



## Application of Bayes Method To Design A Decision Support System Fof Determining The Status Of Permanent Employees In A Soft Beverage Company

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### Abstract

The purpose of this study is to learn how to create a decision support system that can help with the process of deciding whether to hire contract workers on a permanent basis. The following methods of gathering data were employed in this study: literature review, interviews, and observation. The system development approach that the author employed to create this program was called rapid application development, or RAD. The decision support system that has been developed for contract employees to become permanent employees can assist and make it easier to see and read the results of contract employee assessments, according to the research results. This is because the system is quantitative and can generate reports that show the total numerical value of each criterion and sub-criteria for candidates for permanent employment. The system that has been developed has the ability to generate a report on contract employee assessments that presents contract employees in order of recommendation. The evaluation procedure and computation results can be accelerated with the use of a decision support system for contract employees who wish to become permanent employees. This way, the choice of whether to graduate or become a permanent employee can be made in less than seven days.

**Keywords:** Decision Support System, Selection, Rapid Application Development, Assessment, Employees.

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### 1. Introduction

Technological developments are currently developing rapidly. Computers and their software and hardware play a very important role in technological progress. Almost all human activities cannot be separated from the greatness of computer technology in making these activities easier [1]. Currently, computers provide a very appropriate solution in terms of producing good information and also as a work tool for many people. Therefore, there is a great need for experts in the computer field to meet the needs of users [2]. Computers play an important role in the calculation and data processing process, which works with very high speed and accuracy [3]. The accuracy and speed of data management for every transaction that occurs in a number of companies that use it is one of the keys to being able to produce accurate and definite information and data [4]. Accuracy will really help companies make the right decisions. Currently, decision support systems are increasingly being used in various aspects. This can be seen from the increasing number of studies on decision support systems, namely decision support systems for the feasibility of granting motorbike credit using the Simple Additive Weighting Method at companies [5]. HD Finance Leasing produces a system that provides alternative assessments of the feasibility of granting motorbike credit [6]. The business was established in Atlanta in 1892 by Asa G. Chandler, who also holds the patent for the Coca-Cola trademark. By supplying the concentrate raw materials, this corporation serves as the parent company for all bottling companies that possess the trademark in all countries worldwide. The firm constructed its syrup facility outside of Atlanta beginning in 1893. The company first gained recognition in Indonesia in 1927 when De Nederland Indische Mineral Water Fabriek bottled it in Batavia [7]. The business was then bought over by Indonesian traders, who renamed it The Indonesian Bottles Ltd. N.V. (IBL), a national firm. The corporation that produces beverage goods and is aided in product distribution and marketing by its staff is the subject of this study. There are two categories of workers in the marketing and distribution department: contract workers and permanent workers. Candidates for permanent employment who have worked for the company for at least 24 months as contract workers are eligible to take the selection exam [8]. HRD (Human Resource Development) and supervisors will serve as assessors. Managers need employee performance progress reports to decide which employees will be appointed as permanent employees. The company has assessment criteria for choosing contract workers to become

permanent employees, but the benchmarks used in the assessment are qualitative or quantitative sentences rather than quantitative in the form of numbers, so the manager receives the assessment report in the form of a qualitative report or sentence, which makes it challenging for the manager. The selection of contract employees to become permanent employees is a laborious procedure that can take up to 12 days, as it involves analyzing the evaluation results in the form of phrases [9].

After analysis of the system development cycle, design is the next step, which includes defining the functional requirements and explaining how a system is created [10]. This can involve planning, organizing, and sketching several distinct components into a single, functional whole or configuring the system's hardware and software components. A collection or group of variables or elements that are interdependent, mutually organized, and interact with one another might be thought of as a system [11]. The input, processing, and output are some of the components that make up the system. A system has four primary characteristics: it is an entity that functions within an environment, is made up of components, exhibits interconnectedness, and has a single primary objective. A collection of components working together toward a common objective is called a system [12]. Resources flow from the output elements, and they are coupled to a control mechanism to guarantee the smooth operation of the process. Information is data that has been transformed into a meaningful format for users, supporting information sources or being helpful in making decisions right now [13]. Information is already valuable, whereas data does not. If the benefits of having the information outweigh the expenses, it is considered useful. According to the definition given above, information is the outcome of a collection of data that has been processed, has meaning for the user or recipient, and can be utilized to inform decisions [14]. An information system is a system that an organization uses to support its everyday transaction processing needs, operations, management, and strategic initiatives, as well as to give required reports to specific external parties [15]. An information system is generally defined as a collection of information subsystems that work together to analyze data and generate information that can be used to make decisions [16].

