Jurnal Informasi dan Teknologi

https://jidt.org/jidt

2024 Vol. 6 No. 2 Hal: 172-181 e-ISSN: 2714-9730

Analysis of the Additive Ratio Assessment Method in the Selection of the Best Production Head

Akbar Idaman[1], Amrullah[2]✉, Vicky Rolanda[3]

[1,3]Department of Informatics, Universitas Satya Terra Bhinneka, Medan, Indonesia
[2]Department of Information Systems, Universitas Muhammadiyah Sumatera Utara, Medan, Indonesia

amrullah@umsu.ac.id

Abstract

The selection of the Head of Production is crucial for ensuring the operational and strategic success of a company. This study employs the Additive Ratio Assessment (ARAS) method to provide an objective and structured approach to evaluating candidates for this key position. The ARAS method integrates various criteria, both qualitative and quantitative, to facilitate a comprehensive assessment. The research identifies relevant criteria, applies the ARAS method to evaluate candidates, and assesses the effectiveness and efficiency of this method in decision-making. The final results indicate that Head of Production 3 achieved the highest rank with a score of 0.104, demonstrating the best qualifications and capabilities for the position. Consequently, Head of Production 3 is deemed the most suitable candidate, expected to enhance the company's operational performance and success. This study contributes to the literature on the application of the ARAS method in employee selection and provides practical guidelines for companies to improve their selection processes.

Keywords: Head of Production, Decision-Making, Additive Ratio Assessment, Accuracy Analysis

1. Introduction

Selecting the right Head Of Production is a crucial factor in ensuring the operational and strategic success of a company. This position carries significant responsibilities in managing production processes, ensuring efficiency, quality, and operational sustainability, as well as implementing continuous improvements and innovations. Therefore, the selection process for this position must be conducted carefully and based on structured and objective methods. However, in practice, the selection of a Head Of Production often faces various challenges, such as the complexity of criteria that need to be considered, ranging from work experience, technical skills, managerial capabilities, to leadership abilities. Additionally, decision-making based on intuition or subjective judgment can lead to bias and reduce objectivity, while gathering and analyzing relevant data from different candidates requires significant time and resources.

One method that can be used to address these challenges is the Additive Ratio Assessment (ARAS). ARAS is a technique in Multi-Criteria Decision Making (MCDM) used to evaluate and select the best alternatives based on multiple criteria [1 - 7] This method has several advantages, such as objectivity and transparency, as ARAS allows for more objective and transparent evaluations using clear mathematical calculations. Additionally, this method can integrate various criteria, both qualitative and quantitative, into a single evaluation model and is relatively easy to implement and interpret compared to some other MCDM methods.

This research aims to analyze the use of the Additive Ratio Assessment (ARAS) method in selecting the best Head Of Production. The specific objectives of this research include identifying the most relevant and important criteria in selecting a Head Of Production, applying the ARAS method in the selection process to evaluate and compare the existing candidates, and assessing the effectiveness and efficiency of the ARAS method in providing more objective and reliable decision recommendations. This research is expected to contribute in several aspects: adding to the literature on the application of the ARAS method in the context of employee selection, particularly for strategic positions such as Head Of Production, providing practical guidelines for companies in implementing the ARAS method to improve the quality of the selection and decision-making process, and assisting company management in making better and more accurate decisions in selecting the best candidate for the Head Of Production position, thereby enhancing operational performance and success.

Thus, this research will provide in-depth and practical insights into the application of the ARAS method in the context of selecting a Head Of Production and demonstrate how this method can be used to address the challenges present in the selection process.

Receipt: 30-11-2023 | Revision: 20-06-2024 | Publish: 28-06-2024 | doi: 10.60083/jidt.v6i2.546

2. Research Methods

2.1 Research Stages

Because this research uses the concept of an experimental approach. Figure 1 below explains how to conduct this research. The first thing that is done starts from the data collection stage, problem analysis, problem formulation, Additive Ratio Assessment (ARAS) algorithm calculation method with the results of the analysis which then results in a conclusion in the Selection of the Best Head Of Production.

