systems (ATS) allows HR professionals to evaluate candidates based on measurable data, improving the quality of

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hires and reducing time to fill positions [2]. Technology-based information systems, especially data analytics, improve employee data management and strategic decision-making in hiring by leveraging predictive analytics and machine learning to identify high-potential candidates, streamline the hiring process, and reduce recruitment costs [3]. System Management Information (MIS) is a solution to improve HR information management and enhance decision-making systems based on data analysis.

Before organizations carry out the recruitment process, they need to conduct HR planning. In this pre-recruitment HR planning, it is useful to ensure that the organization has adequate manpower at the right time. Effective HR planning includes analyzing workforce needs mapping, compiling job descriptions, and interrelated recruitment planning. [4]. This process has a significant impact on organizations to ensure that they have the workforce that can support strategic achievements. Previous studies have revealed that HRIS helps in pre-recruitment human resource planning by maintaining comprehensive employee information records, thereby enabling proper projection of demand and supply of resources. human resources, besides also being able to differentiate between filled and unfilled positions, so that it can facilitate the development of efficient workforce planning and designing recruitment methods within the organization [5].

The pre-recruitment HR planning stage takes a big role from analysis of workforce needs up to the development of clear job descriptions. However, many organizations still fail to execute this process efficiently and effectively, often facing inefficiencies that result in delays in filling available positions and inflation in operating costs. Such system adaptation risks creating inefficiencies, delays in filling positions, and difficulty in identifying the right candidates. The lack of an integrated information system in the recruitment process can hinder efficiency and result in the loss of important information related to candidates that impacts decision making. Proper integration is essential to optimize the selection process and ensure data protection [6]. In addition, in his research, Troger (2021) collaborated between HR experts and managers organization is essential for effective internal and external HR marketing, selecting suitable candidates, and successfully recruiting and integrating new employees into the organization [7].

So far, pre-recruitment HR planning has often been carried out with an unstructured approach and relies on manual methods. This can lead to inefficiency, delays in filling positions, and difficulties in identifying suitable candidates. Therefore, there needs to be a flow that can visualize in designing and implementing the pre - recruitment HR planning process, one of which is through a flowchart. Flowcharts can be applied as a systematic visual aid to describe the steps of the pre-recruitment HR planning process so that it can be better understood by decision makers. Flowcharts not only help in the interactive stages of a system, but also a method to explore potential weaknesses, so that improvements need to be made. Business visualization through Flowcharts allow for accelerated understanding of the details of complex internal systems through them, further exploring strengths, exploiting and improving communication within the organization [8]. The use of flowcharts can help organizations in designing pre-recruitment HR planning, reducing the possibility of errors, and improving collaboration between organizations. By using flowcharts, HR professionals can easily communicate and collaborate to solve complex problems [7].

Therefore, the purpose of this study is to design and develop an effective management information system to assist the pre-recruitment HR planning process in organizations with the help of flowcharts. By using an information technology and data-based approach, it is

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hoped that this study will be able to provide a more comprehensive explanation of how information systems can play a role in assisting organizations in developing planned and integrated recruitment strategies.

### 1.1. Problem Statement

Lack of structure in the pre-recruitment HR planning process leads to inefficiencies in candidate selection, increases operational costs, and slows down the fulfillment of organizational staffing needs. Many companies still manually conduct pre-recruitment such as collecting application data through physical documents and interviews without an integrated computer-based support system. This slows down the selection process and increases the possibility of administrative errors and subjectivity in the decision-making process.

Insufficient integration in recruitment information systems can hamper efficiency, leading to potential redundancy of critical candidate information with a negative impact on the quality of decisions made. Effective integration is essential to maximize recruitment information systems, optimize selection processes, and ensure data security [8].

