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Analysis Of The Selection of Online Transportation Service Applications Using The Analytical Hierarchy Process (AHP) Method

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Abstract: This study aims to analyze user preferences in choosing online transportation service applications using the Analytical Hierarchy Process (AHP) method. The study was conducted by distributing questionnaires to 51 respondents from various regions in Indonesia, who are active users of Gojek, Grab, and Maxim applications. Four main criteria were used as the basis for evaluation, namely service speed, price, promotion, and driver availability. The results of data processing show that service speed is the most dominant factor in decision making with a weight of 51%, followed by driver availability (23%), promotion (15%), and price (11%). Of the three applications studied, Gojek obtained the highest priority value (0.47), making it the top choice of respondents. This research shows that operational aspects such as speed and service availability are more decisive than price considerations alone, and confirms the relevance of the AHP method in assisting complex, user preference-based decision making.

Keywords: *Analytical Hierarchy Process, priority value, price, driver availability, promotion.*

Introduction

In the midst of rapid technological development, online transportation services such as Gojek, Grab, and Maxim have become a practical choice for many people in fulfilling their daily needs. These apps offer a wide range of services, from taking passengers to delivering goods. However, due to the sheer number of options available, users often feel confused as to which app suits them best. This raises the question of how to choose the best online transportation app? The solution to this question requires a systematic and objective approach, such as using the Analytical Hierarchy Process (AHP) method.

The AHP method is a way of making decisions by comparing various options based on certain criteria. This method is particularly relevant because it is able to break down complex problems into simpler parts, thus facilitating the evaluation process. In the context of choosing an online transportation application, AHP can help identify important factors such as price, convenience, service speed and safety. By considering these criteria, users can make a more rational decision based on adequate information.

This research was conducted to understand user preferences for online transportation applications. Each application has its own advantages and disadvantages, and no one application is right for everyone. For example, there are users who prioritize low prices, while others may prioritize convenience or speed of service. Using the AHP method, we can map these preferences and provide more personalized recommendations according to individual needs.

In addition, this research also aims to provide a clearer understanding of how to objectively evaluate ride-hailing apps. By comparing several popular apps based on pre-defined criteria, we can see which apps excel in certain aspects.

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The results of this analysis are not only useful for users, but also for service providers to understand their strengths and weaknesses and make necessary improvements. Thus, this research is expected to be a practical guide for the public in choosing an online transportation application that best suits their needs. In addition, the AHP method used in this research can be applied in various other contexts, such as selecting technology services or evaluating similar products. Through a structured and data-driven approach, we can make more effective decisions in our daily lives.

Literature Review and Hypothesis

In recent years, the growth of ride-hailing services in Indonesia has brought about major changes in people's mobility. Applications such as Gojek, Grab, and Maxim have become practical solutions that are widely used by the public in meeting their daily travel needs. The decision to choose an online transportation application is influenced by various factors, such as service speed, driver availability, promotions, and price. To understand user preferences objectively, Ghiffari et al. (2025) used the Analytical Hierarchy Process (AHP) method in analyzing the factors that influence the selection of online transportation applications. The study found that service speed was the most dominant criterion (51%), followed by driver availability (23%), promotion (15%), and price (11%). The final results show that Gojek is the app most prioritized by respondents, followed by Grab and Maxim.

This research refers to the literature from Ardiprawiro and Maharani (2020) who also used the AHP approach to analyze decision making in choosing online transportation applications. In the study, it was found that service quality was the most influential criterion with a weight of 34%, followed by brand trust (29%), ease of use of the application (27%), and brand image (10%). Sub-criteria such as "ease of use" and brand "competence" also gained high weight and reinforced the importance of non-price aspects in consumer decisions. The results of this study provide a strong theoretical and methodological basis for Ghiffari et al.'s study, especially in designing the hierarchical structure and formulating evaluation criteria relevant to user needs.

