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# ANALYSIS OF SELECTION AND PERFORMANCE OF PUBLIC TRANSPORT MODE IN TARAKAN CITY

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## *Abstract*

*The problems of passenger transportation (TAP) in Tarakan City are multi-dimensional, such as, fares and routes that are less organized and uneven, inconvenience and less secure, excess passengers during peak hours and vice versa, condition of operator systems, increased pollution and noise and the number of accidents and traffic violations, and driver behavior. In short, the root of the problem is the incompatibility between the Regional Spatial Plan (RTRW) for the city of Tarakan and the TAP. This study aims to assess the performance of passenger transportation based on descriptive statistical methods to: see the demand for population movement; route performance and transport operations; and the performance of transportation infrastructure, as well as the level of road service in the form of the ratio of volume per road segment capacity. The results achieved found that the existing performance of TAP in Tarakan City was relatively not optimal, the level of main road service on secondary roads because the increase in vehicle volume was significantly influenced by the high population movement, land use, level of transportation service, transportation comfort, load factor, and road conditions.*
*Keywords: passenger transport, sustainable, transportation, tarakan*

## Abstrak

*Permasalahan angkutan penumpang (TAP) di Kota Tarakan bersifat multidimensi seperti tarif dan rute yang kurang tertata dan tidak merata, ketidaknyamanan dan kurang aman, kelebihan penumpang pada jam sibuk dan sebaliknya, kondisi sistem operator, meningkatnya polusi. dan kebisingan dan jumlah kecelakaan dan pelanggaran lalu lintas, dan perilaku pengemudi. Singkatnya, akar masalahnya adalah ketidaksesuaian antara Rencana Tata Ruang Wilayah (RTRW) Kota Tarakan dan TAP. Penelitian ini bertujuan untuk menilai kinerja angkutan penumpang berdasarkan metode statistik deskriptif untuk: melihat permintaan pergerakan penduduk; kinerja rute dan operasi transportasi; dan kinerja prasarana transportasi, serta tingkat pelayanan jalan berupa rasio volume per kapasitas ruas jalan. Hasil yang dicapai diketahui bahwa kinerja eksisting TAP di Kota Tarakan relatif belum optimal, tingkat pelayanan jalan utama pada jalan sekunder karena peningkatan volume kendaraan sangat dipengaruhi oleh pergerakan penduduk yang tinggi, tata guna lahan, tingkat pelayanan transportasi, kenyamanan transportasi, faktor beban, dan kondisi jalan.*
*Kata kunci: angkutan penumpang, berkelanjutan, transportasi, tarakan*

## INTRODUCTION

The phenomena of the transportation system in Tarakan City include increased routes and parking areas, high rates of accidents and traffic violations, widespread congestion and delays, high levels of pollution and noise and decreased driving comfort and safety. Meanwhile, the specific problems are (a) operational (fare, convenience, security, punctuality, and so on); (b) management (routes, permits, fleets, funds, subsidies, etc.); and (c) planning.[1]

If simplified the problems of TAP in the city of Tarakan are 1) congestion in the city center; 2) the existence of community groups that have not been served, due to the limited service radius; and 3) increased pollution due to TAP, and social, economic, and environmental problems. Therefore, this research was conducted as a response to the problems of the TAP system in Tarakan City, especially in terms of accessibility in the form of evaluating the effectiveness of route arrangement, and achieving the synergy of spatial planning and transportation in the form of optimizing spatial and transportation interactions.[2]

This study aims to: assess, analyze, and formulate the performance of TAP in Tarakan City as a basis for designing a sustainable and integrated transportation system model with the Tarakan City Spatial Plan 2010 - 2030. The expected benefit is the compilation of information about the performance of the TAP route pattern in Tarakan City so that to obtain the level of sustainability.

## RESEARCH METHOD

This study examines the existing performance of TAP in Tarakan City by analyzing: passenger demand, operating performance, infrastructure, and road service levels based on the Tarakan City RTRW 2010 - 2030. Secondary data retrieval was obtained from the Tarakan City Transportation Agency, the Public Works Department in the Tarakan City Highways Sector and Tarakan City Tratalok documents that are representative and relevant to the topic of this research, while primary data is taken directly in the field through observation and surveys. In addition, direct interviews were also conducted with the TAP driver in Tarakan City on board a vehicle (onboard survey) as well as observing the selected route in one trip in the Tarakan City sub-district. TAP Performance Analysis is based on spatial and non-spatial-based demand assessment with the following multiple linear regression mathematical equation formula:[3]

[1] Theuns Henning, Mohammed Dalil Essakali, and Jung Eun Oh, "A Framework for Urban Transport Benchmarking" (Washington, DC: World Bank, 2011).

