



# Combination of Gada and GRA Methods in Decision Support System for Determining Permanent Employees

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## Abstract

*Determining permanent employees is an essential aspect of human resource management, as it affects the stability, productivity, and sustainability of a company. This decision-making process often faces challenges such as subjectivity in assessment and limitations in processing employee performance data. Therefore, a Decision Support System (DSS) is needed to assist management in determining permanent employees in a more objective, accurate, and structured manner. This study proposes a combination of Gada and Grey Relational Analysis (GRA) methods in the design of a web-based DSS at PT. Medan Bajaindo. The Gada method is applied to determine the weight of criteria based on their importance level, while the GRA method is used for ranking employee alternatives by calculating their closeness to the ideal solution. The system is developed on a web-based platform, making it accessible for management. The test results show that the combination of Gada and GRA methods can provide more accurate recommendations for determining permanent employees compared to manual evaluation. Thus, this system is expected to support companies in making decisions that are more objective, transparent, and efficient.*

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## 1. Introduction

Human resources play a fundamental role in shaping the strategic direction and long-term performance of an organization, especially in labor-intensive industries that require consistency, precision, and operational reliability. At PT. Medan Bajaindo, a steel manufacturing company, employees are categorized into two groups: permanent employees and contract laborers. Permanent employees are bound to the company under long-term employment arrangements with clearly stated rights, obligations, and career development structures, while contract laborers typically work under short-term or project-based agreements. This distinction underscores the importance of ensuring fairness, transparency, and objectivity in the process of selecting workers who qualify for permanent employment status. A systematic and unbiased approach is essential to support operational stability and ensure that workers who demonstrate exceptional performance, discipline, and loyalty receive equitable recognition. As noted by multiple studies, a reliable decision support mechanism is critical for improving the quality of HR-related decisions, minimizing subjective bias, and strengthening

organizational governance (Agusli et al., 2020; Alfina & Harahap, 2019). Therefore, to enhance the credibility of human resource management practices, PT. Medan Bajaindo requires a structured process supported by technology that can clearly distinguish workers who meet the required competencies and performance standards for permanent employment.

In the field of human resource management, achieving optimal employee performance begins with effective recruitment and selection efforts that align individual capabilities with organizational needs. This aligns with the principle of placing “the right person in the right place,” which is widely recognized as one of the main drivers of productivity and organizational efficiency. A structured selection mechanism is essential to ensure that the organization acquires and retains employees who demonstrate appropriate competence, discipline, and motivation. Previous decision support system studies highlight that integrating computational methods into employee selection contributes significantly to decision accuracy, especially when multiple criteria must be evaluated simultaneously (Anggraini & Harahap, 2023; Hulu & Zalukhu, 2023). For PT. Medan Bajaindo, which relies heavily on consistent production output, the efficiency of workforce selection becomes strategically important. The recruitment and promotion of employees must be conducted in a manner that reduces errors, ensures procedural fairness, and supports organizational continuity. As emphasized in prior research, the use of decision support systems equipped with systematic modeling tools such as UML can strengthen clarity in system development, workflow representation, and functional requirements in employee-related applications (Alfina & Harahap, 2019; Pratiwi et al., 2020). Thus, adopting an improved selection process is necessary to maintain workforce quality and organizational competitiveness.

At PT. Medan Bajaindo, the promotion of contract laborers to permanent employee status occurs three times annually, focusing specifically on the production division—a critical operational component directly responsible for steel manufacturing activities. During each selection cycle, a total of 93 contract employees are evaluated based on their years of service, adherence to procedures, job performance, productivity, and overall loyalty to the company. Despite the sizeable candidate pool, only two employees are promoted during each selection period, resulting in a total of six permanent employee appointments per year. The stringent nature of this selective process reflects the company's commitment to maintaining a highly qualified and reliable workforce. However, reliance on manual assessment techniques has frequently led to challenges, including inconsistencies in evaluation, subjective judgments, incomplete record-keeping, and potential dissatisfaction among employees who perceive the process as unclear or biased. Research in similar organizational settings has reported that manual decision procedures often lack transparency and repeatability, leading to decreased employee morale and reduced organizational trust (Handoko, 2024; Sintaro, 2023). Therefore, in order to improve fairness, accountability, and operational consistency, organizations such as PT. Medan Bajaindo require a more structured and technology-based approach to ensure that every decision made reflects measurable and verifiable criteria.