The AHP method is considered very appropriate in this context because it allows decision-making to be done in a structured and systematic manner. Through the process of pairwise comparison and calculation of priority weights, AHP is able to present objective and accountable analysis results. Therefore, the use of AHP in Ghiffari et al.'s research is not only methodologically relevant, but also supported by theoretical foundations from previous studies such as those conducted by Ardiprawiro and Maharani.

Based on the results of the literature review, it is known that the selection of online transportation applications by the public is influenced by a number of factors that can be measured systematically through the Analytical Hierarchy Process (AHP) method. Research conducted by Ardiprawiro and Maharani (2020) shows that service quality is the main criterion that forms the basis for user decision making, followed by trust in the brand, ease of use, and brand image. Sub-criteria such as "easy to use" and brand "competence" are also important factors that shape positive perceptions of the applications used. Meanwhile, a study conducted by Ghiffari et al. (2025) found that service speed, driver availability, promotion, and price are the main aspects taken into account in the selection of online transportation applications.

Based on the findings from the two literatures, several hypotheses can be formulated which form the basis of this study. First, service speed is assumed to be the most dominant factor in influencing user preferences for online transportation applications. Second, driver availability is assumed to have a significant influence on user decisions, given that service affordability is largely determined by the availability of driver partners. Third, promotion is expected to have a positive influence although not dominant, as users still consider economic incentives. Fourth, although price is one of the consideration factors, it is assumed that its weight is not as great as the service and convenience factors. Thus, these hypotheses are formulated based on the theories and empirical findings that have been discussed in the previous literature and will be further tested through the AHP approach.

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H0: There is no significant effect of service speed, driver availability, promotion, and price on user preferences in choosing online transportation applications.
H1: Service speed has a significant effect as the main criterion in selecting online transportation applications by users.
H2: Driver availability has a significant influence on user preferences in choosing online transportation applications.
H3: Promotion makes a positive contribution to users' decisions to choose online transportation applications, although it is not a dominant factor.
H4: Price has an influence on app selection decisions, but its weight is lower than service speed and driver availability.

Methodology

This study aims to analyze the selection of online transportation applications using the Analytical Hierarchy Process (AHP) method. We selected the AHP method because this research requires a decision-making process to determine which online transportation application is better than the others, which aligns with the use of AHP. In addition, we conducted a literature review by examining previous studies relevant to this topic. Based on the literature review, several key issues faced by users in choosing online transportation applications were identified, including service speed, pricing, driver availability, and promotions.

The initial step in this analysis involved constructing a hierarchy diagram based on the identified problems. The hierarchy diagram was developed according to the established criteria and alternatives, which were determined based on the results of a survey conducted among users of online transportation applications and presented in tabular form.

Table 1 Criteria Weight

NO.	Criteria Weight
1.	Speed of Service
2.	Price
3.	Driver Availability
4.	Promotion

The next step is the assessment of criteria and alternatives through pairwise comparisons. In various decision-making problems, a scale from 1 to 9 is considered the most effective for capturing respondents' judgments. The values and definitions of the pairwise comparison scale can be seen in the following table.

Table 2 . Pairwise Comparison Rating Scale

Intensity Importance	Description
1	Both elements are equally important
3	One element is slightly more important than the others
5	One element is more important than the other
7	One element is clearly more absolutely essential than the other
9	One element is absolutely more important than the other
2,4,6,8	Values between two adjacent consideration values

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The table in the first figure explains the scale of intensity of importance used in the decision-making or comparative analysis process. This scale helps determine how important one element is compared to another. The intensity scale begins at a value of 1, which indicates that both elements are considered equally important, meaning there is no significant difference between them. A value of 3 indicates that one element is slightly more important than the other, signifying a small difference in the level of importance.

When the intensity of importance reaches a value of 5, it indicates that one element is more important than the other, representing a moderately significant difference. A value of 7 is used when one element is clearly more strongly important than the other, indicating a large difference in the level of importance. The highest value, 9, signifies that one element is absolutely more important than the other, reflecting a very large difference in importance. In addition, there are intermediate values such as 2, 4, 6, and 8, which are used when the difference in importance lies between two adjacent levels of judgment. For example, if the difference in importance between two elements is perceived to fall between values 3 and 5, then a value of 4 may be used.

