Jurnal Informasi dan Teknologi

https://jidt.org/jidt

2024 Vol. 6 No. 1 Page: 217-222 e-ISSN: 2714-9730

Application of Simple Additive Weighting Method To Design an Employee Performance Assessment System in a National Logistics Company

Mohammad Kus Yunanto[1]✉, Herty Ramayanti Sinaga[2], Vivid Violin[3], Tengku Kespandiar[4], Prety Diawati[5]

[1]Sekolah Tinggi Ilmu Administrasi (STIA) "AAN" Yogyakarta
[2]Universitas Sains dan Teknologi Komputer
[3]Politeknik Maritim AMI Makassar
[4]Politeknik Negeri Bengkalis
[5]Universitas Logistik dan Bisnis Internasional

mykusyunanto@gmail.com

Abstract

This research aims to discover how an employee performance appraisal system using the website-based SAW method can help managers carry out the employee performance appraisal process. The method used in developing a web-based decision-making system is the prototype method. For data collection, two techniques were used. First, obtain the necessary information through interviews. Second, by collecting performance assessment data previously carried out manually by managers. It can be observed that the system may function effectively by performing its functions as an employee performance assessment utilizing the simple additive weighting calculation technique after creating a prototype decision-making system using the website-based simple additive weighting method. After managers have completed an evaluation, website-based solutions can combine data to make it easier to access, preserve data security, and support decision-making. The results provided yield high accuracy based on the SAW formula. This system uses the SAW calculation method so that employee performance assessments are carried out based on the percentage weight of the criteria that the manager has determined. From the requirements and results of this assessment, SAW can produce a ranking of employees with the best to worst performance. From this ranking, the manager can determine the employee with the best and worst performance, and then managers can make decisions based on that data.

Keywords: Data Security, Prototype, Simple Additive Weighting, Decision-Making System, Performance.

1. Introduction

The logistics industry has entered an era of digitalization, where technology is essential in various aspects of the company. Digitalization allows companies to manage data more efficiently and provide easier access to all employees who need it. With a digital system, employees can access data from anywhere and anytime, increasing productivity and effectiveness in their duties. Not only that, but the use of technology is also essential in human resources (HR) [1]. HR is one of the main factors that determines a company's success. By applying technology in HR management, companies can do various things, such as managing employee data, performance evaluation, employee development, and so on, more efficiently and accurately. This can help companies keep employees motivated and improve their performance [2]. Thus, using technology impacts company operations and is very important in enhancing HR management and creating a more efficient and productive work environment [3].

Standards for assessing employee performance in human resources are significant for every company. This standard includes various criteria used to evaluate employee performance as a whole. For example, employees' ability to think carefully before making decisions, high curiosity about new things, ability to solve problems, adaptability to change, and delays in fulfilling work schedules [4]. The assessment standards also include employees' ability to work collaboratively, focus on personal and professional progress, consider decision-making risks, and be willing to continue learning and developing themselves. This employee performance assessment standard is essential as an evaluation tool and a guide for employees to improve their performance [5]. By having clear standards, employees can understand the company's expectations of them and work to achieve those standards. This can also help companies identify training and development needs and motivate employees to continue improving their performance. Thus, employee performance assessment standards are essential in creating a productive and high-performance work environment [6].

Receipt: 23-06-2023 | Revision: 15-12-2023 | Publish: 27-02-2024 | doi: 10.60083/jidt.v6i1.502

Companies must consider several things when developing a performance appraisal system integrated with technology. First, companies must determine performance assessment criteria that follow the company's goals and values. These criteria include productivity, work quality, initiative, teamwork, etc [7]. Second, companies must design a system that allows managers to provide objective assessments based on measurable and documented data. This system must also have features enabling employees to view and monitor their performance progress. Third, companies must ensure this system is easy to use and accessible to all parties involved in the performance appraisal process, including managers and employees. Fourth, companies need to provide training to managers and employees on using this system so that it can be utilized optimally. By developing a performance appraisal system integrated with technology, it is hoped that companies can increase the efficiency and accuracy of employee performance appraisals and increase employee satisfaction and motivation in achieving company goals [8].