[2] Rendy Muhammad Mubarok and Ludfi Djakfar, "An Alternate Method to Evaluate Public Transportation Performance," *IRJAES* 4, no. 3 (2019).

[3] Eric Bruun, Duncan Allen, and Moshe Givoni, "Choosing the Right Public Transport Solution Based on Performance of Components," *Transport* 33, no. 4 (2018), https://doi.org/10.3846/transport.2018.6157.

$Y_1 = a_1 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5 X_5 + b_6X_6 + b_7 X_7$

To support the selection of the TAP route selection as a function of the optimal route, the optimal path selection stage is carried out by utilizing data on travel distances or interactions between regions within the city of Tarakan using the Lowry Model and road network data with the best route from one point on a predetermined road segment on 4 districts. The process of spatial analysis in the management of TAP optimal path selection uses road network data were the best route from one point is determined based on the distance of the road to the map of land use patterns and population density.[4]

## RESULT AND DISCUSSION

### A. Tarakan City Transportation System

The transportation system in Tarakan City basically consists of land, water and air modes. In particular, urban transportation is dominated by land modes, including TAP, which is reviewed based on data and information such as: traffic volume, road capacity and characteristics, transportation infrastructure and facilities, vehicle emission levels and city ambient air quality, and accident rates, traffic violations, and congestion.[5]

| | | |
|---|---|---|
| $Y_1$ | = | Dependent variable is the numer of transportation needs/ travel desires constant number |
| $a_1$ | = | transportation/travel wishes |
| $b_1X_1$ | = | population parameter and independent variable (life/km2) |
| $b_2X_2$ | = | socioeconomic parameters and independent variables (units) |
| $b_3X_3$ | = | land use independent parameters and variables |
| $b_4X_4$ | = | service level independent parameters and variables |
| $b_5X_5$ | = | price/cost-free parameters and variables |
| $b_6X_6$ | = | convenience-free parameters and variables |
| $b_7X_7$ | = | travel time independent parameters and variables |

This land transportation condition includes the road network, TAP routes and terminals. Based on its status, until 2016 the road network of Tarakan City was about 169.037 Km in length.

[4] Jitendra Gurjar, P.K. Jain, and P.K. Agarwal, "Comparative Performance Evaluation of Public Transport Services from City Perspective," *Transportation Research Procedia* 48 (2020), https://doi.org/10.1016/j.trpro.2020.08.277.

[5] Hana Fitzová, Markéta Matulová, and Zdeněk Tomeš, "Determinants of Urban Public Transport Efficiency: Case Study of the Czech Republic," *European Transport Research Review* 10, no. 2 (2018): 42, https://doi.org/10.1186/s12544-018-0311-y.

Table 1. Roads in Tarakan City by Condition, Surface Type, Road Class

| No | Information | Road Length (Km) | | | | |
|---|---|---|---|---|---|---|
| | | 2011 | 2012 | 2013 | 2014 | 2015 |
| 1 | Road Condition | | | | | |
| | a. Well | 97,040 | 112,503 | 122,027 | 126,778 | 138.510 |
| | b.Medium | 31,870 | 22,501 | 22,880 | 33,807 | 29.430 |
| | c. Damaged | 12,284 | 15,000 | 7,267 | 8,452 | 5.190 |
| | Amount | 141,194 | 150,004 | 152,174 | 169,037 | 173,137 |
| 2 | Surface Type | | | | | |
| | a.Asphalt | 19,627 | 20,167 | 20,250 | 21,666 | 133.090 |
| | b.Hotmix | 81,611 | 85,271 | 91,263 | 105,705 | 0 |
| | c.Stone/Gravel | 7,350 | 7,450 | 6,150 | 3,470 | 3.300 |
| | d.Land | 32,606 | 37,116 | 34,871 | 38,196 | 36.747 |
| | Amount | 141,194 | 150,004 | 152,534 | 169,037 | 173,137 |
| 3 | Street Class | | | | | |
| | a.Class I | - | - | - | - | - |
| | b.Class II | - | - | - | - | - |
| | c.Class III | - | - | - | - | - |
| | d.Class IIIa | 34,490 | 34,490 | 34,490 | 34,490 | 34,490 |
| No | Information | Road Length (Km) | | | | |
| | | 2004 | 2005 | 2006 | 2007 | 2008 |
| | e.Class IIIb | 40,460 | 40,460 | 40,460 | 40,460 | 40,460 |
| | f.Class IIIc | 17,201 | 17,201 | 17,951 | 18,701 | 19.450 |
| | g.Class tidak dirinci | 49,043 | 57,853 | 59,633 | 75,386 | 78.740 |
| | Jumlah | 141,194 | 150,004 | 152,534 | 169,037 | 173,137 |
| 4 | Authorized Goverment | | | | | |
| | Country | - | - | - | - | 3,460 |
| | Province | - | - | - | - | - |
| | Country/City | 141,194 | 150,004 | 152,534 | 169,037 | 169,677 |
| | Amount | 141,194 | 150,004 | 152,534 | 169,037 | 173,137 |