This scale is highly useful in the pairwise comparison process, in which each element is compared with others to determine its priority or relative importance. This process involves a detailed evaluation to ensure that the decisions made are based on thorough and structured consideration. By using this scale, decision-makers can more easily understand and compare various elements, thereby producing more informed and effective decisions.

Table 3 Random Index Value

Matrix Size	1,2	3	4	5	6	7	8	9	10
Value RI	0,00	0,58	0,90	1,12	1,24	1,32	1,41	1,45	1,49

The Random Index (RI) is a reference value used to measure consistency in the Analytic Hierarchy Process (AHP) method. RI represents the average consistency index of a number of randomly generated matrices of a specific size. In AHP, when comparing several criteria or alternatives in a pairwise manner, it is essential to ensure that the judgments provided are consistent. For example, if we consider A to be more important than B, and B to be more important than C, then logically A should be more important than C. The larger the matrix size (i.e., the number of criteria being compared), the higher the RI value tends to be. This value is used in the calculation of the Consistency Ratio (CR), as follows:

$$CR=CI/CR$$

CI refers to the Consistency Index. If the CR (Consistency Ratio) value is less than or equal to 0.1 (or 10%), the judgment is considered consistent and acceptable. Conversely, if CR exceeds 0.1, the judgment is considered inconsistent and needs to be re-evaluated. The use of RI allows us to ensure that decision-making outcomes in AHP are not only based on subjective preferences but are also logical and consistent.

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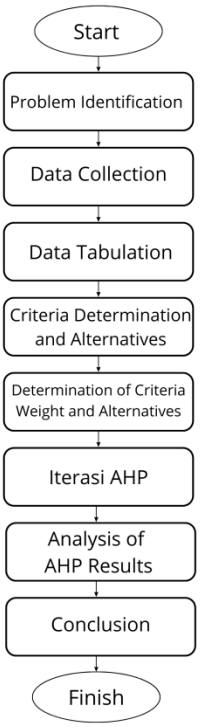

Figure 1 Research Flow Chart

Results and Discussion

The results of a questionnaire distribution survey of 51 respondents who use online transportation services, which are dominated by students, show a diversity of choices in choosing the application used. The respondents are active users who have used more than one type of online transportation application in their daily lives from various regions in Indonesia, such as Yogyakarta, Medan, Malang, Bali, Kalimantan, and Riau Islands. This survey was conducted to examine their perceptions of important aspects in choosing an online transportation service application such as Gojek, Grab, and Maxim.

The process of determining criteria and alternatives was carried out through discussions with active users of online transportation applications. From the discussion results and relevant literature, four main criteria were determined to be used in the analysis process, namely service speed, price, promotion, and driver availability. Each of these criteria was then compared in pairs by respondents through filling out a questionnaire, the results of which were processed using the Analytical Hierarchy Process (AHP) method to determine priority weights.

Next, a decision hierarchy chart is compiled, starting from the main objective, which is to choose the best online transportation application, followed by four main criteria that influence decision making, as well as three alternative applications that are targeted for evaluation, namely Gojek, Grab, and Maxim. After all data is collected and calculated, the priority weights of each criterion and alternative are obtained, which are then used to determine the global preferences of the respondents for online transportation service applications.

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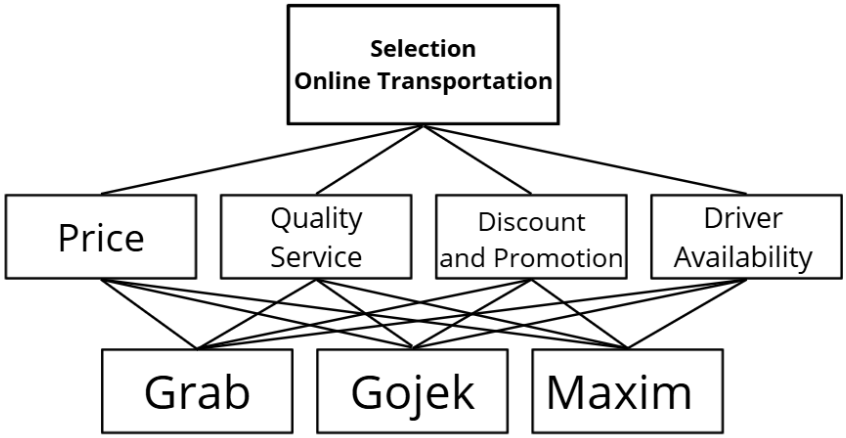

