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IMPLEMENTATION OF *OPERATIONAL COMPETITIVE RATING ANALYSIS* (OCRA) METHOD IN DETERMINING THE BEST *E-COMMERCE* APPLICATION

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Abstract. The development of e-commerce in Indonesia is getting more and more rapid, with various platforms that offer the best services for its users. This research aims to analyze and rank the best e-commerce platforms based on several key criteria, namely transaction speed, ease of use, operational costs, security, and user service support. The method used in this study is Operational Competitiveness Rating Analysis (OCRA), which evaluates alternatives based on criteria with a linear preference approach. The results of the study show that Shopee ranks first with the highest total preference, followed by Tokopedia, Lazada, Blibli, and Bukalapak. This shows that Shopee is superior in the aspects assessed compared to other platforms. Based on these findings, it is recommended for other e-commerce platforms to improve the quality of service to increase their competitiveness. This research can also be a reference for users in choosing an e-commerce platform that suits their needs

Keywords: **E-Commerce, OCRA, Preference Ranking, Transaction Speed, User Service.**

A. Introduction

With the rapid growth of digital technology, *e-commerce* allows businesses, especially UMKM, to expand market reach and increase sales through online platforms (Orinaldi, 2020) supported by increasing internet penetration and the use of digital devices. E-commerce provides convenience for consumers in shopping online and offers great opportunities for businesses to expand market reach. However, with many e-commerce platforms available, such as Shopee, Tokopedia, Lazada, Bukalapak, and Blibli, choosing the best platform is a challenge for consumers and businesses.

Choosing the right *e-commerce* application is a challenge because it involves various factors that must be considered to meet business and consumer needs (Anugrah, et al., 2023). Each e-commerce platform has its own advantages and disadvantages, which can be seen from various aspects, such as transaction speed, ease of use, operational costs, user service support, and transaction security. Not all *e-commerce* applications are compatible with existing systems, so technology integration can be an obstacle (Sofia, et al., 2021). Therefore, an objective analysis method is needed to determine the best e-commerce platform based on these criteria. One method that can be used is Operational Competitiveness Rating Analysis (OCRA), OCRA is a method used to evaluate the operational performance of an organization by comparing it to competitors in the same industry (Karim et al., 2021) .

The OCRA method is used to calculate the ranking of each e-commerce platform by considering the factors of benefit (the higher the better) and cost (the lower the better) and OCRA can be applied to assess various aspects, such as user experience, product variety, pricing strategy, and customer service (Iqbal, 2024) . Through this approach, this study aims to identify the best e-commerce platform based on the calculation of performance preferences and

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determine the success of an e-commerce application and how OCRA can be used as a tool to select the best application in a competitive market.

B. Research Methodology

The method used in this research is Operational Competitiveness Rating Analysis (OCRA)**,** which aims to evaluate and rank the best e-commerce platforms based on five main criteria, namely transaction speed, ease of use, operational costs, user service support, and security. The alternatives analyzed in this study include five e-commerce platforms, namely Shopee, Tokopedia, Lazada, Bukalapak, and Blibli.

This investigation was conducted in the February quarter. The data was collected by administering questionnaires to respondents who were students from several universities in Medan. To reach respondents from other universities, the questionnaire was distributed online through digital platforms such as Google Forms, social media, and academic organizations. This allowed students from different backgrounds to provide more representative and varied data for this study.

The types of data used in this study are primary data and quantitative data. Primary data was obtained directly from respondents through distributing questionnaires to students from various universities. This questionnaire contains questions that measure their experience and assessment of five e-commerce applications, namely Shopee, Tokopedia, Lazada, Bukalapak, and Blibli, based on five predetermined criteria.

The data collected is quantitative because the results are in the form of numbers on a rating scale of 1-5. This data is then used for analysis using the Operational Competitiveness Rating Analysis (OCRA) method to determine the best e-commerce application. In addition to primary data, this research is also supported by various literature sources, such as journals, books, and previous research related to the OCRA method and e-commerce performance evaluation.

Steps of OCRA Method The data used in this study are primary data obtained directly from respondents and are quantitative, in the form of assessment results on a scale of 1-5 on the five main criteria that have been determined. The research was conducted at February 2025, with data collection conducted through the distribution of questionnaires to students from various universities in Medan. The questionnaire was distributed online using Google Forms to reach more respondents.

1. Defining Alternatives and Criteria
2. Determining Criterion Weights
   Weights are assigned based on Ranking Order Centroid (ROC) to indicate the importance of each criterion.
3. Forming the Decision Matrix
   Compile a table based on the questionnaire results that shows the performance of each platform on each criterion.
4. Calculating Preferences for Cost and Benefit Criteria
   a. Cost is calculated by finding the value of competitive loss.
   b. Benefit is calculated by finding the value of the relative advantage (competitive gain).
5. Determine Total Preference Score and Final Rank

The final score is obtained by calculating the difference between **benefit** and **cost** preferences, then ranking is done to determine the best e-commerce platform.