Below can be seen in Figure 1 the stages in the research are as follows:

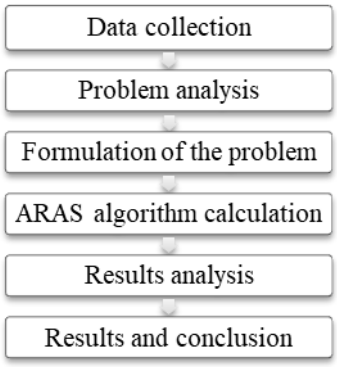

Figure 1. Research Stages

2.2 Additive Ratio Assessment Method (ARAS)

According to Stanujkic and Jovanovic, the ARAS method was developed by Zavadskas and Turskis in 2010 [8 - 14]. The ARAS method is a method of making multicriteria decisions based on the concept of ranking and feasibility using utility degree, which compares the overall index value of each alternative to the overall index value of the optimal alternative.

Additive Ratio Assessment (ARAS) is a method used for ranking or feasibility. In ranking, the ARAS Method has 5 stages that must be carried out as can be seen below [15 - 20]:

1. Forming in the decision matrix

$$X = \begin{pmatrix} X_{0i} & X_{0j} & \cdots & X_{0n} \\ X_{i1} & X_{ij} & \cdots & X_{in} \\ \vdots & \vdots & \ddots & \vdots \\ X_{ni} & X_{mj} & \cdots & X_{mn} \end{pmatrix} \quad i = 0, m; \quad j = 1, n$$

Where :

m = number of alternatives

n = number of criteria

X_{ij} = performance value of alternative i against criterion j

X_{0j} = the optimum value of criterion j

$X_{oj} = Max \frac{Min}{i} = X_{ij} \,.if \frac{Max}{i} = X_{ij}$ better or

$X_{oj} = Max \frac{Min}{i} = X_{ij} \,.if \frac{Min}{i} = X_{ij}$ Better

2. Matrix normalization in the ARAS method

If the proposed criteria has a maximum value then the normalization is:

$X_{ij} *= \frac{X_{ij}}{\sum_{i=0}^{m} X_{ij}}$ Where: $Xij*$ is the normalized value

If the proposed criteria has a minimum value, then the normalization process has 2 stages, namely:

$x_{ij} = \frac{1}{X * ij}$; $\bar{x_{ij}} = \frac{X_{ij}}{\sum_{i=0}^{m} X_{ij}}$

3. Determining the weight of the normalization matrix

D = [dij]m x n = rij.wj ➔ Where: wj = criteria weights

4. Determining the optimum function value

$S_i = \sum_{j=1}^{n}$ dij ; (i = 1,2,.... m : j = 1,2,.....,n)

5. Determine the eligibility level

$$K_i = \frac{S_i}{S_o}$$

Where Si and So are the optimality criterion values
Description:
Ki = alternative ranking level value
Si = optimum value for alternative i

$S0$ = optimum value for the optimal alternative

3. Results and Discussion

3.1 Application of the ARAS Method

In determining the best Head of Production Selection using the ARAS method, the stages in completing the calculation are required as follows:

1. Determine assessment criteria
2. Forming in the decision matrix
3. Normalize the matrix in the ARAS method
4. Determining the weight of the normalization matrix
5. Determining the optimum function value
6. Determine the level of eligibility

3.1.1 Framework

Framework is a basic conceptual structure used to solve or handle a complex problem. This term is often used, among others, in the field of reusable software, as well as in the field of management to describe a concept that allows handling various types or business entities homogeneously, this framework is a step that will be taken in solving the problem to be discussed.
The research framework can be depicted in the following figure:

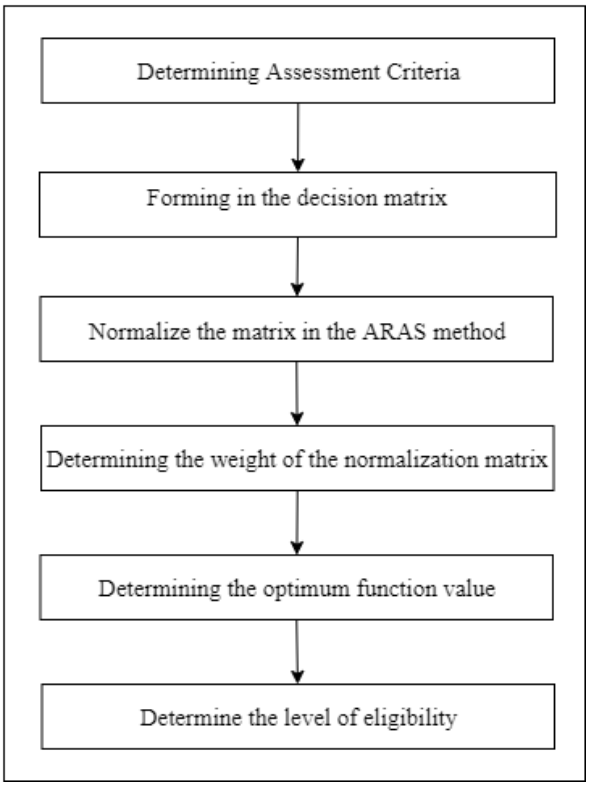

Figure 2 ARAS Method Framework

3.1.2 Determining Assessment Criteria

Some of the factors to be assessed are as shown in the table below:

Table 1 Criteria Weight Table

No	Criteria	Description	Type	Weight (%)
1	C1	Discipline	Benefit	0,35
2	C2	Responsibility	Benefit	0,15
3	C3	Communication	Benefit	0,10
4	C4	Target Achievement	Benefit	0,40

3.1.3 Problem solving with ARAS method

In the discussion of this ARAS calculation, 10 samples will be taken from alternatives that have 4 criteria. ARAS calculation in the system if calculated manually, we can see the solution as follows:
Case Data There are 10 Head Of Production that will be selected as the best Head Of Production, the data is as follows:

Table 2 Alternative Data

Code	Name	Criteria			
		C1	C2	C3	C4
A01	Head Of Production 1	Discipline	Very good	Good	Highly Achieved
A02	Head Of Production 2	Very Disciplined	Good	Good	Achieved
A03	Head Of Production 3	Very Disciplined	Very good	Good	Highly Achieved
A04	Head Of Production 4	Very Disciplined	Very good	Good	Achieved
A05	Head Of Production 5	Discipline	Good	Very good	Achieved
A06	Head Of Production 6	Discipline	Good	Very good	Highly Achieved
A07	Head Of Production 7	Discipline	Very good	Simply	Simply
A08	Head Of Production 8	Simply	Simply	Simply	Achieved
A09	Head Of Production 9	Very Disciplined	Simply	Simply	Achieved
A10	Head Of Production 10	Very Disciplined	Good	Very good	Simply

After that, the feasibility of the factors supporting the feasibility will be calculated whether it is acceptable or not, the steps are as below:

1. Establishing Assessment Criteria
   Forming Assessment Criteria here is converting alternative data into numerical values according to the criteria normalization table.

Table 3 Self-Research Criteria Values After Weighting

Code	Name	Criteria			
		C1	C2	C3	C4
A01	Head Of Production 1	4	5	4	5
A02	Head Of Production 2	5	4	4	4
A03	Head Of Production 3	5	5	4	5
A04	Head Of Production 4	5	5	4	4
A05	Head Of Production 5	4	4	5	4
A06	Head Of Production 6	4	4	5	5
A07	Head Of Production 7	4	5	3	3
A08	Head Of Production 8	3	3	3	4
A09	Head Of Production 9	5	3	3	4
A10	Head Of Production 10	5	4	5	3

2. Forming the decision matrix
   Forming a decision making matrix here is to reshape the data matrix that has been normalized in accordance with the criteria nomalization table.