Companies must consider several things when developing a decision-making system for evaluating employee performance using the SAW method. First, companies must determine relevant employee performance assessment criteria aligning with company goals. These criteria must be measurable objectively and can be weighted according to their level of importance [9]. Second, companies need to collect employee performance data based on predetermined criteria. This data can include work results, productivity, attendance, and other relevant performance. Third, companies need to weigh each assessment criterion based on its level of importance. This weighting can involve various related parties, such as assessing managers and employees. Fourth, companies must implement a SAW-based decision-making system by entering employee performance data and criteria weights into the system [10]. Fifth, companies must evaluate the results obtained from this system to ensure that it effectively assesses employee performance and can help the company make the right decisions. By following these steps, it is hoped that companies can increase efficiency and accuracy in evaluating employee performance and improve decisions based on the results of employee evaluations [11].

The weighted ratings for each alternative for each criterion currently used are added up in the simple additive weighting (SAW) decision-making technique [12]. SAW is a good option for a website-based decision support system (DSS) since it can give users quick access to information. As long as they have an internet connection, consumers can readily access information utilizing a website as an implementation platform anytime and anywhere. It is advised to use the web-based SAW technique to develop a decision support system for employee performance assessments [13]. Companies can evaluate employee performance more efficiently with this system based on predetermined criteria. Using the SAW method can also overcome the need for employee assessments based on more than one criterion, a common need in complex decision-making [14] [15]. By implementing this system, companies can increase efficiency and accuracy in employee performance assessment [16] [17] [18]. Apart from that, this system can also help identify the best employees based on predetermined criteria so that they can positively contribute to the company's success [19][20][21].

2. Research Methods

The prototype model method was chosen to develop a web-based decision-making system because of its high flexibility. This model allows companies to adapt assessment criteria to new standards quickly and enable rapid changes to assessment criteria if necessary. In addition, system development using this method requires a relatively small team and shorter development time than the waterfall model. The data collection techniques used in this research were interviews and performance assessment data collection, which managers had previously carried out manually. This data is the basis for adding the criteria needed in the performance assessment system that is being developed. In determining the software development life cycle (SDLC) model, the prototype model is selected based on previous considerations. This model allows developers to create system prototypes that users can quickly test and evaluate. Thus, using a prototype model in developing this system is expected to help companies adapt and develop employee performance appraisal systems more efficiently.

3. Results and Discussion

From the interviews conducted, it was identified that the company does not yet have a computerized decision-making system, and all decisions are still taken manually. The process of recording employee performance is carried out using tools such as Microsoft, where after the data is recorded, it is collected from each employee whose assessment has been recorded. After that, a meeting was held to discuss performance appraisals. Managers recognize that each stage in this process takes a long time. From this identification, it appears that the employee performance assessment process is still carried out conventionally and manually, which can result in less-than-optimal efficiency and accuracy. By implementing a web-based decision-making system using the prototype model method, companies can increase efficiency in recording and processing employee performance data and speed up decision-making. This can help companies optimize employee performance management and improve overall company productivity.

The business process of assessing employee performance in a company begins with HR determining the 400 process, where HR determines the general assessment carried out by managers in their division. Available assessments include company values such as putting the customer first, open-mindedness, and ownership. Next, division managers determine objective vital results (OKR) based on each division's tasks. After OKRs are created, managers control ongoing OKR activities and conduct individual assessments of the results of the OKRs they carry out. The following process is the final assessment, where the data for each assessment is collected and discussed with the leadership to which the employee is assigned. The results of this meeting then produce an individual evaluation. After the individual assessment results are obtained, another meeting is held to determine the ranking of each employee's performance assessment. This process provides a clear picture of how the company assesses employee performance and sets priorities for achieving company goals. This process shows that the company has an excellent systematic way of evaluating employee performance, from general assessment to ranking. This way, the company can ensure that each employee is assessed fairly and according to their contribution.

The solution to the problems raised by the quality assurance manager is to create a decision support system (DSS), which can assist in assessing employee performance. This DSS will use the simple additive weighting method and be implemented via the website. This system will assist managers in integrating performance assessment data that uses weighted criteria in each assessment. The system developed will display the ranking of each employee based on criteria obtained through interviews. The ranking calculation will use the SAW method. Some of the main features needed in this website-based DSS system include login and logout for security and privacy; administrator management, which allows administrators to change, add, and delete administrator data; employee data management, which enables administrators to change, add, and delete employee performance assessment data; criteria management, which will allow users to change the criteria and sub-criteria used in the system; and displaying the final results of employee performance assessments in the form of employee rankings. With this website-based DSS system, it is hoped that managers can more quickly and efficiently assess employee performance. This system will also help increase transparency and objectivity in the performance appraisal.