Figure 2 Online Transportation App Hierarchy Chart

Calculation of the pairwise comparison matrix, the priority weights of each criterion and alternative are obtained as follows:

Criteria Priority Weight

Table 4 Criterion Priority Weights

Criteria	**Weight**
Service Speed	0,51
Price	0,11
Driver Availability	0,23
Promotion	0,15

From the table above, it is evident that service speed has the highest weight (0.51), indicating that most respondents consider it the most critical factor when selecting an online transportation application. This is followed by driver availability (0.23), promotion (0.15), and price (0.11).
Calculate Cosistency Vector (CV)

CV = A × W

1. Service Speed Row:
   CV1 = (1×0.506) + (3.45×0.113) + (3.25×0.228) + (3.15×0.152)
   CV1 = 0.506 + 0.390 + 0.741 +0.479 = 2.116 CV1 = 0.506 + 0.390 + 0.741 + 0.479 = 2.116
2. Price Row
   CV2 = (0.29×0.506) + (1×0.113) + (0.48×0.228) + (0.6×0.152)
   CV2 = 0.147 + 0.113 + 0.109 + 0.091 = 0.460
3. Driver Availability Row
   *CV*3 = (0.31×0.506) + (2.08×0.113) + (1×0.228) + (2.1×0.152)
   CV3 = 0.157 + 0.235 + 0.228 + 0.319 = 0.939
4. Promotion Row
   *CV*4 = (0.32×0.506) + (1.67×0.113) + (0.48×0.228) + (1×0.152)
   CV4 = 0.162 + 0.189 + 0.109 + 0.152 = 0.612

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Results CV:

CV=

2.116

0.460

0.939

0.612

Calculation of λmax

λmax is calculated by averaging the CVi/Wi ratio:

λmax = 1/n ∑ (CVi/Wi) = 1/4 (2.116/0.506+0.460/0.113+0.939/0.228+0.612/0.152)

λmax = 1/4 (4.182+4.071+4.118+4.026) = 16.397/4 = 4.099

Consistency Ratio (CR) Calculation

The RI value for a 4×4 matrix is 0.90

CR = CI/RI = 0.033/0.90 = 0.0367 (3.67%)

Since the value of CR = 0.0367 (3.67%) < 0.10, the criteria comparison is considered consistent and acceptable. This means that the data from filling out the questionnaire by experts is valid enough to proceed to the weight and priority calculation process using the AHP method.

Priority Alternative Selection of Online Transportation Applications

Based on the results of the global priority synthesis calculation of three alternative online transportation applications, namely Gojek, Grab, and Maxim, a total priority value is obtained which shows the level of user preference for each application. The calculation is based on the weight of the four main criteria, namely service speed (51%), price (11%), promotion (15%), and driver availability (23%). The following table shows the weight of each alternative based on each criterion and the total global priority value:

Alternative	Speed (50%)	Price (11%)	Promotion (15%)	Driver Availability (23%)	Total
Gojek	0.28	0.04	0.06	0.09	0.47
Grab	0.15	0.03	0.06	0.09	0.33
Maxim	0.08	0.04	0.03	0.05	0.20

Based on the results of data processing using the Analytical Hierarchy Process (AHP) method, it is found that service speed is the most influential criterion in user decision making in choosing an online transportation application, with a weight of 0.51. This shows that respondents have a very large consideration in considering response time and speed of service in using the application. The next criteria that also received great attention was the availability of drivers with a weight of 0.23, then promotions of 0.15, and the last choice was price with the lowest weight of 0.11.