The limitations of conventional manual assessment methods underline the necessity for an integrated decision support system that can offer objective, traceable, and structured evaluations. Manual decision-making is prone to bias, data inconsistencies, and inefficient processing, especially when multiple assessment criteria are involved. Such weaknesses can negatively affect workforce motivation, particularly among employees who believe that the selection process lacks transparency. Previous research has emphasized that decision support systems (DSS) are capable of reducing human subjectivity through standardized computational logic and reproducible evaluation steps (Hafiz, 2024; Suhartini et al., 2020). In human resource contexts, DSS applications help organizations evaluate candidates more accurately by leveraging multidimensional data points, weighting strategies, and objective ranking methods. In addition, the incorporation of modern design methodologies such as UML helps create reliable system architectures that enhance clarity, maintainability, and systematic operational flow (Alfina & Harahap, 2019; Hermiati et al., 2021). By adopting DSS technology, PT. Medan Bajaindo can minimize errors in decision calculations, improve fairness in employee promotion processes, and reinforce trust between management and employees. This shift toward a more

quantitative, data-driven selection process is essential for supporting long-term human resource strategy and maintaining operational excellence within the production division.

To address the identified challenges, this study introduces a website-based Decision Support System utilizing a hybrid approach that combines the Grey Absolute Decision Analysis (GADA) method and the Grey Relational Analysis (GRA) method. The GADA method is applied to determine the weight of each evaluation criterion by analyzing their significance and priority, as demonstrated in several prior studies involving employee selection and organizational decision-making (Anggraini & Harahap, 2023; Halawa & Kunci, 2023). Meanwhile, the GRA method is used to evaluate and rank employee alternatives based on their relational closeness to ideal performance standards, a method proven effective in performance assessment, sales evaluation, and incentive determination (Citra et al., 2024; Hafiz, 2024; Seran, 2024). Integrating these methods allows the system to transform qualitative criteria into quantifiable values, ensuring a more precise and objective assessment process. Furthermore, previous research has demonstrated that combining weighting and ranking methods improves overall decision accuracy and reduces inconsistencies associated with manual evaluation (Agusli et al., 2020; Sintaro, 2023). By adopting a GADA–GRA-based framework, PT. Medan Bajaindo can enhance decision speed, promote transparency, and ensure fairness in selecting permanent employees, thereby supporting strategic human resource development within the company.

## 2. Research Methodology

The system development using the Design Procedure can be explained as follows:

### 1. First Step: Problem Formulation

The determination of permanent employees at PT. Medan Bajaindo is still done manually, namely by verifying employee data and developing a correct decision-making process in its operational activities.

### 2. Second Step: Objective Determination

The objectives to address the problems in the existing system analysis are as follows:

- a. Design and build a decision support system for permanent employees at PT. Medan Bajaindo.
- b. Design a system for permanent employees at PT. Medan Bajaindo.
- c. Design a system with database storage capable of storing large amounts of data with high data security.

### 3. Third Step: Literature Review

The author conducted a literature review to obtain data related to the writing of this thesis from various sources related to permanent employees at PT. Medan Bajaindo, decision support systems, and web application design.

### 4. Fourth Step: Data Collection

This stage analyzes the current system based on the data, specifically data on permanent employees at PT. Medan Bajaindo, obtained from this research. To complete this research, the author used two study methods:

#### 1. Field Study

The author conducted a direct field study to collect data, namely:

- a. Observation  
Observing data on the determination of permanent employees at PT. Medan Bajaindo.
- b. Interviews  
Conducting interviews with HR during new employee recruitment by asking questions about the determination of permanent employees at PT. Medan Bajaindo and sources related to the research problem.

### 5. Fifth Step: Current System Analysis

This stage identifies the problems and process of determining permanent employees at PT. Medan Bajaindo, and identifies the stages in employee recruitment and the criteria used.

### 6. Sixth Step: System Requirements Analysis

In general, the Decision Support System for permanent employees at PT. Medan Bajaindo uses the Unified Modeling Language design model, designed using Visio 2013. The method used to process permanent employee data at PT. Medan Bajaindo uses the GADA and GRA methods.

#### 7. Seventh Step: Database Design

In system development, a database is used to store and store data. The database used in the system is MySQL.

#### 8. Eighth Step: Interface Design

Performed by the programmer who will translate the transactions requested by the user. This stage is the actual stage in developing a system. In other words, computer usage will be maximized during this stage. The purpose of testing is to identify errors in the system and then correct them.