A use case diagram is used to develop a firm website-based employee performance assessment decision-making system to clarify how the manager conducts the performance evaluation process. The manager, who registers via the admin data page, is the principal player in this system. Managers can monitor performance evaluation results, manage admin data, and manage criteria after registering. According to the activity diagram for the login process, the manager needs to input their username and password to access the main page. The database contains the username and password. The manager will be prompted to input the username and password again if the username and password entered do not match the information in the database. This system makes it easy for managers to manage employee performance assessments because they can easily access employee performance data, manage assessment criteria, and view assessment results directly via the website. With this system, it is hoped that employee performance assessments can be carried out more efficiently and accurately, making it easier for managers to make decisions regarding employee performance management.

Next, in the activity diagram for the admin page, the actor must log in first and select the admin page. After successfully entering the admin page, the manager can manage admin data, such as deleting, adding, and changing admin data. A form must be filled out to add a new admin before the admin registration account can be successfully created. Ensuring that only legitimate and authorized admins can access the admin page is essential to maintain system security. Apart from that, there is an employee data page where managers can manage employee data, such as deleting, adding, and changing employee data. Managers can also make changes and additions to performance assessments based on existing or newly added employees in the employee data list. The assessment data entered by the manager will later be processed using the simple additive weighting method. This method will produce a ranking based on the assessments contained in the employee data page. With this system, it is hoped that managers can manage employee data and performance assessments more efficiently and accurately to increase productivity and overall company performance.

Furthermore, in the activity diagram for the criteria page, the manager can manage criteria such as changing the name, the type of attribute, and the weight of each criterion. After the manager enters the weight, the system will validate it. If the weight exceeds 100, the assessment cannot be carried out, and the system will display an error message. The manager will be asked to change the weights until the total weight does not exceed 100. Apart from that, the manager can also add new criteria or delete existing criteria. Adding new criteria involves filling in information such as criteria name, attribute type, and weight.

Meanwhile, to delete criteria, the manager must select the criteria he wants to delete and confirm the deletion. The manager can modify the sub-criteria information in the activity diagram by using the requirements entered on the criteria page. Managers can also view the assessment scores for each sub-criterion, ranging from one to four for each criterion, on this page. This functionality is intended to allow managers to more efficiently and flexibly modify criteria to meet business demands, improving the efficiency of the employee performance assessment process.

In the employee ranking activity diagram, the manager can see the results of employee performance appraisal calculations using the simple additive weighting method and make changes to the assessments that have been previously inputted. Managers can edit or delete employee assessments and add new evaluations as needed. This feature allows managers to continuously update and manage employee assessments dynamically according to performance developments and company goals. Apart from that, the system also provides a feature to view employee assessment history so that managers can track and analyze changes in employee performance over time. This can help in making better decisions regarding career development and recognition of employee performance. In the activity diagram for logging out, the system also provides the option to save the session or log out permanently. The manager can continue his work later without logging in by holding the session. This feature allows managers to have a better user experience and be more efficient when using the system. With these features, it is hoped that the website-based employee performance assessment decision-making system can provide more significant benefits for companies in managing employee performance and development and increase efficiency and accuracy in the assessment process.

In the class diagram for the employee performance assessment decision-making system, several main classes reflect the data structure and relationships between objects. These main classes help organize information in a structured manner and clarify how data will be collected and used in the system. The Manager class represents the leading actor in the system, with attributes such as username, full name, and password for authentication. This Class also has operations for managing admin data, such as changing, deleting, and adding admins. The employee data class stores employee information, including identification numbers, employee names, and performance evaluation criteria. The operations associated with this Class are changing, deleting, and adding employee data. The criteria Class defines performance assessment criteria with attributes such as number, criteria name, description, information, and total weight. This Class is also related to the sub-criteria class, which defines sub-criteria for each main criterion. The operations associated with this Class are changing criteria and changing sub-criteria descriptions. The employee rating class stores employee ranking results based on predetermined assessment criteria. This Class has the attribute number, employee name, and ranking results generated from the simple additive weighting method. The operation associated with this Class is to print the ranking results in Excel format. With a well-organized class structure, the system can efficiently manage employee performance assessment data and produce accurate ranking results based on predetermined criteria.