From the existing conditions, there are several potential problems with the Tarakan City transportation network (based on the Local Transportation Level (Tratalok) and the Tarakan City Transportation Service):

a. Traffic density is concentrated in the city center, while the traffic volume outside the city is still low because the area is not yet developed (North Tarakan District) so traffic generation has not formed a stable pattern.
b. The road network has not yet reached all parts of the island and some of the main roads are still dirt roads that are difficult for vehicles to pass when it rains, such as Jalan Mambirdan and Jalan Karungan Tanjung Pasir.
c. Currently, there are several embryos of dirt roads as an effort to develop road networks and accessibility on Tarakan Island (a dirt road on the coast of Amal Beach to Jalan Mambrungan, from the Kampung Enam area to Binalatung, Jalan Karungan-Tanjung Pasir and a dirt road in the Juanita Permai area.
d. The road network in the center of Tarakan City is prone to congestion because it is relatively narrow, the parking pattern is not adequate, and there is no transportation management system that regulates the movement of traffic modes so that various types of vehicles are free to enter the city center and many city transportations are stalled.
e. Several roads in the city center have a fairly large traffic load, which is feared to affect the performance of the road network (Yos Sudarso Street, Jenderal Sudirman Street, Mulawarman Street, and Halmahera Street).

The Minimum Service Standard (SPM) for roads in Tarakan City was developed based on the perspective of the community as users, where the size is a common indicator desired by users. SPM was developed from 3 basic wishes of road users, namely: (1) good road conditions (no potholes) (2) no traffic jams (smooth all the time), and (3) can be used throughout the year (no flooding during the rainy season). In this regard, the City Government of Tarakan accommodates public demands for MSS by following technical norms/rules/aspects and financing.[6] The results of the assessment comparing the existing condition of the existing road network in Tarakan City with the Road SPM can be seen in the following table.

[6] Gang Lin et al., "Evaluating Performance of Public Transport Networks by Using Public Transport Criteria Matrix Analytic Hierarchy Process Models—Case Study of Stonnington, Bayswater, and Cockburn Public Transport Network," *Sustainability* 13, no. 12 (2021), https://doi.org/10.3390/su13126949.

Table 2. Results of Assessment of Road Network Service Levels in Tarakan City

| Paramr | | Score | Information |
|---|---|---|---|
| City Area ($km^2$) | | 406,53 | |
| Road Length (km) | | 169,037 | |
| Total Population (people) | | 176.981 | |
| Population density people/km2) | | 706 | |
| Accessibility index = road length/area (km/km2) | Existing | 0,42 | Existing condition above standard minimum |
| | Minimum standard | > 0,05 | |
| Mobility index = (street length/1000 inhabitants) | Existing | 0,17 | Existing condition is below standard minimum |
| | Minimum Standard | > 2 | |

Based on table 2 above, it can be seen that the value of the accessibility index and the mobility index are overall above the SPM. This means that the existing road network has relatively reached the entire city of Tarakan while judging from the mobility index it is still below the minimum standard. But if we look at the condition of the road, there are still many roads whose surface is made of dirt or gravel and most of them are damaged. Thus, it is necessary to improve the condition of the existing road network.[7]

## B. Transportation Infrastructure Development

The development of the urban transportation system in the form of engineering and transportation management is directed to spur the economic, social, and physical development of the City of Tarakan. The land transportation network system includes (a) a Road transport traffic network; and (b) River, lake, and ferry transportation network. While the road transport traffic network, includes:[8]

a. Road Network
   1) The primary road network system, namely the primary arteries, includes the sections, P. Aji Iskandar Street, Aki Balak Street, Bhayangkara Street, Mulawarman Street, Yos Sudarso Street.
   2) The secondary road network system consists of:

[7] Todd Litman, "Evaluating Public Transit Benefits and Costs," *Victoria Transport Policy Institute*, 2022, 141.