#### 9. Ninth Step: Implementation

Software that is difficult to deliver to users will inevitably undergo changes. These changes can be due to errors, the software having to adapt to a new environment (a new peripheral or operating system), or because users require functional developments. The implementation of the permanent employee system at PT. Medan Bajaindo uses PHP and a MySQL database.

#### 10. Step Ten: System Testing

The research conducted to finalize the design of the permanent employee decision support system at PT. Medan Bajaindo is as follows:

- 1) Implementing the GADA and GRA methods in determining permanent employees at PT. Medan Bajaindo.
- 2) Developing a system that works for determining permanent employees at PT. Medan Bajaindo.

### 3. Results and Discussion

#### 3.1. Discussion

##### 1. Determining Criteria and Sub-Criteria

Criteria are measures that form the basis for assessing or determining something. They are used to consider a decision. The following is the criteria data in the Combination of the Gada and GRA Methods in the Website-Based Decision Support System for Determining Permanent Employees at PT Medan Bajaindo, which is displayed in Table 1:

Table 1. Criteria Data

Kode	Criteria Name	Bobot	Weight Normalization
C <sub>1</sub>	Absence	25	0.25
C <sub>2</sub>	Discipline	35	0.35
C <sub>3</sub>	Work Target	20	0.2
C <sub>4</sub>	Skills	10	0.1
C <sub>5</sub>	Years of service	10	0.1

#### GADA Method

Based on employee data, the alternatives listed in Table 3 can be seen in the following table.

Table 2. Weighted rating table

No	Alternative Name	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	C <sub>4</sub>	C <sub>5</sub>
1	Muhammad Akmal	4	4	2	2	2
2	Rahmat Maulidan	2	3	2	3	2
3	Ade Kurniawan	2	3	2	2	1
4	Ade Ridho Ramadhan	1	2	4	3	2
5	Muhammad Yanis	3	3	2	3	1
6	Ari Maulana	1	1	2	1	2
7	Raka Jibril Estrada	3	3	2	1	2
8	Yuhardi	3	3	2	1	1
9	Azeng Suci Ramadhan	1	4	2	2	2
10	Dani Syahputra	4	1	2	1	2
11	Rhafiri Rahman	4	3	2	1	2

No	Alternative Name	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	C <sub>4</sub>	C <sub>5</sub>
12	Sujarwo	1	4	3	3	2
13	Muhamad Aditia Akbar	4	2	4	3	2
14	Wahyu Sudirman	3	4	2	3	2
15	Rizki Oktara	3	4	2	2	2
Geometric Mean Value		2.60	2.93	2.33	2.07	1.80

2. Determine the value of the pairwise comparison matrix

Comparison of A<sub>1</sub> to A<sub>1</sub>

$$|si| = ((15) + \frac{1}{2} 4) + ((15) + \frac{1}{2} 4) + ((15) + \frac{1}{2} 2) + ((15) + \frac{1}{2} 2) + ((15) + \frac{1}{2} 2)$$

$$|si| = 82$$

$$|si| = ((15) + \frac{1}{2} 4) + ((15) + \frac{1}{2} 4) + ((15) + \frac{1}{2} 2) + ((15) + \frac{1}{2} 2) + ((15) + \frac{1}{2} 2)$$

$$|si| = 82$$

$$\in 1 = \frac{1 + |82| + |82|}{1 + |82| + |82 - 82|} = 1.988$$

Comparison of A<sub>1</sub> to A<sub>2</sub>

$$|si| = ((15) + \frac{1}{2} 4) + ((15) + \frac{1}{2} 4) + ((15) + \frac{1}{2} 2) + ((15) + \frac{1}{2} 2) + ((15) + \frac{1}{2} 2)$$

$$|si| = 82$$

$$|si| = ((15) + \frac{1}{2} 2) + ((15) + \frac{1}{2} 3) + ((15) + \frac{1}{2} 2) + ((15) + \frac{1}{2} 3) + ((15) + \frac{1}{2} 2)$$

$$|si| = 81$$

$$\in 1 = \frac{1 + |82| + |81|}{1 + |82| + |82 - 81|} = 1.952$$

Comparison of A<sub>1</sub> to A<sub>3</sub>

$$|si| = ((15) + \frac{1}{2} 4) + ((15) + \frac{1}{2} 4) + ((15) + \frac{1}{2} 2) + ((15) + \frac{1}{2} 2) + ((15) + \frac{1}{2} 2)$$