Testing is the last step in creating a performance evaluation system that uses the primary additive weighting method. The User Acceptance Test (UAT) was used for testing in this study. The quality assurance manager uses the website-based SAW approach to try out the decision-making system directly during the UAT stage. After the manager has finished testing the system, he is asked to fill out a UAT sheet containing an assessment of the system. The UAT sheet includes testing scenarios, including the manager trying the employee performance appraisal system by accessing the system directly. Ensure the system can run smoothly and fulfil the features required in the employee performance appraisal process. The add admin feature was also tested, not just the change admin feature. UI development to improve the appearance and user experience. By carrying out UAT, it is hoped that you can ensure that the system is ready for use, meets user expectations, and provides input for further development and improvement. This stage is essential to ensure the system can run well according to the company's needs and provide added value in the employee performance appraisal process.

4. Conclusion

The website-based Simple Additive Weighting method was used to develop a decision-making system prototype. The system was designed using Java, PHP, CSS, and HTML for website-based system development. The quality assurance manager conducted user testing by running scenarios, and the results indicated that the system could function properly. Using the SAW computation approach, this system may execute its function as a tool for evaluating employee performance. Based on the SAW formula, the system's results demonstrate high precision. This website-based system can also integrate data well, allowing users to access data more efficiently. Data security is also well maintained in this system. Hopefully, this system can help in decision-making after the manager carries out the performance assessment. Thus, this system is expected to contribute positively to the employee performance management process. This system uses the Simple Additive Weighting calculation method, where employee performance assessments are carried out based on the percentage weight of the criteria determined by the manager. Using SAW, the system can produce employee rankings ranging from those with the best to those with the worst. Managers can quickly assess their team's best and worst-performing employees from these rankings. With this ranking, managers can make better decisions based on the data generated by the system. For example, managers can reward employees with the best performance or provide training and coaching to employees with the worst performance to improve their performance in the future. Thus, this system can help managers manage employee performance more effectively and efficiently.

Based on the research that has been conducted, there are several suggestions for developing a decision support system for employee performance assessment. First, in developing a decision-making system, it is best to use one

decision-making method and combine two or more multiple-attribute decision-making methods, such as AHP. This can increase the accuracy and reliability of the system in assessing employee performance. Second, because the system has only been tested in one quality assurance division, it is best to carry out trials in each existing division to ensure the system's suitability if implemented widely. This will help understand the potential for success and problems that may arise in using the system in various divisions. Finally, before the system is implemented thoroughly, it is recommended to provide training to potential users first. This aims to reduce confusion and increase user understanding of the system to increase the effectiveness of using the system in assessing employee performance.

References

[1] Crockett, W. H, "Employee attitudes and employee performance," *Psychological Bulletin*, vol. 20, pp. 396–424, 2020.

[2] Tannady, H., Andry, J. F., Sudarsono, B. G., & Krishartanto, Y. (2020). Enterprise architecture using Zachman framework at paint manufacturing company. *Technol. Reports Kansai Univ*, *62*(4), 1869-1883.

[3] Sulistiowati, R., Wahyuni, S., Yunanto, M. K., Elsera, M., Yudiatmaja, W. E., & Samnuzulsari, T. (2022, June). Community forestry for environmental sustainability and ecotourism: the context and problems in Indonesia. In *IOP Conference Series: Earth and Environmental Science* (Vol. 1041, No. 1, p. 012037). IOP Publishing.

[4] D. Abdullah, "Designing Library Applications using SDLC: System Development Life Cycle," *lhokseumawe: Sefa Bumi Persada*, vol. 1, pp. 23-45, 2021.

[5] Yunanto, M. K. (2019). Analisis Resolusi yang Tepat terhadap Konflik Kebijakan Penambangan Pasir Besi di Pesisir Selatan Kabupaten Kulon ProGo Provinsi DI Yogyakarta. *PARADIGMA: Jurnal Ilmu Administrasi*, *6*(1), 87-106.

[6] J. F. Yates and S. Oliveira, "Organizational Behavior and Human Decision Processes," *Buana Journal of Computer Science*, vol. 136, pp. 106-118, 2022.