Resources are assets that create value when embedded in operational systems in a way that enhances a company's ability to handle turbulent environments. In the business world, human resources (HR) refers to the individuals who work for an organization and are frequently referred to as workers [17]. A company's people are its most significant asset as without them, its resources cannot create profits or add value to themselves. Workers represent a vital resource for the business. Workers are the individuals who do the operational tasks of the business; without them, a business could not function [18]. There are two categories of workers that we identify in the workplace: contract workers and permanent workers. Workers classified as permanent are those who consistently get or make a specific amount of money. Those who work for an employer as permanent employees are those who are paid a set amount on a regular basis [19]. This includes members of the supervisory board and board of commissioners who are routinely involved in carrying out business operations [20]. Workers under contract are those who have a restricted working relationship with the company for a predetermined amount of time, as stipulated by a work contract or agreement [21]. Non-permanent employees are individuals who work for an employer and only receive wages when the person works [22].

Permanent employees are those who earn a set amount of money on a regular basis. This includes members of the supervisory board and board of commissioners who actively manage the company's operations on a regular basis, as well as workers hired on a contract basis for a specific duration of time as long as they are employed full-time in that role [23]. Contract workers are workers who only get paid when they produce a certain amount of work, work a certain number of days, or complete a certain sort of work that the employer requests in line with the terms of the agreement [24]. Legally speaking, contract employees are those who hold non-permanent employment status, or, to put it another way, those who work for a specific amount of time only as agreed upon by the employer and the employee [25]. Contract workers are frequently referred to as certain-time work agreement (PKWT) employees in legalese. Employees can be classified as either contract or permanent, meaning they have an ongoing employment contract [26] [27].

Performance is defined as the number and quality of job outputs that an employee completes in order to fulfill his assigned tasks [28] [29]. Supervisors assess whether a worker is performing their job as planned through the performance review process [30]. A methodical analysis of an employee's performance and future potential is called employee assessment. The process of evaluating or ascertaining the worth, characteristics, or standing of any item, person, or thing is known as valuation [31]. The aforementioned perspective states that firm leaders utilize employee job performance assessment as a strategy to systematically analyze employees' work performance based on the tasks assigned to them [32]. Selecting is a collection of choices. The selection process involves choosing from various objects, with only a few being selected [33] [34]. In staffing, selection more specifically takes decisions by limiting the number of employees who can be hired from several potential employees.

## **2. Research Methods**

In this research, data, information, and references are needed as material that can support the description and discussion material. The following methods of gathering data were employed in this study: literature review,

interviews, and observation. The system development approach that the author employed to create this program was called rapid application development, or RAD. The author selected this approach because Rapid Application Development (RAD) is a technique for system development that prioritizes speed of development through significant user involvement in building, rapid iteration, and increasing the number of functional prototypes of a system that eventually evolves into the final system. The author first notes the issues that now exist before formulating a plan to establish objectives and the prerequisites for achieving them. The information required for system design is acquired following the completion of the requirements planning stage. In addition, a Bayes technique design is included for calculating employee performance appraisals. The process of designing a system ends with the implementation stage. At this point, the developed diagrams serve as the basis for the coding procedure. After the coding is complete, the testing process will continue. The application trial was carried out using the black box testing stage, wherein the author used external testing of the application by checking the links one by one using the test table "whether the link is as expected or not."