Although many studies have been conducted on the benefits of management information systems in the recruitment process, not many studies have focused on management information systems related to HR planning at the pre-recruitment stage. Therefore, this study will examine an effective management information system model to facilitate the pre-recruitment HR planning process in an organization. To minimize stakeholders in the limitations of understanding how effective workflows can be implemented by stakeholders in the pre-recruitment HR planning program, it is necessary to visualize the process with the help of a flowchart. Flowchart is one approach that can help organizations design more effective and clear recruitment plans. Organizations can identify barriers and simplify processes by visualizing workflows [9].

### 1.2. Research Objectives

The purpose of this study is to design and develop an effective management information system to assist the pre-recruitment human resource planning process using a flowchart. By doing so, it will be able to assist organizations in maintaining speed and accuracy in candidate management so that in understanding and implementing their recruitment they are more structured and in accordance with procedures. The implications resulting from this study can provide recommendations that can be implemented by organizations to improve the quality and transparency of recruitment process data collection through maximum technology. Thus, this study not only has benefits for the development of theory, but also as a reference for practitioners in their fields.

## 2. Methode

This research is a qualitative research using Research and Development method to design and develop pre-recruitment management information system. The data used in this research is primary data obtained based on literature study and interview techniques. The development model used is ADDIE model which consists of five main stages: 1) Analysis 2) Design, 3) Development, 4) Implementation, and 5) Evaluation [10, 11].

Each of the five phases of the ADDIE model plays a critical role in ensuring that the information system primarily addresses the needs of users and critical services that are

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currently not addressed while integrating them into a cohesive lens to support the pre-recruitment process. For example, the analysis phase focuses on analyzing the needs and challenges faced by HRD. The design phase then builds an adequate solution. At another level, the development phase puts the system into practice, with the implementation phase ensuring that the system can function in real use cases. The evaluation phase is designed to gain knowledge about the effectiveness of the system, as well as assess the systematic and proactive actions that should be taken. This approach is confirmed by previous research findings that the ADDIE model is provided which can improve the quality of information system development in the context of human resource management and relevant education. Once the relevant questions have been raised, this reciprocal communication model should be allowed to be implemented. Data were taken from interviews and reading and included under the strategy and data reduction classification technique where relevant data are widely identified for certain themes. This is relevant to using this method to address pre-recruitment HR planning problems and provide structured and systematic solutions.

### 3. Results and Discussion

This study aims to design and develop an effective management information system in human resource (HR) planning at the pre-recruitment stage. Using a qualitative approach through the Research and Development (R&D) method, the researcher adopted the ADDIE model which includes five stages: analysis, design, development, implementation, and evaluation. Each stage plays an important role in ensuring that the information system developed can meet user needs and function effectively. The stages of the ADDIE process are as follows:

#### 3.1. Analysis

At this stage, the researcher conducted a needs analysis to understand the challenges and problems faced by the organization in the pre-recruitment process. Primary data was collected through interviews with HRD and related literature studies. Through interviews with HRD, findings emerged regarding challenges faced in recruitment, including inefficiencies in data management and lack of integration between various HR processes. Many organizations still rely on traditional methods for candidate selection, which causes delays and increases the chances of errors. Every organization wants system integration where the proposed system is able to integrate various HR functions, providing a centralized platform to manage candidate information, job descriptions, and recruitment workflows. HR departments expressed the need for such integration to improve collaboration among HR teams. In addition, there is a need for improved decision-making, where the new system is expected to facilitate better decision-making by providing real-time data analysis and reporting features. Interviews indicated that access to accurate data would greatly improve their ability to make HR plans.

#### 3.2. Design

After the needs are identified, the researcher designs an integrated information system. The following is the system structure and database design for the pre-recruitment Human Resource Planning (HRM) Management Information System [12, 13].