$$|si| = 82$$

$$|si| = ((15) + \frac{1}{2} 2) + ((15) + \frac{1}{2} 3) + ((15) + \frac{1}{2} 2) + ((15) + \frac{1}{2} 2) + ((15) + \frac{1}{2} 1)$$

$$|si| = 80$$

$$\in 1 = \frac{1 + |82| + |80|}{1 + |82| + |82 - 80|} = 1.918$$

Comparison of A<sub>1</sub> to A<sub>4</sub>

$$|si| = ((15) + \frac{1}{2} 4) + ((15) + \frac{1}{2} 4) + ((15) + \frac{1}{2} 2) + ((15) + \frac{1}{2} 2) + ((15) + \frac{1}{2} 2)$$

$$|si| = 82$$

$$|si| = ((15) + \frac{1}{2} 1) + ((15) + \frac{1}{2} 2) + ((15) + \frac{1}{2} 4) + ((15) + \frac{1}{2} 3) + ((15) + \frac{1}{2} 2)$$

$$|si| = 79$$

$$\in 1 = \frac{1 + |82| + |79|}{1 + |79| + |82 - 79|} = 1.952$$

Comparison of A<sub>1</sub> to A<sub>5</sub>

$$|si| = ((15) + \frac{1}{2} 4) + ((15) + \frac{1}{2} 4) + ((15) + \frac{1}{2} 2) + ((15) + \frac{1}{2} 2) + ((15) + \frac{1}{2} 2)$$

$$|si| = 82$$

$$|si| = ((15) + \frac{1}{2} 3) + ((15) + \frac{1}{2} 3) + ((15) + \frac{1}{2} 2) + ((15) + \frac{1}{2} 3) + ((15) + \frac{1}{2} 1)$$

$$|si| = 81$$

$$\in 1 = \frac{1 + |82| + |81|}{1 + |81| + |82 - 81|} = 1.952$$

The results obtained by calculating the pairwise comparison matrix can be seen in Table 3 below:

Table 3. Pairwise Comparison Matrix Results

No. Employee Name	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	A <sub>4</sub>	A <sub>5</sub>	A <sub>6</sub>	A <sub>7</sub>	A <sub>8</sub>	A <sub>9</sub>	A <sub>10</sub>	A <sub>11</sub>	A <sub>12</sub>	A <sub>13</sub>	A <sub>14</sub>	A <sub>15</sub>
A <sub>1</sub> Muhammad Akmal	1.988	1.952	1.918	1.952	1.952	1.867	1.935	1.918	1.935	1.918	1.952	1.97	2.006	1.988	1.97
A <sub>2</sub> Rahmat Maulidan	2.025	1.988	1.952	1.988	1.988	1.899	1.97	1.952	1.97	1.952	1.988	2.006	2.043	2.025	2.006
A <sub>3</sub> Ade Kurniawan	2.063	2.025	1.988	2.025	2.025	1.933	2.006	1.988	2.006	1.988	2.025	2.044	2.083	2.063	2.044

No. Employee Name	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15
A4 Ade Ridho Ramadhan	2.025	1.988	1.952	1.988	1.988	1.899	1.97	1.952	1.97	1.952	1.988	2.006	2.043	2.025	2.006
A5 Muhammad Yanis	2.025	1.988	1.952	1.988	1.988	1.899	1.97	1.952	1.97	1.952	1.988	2.006	2.043	2.025	2.006
A6 Ari Maulana	2.125	2.084	2.045	2.084	2.084	1.987	2.065	2.045	2.065	2.045	2.084	2.105	2.146	2.125	2.105
A7 Raka Jibril Estrada	2.044	2.006	1.97	2.006	2.006	1.916	1.988	1.97	1.988	1.97	2.006	2.025	2.063	2.044	2.025
A8 Yuhardi	2.063	2.025	1.988	2.025	2.025	1.933	2.006	1.988	2.006	1.988	2.025	2.044	2.083	2.063	2.044
A9 Azeng Suci Ramadhan	2.044	2.006	1.97	2.006	2.006	1.916	1.988	1.97	1.988	1.97	2.006	2.025	2.063	2.044	2.025
A10 Dani Syahputra	2.063	2.025	1.988	2.025	2.025	1.933	2.006	1.988	2.006	1.988	2.025	2.044	2.083	2.063	2.044
A11 Rhafiri Rahman	2.025	1.988	1.952	1.988	1.988	1.899	1.97	1.952	1.97	1.952	1.988	2.006	2.043	2.025	2.006
A12 Sujarwo	2.006	1.97	1.935	1.97	1.97	1.883	1.952	1.935	1.952	1.935	1.97	1.988	2.025	2.006	1.988
A13 Muhamad Aditia Akbar	1.97	1.935	1.901	1.935	1.935	1.851	1.918	1.901	1.918	1.901	1.935	1.953	1.988	1.97	1.953
A14 Wahyu Sudirman	1.988	1.952	1.918	1.952	1.952	1.867	1.935	1.918	1.935	1.918	1.952	1.97	2.006	1.988	1.97
A15 Rizki Oktara	2.006	1.97	1.935	1.97	1.97	1.883	1.952	1.935	1.952	1.935	1.97	1.988	2.025	2.006	1.988