Through these steps, this research will produce the best e-commerce ranking based on the OCRA method.

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C. Research Results and Discussion

In Operational Competitive Rating Analysis (OCRA)**,** the first step is to determine the alternatives and criteria used in the evaluation. Alternatives are the choices that will be compared in the analysis. In this context, we want to determine the best e-commerce application based on some predefined criteria.

1. Define alternatives and criteria

a. Alternatives**:** Shopee, Tokopedia, Lazada, Bukalapak, and Blibli.
b. Criteria**:**
   a. Transaction speed (Benefit)
   b. Ease of use (Benefit)
   c. Operating costs (Cost)
   d. User service support (Benefit)
   e. Safety (Benefit)

Table 1. Alternative Data

No.	Alternative Code	Alternative Name
1	A1	Shopee
2	A2	Tokopedia
3	A3	Lazada
4	A4	Bukalapak
5	A5	blibli

Table 2. Criteria Data

Criteria Code	Criteria	Type
K1	Transaction speed	Benefit
K2	User-friendliness	Benefit
K3	Operating costs	Cost
K4	User service support	Benefit
K5	Security	Benefit

With a questionnaire technique where the googleform link is distributed to target respondents, namely students of various universities and a maximum of 100 respondents. Assessment Questionnaire To obtain evaluation data on e-commerce applications. After the data from all respondents is collected, we calculate the average for each alternative in each criterion.

Table 3. Average Result Data

Alternative	(K1)	(K2)	(K3)	(K4)	(K5)
(A1)	4,31	4,45	3,96	3,99	4,19
(A2)	3,79	3,74	3,62	3,75	3,86
(A3)	3,67	3,5	3,43	3,41	3,58
(A4)	3,36	3,25	3,21	3,28	3,31
(A5)	3,33	3,31	3,23	3,28	3,4

2. Determining Criterion Weights

In the Operational Competitive Ranking Analysis (OCRA) approach, deciding on criteria weights is done after deciding on alternatives and criteria. The importance of each factor in e-commerce assessment is indicated by these weights. According to the ranking based on the specified importance, the ROC technique can assign weights to each criterion...

1. Rank the criteria in order of importance.
2. Use the formula:

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$$w_j = \frac{1}{n}\sum_{k=j}^{n}\frac{1}{k} \quad (1)$$

where **n** is the number of criteria, and **j** is the criteria rank.

Table 4. Weight Calculation

Rating	Criteria	ROC Formula	Weight
1	Transaction Speed	$\frac{\left(\frac{1}{1}+\frac{1}{2}+\frac{1}{3}+\frac{1}{4}+\frac{1}{5}\right)}{5}$	0,4566666667
2	User-friendliness	$\frac{\left(0+\frac{1}{2}+\frac{1}{3}+\frac{1}{4}+\frac{1}{5}\right)}{5}$	0,2566666667
3	Operating costs	$\frac{\left(0+0+\frac{1}{3}+\frac{1}{4}+\frac{1}{5}\right)}{5}$	0,1566666667
4	Security	$\frac{\left(0+0+0+\frac{1}{4}+\frac{1}{5}\right)}{5}$	0,09
5	User Service Support	$\frac{\left(0+0+0+0+\frac{1}{5}\right)}{5}$	0,04
Total			1,00

This is a weighting method that gives higher weights to higher-ranked criteria and progressively smaller weights to the next rank.

Table 5. Weighted Criteria Results

Criteria Code	Criteria	Weight
K1	Transaction speed	0,4566666667
K2	User-friendliness	0,2566666667
K3	Operating costs	0,1566666667
K4	User service support	0,04
K5	security	0,09

3. Application of Operational Competitiveness Rating Analysis (OCRA) Method

The (OCRA) approach is then used to calculate each option based on the information from the questionnaire results shown in the table above. To complete the calculation using the OCRA method, follow these steps

a. Forming the Decision Matrix

The decision matrix in the **(OCRA)** method is made based on the alternatives to be evaluated and the value of the criteria given. The decision matrixX_{ij} is obtained from the average result data contained in table 3.

$$matriks\ X_{ij} = \begin{bmatrix} 4{,}31 & 4{,}45 & 3.96 & 3{,}99 & 4{,}19 \\ 3{,}79 & 3{,}74 & 3{,}62 & 3{,}75 & 3{,}86 \\ 3{,}67 & 3{,}50 & 3{,}43 & 3{,}41 & 3{,}58 \\ 3{,}36 & 3{,}25 & 3{,}21 & 3{,}28 & 3{,}31 \\ 3{,}33 & 3{,}31 & 3{,}23 & 3{,}28 & 3{,}4 \end{bmatrix}$$

b. Calculating Preference Ranking for Minimized Criteria (Cost)