Table 4 Decision Making Matrix

Alternative	C1	C2	C3	C4

A00	5	5	5	5
A01	4	5	4	5
A02	5	4	4	4
A03	5	5	4	5
A04	5	5	4	4
A05	4	4	5	4
A06	4	4	5	5
A07	4	5	3	3
A08	3	3	3	4
A09	5	3	3	4
A10	5	4	5	3
Decision Type	***Max***	***Max***	***Max***	***Max***

$$\begin{pmatrix} 5 & 5 & 5 & 5 \\ 4 & 5 & 4 & 5 \\ 5 & 4 & 4 & 4 \\ 5 & 5 & 4 & 5 \\ 5 & 5 & 4 & 4 \\ 4 & 4 & 5 & 4 \\ 4 & 4 & 5 & 5 \\ 4 & 5 & 3 & 3 \\ 3 & 3 & 3 & 4 \\ 5 & 3 & 3 & 4 \\ 5 & 4 & 5 & 3 \\ \mathbf{49} & \mathbf{47} & \mathbf{45} & \mathbf{46} \end{pmatrix}$$

3. Matrix normalization in the ARAS method

   If the criterion is Beneficial (max) then normalization is done following :

   $X_{ij} = \frac{X_{ij}}{\sum_{i=0}^{m} x_{ij}}$.

   If the criteria are non-beneficial (min) then normalization is done following :

   Stage 1 $x_{ij} = \frac{1}{X* ij}$

   Stage 2 $\bar{x_{ij}} = \frac{X_{ij}}{\sum_{i=0}^{m} X_{ij}}$

   The results of normalizing the decision matrix can be seen as follows:

   $X_{0,1} = \frac{X0,1}{X0,1+X1,1+X2,1+X3,1+X4,1+X5,1+X6,1+X7,1+X8,1+X9,1+X10,1}$

   $= \frac{5}{5+4+5+5+5+4+4+4+3+5+5}$

   $= \frac{5}{49}$

   $= 0.102$

   $X_{0,2} = \frac{X0,2}{X0,2+X1,2+X2,2+X3,2+X4,2+X5,2+X6,2+X7,2+X8,2+X9,2+X10,2}$

   $= \frac{5}{5+5+4+5+5+4+4+5+3+3+4}$

   $= \frac{5}{47}$

   $= 0,106$

   $X_{0,3} = \frac{X0,3}{X0,3+X1,3+X2,3+X3,2+X4,3+X5,3+X6,3+X7,3+X8,3+X9,3+X10,3}$

$$= \frac{5}{5+4+4+4+4+5+5+3+3+3+5}$$
$$= \frac{5}{45}$$
$$= 0{,}111$$

$$X_{0,4} = \frac{X0,4}{X0,4+X1,4+X2,4+X3,4+X4,4+X5,4+X6,4+X7,4+X8,4+X9,4+X10,4}$$
$$= \frac{5}{5+5+4+5+4+4+5+3+4+4+3}$$
$$= \frac{5}{46}$$
$$= 0{,}109$$

Then from the decision matrix above, a normalized decision matrix can be obtained as follows:

0.102	0.106	0.111	0.109
0.082	0.106	0.089	0.109
0.102	0.085	0.089	0.087
0.102	0.106	0.089	0.109
0.102	0.106	0.089	0.087
0.082	0.085	0.111	0.087
0.082	0.085	0.111	0.109
0.082	0.106	0.067	0.065
0.061	0.064	0.067	0.087
0.102	0.064	0.067	0.087
0.102	0.085	0.111	0.065

Next, determine the weight on each criterion as follows:

D1	**D2**	**D3**	**D4**
0.102	0.106	0.111	0.109
0.082	0.106	0.089	0.109
0.102	0.085	0.089	0.087
0.102	0.106	0.089	0.109
0.102	0.106	0.089	0.087
0.082	0.085	0.111	0.087
0.082	0.085	0.111	0.109
0.082	0.106	0.067	0.065
0.061	0.064	0.067	0.087
0.102	0.064	0.067	0.087
0.102	0.085	0.111	0.065
0.35	**0.15**	**0.10**	**0.40**

D1 = 0.102 * 0,35

D_{01} = A*01 * wj = 0.036

D_{11} = A*11 * wj
= 0.082 * 0,35
= 0.029
D_{21} = A*21 * wj
= 0.102 * 0,35
= 0.036
D_{31} = A*31 * wj
= 0.102 * 0,35
= 0.036
D_{41} = A*41 * wj
= 0.102 * 0,35
= 0.036
D_{51} = A*51 * wj
= 0.082 * 0,35
= 0.029
D_{61} = A*61 * wj
= 0.082 * 0,35
= 0.029
D_{71} = A*71 * wj
= 0.082 * 0,35
= 0.029
D_{81} = A*81 * wj
= 0.061 * 0,35
= 0.021
D_{91} = A*91 * wj
= 0.102 * 0,35
= 0.036
D_{101} = A*101 * wj
= 0.102 * 0,35
= 0.036

D2

D_{02} = A*02 * wj
= 0.106 * 0,15
= 0.016
D_{12} = A*12 * wj
= 0.106 * 0,15
= 0.016
D_{22} = A*22 * wj
= 0.085 * 0,15
= 0.013
D_{32} = A*32 * wj
= 0.106 * 0,15
= 0.016
D_{42} = A*42 * wj
= 0.106 * 0,15
= 0.016
D_{52} = A*52 * wj
= 0.085 * 0,15
= 0.013
D_{62} = A*62 * wj
= 0.085 * 0,15
= 0.013
D_{72} = A*72 * wj
= 0.106 * 0,15
= 0.016
D_{82} = A*82 * wj
= 0.064 * 0,15
= 0.010
D_{92} = A*92 * wj
= 0.064 * 0,15
= 0.010
D_{102} = A*102 * wj
= 0.085 * 0,15
= 0.013

D3

D_{03} = A*03 * wj
= 0.111 * 0,10
= 0.011
D_{13} = A*13 * wj
= 0.089 * 0,10
= 0.009
D_{23} = A*23 * wj
= 0.089 * 0,10
= 0.009
D_{33} = A*33 * wj
= 0.089 * 0,10
= 0.009
D_{43} = A*43 * wj
= 0.089 * 0,10
= 0.009
D_{53} = A*53 * wj
= 0.111 * 0,10
= 0.011
D_{63} = A*63 * wj
= 0.111 * 0,10
= 0.011
D_{73} = A*73 * wj
= 0.067 * 0,10
= 0.007
D_{83} = A*83 * wj
= 0.067 * 0,10
= 0.007
D_{93} = A*93 * wj
= 0.067 * 0,10
= 0.007
D_{103} = A*103 * wj
= 0.111 * 0,10
= 0.011

D4

D_{04} = A*04 * wj
= 0.109 * 0,40
= 0.043
D_{14} = A*14 * wj
= 0.109 * 0,40
= 0.043
D_{24} = A*24 * wj
= 0.087 * 0,40
= 0.035
D_{34} = A*34 * wj
= 0.109 * 0,40
= 0.043
D_{44} = A*44 * wj
= 0.087 * 0,40
= 0.035
D_{54} = A*54 * wj
= 0.087 * 0,40
= 0.035
D_{64} = A*64 * wj