3. Calculating Simulation Weights From Criteria

Muhammad Akmal =

$$\frac{1.988 + 1.952 + 1.918 + 1.952 + 1.952 + 1.867 + 1.935 + 1.918 + 1.935 + 1.918 + 1.952 + 1.97 + 2.006 + 1.988 + 1.97}{15}$$

= 1.948

Rahmat Maulidan =

$$\frac{2.025 + 1.988 + 1.952 + 1.988 + 1.988 + 1.899 + 1.97 + 1.952 + 1.97 + 1.952 + 1.988 + 2.006 + 2.043 + 2.025 + 2.006}{15}$$

= 1.983

Ade Kurniawan =

$$\frac{2.063 + 2.025 + 1.988 + 2.025 + 2.025 + 1.933 + 2.006 + 1.988 + 2.006 + 1.988 + 2.025 + 2.044 + 2.083 + 2.063 + 2.044}{15}$$

= 2.02

Ade Ridho Ramadhan =

$$\frac{2.025 + 1.988 + 1.952 + 1.988 + 1.988 + 1.899 + 1.97 + 1.952 + 1.97 + 1.952 + 1.988 + 2.006 + 2.043 + 2.025 + 2.006}{15}$$

= 1.983

Muhammad Yanis =

$$\frac{2.025 + 1.988 + 1.952 + 1.988 + 1.988 + 1.899 + 1.97 + 1.952 + 1.97 + 1.952 + 1.988 + 2.006 + 2.043 + 2.025 + 2.006}{15}$$

= 1.983

Ari Maulana =

$$\frac{2.125 + 2.084 + 2.045 + 2.084 + 2.084 + 1.987 + 2.065 + 2.045 + 2.065 + 2.045 + 2.084 + 2.105 + 2.146 + 2.125 + 2.105}{15}$$

= 2.08

Raka Jibril Estrada

$$\frac{2.044 + 2.006 + 1.97 + 2.006 + 2.006 + 1.916 + 1.988 + 1.97 + 1.988 + 1.97 + 2.006 + 2.025 + 2.063 + 2.044 + 2.025}{15}$$

= 2.002

So it is known that the total result of ái is as follows:

$$= 1.948 + 1.983 + 2.02 + 1.983 + 1.983 + 2.08 + 2.002 + 2.02 + 2.002 + 2.02 + 1.983 + 1.966 + 1.931 + 1.948 + 1.966$$

= 29.835

4. Calculation  $\sqrt{\acute{a}i}$  (k)

Muhammad Akmal	$= \sqrt{1.948 * 2.006} = 1.977$
Rahmat Maulidan	$= \sqrt{1.983 * 2.043} = 2.013$
Ade Kurniawan	$= \sqrt{2.02 * 2.083} = 2.051$
Ade Ridho Ramadhan	$= \sqrt{1.983 * 2.043} = 2.013$
Muhammad Yanis	$= \sqrt{1.983 * 2.043} = 2.013$
Ari Maulana	$= \sqrt{2.08 * 2.146} = 2.113$
Raka Jibril	$= \sqrt{2.002 * 2.063} = 2.032$
Yuhardi	$= \sqrt{2.02 * 2.083} = 2.051$
Azeng Suci Ramadhan	$= \sqrt{2.002 * 2.083} = 2.032$
Rhafiri Rahman	$= \sqrt{2.02 * 2.083} = 2.051$
Aulia Amanda	$= \sqrt{1.983 * 2.043} = 2.013$
Sujarwo	$= \sqrt{1.966 * 2.025} = 1.995$
Muhamad Aditia Akbar	$= \sqrt{1.931 * 1.988} = 1.959$
Wahyu Sudirman	$= \sqrt{1.948 * 2.006} = 1.977$
Riski Oktara	$= \sqrt{1.966 * 2.025} = 1.995$