- 1) System Structure
  - a) System Architecture

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1. Client-Server Architecture : Separates client (user interface) and server (data processing) components. The client is responsible for displaying information and receiving input from the user, while the server manages the business logic and database. This increases security, as sensitive data is not directly accessed by the user.
2. Modular Design
  - a. Recruitment Module : Manage all aspects of the recruitment process, from job posting to applicant assessment.
  - b. Employee Management Module : stores and manages employee data, including personal information, employment history, and performance.
  - c. Data Analysis Module : Collect , extract and analyze data related to recruitment performance and workforce needs to assist decision making .
  - d. Report Module : Preparation of periodic reports on employee recruitment and attendance status as well as HR needs analysis.
  - e. Settings and Security Module : User access rights and data security settings, system policies.
- b) System Components
  1. User Interface (UI) : .Easy to use interface where users can utilize the system with its functions. The right UI will improve user experience and reduce errors.
  2. Application Layer : layer that holds the business logic to process input coming from the UI and communicate with the database. It includes protocols and algorithms that define the storage and presentation of data.
  3. Database Layer : Used to store all employees, applicants, and recruitment details. This layer is used to manage data, ensure its integrity, and enable users to access it securely.
- c) System Users
  1. HR Manager : involves general HR planning, HR needs monitoring, employee motivation, and strategic planning. Can access HR needs analysis reports and submit job request forms, and track all recruitment processes.
  2. Recruitment/HR Staff D : Manage recruitment processes, posting vacancies, and screening applications. Can add/edit vacancies, can view and process prospective employee applications, and can manage new employee details.
  3. Job Candidates: Apply for jobs and provide their information. Can register an account, fill out an application form and track the status of their application.
  4. Team/Division Manager : Communicates HR needs for their division and provides input on the criteria for prospective employees needed. Can view HR requests, evaluate candidates, and approve recommended candidate applications.
  5. System Administrator : Maintain and manage systems, including user management and data security. Can manage user accounts, set access rights, and manage database integrity.
  6. Stakeholders : Including executives or company owners who require information about recruitment status for decision making. Can access summary reports and dashboards to gain insight into HR needs and status.

## 2) Database Design

contains HR entities and attributes consisting of employee tables , recruitment tables, applicant tables, interview results tables, competency tables, employee skills tables .

## 3) Process flowchart in the system

A flowchart scheme is created to illustrate the flow of the pre-recruitment HR planning process . This design makes it easier The recruitment strategy to be implemented will be more structured.

