

Analysis of Transportation Mode Selection Factors Using the Ranking Method (Case Study: Tapaktuan to Banda Aceh)

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ABSTRACT

The development of a region is always accompanied by growth in the transportation sector. Tapaktuan is a developing city. Many residents of Tapaktuan travel to the provincial capital, Banda Aceh. Along the way, they encounter various modes of transportation. The most preferred means of mobility are private cars or public transportation. This study aims to identify the factors influencing the public's choice of transportation mode. The method used in this study is the ranking method. A total of 80 respondents were surveyed. Data analysis indicates that the variables influencing the choice of transportation options to Banda Aceh include travel time (214), cost/fare (212), vehicle facilities (195), waiting time (181), departure frequency (155), distance (134), and ticketing system (113).

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I. Introduction

The development of a region is always accompanied by rapid advancements in the transportation sector. Transportation plays a vital role in boosting a region's economy. Transportation infrastructure enhances the movement of people and resources, facilitating economic growth across various regions [1].

To meet their needs, people travel. This travel takes them from one city to another. To make this travel possible, individuals need a means of transportation. The choice of transportation mode occurs as a result of the need for movement, and movement occurs because of the process of fulfilling needs [2]. The choice of transportation mode stems from the need for mobility, and mobility is achieved by fulfilling that need [3]. The prevailing trend in choosing transportation modes is that people prefer vehicles that minimize travel time and are affordable. Public transportation better meets these criteria, but the service provided is inferior to private vehicles, so travelers prefer to use private vehicles [4]. The high number of private vehicles indicates that the public generally still relies on private transportation rather than mass transportation [5].

Tapaktuan is a city located on the southern coast of Aceh; it boasts a natural harbor and serves as the foundation of the maritime economy in Aceh Province [6]. According to BPS data, the population of Tapaktuan in 2023 was 22,352 people [7]. Residents of Tapaktuan frequently travel to Banda Aceh, the capital of Aceh Province. They have several transportation options for that trip, such as private vehicles or public transportation. Many factors influence those traveling from Tapaktuan to Banda Aceh. This study aims to identify the main factors influencing the choice of transportation mode.



II. Method

A. Location and Time of Research

Data collection took place in the city of Tapaktuan. Questionnaires were distributed over a three-day period, from May 18 to May 20, 2026.

B. Data Collection Methods

- The data used in this study are: Primary data, including questions related to cost, time, ticketing system, distance, waiting time, vehicle facilities, and departure frequency.
- Secondary data, including the number of passengers during the study period, departure schedules for each analysed mode of transportation, cost structures for each mode, and average travel duration for each mode. The factors influencing the choice of transportation mode to Banda Aceh from the city of Tapaktuan can be seen in Table 1.

Table 1. Factors influencing mode choice

No	Factors Influencing Mode Choice
1	Fare
2	Travel Time
3	Ticketing System
4	Distance
5	Waiting Time
6	Vehicle Facilities
7	Departure Frequency

C. Data Processing and Analysis Methods

Data processing was conducted using a ranking method, The ranking method is highly reliable because it is fast and easy to understand. A suitable sample size in research is more than 30 and less than 500 [8]. A total of 80 respondents were surveyed, respondents were selected who had traveled to Banda Aceh in which respondents were asked to complete the questionnaire by assigning a number from 1 to 7 to each option. Subsequently, the following values are assigned: option 1 is assigned a value of 7, option 2 a value of 6, option 3 a value of 5, option 4 a value of 4, option 5 a value of 3, option 6 a value of 2, and option 7 a value of 1. The total of each obtained value is then calculated

III. Results and Discussion

3.1 Research Results

a. Gender

The characteristics of the number of commuters using various modes of transportation to Banda Aceh by gender are shown in Table 2.

Table 2. Percentage of Transportation Passengers by Gender

Gender	Number of Choosers	Percentage
Male	21	26.25 %
Female	59	73.75 %

b. Age

Passenger characteristics based on age can be seen in Table 3.

Table 3. Percentage of Transportation Passengers by Age

Age (years)	Number	Percentage (%)
15-20	3	3.75
21-25	15	18.75
26-30	18	22.5
31-35	24	30
36-40	11	13.75
>40	9	11.25

c. Education Level

Passenger characteristics based on education level can be seen in Table 4.

Table 4. Percentage of Transportation Passengers by Education Level

Education Level	Number	Percentage (%)
Junior High School	0	0
Senior High School	4	5
Diploma	31	38.75
Bachelor's/Master's/Doctoral	45	56.25

d. Occupation

Passenger characteristics based on occupation can be seen in Table 5.

Table 5 Percentage of Transportation Passengers by Occupation

Education Level	Number	Percentage (%)
University Students	8	10
Farmers	6	7.5
Entrepreneurs	19	23.75
Civil Servants/Honorary Staff/Military/Police	47	58.75

e. Income

Passenger characteristics based on income can be seen in Table 6.

Table 6 Percentage of Transportation Passengers by Income

Income	Number	Percentage (%)
≤ Rp. 1,000,000	41	51.25

Income	Number	Percentage (%)
Rp. 1,000,000 - Rp. 3,000,000	26	32.5
Rp. 3,000,000 - Rp. 5,000,000	9	11.25
$\geq$ Rp. 5,000,000	4	5

The 80 respondents have provided assessments on each of the factors that influence the travel of people from Tapaktuan to Banda Aceh city. The analytical findings are shown in Table 7.