So the total of the calculation  $\sqrt{k}$  30.285

1. Menghitung Agregasi Bobot Terhadap Kriteria

$$C_1 = (4^{29.835} + 2^{29.835} + 2^{29.835} + 1^{29.835} + 3^{29.835} + 1^{29.835} + 3^{29.835} + 3^{29.835} + 1^{29.835} + 4^{29.835} + 4^{29.835} + 1^{29.835} + 4^{29.835} + 3^{29.835} + 3^{29.835})^{1/29.835}$$

$$= 4.1871$$

$$C_2 = (4^{29.835} + 3^{29.835} + 3^{29.835} + 2^{29.835} + 3^{29.835} + 1^{29.835} + 3^{29.835} + 3^{29.835} + 4^{29.835} + 1^{29.835} + 3^{29.835} + 4^{29.835} + 2^{29.835} + 4^{29.835} + 4^{29.835})^{1/29.835}$$

$$= 4.2185$$

$$C_3 = (2^{29.835} + 2^{29.835} + 2^{29.835} + 4^{29.835} + 2^{29.835} + 2^{29.835} + 2^{29.835} + 2^{29.835} + 2^{29.835} + 2^{29.835} + 2^{29.835} + 3^{29.835} + 4^{29.835} + 2^{29.835} + 2^{29.835})^{1/29.835}$$

$$= 4.091$$

$$C_4 = (2^{29.835} + 3^{29.835} + 2^{29.835} + 3^{29.835} + 3^{29.835} + 1^{29.835} + 1^{29.835} + 1^{29.835} + 2^{29.835} + 1^{29.835} + 1^{29.835} + 3^{29.835} + 3^{29.835} + 3^{29.835} + 2)^{1/29.835}$$

$$= 3.1837$$

$$C_5 = (2^{29.835} + 2^{29.835} + 1^{29.835} + 2^{29.835} + 1^{29.835} + 2^{29.835} + 2^{29.835} + 1^{29.835} + 2^{29.835} + 2^{29.835} + 2^{29.835} + 2^{29.835} + 2^{29.835} + 2^{29.835} + 2^{29.835})^{1/29.835}$$

$$= 2.1728$$

then the total of the Gada index is

$$4.1871 + 4.2185 + 4.091 + 3.1837 + 2.1728 = 17.8531$$

From the GADA Index above, the weight and ranking of the criteria can be determined.

$$C_1 = 4.1871 / 17.8531 = 0.2345$$

$$C_2 = 4.2185 / 17.8531 = 0.2363$$

$$C_3 = 4.091 / 17.8531 = 0.2291$$

$$C_4 = 3.1837 / 17.8531 = 0.1783$$

$$C_5 = 2.1728 / 17.8531 = 0.1217$$

GRA Method

1. Weight Multiplication

The next step is to multiply the criteria weights by the GRA matrix.