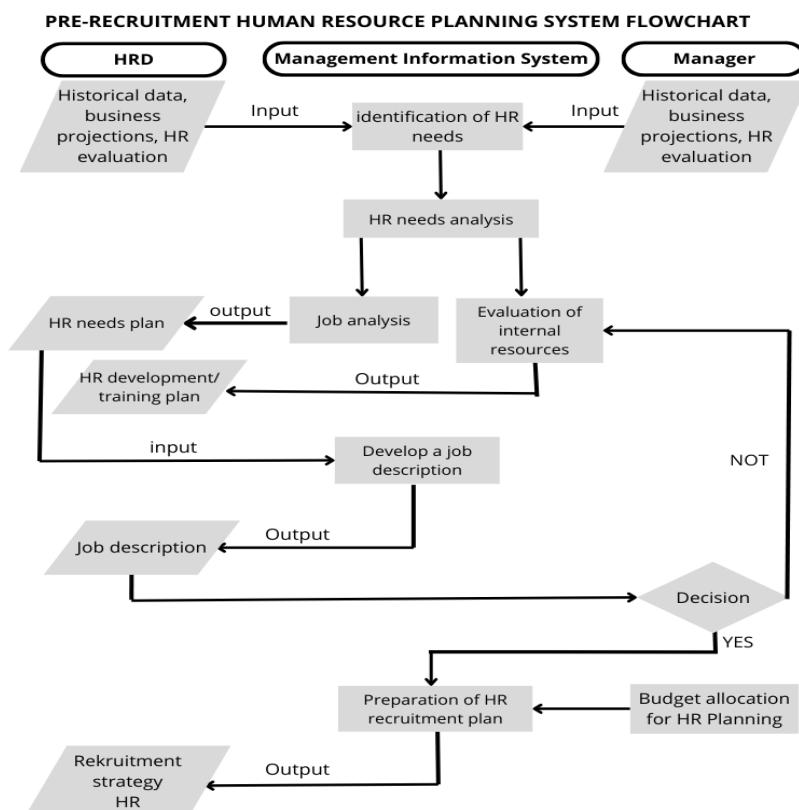


Figure 1. System Flowchart

The flowchart presented illustrates the process flow of the management information system in human resource planning (HR) at the pre-recruitment stage. The following is a detailed explanation of each element in the flowchart .

- 1) Identification of needs: The HR department and managers fill in historical HR data , including information on past HR performance, training needs, and previous evaluations. The goal is to understand trends and patterns that may affect future HR needs. The system will identify HR needs based on an evaluation of the organization's positions and goals. This involves assessing vacant positions and specific needs for teams or departments. Data-Driven Decision Making through HRIS provides valuable insights that inform recruitment strategies, helping organizations align their recruitment processes with business goals . Therefore, at this stage, coordination between HR and Managers is needed to understand business projections. Relying on input from HR and managers, this system facilitates more accurate identification of HR needs through job analysis.

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- 2) analysis process : The HR needs analysis process consists of 2 processes, namely job analysis and internal HR evaluation. In this job analysis process , it involves an in-depth assessment of the qualifications, skills, and competencies needed for a particular position. In this section, you are able to understand the duties, responsibilities, qualifications, and skills needed for each position . So that the organization can ensure that they recruit the right candidates. Implementing data analytics can improve candidate selection, reduce bias and improve job fit. [14] . At the internal HR evaluation stage , HRD conducts an analysis of the performance of existing employees. This section includes an assessment of the skills, competencies, and abilities possessed by internal HR. The results of this evaluation will provide insight into whether there are employees who can be promoted or moved to the required positions, thereby reducing the need for external recruitment. If there are employees who need to be promoted or rotated then the next stage requires an HR development/training plan.
- 3) HR needs planning: From the HR needs analysis process, HR needs planning data will be obtained. This data aims to determine the number, quality, and type of employees needed to achieve organizational goals.
- 4) Job Description Preparation : From HR needs planning data , the system will prepare a clear job description. This job description includes the responsibilities, qualifications, and skills expected of the candidate, serving as an important guide in the recruitment process.
- 5) Manager's Decision : After the job description is prepared, the next stage is decision making by the manager, in this case the company leader or the head of HRD . If the plan is approved, the next steps are to prepare the job description. recruitment plan including budget allocation for the recruitment activities. However, if rejected, HRD and division managers must re-evaluate the internal HR evaluation. If recruitment does not take place, then internal HR development/training is needed to meet HR needs.
- 6) HR Recruitment Plan : If the manager's decision is "YES", then the next stage the system will prepare a detailed recruitment plan including budget allocation from the finance division manager is also involved . This stage includes steps to attract and select the most suitable candidates for the organization's needs.
- 7) HR recruitment strategy: From the HR recruitment planning process, the output produced is the HR recruitment strategy that will be implemented in the future HR recruitment stage. Recruitment strategy is a systematic approach to attracting and selecting the right candidates according to the needs of the organization. In a human resources (HR) recruitment strategy, collecting the right data is essential to ensure that the candidate search and selection process is effective and in accordance with the needs of the organization. The following data is needed in an HR recruitment strategy, including: HR needs analysis, this data contains the current number of workers, positions that need to be filled, and the skills and competencies needed. Analysis of the workload in each department is also important to determine urgent needs. Second, recruitment sources , contain data on applicant sources, both internal (promotion or rotation) and external (job fairs, job sites, social media). The effectiveness of each source must also be analyzed to determine which ones produce quality candidates. Third , candidate profiles , including educational qualifications, work experience, hard skills, and desired soft skills, as well as suitability to the company culture, will help clarify the selection process. Fourth , selection process , contains guidelines for