### **3. Results and Discussion**

In the selection system for contract employees to become permanent employees, the process begins when the manager issues an appointment order to HRD. The next step involves HRD creating a list of employee names and assessment forms. The supervisor then fills out an assessment form for each contract employee, which is then submitted to HRD. The assessment process is carried out by HRD based on the results provided by the supervisor by reviewing the evaluation that has been given. After that, HRD compiles a list of names of contract employee candidates who are recommended to be appointed as permanent employees and submits it to the manager. The manager is responsible for determining the number of contract employees who will be appointed as permanent employees, then providing a report on the selection results to HRD. HRD receives a report from the manager containing a list of names of contract employees who have succeeded in becoming permanent employees. This process describes procedures involving collaboration between managers, supervisors, and HRD in assessing and selecting contract employees who are worthy of permanent employee status, but also shows several stages that might be improved for the efficiency and transparency of the existing selection system. After identification, several crucial problems were revealed. First, the qualitative assessment method using sentences without quantitative values is an obstacle because there is no definite value measure for assessing each criterion. Second, obstacles arise in reviewing the assessment results due to the unavailability of reports that sort the assessment results of contract employees, making determining which contract employees are eligible to become permanent employees difficult. Lastly, the length of the selection process is a significant problem because it takes approximately 14 working days under normal circumstances, maybe even more. This condition shows the need to improve assessment methods, prepare more structured assessment reports, and streamline the selection process to make it more efficient without sacrificing the quality of the resulting decisions.

In order to help make more efficient and measurable decisions regarding the selection of contract employees to become permanent employees, a decision support system needs to be developed. This system will use the Bayes method with six main criteria and a number of sub-criteria as a reference in evaluating contract employees. The main criteria include education, quality of work, quantity of work, responsibility, attitude, and length of work, each with sub-criteria that can provide more detailed dimensions in the assessment. HRD will be responsible for assessing educational criteria and length of service, while supervisors will assess work quality, work quantity, responsibility, and attitude. With this system, it is hoped that data processing and employee evaluation can be carried out automatically, producing reports that provide recommendations for the most suitable contract employees to be appointed as permanent employees. This is expected to speed up the selection process and increase objectivity and accuracy in decision-making regarding improving employee status.

The proposed system for selecting contract employees to become permanent employees is explained as follows: First, the admin is responsible for managing system users by assigning appropriate access rights to each employee. HRD will manage contract employee data with the CRUD (create, read, update, delete) function. Apart from that, HRD will also manage data on criteria and sub-criteria used as standards for evaluating employee performance and assign weight to each of these criteria. Then, HRD and supervisors have the task of providing grades to contract employees who are candidates for permanent employees, with their respective responsibilities for several assessment criteria. After the assessment is carried out, the manager has access to view the calculation results report from the decision support system, which includes the results of the assessment carried out by HRD and supervisors. Managers also have the authority to determine the number of contract employees who will be appointed as permanent employees by sorting the values from largest to smallest. Finally, managers can see a report that presents a list of contract employees who have been successfully selected to become permanent employees based on the results of the selection that has been carried out. With this system, it is hoped that the selection process can be more structured and transparent and support more efficient and objective decision-making in determining contract employees who are worthy of permanent employee status. The design workshop is the second stage of discussing system development methods using the RAD method. In this stage, we will discuss

SPK modeling using the Bayes method and system design using UML modeling, as well as database design and designing how the display will be presented to system users. The stages required in the calculation to determine the priority order of alternatives using the Bayes method.

In the Bayes method, determining the weight for each criterion is an important step that determines the direction of the final calculation. Each criterion has a relative weight that reflects its level of importance in the assessment process. Education, for example, is given a weight of 0.1 because, while it is important, companies focus more on aspects of the quality and quantity of work produced by employees. Work quality is given the greatest weight, namely 0.2, because work quality is the main pillar that influences accuracy, skills, and company and consumer satisfaction. Work quantity received the highest weight, namely 0.3, because of the crucial need to achieve sales targets and meet the demands of work partners and consumers. Responsibility has a significant weight, amounting to 0.1, because its essence is related to the trust of the company, employees, and consumers. Attitude is assessed with a weight of 0.1 because of its importance in creating a comfortable work environment for employees and its relationship with the company's image in the eyes of consumers. Meanwhile, length of service is given a weight of 0.2 because of its role in supporting compliance with government regulations as well as indicating employee loyalty and dedication to the company. It is hoped that by determining the agreed-upon weights, the employee assessment process will become more focused and objective. The value given to each criterion will be adjusted according to its respective weight, resulting in more accurate selection decisions from contract employees to permanent employees that are based on strong data.