= 0.109 * 0,40
= 0.043

D_{74} = A*74 * wj
= 0.065 * 0,40
= 0.026

D_{84} = A*84 * wj
= 0.087 * 0,40
= 0.035

D_{94} = A*94 * wj
= 0.087 * 0,40
= 0.035

D_{104} = A*104 * wj
= 0.065 * 0,40
= 0.026

From the multiplication calculation above, the following matrix results can be obtained:

$$\begin{vmatrix} 0.050 & 0.021 & 0.014 & 0.057 \\ 0.050 & 0.004 & 0.003 & 0.023 \\ 0.050 & 0.021 & 0.014 & 0.046 \\ 0.010 & 0.004 & 0.003 & 0.023 \\ 0.050 & 0.021 & 0.014 & 0.034 \\ 0.050 & 0.021 & 0.014 & 0.057 \\ 0.010 & 0.021 & 0.003 & 0.034 \\ 0.010 & 0.004 & 0.003 & 0.034 \\ 0.050 & 0.004 & 0.014 & 0.057 \\ 0.010 & 0.004 & 0.014 & 0.023 \\ 0.010 & 0.021 & 0.003 & 0.011 \end{vmatrix}$$

4. Determining the weight of the normalization matrix
   Determining the optimization value (Si), by summing the value of the criteria for each alternative from the results of matrix multiplication with weights that have been done before.

S0 = 0.036 + 0.016 + 0.011 + 0.043
= 0.106

S1 = 0.029 + 0.016 + 0.009 + 0.043
= 0.097

S2 = 0.036 + 0.013 + 0.009 + 0.035
= 0.092

S3 = 0.036 + 0.016 + 0.009 + 0.043
= 0.104

S4 = 0.036 + 0.016 + 0.009 + 0.035
= 0.095

S5 = 0.029 + 0.013 + 0.011 + 0.035
= 0.087

S6 = 0.029 + 0.013 + 0.011 + 0.043
= 0.096

S7 = 0.029 + 0.016 + 0.007 + 0.026
= 0.077

S8 = 0.021 + 0.010 + 0.007 + 0.035
= 0.072

S9 = 0.036 + 0.010 + 0.007 + 0.035
= 0.087

S10 = 0.036 + 0.013 + 0.011 + 0.026
= 0.086

Then find S0 by adding S0 to S10 as follows :

S0 = 0.106 + 0.097 + 0.092 + 0.104 + 0.095 + 0.087 + 0.096 + 0.077 + 0.072 + 0.087 + 0.086 = 1.00

5. Determine the optimum function value

Determine the highest rank level of each alternative, by dividing the alternative value against alternative 0 (A0).

K0 = $\frac{S0}{S0} = \frac{0.106}{1,000}$ = 0,106

K1 = $\frac{S1}{S0} = \frac{0.097}{1,000}$ = 0,097

K2 = $\frac{S2}{S0} = \frac{0.092}{1,000}$ = 0,092

K3 = $\frac{S3}{S0} = \frac{0.104}{1,000}$ = 0,104

K4 = $\frac{S4}{S0} = \frac{0.095}{1,000}$ = 0,095

K5 = $\frac{S5}{S0} = \frac{0.087}{1,000}$ = 0,087

K6 = $\frac{S6}{S0} = \frac{0.096}{1,000}$ = 0,096

K7 = $\frac{S7}{S0} = \frac{0.077}{1,000}$ = 0,077

K8 = $\frac{S8}{S0} = \frac{0.072}{1,000}$ = 0,072

K9 = $\frac{S9}{S0} = \frac{0.087}{1,000}$ = 0,087

K10 = $\frac{S10}{S0} = \frac{0.086}{1,000}$ = 0.086

6. Determining Ranking Levels/ Eligibility
   Therefore, from the total calculation results above, it can be concluded that the alternative with the highest score ranks the highest. Thus, the decision outcome appears as follows.