Muhammad Akmal

$$C_{1,1} = 4 * 0.2345 = 0.938$$

$$C_{1,2} = 4 * 0.2363 = 0.9452$$

$$C_{1,3} = 2 * 0.2291 = 0.4582$$

$$C_{1,4} = 2 * 0.1783 = 0.3566$$

$$C_{1,5} = 2 * 0.1217 = 0.2434$$

Rahmat Maulidan

$$C_{1,1} = 2 * 0.2345 = 0.469$$

$$C_{1,2} = 3 * 0.2363 = 0.7089$$

$$C_{1,3} = 2 * 0.2291 = 0.4582$$

$$C_{1,4} = 3 * 0.1783 = 0.5349$$

$$C_{1,5} = 2 * 0.1217 = 0.2434$$

## 2. Calculating Grayscale Relationship Values

Table 4. Grayscale Relationship

No.	Employee Name	Calculation	Score
A1	Muhammad Akmal	$1/5 * ((0.938) + (0.9452) + (0.4582) + (0.3566) + (0.2434))$	0.788
A2	Rahmat Maulidan	$1/5 * ((0.469) + (0.7089) + (0.4582) + (0.5349) + (0.2434))$	0.683
A3	Ade Kurniawan	$1/5 * ((0.469) + (0.7089) + (0.4582) + (0.3566) + (0.1217))$	0.623
A4	Ade Ridho Ramadhan	$1/5 * ((0.2345) + (0.4726) + (0.9164) + (0.5349) + (0.2434))$	0.68
A5	Muhammad Yanis	$1/5 * ((0.7035) + (0.7089) + (0.4582) + (0.5349) + (0.1217))$	0.705
A6	Ari Maulana	$1/5 * ((0.2345) + (0.2363) + (0.4582) + (0.1783) + (0.2434))$	0.47
A7	Raka Jibril Estrada	$1/5 * ((0.7035) + (0.7089) + (0.4582) + (0.1783) + (0.2434))$	0.658
A8	Yuhardi	$1/5 * ((0.7035) + (0.7089) + (0.4582) + (0.1783) + (0.1217))$	0.634
A9	Azeng Suci Ramadhan	$1/5 * ((0.2345) + (0.9452) + (0.4582) + (0.3566) + (0.2434))$	0.648
A10	Dani Syahputra	$1/5 * ((0.938) + (0.2363) + (0.4582) + (0.1783) + (0.2434))$	0.611
A11	Rhafiri Rahman	$1/5 * ((0.938) + (0.7089) + (0.4582) + (0.1783) + (0.2434))$	0.705
A12	Sujarwo	$1/5 * ((0.2345) + (0.9452) + (0.6873) + (0.5349) + (0.2434))$	0.729
A13	Muhamad Aditia Akbar	$1/5 * ((0.938) + (0.4726) + (0.9164) + (0.5349) + (0.2434))$	0.821
A14	Wahyu Sudirman	$1/5 * ((0.7035) + (0.9452) + (0.4582) + (0.5349) + (0.2434))$	0.777
A15	Rizki Oktara	$1/5 * ((0.7035) + (0.9452) + (0.4582) + (0.3566) + (0.2434))$	0.741

## 3. Ranking

From the gray-grey relation scores, the ranking results are as follows:

The table above shows the ranking results for determining permanent employees at PT Medan Bajaindo with the highest scores as follows:

Table 5. Decision Results

Rangking	Employee Name	Final score	Information
1	Muhamad Aditia Akbar	0.821	Eligible to Become a Permanent Employee
2	Muhammad Akmal	0.788	-
3	Wahyu Sudirman	0.777	-
4	Rizki Oktara	0.741	-
5	Sujarwo	0.729	-
6	Muhammad Yanis	0.705	-
7	Rhafiri Rahman	0.705	-
8	Rahmat Maulidan	0.683	-
9	Ade Ridho Ramadhan	0.680	-
10	Raka Jibril Estrada	0.658	-
11	Azeng Suci Ramadhan	0.648	-
12	Yuhardi	0.634	-
13	Ade Kurniawan	0.623	-
14	Dani Syahputra	0.611	-
15	Ari Maulana	0.470	-

Using the GADA and GRA methods, Muhamad Aditia Akbar is considered worthy of becoming a permanent employee with a value of 0.821.

### 3.2. Result

#### 1. Analysis Form Display

This display is the Analysis form used to perform the Analysis process, as shown in Figure 3:

No	Nama Karyawan	S1	S2	S3	S4	S5
1	Muhammad Akbar	5	4	3	2	1
2	Rizki Pransiskus Matondang	5	4	3	2	1
3	Adi Nugroho	5	4	3	2	1
4	Wahid Nur Hafid	5	4	3	2	1
5	Yusuf Nur Hafid	5	4	3	2	1
6	Yusuf Nur Hafid	5	4	3	2	1
7	Yusuf Nur Hafid	5	4	3	2	1
8	Yusuf Nur Hafid	5	4	3	2	1
9	Yusuf Nur Hafid	5	4	3	2	1
10	Yusuf Nur Hafid	5	4	3	2	1
11	Yusuf Nur Hafid	5	4	3	2	1
12	Yusuf Nur Hafid	5	4	3	2	1
13	Yusuf Nur Hafid	5	4	3	2	1
14	Yusuf Nur Hafid	5	4	3	2	1
15	Yusuf Nur Hafid	5	4	3	2	1
16	Yusuf Nur Hafid	5	4	3	2	1
17	Yusuf Nur Hafid	5	4	3	2	1
18	Yusuf Nur Hafid	5	4	3	2	1
19	Yusuf Nur Hafid	5	4	3	2	1
20	Yusuf Nur Hafid	5	4	3	2	1