In this case, only the Operating Cost (K3) criterion is **cost**, so the calculation is only based on this value.

$$\bar{I}_i = \sum_{j=1}^{g} w_j \frac{\max(X_{ij}) - X_{ij}}{\min(X_{ij})} \quad (2)$$

Where:

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g = minimum number of attributes/criteria
i = row
j = column
max = the highest value in the column
min = the lowest value in the column

$$\bar{I}_1 = \left(0,156666667 \frac{3,96 - 3,96}{3,21}\right) = 0$$

$$\bar{I}_2 = \left(0,156666667 \frac{3,96 - 3,62}{3,21}\right) = 0,016594$$

$$\bar{I}_3 = \left(0,156666667 \frac{3,96 - 3,43}{3,21}\right) = 0,025867$$

$$\bar{I}_4 = \left(0,156666667 \frac{3,96 - 3,21}{3,21}\right) = 0,036604$$

$$\bar{I}_5 = \left(0,156666667 \frac{3,96 - 3,23}{3,21}\right) = 0,035628$$

The calculated value $\bar{I}$ shows the competitive loss score of each alternative based on cost criteria. Since the minimum value (MIN) of $\bar{I}$ is 0, it means that Shopee (A1) is the best performing alternative in terms of operational cost according to the OCRA method.

c. Calculating Linear Preference Ranking for Minimized Criteria (Cost)

$$\bar{\bar{I}}_i = \bar{I}_i - \min(\bar{I}_i) \quad (3)$$

$\bar{\bar{I}}_1 = 0 - 0 = 0$
$\bar{\bar{I}}_2 = 0,016594 - 0 = 0,016594$
$\bar{\bar{I}}_3 = 0,025867 - 0 = 0,025867$
$\bar{\bar{I}}_4 = 0,036604 - 0 = 0,036604$
$\bar{\bar{I}}_5 = 0,035628 - 0 = 0,035628$

The smaller this linear preference value, the better the alternative in terms of cost. Therefore, A1 (Shopee) is the best in terms of operational cost minimization, while A4 (Bukalapak) has the highest cost in this study.

d. Calculating Preference Ranking for Maximized Criteria (Benefit)

Now we will calculate the preference ranking for the criterion to be maximized **(**Benefit**).**

$$\bar{O}_i = \sum_{j=1}^{g} w_j \frac{X_{ij} - \min(X_{ij})}{\min(X_{ij})} \quad (4)$$

Where =
g = minimum number of attributes/criteria
i = row
j = column
min = the lowest value in the column

$$\bar{O}_1 = \sum \left(0,456666667 \frac{4,31 - 3,33}{3,33}\right) + \left(0,256666667 \frac{4,45 - 3,25}{3,25}\right) + \left(0,04 \frac{3,99 - 3,28}{3,28}\right) + \left(0,09 \frac{4,19 - 3,4}{3,4}\right) = 0,283988$$

$$\bar{O}_2 = \sum \left(0,456666667 \frac{3,79 - 3,33}{3,33}\right) + \left(0,256666667 \frac{3,74 - 3,25}{3,25}\right) + \left(0,04 \frac{3,75 - 3,28}{3,28}\right) + \left(0,09 \frac{3,86 - 3,4}{3,4}\right) = 0,136406$$

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$$\bar{O}_3 = \sum \left(0{,}456666667 \frac{3{,}67 - 3{,}33}{3{,}33}\right) + \left(0{,}256666667 \frac{3{,}50 - 3{,}25}{3{,}25}\right) + \left(0{,}04 \frac{3{,}28 - 3{,}28}{3{,}28}\right) + \left(0{,}09 \frac{3{,}58 - 3{,}4}{3{,}4}\right) = 0{,}077344$$

$$\bar{O}_4 = \sum \left(0{,}456666667 \frac{3{,}36 - 3{,}33}{3{,}33}\right) + \left(0{,}256666667 \frac{3{,}25 - 3{,}25}{3{,}25}\right) + \left(0{,}04 \frac{3{,}28 - 3{,}28}{3{,}28}\right) + \left(0{,}09 \frac{3{,}31 - 3{,}4}{3{,}4}\right) = 0{,}001732$$

$$\bar{O}_5 = \sum \left(0{,}456666667 \frac{3{,}33 - 3{,}33}{3{,}33}\right) + \left(0{,}256666667 \frac{3{,}31 - 3{,}25}{3{,}25}\right) + \left(0{,}04 \frac{3{,}28 - 3{,}28}{3{,}28}\right) + \left(0{,}09 \frac{3{,}4 - 3{,}4}{3{,}4}\right) = 0{,}004738$$