Table 5. Decision Results

Code	Name	Final Grade	Ranking
S3	Head Of Production 3	0.104	1
S1	Head Of Production 1	0.097	2
S6	Head Of Production 6	0.096	3
S4	Head Of Production 4	0.095	4
S2	Head Of Production 2	0.092	5
S5	Head Of Production 5	0.087	6
S9	Head Of Production 9	0.087	7
S10	Head Of Production 10	0.086	8
S7	Head Of Production 7	0.077	9
S8	Head Of Production 8	0.072	10

4. Conclusion

Based on this study, the use of the Additive Ratio Assessment (ARAS) method in selecting the Head of Production has provided objective and transparent results. By considering various relevant and important criteria, the ARAS method enables a comprehensive evaluation of the candidates. The final results of this evaluation indicate that Head of Production 3 achieved the highest rank with a final score of 0.104. This score demonstrates that Head of Production 3 possesses the best qualifications and capabilities for the Head of Production position. Therefore, based on the conducted analysis, Head of Production 3 is deemed the most suitable candidate for the position, and is expected to enhance the company's operational performance and success.

References

[1] S. Kumar, G. · Koushik, G. · Santanu Das, P. Kumar, D. · Arijit, And K. Editors, "Lecture Notes In Mechanical Engineering Advances In Thermal Engineering, Manufacturing, And Production Management Select Proceedings Of Ictema 2020." [Online]. Available: Http://Www.Springer.Com/Series/11693

[2] H. Karimi And Z. Nikkhah-Farkhani, "Performance Appraisal Of Knowledge Workers Using Augmented Additive Ratio Assessment (A-Aras) Method: A Case Study," *Ieee Trans Eng Manag*, Vol. 69, No. 5, Pp. 2285–2295, Oct. 2022, Doi: 10.1109/Tem.2020.3009134.

[3] R. A. S. P. - And Pratiwi Susanti, "Sistem Pendukung Keputusan Pemilihan Perumahan Dengan Metode Aras (Studi Kasus Kabupaten Ponorogo)," *Jurnal Sains Dan Informatika*, Vol. 8, No. 1, Pp. 31–40, Jun. 2022, Doi: 10.34128/Jsi.V8i1.387.

[4] A. Y. Labolo, "Sistem Pendukung Keputusan Penilaian Kinerja Dosen Dengan Menggunakan Metode Additive Ratio Assessment (Aras)," Vol. 5, No. 1, 2020.

[5] C. Tarigan, E. Fahmi Ginting, And R. Syahputra, "Sistem Pendukung Keputusan Dalam Menentukan Kinerja Pengajar Dengan Metode Additive Ratio Assessment (Aras)," *Jurnal Teknologi Sistem Informasi Dan Sistem Komputer Tgd)*, Vol. 5, No. 1, Pp. 16–24, 2022, [Online]. Available: Https://Ojs.Trigunadharma.Ac.Id/

[6] S. M. Hatefi, H. Asadi, G. Shams, J. Tamošaitienė, And Z. Turskis, "Model For The Sustainable Material Selection By Applying Integrated Dempster-Shafer Evidence Theory And Additive Ratio Assessment (Aras) Method," *Sustainability (Switzerland)*, Vol. 13, No. 18, Sep. 2021, Doi: 10.3390/Su131810438.

[7] B. Satria, "Implementation Of Additive Ratio Assessment (Aras) Method On Decision Support System For Recipient Of Inhabitable House," Vol. 6, No. 1, 2020, Doi: 10.33480/Jitk.V6i1.1389.

[8] I. Hidaya And F. Pranita Nasution, "Penerapan Metode Aras Untuk Rekomendasi Produk Wallpaper Pada Pt. Adanusa Udhaya Utama Application Of The Aras Method For Wallpaper Product Recommendations At Pt. Adanusa Udhaya Utama," 2023. [Online]. Available: Http://Kti.Potensi-Utama.Ac.Id/Index.Php/Jureksi/Index|

[9] V. Sihombing *Et Al.*, "Additive Ratio Assessment (Aras) Method For Selecting English Course Branch Locations," In *Journal Of Physics: Conference Series*, Iop Publishing Ltd, Jun. 2021. Doi: 10.1088/1742-6596/1933/1/012070.