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selection methods such as interviews or psychological tests, and sets assessment standards. The fifth is data analysis of previous recruitment effectiveness , this measures the effectiveness of the recruitment process through data on the number of applicants, time to fill positions, and the retention rate of new employees which can help companies improve recruitment strategies in the future. As the final step, recruitment budget, here it is important to think about advertising costs, recruitment agencies, and training of new employees to ensure that you have an effective recruitment process without wasting resources. All these data can be integrated & help companies to know how to conduct a systematic, effective, and efficient recruitment procedure to attract and retain the best talent to grow the organization.

flowchart shows a systematic approach to pre-recruitment HR planning, from gathering data to creating a recruitment plan. Incorporating internal HR evaluations allows organizations to understand the capabilities that exist internally and tap into the untapped potential of current employees before exploring new candidates. New strategic hiring decisions can rely on good internal HR performance evaluation data, and integration of input from HR and managers must be done for productive results. The HR management information system flowchart is an open way to comprehensively automate human resource processes. A flowchart is a simple way to visualize a process in chronological order. It serves as a guide for decision making, assisting many other factors, data management systems, and communications. Flowcharts offer a clear graphical depiction of operations, allowing us to detect inefficiencies and encourage compliance with policies; all of which can improve operational effectiveness [15].

### 3.3. Development

At the development stage of the management information system, the prototype design of the pre-recruitment information system that was developed has been equipped with key features that will help and facilitate the investment of this system. The same prototype also provides a basis for integrating where and how candidates are tracked, how jobs are analyzed, and how clear job descriptions are prepared. Real-time reporting functionality allows HR teams to access information instantly and accurately, enabling better, faster, data-driven decision making. The additional structured workflow in this prototype minimizes administrative errors and speeds up the candidate selection process.

### 3.4. Implementation

This research is still in the design stage and has not reached the direct implementation stage. However, knowledge for future implementation plans is very important. The implementation stage of the management information system is based on a prototype that has been tested. The following are the implementation steps:

- 1) User Training: Train HR teams and managers on how to navigate the new system and utilize its features.
- 2) System Testing: Testing the system in a real-world environment, ensuring that each feature works correctly and meets identified needs.
- 3) Existing Environment Integration: Ensuring new solutions integrate well with existing devices and applications in the organization

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- 4) Feedback Collection: After implementation, collect feedback through polls or direct conversations with users to evaluate how effective the system is and find out how it can be improved.
- 5) Continuous Improvement: Improve and update the system based on feedback to optimize functionality and better usability.

### 3.5. Evaluation

This evaluation was made to evaluate whether the designed information system was effective and efficient. Through interviews with HR professionals, the researcher aimed to obtain feedback on the features developed and the needs met by them. Interviews suggested that access to accurately obtained data would be very helpful in assessing candidates.

## 4. Conclusion

This study successfully designed and developed an efficient Management Information System (MIS) to assist the pre-recruitment HR planning process. Through the R&D method and the ADDIE model, this study shows that the use of flowcharts as a visualization tool can help the pre-recruitment HR planning process become more understandable and effective.

The results of the study show that the developed system is able to integrate candidate data management, job analysis, and job description preparation regularly. This allows organizations to better determine HR needs and accelerate data-driven decision making. In addition, cross-functional integration in the system minimizes administrative errors and reaps unlimited possibilities from electronic submission.

Thus, this study reaffirms the importance of close collaboration between HR teams, and managers to design HR planning in order to realize effective recruitment strategies. Information technology and data driven enable organizations to be the first organizations can be strategic with the use of information technology and data-based methods. It is hoped that the realization of a system that systematically adopts methods from this science can really contribute to improving the quality and transparency of the return process, as well as providing practical guidance for HR abstractors to the challenges of the digital era.

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