Various users, including admin, HRD, supervisor, and manager, carry out a variety of tasks in the system. All users start out by performing the login process. After opening the system, they will be faced with a login menu display. Users are then asked to enter their username and password. If the information entered is incorrect, the system will display an error message. However, if the data entered is correct, they will be directed to the system's main menu according to the access rights each user has. After successfully logging in, the administrator, HRD, supervisor, and manager can perform the activity to change the password. Users who have logged in will select the "change password" menu. They can then make changes to the password data by filling out the change form and pressing the "save" button. Password change data will be stored in the system after the user carries out this interaction. On the other hand, there are tasks that the admin alone carries out to manage user data. After logging in, admins can select the "manage user data" menu. In this menu, admins can view, add, edit, and delete user data. Admin will complete the form to add or edit user data, and if the data is complete, Admin will save the information into the system. If the administrator chooses to delete user data, the system will delete the data. Furthermore, HRD has special activities such as managing employee and position data. After logging in, HRD can select the menu "manage employee data" or "manage position data." In these two menus, HRD can perform similar actions, such as adding, editing, deleting, or viewing data related to employees and positions in the company. The process of filling out forms and validating data is also carried out in this activity, where the data will be saved after the validation process is complete. These activities describe the system's workflow in managing user information, employees, and data related to positions within the company. With these activities, it is hoped that the system can help users manage data effectively and in an organized manner. The activity diagram mentioned shows the steps in the employee management system, which is facilitated by various users, such as HRD, supervisors, and managers. HRD has access to manage criteria and sub-criteria data. In managing criteria data, HRD can view, add, edit, and delete criteria data. The system will check the completeness of the data when saving; if it is incomplete, an error message will be displayed. Then, HRD can also manage sub-criteria data with similar steps.

Next, assessment activities are carried out by HRD and supervisors. In entering scores for selecting contract employees to become permanent employees, HRD, or supervisor, selects the assessment menu, selects a position, and assesses contract employee data according to the position selected. They can enter weight values for selection. The selection process for contract employees is carried out by the manager. After logging in, the manager selects the contract employee selection menu, displays contract employee data with calculation results according to the selected position, and marks employees who pass or fail. Then, the manager can print a report on the selection results. On the other hand, managers also have access to view permanent employee reports. By selecting the permanent employee report menu, the manager can display permanent employee report data according to the selected position and print the report if necessary. Finally, all users, such as administrators, HRD, supervisors, and managers, can log out of the system by selecting the logout menu after finishing using the system, and the system will display the login menu again. This is a series of activities that describe the various steps taken by users in managing, assessing, and monitoring employee status in the company's employee management system. A class diagram is a visualization of a system structure that describes the classes and the relationships between them. The first stage before creating a class diagram is identifying potential objects from the use case diagram. Sequence diagrams describe interactions between objects in a use case, illustrating the messages sent and received as well as the time span for these objects to interact. At the implementation stage, the program was coded using the PHP programming language and utilized a MySQL database to build a decision support system for selecting contract employees to become permanent employees. A manager leads the black box testing method for system testing.

The purpose of this testing is to ensure that the functions, input, and output of the software comply with the specified specifications. This black box testing process involves testing scenarios that cover all software functions to verify conformance with previously outlined specifications.

#### 4. Conclusion

Based on research findings, the decision support system that has been developed proves its ability to effectively support the selection process from contract employees to permanent employees. This system has made it easier to evaluate and understand the results of contract employee assessments. With an approach that adopts a quantitative aspect, the system can produce reports containing numerical values for each criterion and sub-criteria, providing a more detailed view regarding the performance and ranking of contract employees who are candidates for permanent employees. In addition, this system has also proven capable of presenting reports that rank contract employees based on recommendations, providing clearer guidance for decision-makers. Efficiency in understanding data is one of the advantages of this system, which also manages to speed up the overall assessment and calculation process. This allows decisions regarding permanent employee status to be completed in a short time, less than 7 days. This success in reducing the selection process time has helped increase productivity and efficiency in human resource management in the company. Based on the analysis that has been presented, several suggestions can be put forward for future research. One of them is looking into using several techniques to create a decision support system that will help choose which contract workers will become full-time employees. Additional study may concentrate on techniques like the simple additive weighting (SAW), the analytical hierarchy process (AHP), and other decision-support method approaches. Through the process of method comparison with other current approaches, this research can offer a more comprehensive comprehension of the benefits and drawbacks of each approach in the context of employee selection. References from this study may serve as a foundation for further investigations into decision support systems in the human resources domain. By carrying out further exploration, future research can develop better, more effective, and more efficient systems for supporting the employee selection process and human resource management in companies.

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