[7] Nurprihatin, F., & Tannady, H. (2018). An integrated transportation models and savings algorithm to minimize distribution costs. In *Proceeding of the 1st Asia Pacific Conference on Research in Industrial and Systems Engineering* (pp. 216-221). Depok: Department of Industrial Engineering Universitas Indonesia.

[8] Tannady, H., & Filbert, K. (2018). Pengendalian Persediaan dengan Menggunakan Metode Economic Oreder Quantity dan Silver Meal Algorithm (Studi Kasus PT SAI). *Jurnal Teknik dan Ilmu Komputer*.

[9] Madyatmadja, E. D., Liliana, L., Andry, J. F., & Tannady, H. (2020). Risk analysis of human resource information systems using COBIT 5. *Journal of Theoretical and Applied Information Technology*, *98*(21), 3357-3367.

[10] Sinaga, H. R. (2018). Pengaruh pelatihan dan pendidikan terhadap kinerja penyuluh pertanian pada BKP5K Kabupaten Bogor. *Jurnal E-Bis*, *2*(2), 64-70.

[11] Tannady, H., Dewi, C. S., & Gilbert. (2024). Exploring Role of Technology Performance Expectancy, Application Effort Expectancy, Perceived Risk and Perceived Cost On Digital Behavioral Intention of GoFood Users. *Jurnal Informasi Dan Teknologi*, *6*(1), 80-85. https://doi.org/10.60083/jidt.v6i1.477

[12] Manzini, and F. Maranesi, "A decision support system for the design and management of warehousing system," *Journal of Computer Science*, vol. 65, pp. 175-186, 2020.

[13] Tannady, H., Sjahruddin, H., Saleh, I., Renwarin, J. M., & Nuryana, A. (2022). Role of Product Innovation and Brand Image Toward Customer Interest and Its Implication on Electronic Products Purchase Decision. *Widyakala Journal*, *9*(2), 93-98.

[14] W. W. Widiyanto, "System development methodology analysis with a comparison of personnel information system software models using waterfall development mode, prototype model, and rapid application development (RAD) model," *Jurnal Penelitian dan Pengabdian Masyarakat*, vol. 4, no. 1, 2020.

[15] Andry, J. F., Tannady, H., & Nurprihatin, F. (2020, March). Eliciting requirements of order fulfilment in a company. In *IOP Conference Series: Materials Science and Engineering* (Vol. 771, No. 1, p. 012023). IOP Publishing.

[16] Solehati, A., Mustafa, F., Hendrayani, E., Setyawati, K., Kusnadi, I. H., Suyoto, Y. T., & Tannady, H. (2022). Analisis Pengaruh Store Atmosphere dan Service Quality Terhadap Brand Preference (Studi Kasus Pelanggan Gerai Ritel Kopi di DKI Jakarta). *Jurnal Kewarganegaraan*, *6*(2), 5146-5147.

[17] Basrah S & Samsul I, "The Influence of Product Quality and Service Quality on Consumer Satisfaction," *Jurnal Riset Manajemen Sains Indonesia (JRMSI)*, vol.3, no.1, 2022.

[18] D. Abdullah, "Perancangan Sistem Informasi Pelayanan Kapal," *J. Ilm. Teknol. Inf. Terap*., 2015.

[19] Hasanun, D. Abdullah, and M. Daud, "Pengembangan Sistem E-Learning Politeknik Negeri Lhokseumawe dengan Model Vark ", *jidt*, vol. 5, no. 4, pp. 222-228, Dec. 2023.

[20] A. Faridhatul Ulva, D. Abdullah, Masriadi, Nurhasanah, N. Alimul Haq, and B. Ulumul Haq, "AROS(AgRO-Smart) : Smart City Pertanian dengan Track and Trace GPS berbasis Mobile", *jidt*, vol. 5, no. 4, pp. 78-91, Nov. 2023.

[21] D. . K. Pramudito, A. . Titin Sumarni, E. . Diah Astuti, B. . Aditi, and Magdalena, "The Influence of User Trust and Experience On User Satisfaction Of E-Commerce Applications During Transactions in Mini Markets Using Delon and McLean Method", *jsisfotek*, vol. 5, no. 4, pp. 1–7, Oct. 2023.