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A Decision Support System for Selecting Outstanding Village Officials Using the Analytical Hierarchy Process (AHP): A Case Study of Pajar Bulan Village

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Abstract

Law Number 06 of 2014 concerning Villages stipulates that the authority to appoint and dismiss village officials is vested in the village head, provided that the process complies with prevailing legal regulations. Consequently, the selection of outstanding village officials must be conducted in a fair, transparent, and accountable manner to avoid subjectivity and bias. This study aims to design and implement a Decision Support System (DSS) for selecting the best village officials at the Pajar Bulan Village Office by applying the Analytical Hierarchy Process (AHP) method. AHP is utilized as a structured multi-criteria decision-making approach that determines priority weights through systematic pairwise comparisons. The proposed system was developed using the PHP programming language with a MySQL database as the data storage platform. The results demonstrate that the system is capable of producing objective and accurate rankings of village officials based on predetermined criteria, thereby enhancing both the efficiency and transparency of the selection process at Pajar Bulan Village.

Keywords

Decision Support System, Village Officials, Analytical Hierarchy Process

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Introduction

Village officials play a strategic role in supporting the village head in carrying out governmental, development, and community service functions at the local level (Sari, 2020). In Indonesia, the administrative position of village officials is legally regulated under Law Number 06 of 2014 concerning Villages, which grants authority to the village head to appoint and dismiss village officials in accordance with applicable procedures. Although this authority is clearly regulated, the practical implementation still requires transparent, objective, and accountable mechanisms to prevent conflicts of interest and subjective decision-making (Kementerian Desa, 2014; Handayani, 2019).

The rapid development of information technology has significantly transformed administrative systems in public and private organizations. Computer-based information systems are now widely applied to improve efficiency, accuracy, and transparency in decision-making processes (Laudon & Laudon, 2018; Turban et al., 2011). Access to accurate and timely information has become a fundamental requirement in modern governance. Furthermore, the implementation of digital systems can reduce human error and increase objectivity in complex multi-criteria decisions (Alter, 2014; O'Brien & Marakas, 2017).

At the Pajar Bulan Village Office, the evaluation and determination of outstanding village officials have traditionally been conducted through deliberation and manual assessments during annual village meetings. Candidate nominations are proposed by the village secretary and finalized by the village head based on general observations of activeness, participation, and community involvement. This conventional approach is vulnerable to bias, subjectivity, and potential unfairness because evaluation indicators are not structured and are heavily dependent on personal judgment (Sari, 2020; Rahmawati & Gunawan, 2017).

Subjective assessment methods often lead to dissatisfaction among village officials whose performance is not measured through standardized criteria. This condition may reduce work motivation and weaken institutional accountability. According to Saefudin and Wahyuningsih (2017), decision-making based solely on intuition without analytical support is highly susceptible to inconsistency and conflict of interest. Therefore, a systematic, measurable, and data-driven approach is needed to ensure fairness and transparency in the selection process of outstanding village officials.

A Decision Support System (DSS) is a computer-based information system designed to support managerial decision-making in semi-structured and unstructured problems (Turban et al., 2011; Alter, 2014). DSS integrates data, models, and user-friendly software to assist decision-makers in selecting the best alternatives based on multiple criteria. One of the most widely applied multi-criteria decision-making methods in DSS is the Analytical Hierarchy Process (AHP), introduced by Thomas L. Saaty. AHP decomposes complex decision problems into a hierarchical structure of goals, criteria, sub-criteria, and alternatives, and evaluates them using pairwise comparisons with consistency testing (Saaty, 2008; Saaty & Vargas, 2012).

Several previous studies have demonstrated the effectiveness of AHP in supporting objective performance evaluation and personnel selection, including government and organizational contexts (Marimin, 2013; Saefudin & Wahyuningsih, 2017; Wibowo, 2020; Setiawan & Pratama, 2019). Therefore, this study proposes the development of a Decision

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Support System based on the AHP method to assist the Pajar Bulan Village Office in selecting outstanding village officials objectively, transparently, and consistently. The system is expected to improve decision accuracy, minimize subjectivity, strengthen accountability, and enhance the overall quality of public service governance at the village level.

Methodology

Data Collection Techniques

Data for this research were obtained using several complementary methods. First, direct observation was carried out at the Pajar Bulan Village Office to identify existing procedures for evaluating village officials. Second, structured interviews were conducted with the village head to gather detailed information about the current decision-making process. Third, a literature review was performed by examining books, academic journals, and credible online sources to strengthen the theoretical foundation related to decision support systems, AHP, and village administration.

System Development Method

The system was developed using the Prototype Method, which allows continuous interaction between developers and users to refine system functionality (Sumarta et al., 2019).