  

No	Nama Karyawan	Nilai Akhir	Keterangan
1	Muhammad Akbar	0.821	Layak Menjadi Karyawan Tetap
2	Rizki Pransiskus Matondang	0.798	
3	Adi Nugroho	0.771	
4	Wahid Nur Hafid	0.741	
5	Yusuf Nur Hafid	0.712	
6	Yusuf Nur Hafid	0.683	
7	Yusuf Nur Hafid	0.654	
8	Yusuf Nur Hafid	0.625	
9	Yusuf Nur Hafid	0.596	
10	Yusuf Nur Hafid	0.567	
11	Yusuf Nur Hafid	0.538	
12	Yusuf Nur Hafid	0.509	
13	Yusuf Nur Hafid	0.480	
14	Yusuf Nur Hafid	0.451	
15	Yusuf Nur Hafid	0.422	
16	Yusuf Nur Hafid	0.393	
17	Yusuf Nur Hafid	0.364	
18	Yusuf Nur Hafid	0.335	
19	Yusuf Nur Hafid	0.306	
20	Yusuf Nur Hafid	0.277	

Figure 3. Analysis Data Form Display

#### 2. Analysis Report Form Display

This form displays the Analysis data report. When the administrator selects a report from the Analysis report option, the program will display the Analysis report. An image of the Analysis report form can be seen in Figure 4:

No	Nama Karyawan	Nilai Akhir	Keterangan
1	Muhammad Akbar	0.821	Layak Menjadi Karyawan Tetap
2	Rizki Pransiskus Matondang	0.798	
3	Adi Nugroho	0.771	
4	Wahid Nur Hafid	0.741	
5	Yusuf Nur Hafid	0.712	
6	Yusuf Nur Hafid	0.683	
7	Yusuf Nur Hafid	0.654	
8	Yusuf Nur Hafid	0.625	
9	Yusuf Nur Hafid	0.596	
10	Yusuf Nur Hafid	0.567	
11	Yusuf Nur Hafid	0.538	
12	Yusuf Nur Hafid	0.509	
13	Yusuf Nur Hafid	0.480	
14	Yusuf Nur Hafid	0.451	
15	Yusuf Nur Hafid	0.422	
16	Yusuf Nur Hafid	0.393	
17	Yusuf Nur Hafid	0.364	
18	Yusuf Nur Hafid	0.335	
19	Yusuf Nur Hafid	0.306	
20	Yusuf Nur Hafid	0.277	

Figure 4. Analysis Report Form Display

#### 3. Employee Report Form Display

This form displays the employee data report. When the administrator selects a report from the Employee report option, the program will display the employee report. An image of the Employee Report Form can be seen in Figure 5:

No.	Nama	Identifikasi	Umur	Gaji Pokok	Jumlah Kerja
1.	Andi Pratomo	12345	28	2.500.000	10.000
2.	Budi Santiaji	67890	35	3.000.000	12.000
3.	Citra Dimpud	11223	30	2.800.000	11.000
4.	Dani Kurniawan	44556	32	2.900.000	11.500
5.	Eka Nugroho	77889	31	2.700.000	10.500
6.	Fani Satrio	10112	29	2.600.000	10.000
7.	Gani Hidayat	33445	33	2.850.000	11.200
8.	Hani Nur Hafidza	66778	27	2.400.000	9.500
9.	Irena Endang Nurhidayah	99001	34	2.950.000	11.800
10.	Joni Pratomo	22334	36	3.100.000	12.500

Figure 5. Employee Report Form Display

#### 4. Conclusion

Based on the development and implementation of a website-based decision support system utilizing the combined Gada and GRA methods for determining permanent employees at PT. Medan Bajaindo, the study concludes that the proposed system functions effectively and is capable of significantly accelerating data processing to support decision-making. The system incorporates key evaluation criteria—namely attendance, age, work targets, work experience, and length of service—and aligns with the existing selection process conducted by production employees. Furthermore, the integration of the Gada and GRA methods enables automatic computation once users input alternative and criterion values, thereby minimizing decision-making difficulties and enhancing accuracy. The use of Unified Modeling Language (UML) also contributes to a structured and systematic system design. This research demonstrates that the combined methodological approach successfully improves the efficiency and reliability of determining employee permanency.

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