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This finding indicates that although price remains one of the important and determining factors, users place more emphasis on ease of access and time efficiency. From the results of the calculation of global priorities for three alternative applications, it is known that Gojek has the highest score of 0.46, making it the most prioritized application by respondents. Gojek shows a fairly balanced performance across all criteria, with the highest value in the aspect of service speed (0.28), which reflects user perceptions of the ease of getting services whenever needed. In addition, Gojek also showed excellence in driver availability (0.09) and promotions (0.06), making it an attractive option in terms of cost and special offers. Despite not being the best in terms of price, Gojek is suitable for consumers who need a fast and accessible app, albeit at a higher price.

Meanwhile, Grab took second place with a total score of 0.33. This app stands out on the criteria of driver availability, with the highest score of 0.99 and promotion of 0.06, this shows that grab is seen as responsive in getting drivers and offering cheaper prices due to promotions by users. In this case grab has a higher score in terms of driver availability compared to gojek, although in terms of promotion it has the same score. This shows that grab does not dominate in one particular criterion, but has a balanced performance.

On the other hand, Maxim comes in last with a total score of 0.20. This low score indicates that the Maxim app is not yet the first choice for users. The lowest scores were found in the speed of service (0.08) and promotion (0.03) criteria, indicating that the speed of service and promotion provided are still not in line with user expectations. However, Maxim scores quite well on the price criterion (0.04), which indicates that although Maxim is not yet the first choice due to its lack of excellence in other criteria, Maxim is still quite competitive in the field in terms of price.

Overall, the results of this study show that apps that offer even performance across all criteria, such as Gojek, tend to be preferred by users over apps that only excel in one aspect. This shows the importance of balance in service quality in order to meet the diverse needs of consumers. Therefore, online transportation service providers need to pay attention not only to speed, but also other supporting factors such as competitive pricing, adequate driver availability, and attractive promotional strategies to increase user preference and loyalty.

Meanwhile, based on interviews with ten respondents consisting of university students and workers, it was found that the most frequently used online transportation applications are Gojek and Grab. This preference is primarily driven by factors such as service speed, driver availability, and ease of use. A small number of respondents opted for Maxim, mainly due to its lower prices. Overall, service speed emerged as the most dominant factor influencing the choice of application, as most respondents had experienced delays caused by slow services. Price was also an important consideration, particularly for students with limited budgets, although it generally ranked below service speed in terms of priority.

Driver availability was considered crucial by all respondents, as the absence of available drivers renders the application ineffective, regardless of competitive pricing or promotional offers. Promotions and discounts were seen as attractive added values, but not the primary deciding factors, except for certain respondents who prioritized cost savings. In urgent situations, nearly all respondents prioritized service speed over price or promotions. Therefore, it can be concluded that the most preferred online transportation applications are those that are able to offer fast service, high driver availability, and competitive pricing, with appealing promotions serving as an additional advantage.

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Conclusion and Suggestions

Based on the results of the analysis using the AHP method, it can be concluded that the selection of online transportation applications by users is strongly influenced by aspects of service speed and driver availability. Gojek is the most prioritized application by respondents because it excels in terms of service speed, promotion, and driver availability. Grab is in the second position with a fairly good performance in the aspects of driver availability and promotion, while Maxim is in the last position because it is still lacking in terms of speed and promotion even though it excels in the aspect of price. This shows that price is not the only determining factor, but only a complement to key factors such as service speed and convenience. The AHP method proved effective in deciphering user preferences and providing recommendations based on a systematic decision-making hierarchy structure.

For online transportation application developers, it is recommended to focus on improving service quality, especially in terms of response speed and driver availability in various regions. This is important to increase user satisfaction and loyalty. In addition, a consistent and user needs-oriented promotional strategy can be a significant added value. For future research, it is recommended to expand the number of respondents and involve a wider area so that the results are more representative. The addition of new variables such as security features, ease of application interface, or user experience will also enrich the analysis and deepen the understanding of consumer preferences more comprehensively.

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