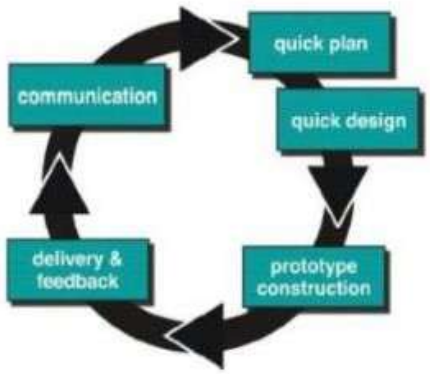

Figure 1: MetodePrototyping
Source: (Sumarta et al., 2019)

This method ensures that user requirements are accurately translated into the final application. The stages of development include:

1. Communication, which involves identifying problems, defining system requirements, and determining assessment criteria in collaboration with stakeholders.
2. Quick Planning, where initial ideas are transformed into a preliminary design outlining system inputs, outputs, and technical requirements.
3. Modeling (Quick Design), which uses Unified Modeling Language (UML) diagrams such as use case diagrams, activity diagrams, and class diagrams, along with interface and database design.

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4. Prototype Construction, in which the system is built using PHP and MySQL, followed by functional testing through black-box testing.
5. Deployment and Feedback, where the system is implemented at the Pajar Bulan Village Office and user feedback is collected for further refinement.

Results

The Decision Support System for Selecting Outstanding Village Officials using AHP was implemented as a web-based application accessible locally at: localhost/perangkatdesaspkahp. Access to the system is restricted to authorized administrators.

Login and Main Interface

The login page serves as the initial security gateway for administrators. Upon successful authentication, users are directed to the home page, which provides access to all system menus and operational features through an organized navigation structure.

Master Data Management

The Master Data menu is used to manage the personal data of village officials who participate as candidates in the selection process. Administrators can add new records, update existing information, or delete outdated data through dedicated input forms and action buttons.

AHP Processing Module

The AHP module consists of two main components. The criteria management page defines the evaluation criteria used in this study, namely attendance, length of service, and education level. Each criterion is assigned a specific weight. The assessment page allows administrators to input qualitative values for each candidate based on predefined categories:

1. Attendance: Poor, Fair, Good, Very Good
2. Length of Service: Less than 1 year, 1–5 years, More than 5 years
3. Education Level: Senior High School (SMA), Bachelor's Degree (S1), Master's Degree (S2), Doctoral Degree (S3).
4.

Report and Visualization

The report menu presents the final ranking results generated from AHP calculations. The ranking visualization page displays a bar chart of cumulative scores for each village official. Among the ten evaluated candidates, Mahbar Efendi achieved the highest score, while Suryadi recorded the lowest score with a value of 3.

System and User Management

The system menu is used to manage administrator accounts and access rights. Users can securely exit the application through the logout menu, which ensures data protection and access control.

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Discussion

The implementation of the AHP-based Decision Support System (DSS) at the Pajar Bulan Village Office has proven effective in producing objective and transparent evaluation results. By applying structured and measurable criteria—namely attendance, length of service, and education level—the system ensures that every candidate is assessed using uniform standards. This structured evaluation framework minimizes ambiguity and allows village decision-makers to rely on quantifiable data rather than subjective impressions alone (Saefudin & Wahyuningsih, 2017).

The application of the Analytical Hierarchy Process (AHP) enables a systematic determination of priority weights through pairwise comparisons among criteria. This weighting process ensures that more influential factors, such as attendance and work experience, receive proportionate importance in determining the final ranking. The consistency ratio (CR) calculation further validates that the judgments made by decision-makers are logically consistent, thereby enhancing the mathematical reliability of the decision-making process.

One of the key advantages observed in this study is the significant reduction of personal bias during the evaluation process. Previously, the selection of outstanding village officials relied heavily on subjective perceptions and informal deliberations. With the introduction of the DSS, all performance assessments are processed through a transparent computational mechanism. This aligns with the fundamental purpose of decision support systems, which is to assist decision-makers in selecting optimal alternatives based on objective and well-defined criteria.

The availability of visual ranking results generated by the system further strengthens accountability and acceptance among stakeholders. Village officials can clearly observe how each criterion contributes to the final ranking, thereby increasing the level of trust in the system. This transparency also helps reduce potential disputes or dissatisfaction, as the evaluation process is based on verifiable data rather than personal judgment.

From an administrative standpoint, the DSS improves efficiency in the selection process. Data processing and evaluation that previously required lengthy discussions can now be completed more quickly and accurately. The system also ensures that historical performance data can be stored and reused for future evaluations, contributing to long-term performance monitoring and documentation.

Overall, the successful implementation of the AHP-based DSS at the Pajar Bulan Village Office demonstrates that information technology can play a strategic role in enhancing governance quality at the village level. By ensuring objectivity, transparency, efficiency, and accountability, the system supports fair decision-making and strengthens institutional credibility. These findings reinforce previous studies that highlight the effectiveness of DSS and AHP in public sector performance evaluation (Saefudin & Wahyuningsih, 2017).

Conclusion and Recommendations

This study successfully designed and implemented a web-based Decision Support System for selecting outstanding village officials using the Analytical Hierarchy Process (AHP) at the Pajar Bulan Village Office. The system applies three main evaluation criteria: attendance, length of service, and education level.

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The developed system effectively improves the objectivity, accuracy, and efficiency of the selection process while promoting transparency and accountability in village governance. The DSS also serves as a reliable tool for supporting managerial decision-making at the village level.

Disclosure Statement

The authors declare no conflict of interest related to this study.

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Biographical Notes

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