Table 7. Results of Factor Analysis Influencing Mode Choice

No	Factors Influencing Mode Choice	Analysis Results
1	Fare	212
2	Travel Time	214
3	Ticketing System	113
4	Distance	134
5	Waiting Time	181
6	Vehicle Facilities	195
7	Departure Frequency	155

From the graph above, the ranking results identify travel time, fare, and vehicle facilities as the three most influential factors in choosing a mode of transport to Banda Aceh Cit

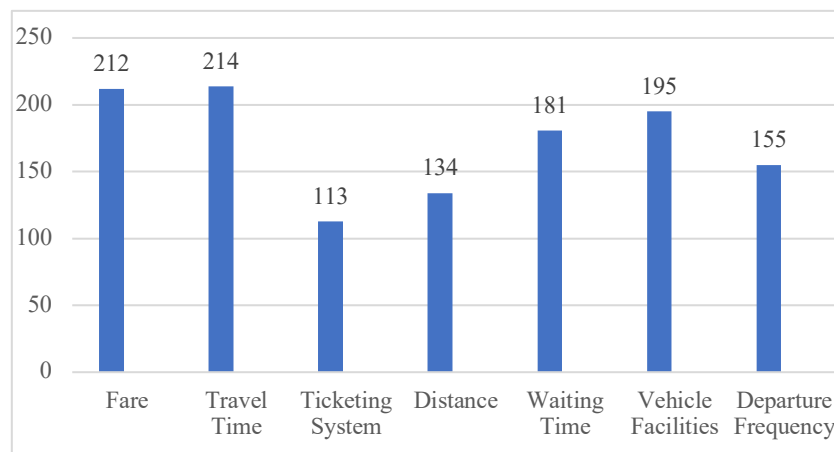


Fig 1. Mode Choice Factors for Private and Public Vehicle Users

IV. Conclusion

This indicates that the public prefers transportation modes that offer fast travel times, lower fares, and good facilities.

1. The dominant factors in mode choice are travelling time with a value of 214, This shows that fast and timely travel is a top priority. fare with value of 212, Ticket prices, fuel, and parking often determine the choice. Public transportation is often chosen because it's much more economical

- than bearing the operating costs of a private vehicle and vehicle facilities with a value of 195, people need comfort in traveling.
2. The government must evaluate the issues influencing mode choice to improve the variety of public transportation options.
 3. Several previous studies have shown that safety (28.3%) is the primary factor in selecting a mode of transportation, followed by security (23.3%) and reliability (12.3%) and factors inherent to the vehicle [9].

References

- [1] Rahmad, Saputra, Renni Anggraini, and M. Isya. "Analisa FaktorFaktor Yang Mempengaruhi Pemilihan Moda Menuju Tempat Kerja Menggunakan Metode *Analytic Hierarchy Process*." *Jurnal Teknik Sipil* 1(1): 99–218, 2017.
- [2] Saputra, R. Analisa Fator Faktor yang Mempengaruhi Pemilihan Moda menuju tempat kerja Menggunakan Metode AHP. *Jurnal Teknik Sipil* 1(1)199-218. 2017
- [3] Tamin, O Z. *Perencanaan, Permodelan, & RekayasaTransportasi : Teori, Contoh Soal, Dan Aplikasi*, ITB, 2008.
- [4] Prayoga, G. Model Probabilitas Alih Moda Sepeda Motor ke Angkutan Kota di Bekasi Timur. *Jurnal Teknik ITS*. 5(1):23-28.2016.
- [5] Dinda, R., Anggraini, R. & Sugiarto, S. Model Bangkitan Pergerakan Rumah Tangga Bagi Pengguna Sepeda Motor Berdasarkan Lokasi Tujuan Perjalanan Di Kota Banda Aceh. Banda Aceh: *Jurnal Arsip Rekayasa Sipil dan Perencanaan* 1(3):19-30. 2018.
- [6] Rangkuti E. "Analysis of Ecotourism Potential (Ecotourism) in Tapaktuan sub District, 2021.
- [7] South Aceh District". *Jurnal Akademi Pariwisata Medan* ISSN 2656-0992 (Online), ISSN 1858 – 2842 (Print), Januari - Juni 2021, Vol. 9 No.1, 2021.
- [8] Roscoe, J. T. *Fundamental research statistics for the behavioural sciences*.(2nd ed.) New York: Holt Rinehart & Winston.1975.
- [9] Sugiyanto, Arnaya .I.W, Ryanto S.S & Surya. A. Analisa Faktor Pemilihan Moda Transportasi Menggunakan Metode *Analytic Hierarchy Process*. *Jurnal Teknologi Transportasi dan Logistik* Volume 2 No 1, Juni 2021, Hal 11 – 18.2021.
- [10] Rater Salya,Balkhaya, "The Influence of Social Media Digital Marketing Analysis on New Student Acceptance in a University" *J.inotera*, Vol. 8 No.1 PP. 150-154, 2023