[10] A. Iskandar, "Penyeleksian Penerimaan Teleservice Representative Dengan Penerapan Metode Aras Dan Pembobotan Roc," *Jurikom (Jurnal Riset Komputer)*, Vol. 10, No. 2, P. 548, Apr. 2023, Doi: 10.30865/Jurikom.V10i2.6069.

[11] A. Idaman, Roslina, And R. Rosnelly, "Implementation Of Linear Congruent Methods And Multiplication Random Numbers For Academic Potential Tests," *International Journal Of Research In Vocational Studies (Ijrvocas)*, Vol. 2, No. 4, Pp. 32–41, Jan. 2023, Doi: 10.53893/Ijrvocas.V2i4.160.

[12] J. Hutagalung, D. Nofriansyah, And M. A. Syahdian, "Penerimaan Bantuan Pangan Non Tunai (Bpnt) Menggunakan Metode Aras," *Jurnal Media Informatika Budidarma*, Vol. 6, No. 1, P. 198, Jan. 2022, Doi: 10.30865/Mib.V6i1.3478.

[13] A. Idaman, H. Arahman, A. Muis, T. Muhammad Raja Gunung, And H. Eldo, "Implementation Of The Oreste Method In Determining The Selection Of Service Ambassador Events," *Journal Of Computer Networks, Architecture And High Performance Computing*, Vol. 6, No. 1, Pp. 45–54, Dec. 2023, Doi: 10.47709/Cnahpc.V6i1.3225.

[14] J. Hutagalung And M. T. Indah R, "Pemilihan Dosen Penguji Skripsi Menggunakan Metode Aras, Copras Dan Waspas," *Jurnal Sisfokom (Sistem Informasi Dan Komputer)*, Vol. 10, No. 3, Pp. 354–367, Nov. 2021, Doi: 10.32736/Sisfokom.V10i3.1240.

[15] P. Kinerja Karyawan Pada Kantor Perum Bulog Yilistriyani, I. Kanedi, And L. Elfianty, "Implementation Of The Additive Ratio Assessment (Aras) Method For Employee Performance Assessment In The Office Of Perum Bulog Implementasi Metode Additive Ratio Assessment (Aras) Untuk," *Lena Elfianty; Booking Service Application On*, Doi: 10.53697/Jkomitek.V1i1.

[16] P. Lishayani, R. Buaton, T. R. Pasaribu, And S. Kaputama, "Journal Of Artificial Intelligence Applications And Engineering Determining The Selection Of Departments At Abdi Negara Vocational School Using The Additive Ratio Assessment (Aras) Method." [Online]. Available: Https://Ioinformatic.Org/

[17] Bayu Pangestu, Kosim, And Asep Kosasih, "Application Of Additive Ratio Assessment (Aras) Method For The Selection Of Youth Red Cross Chairperson At Sma Negeri 1 Lebakwangi Kuningan," *Journal Of General Education And Humanities*, Vol. 1, No. 2, Pp. 83–94, Aug. 2022, Doi: 10.58421/Gehu.V1i2.18.

[18] S. R. Cholil And E. S. Prisiswo, "Sistem Pendukung Keputusan Seleksi Calon Karyawan Baru Pt. Dawam Prima Perkasa Menggunakan Metode Aras Berbasis Web," *Jurnal Rekayasa Sistem & Industri (Jrsi)*, P. 107, Dec. 2020, Doi: 10.25124/Jrsi.V7i2.422.

[19] N. Putra, K. Imtihan, P. Simanjuntak, M. Mesran, And H. Rohayani, "Decision Support System For Choosing The Best General Practitioner With Additive Ratio Assessment (Aras) Method," *The Ijics (International Journal Of Informatics And Computer Science)*, Vol. 7, No. 1, P. 11, Mar. 2023, Doi: 10.30865/Ijics.V7i1.6165.

[20] Y. Arianti And R. Sandhy Winanda, "Application Of The Additive Ratio Assessment (Aras) Method In Selecting Superior Tourism In The Pasaman District Region," *Article History Rangkiang Mathematics Journal*, Vol. 3, No. 1, 2024.