From this result, it can be concluded that Shopee is an e-commerce that provides the highest benefits for users, while Bukalapak has the lowest benefits based on the calculation of benefit criteria preferences.

e. Calculating Linear Preference Ranking for Maximized Criteria (Benefit)

$$\bar{\bar{O}}_i = \bar{O}_i - \min\left(\bar{O}_i\right) \quad (5)$$

$\bar{\bar{O}}_1 = 0{,}283988 - 0{,}001732 = 0{,}282256$
$\bar{\bar{O}}_2 = 0{,}136406 - 0{,}001732 = 0{,}134674$
$\bar{\bar{O}}_3 = 0{,}077344 - 0{,}001732 = 0{,}075613$
$\bar{\bar{O}}_4 = 0{,}001732 - 0{,}001732 = 0$
$\bar{\bar{O}}_5 = 0{,}004738 - 0{,}001732 = 0{,}003007$

From these results, it can be concluded that Shopee is the e-commerce that provides the highest benefits for users, while Bukalapak has the lowest benefits in the calculation of linear preferences for the Benefit criteria.

f. Calculating Total Preference

To calculate the total preference value of each alternative in the (OCRA) method, we use the formula:

$$P_i = (\bar{I} + \bar{O}) - min(\bar{I} + \bar{O}) \quad (6)$$

$P_1 = 0 + 0{,}282256 = 0{,}28225623 - 0{,}036604361 = 0{,}245651869$
$P_2 = 0{,}016594 + 0{,}136406 = 0{,}151268393 - 0{,}036604361 = 0{,}114664031$
$P_3 = 0{,}025867 + 0{,}077344 = 0{,}101479593 - 0{,}036604361 = 0{,}064875231$
$P_4 = 0{,}036604 + 0{,}001732 = 0{,}036604361 - 0{,}036604361 = 0$
$P_5 = 0{,}035628 + 0{,}004738 = 0{,}038634946 - 0{,}036604361 = 0{,}002030584$

The ranking process, which will be displayed like the table below, is done after you have finished determining the preference values for each alternative:

Table 6. Ranking Results

Alternative	E-Commerce	Total Preference	Ranking
A1	shopee	0,245651869	1
A2	Tokopedia	0,114664031	2
A3	Lazada	0,064875231	3
A5	blibli	0,002030584	4
A4	bukalapak	0	5

This research uses the Operational Competitiveness Rating Analysis (OCRA) method to assess and rank five e-commerce platforms based on the criteria of transaction speed, ease of use, operational costs, user service support, and security. Respondents in this study were students from various universities in Medan, who rated each platform on a scale of 1-5.

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Based on the results of the analysis, linear preferences are obtained for the cost criterion as shown in the previous calculation, where Shopee (A1) has a value of 0, which means it is the platform with the most efficient operating costs compared to the others. Bukalapak (A4) has the highest value (0.036604), which indicates that this platform has the highest cost in this evaluation. In the benefit criteria preference results show that Shopee has the highest value (0.283988), which means it provides the most benefits compared to other platforms. In contrast, Bukalapak has the lowest value (0.001732)**,** indicating that this platform has the least benefit compared to other alternatives. This calculation is reinforced by the results of the linear preference of the benefit criteria, where Bukalapak has a value of 0, which indicates that this platform is in the lowest position in the benefit aspect**.**

The final results of the total preference calculation obtained in Table 6 show that Shopee is ranked first with a total preference of 0.245651869, indicating that Shopee has the best performance compared to other alternatives. Tokopedia is ranked second at 0.114664031, followed by Lazada at 0.064875231, Blibli at 0.002030584, and Bukalapak at 0 as the last rank. From this result, it can be concluded that Shopee is the best e-commerce platform in this study, with the main advantage in transaction speed and ease of use. Meanwhile, Bukalapak is ranked last, which indicates that this platform needs to improve the service aspect to be able to compete with other e-commerce.

D. Conclusion

Based on the results of the analysis using the Operational Competitiveness Rating Analysis (OCRA) method, an e-commerce ranking is obtained based on the total preference value. Shopee ranks first with the highest total preference (0.245651869), which indicates that this platform has the best performance compared to other alternatives. Tokopedia is in the second position (0.114664031), followed by Lazada (0.064875231), Blibli (0.002030584), and Bukalapak which has a total preference of 0, signifying the lowest performance in this evaluation.This result shows that Shopee is the most superior e-commerce platform based on the criteria that have been analyzed, while Bukalapak has the lowest performance among the evaluated alternatives.The OCRA method proves to be effective in providing an objective assessment of the performance of each platform based on the weights and rankings obtained. By considering these results, the selection of e-commerce platforms can be adjusted to the needs and preferences of users.

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