[8] European Investment Bank., *Evaluation of the EIB Support to Urban Public Transport in the EU (2007-2019): Synthesis Report.* (LU: Publications Office, 2021), https://data.europa.eu/doi/10.2867/202324.

a) The secondary arterial road network system includes the Juata Laut – Amal Beach Ring Road, Gajah Mada Street, Jenderal Sudirman Street, Kusuma Bangsa Street, RE Martadinata Road, Banda Road, Kalimantan Road, Patimura Road, Sumatra Island Road, Sadau Island Road, Sungai Road Sesayap, Jalan Sungai Kapuas, Jalan Sungai Kayan, Jalan Sungai Mahakam, and Jalan Sungai Sembakung.
b) The secondary collector road network system includes Amal Baru Beach Street and Mambirdan Street

3) Directions for the development of the road network system consist of:
a) improved road conditions for primary and secondary arterial roads; and
b) construction of new roads as extensions of existing roads for secondary collector roads;

b. The traffic and road transport infrastructure network consists of:
1) The plot intersections are located at Mulawarman Street, Yos Sudarso Street, Gajah Mada Street, Jenderal Sudirman Street, Kusuma Bangsa Street, Diponegoro Street, Panglima Batur Street, Halmahera Street, Sumatra Street, Teuku Umar Street, Martadinata Street, Sungai Sesayap Street, Sadau Street.
2) The median availability is on Mulawarwan Street, Yos Sudarso Street, Kusuma Bangsa Street, Gajah Mada Street.

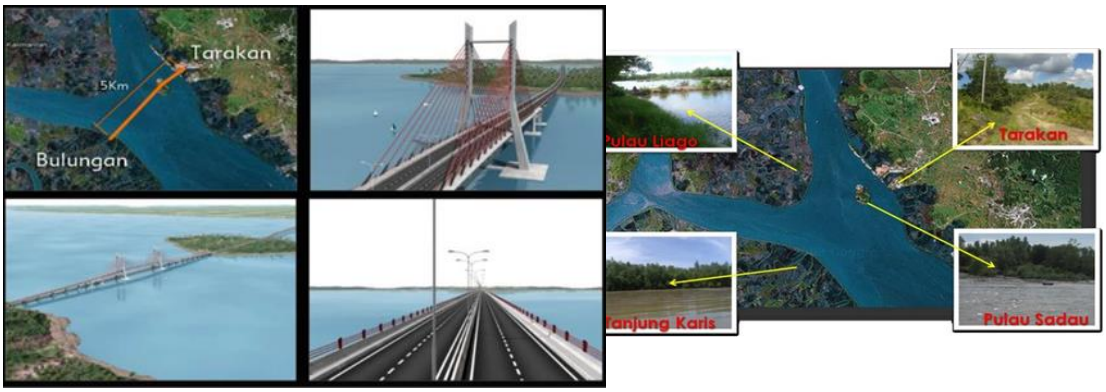
c. The traffic and road transport service network includes a terminal development plan. The provision of terminals is linked to the planned system of service centers, namely at the City Service Center, at the Sub City Service Center, and in the Juata Laut Ferry Port area. The terminal development consists of:[9]

- Type C terminal development includes (a) Boom Panjang Terminal in Pamusian Village, Central Tarakan District; and (b) Simpang Tiga Terminal in Karanganyar Pantai Village, West Tarakan District.
- Sub-terminal development, including (a) Amal Beach Sub-terminal in Pantai Amal Village, East Tarakan District; (b) Tanjung Simaya Sub-terminal in Juatalaut Village, North Tarakan District, and (c) Juata Laut Sub-terminal in Juata Laut Sub-district, North Tarakan District.

[9] European Commission. Directorate General for Regional and Urban Policy., *How Many People Can You Reach by Public Transport, Bicycle or on Foot in European Cities?: Measuring Urban Accessibility for Low Carbon Modes.* (LU: Publications Office, 2020), https://data.europa.eu/doi/10.2776/021137.

d. Bridge cpmmecting Tarakan City

The plan for the construction of the 5 km Tarakan – Bulungan bridge which will be built in Karang Harapan Village, West Tarakan District and will pass through Sadau Island, see the following picture.




Meanwhile, the transportation network for rivers, lakes, and crossings in Tarakan City consists of: (a). Tengkayu I Port in Selengkung Village, Central Tarakan District; and (b) Ferry Port in Juata Laut Village, North Tarakan District as a ferry port. In addition, the road quality and quantity development program in Tarakan City for the period 2010 – 2030 is in the form of improvements (secondary collector roads = 30 km, primary collector roads = 15 km; primary arterial roads = 11.5 km, and secondary arterial roads = 13 km). ,6 km). For the construction of a secondary collector road along 42 km and a secondary arterial road along 13 km.

## C. Passenger Movement Request

The need for TAP services in Tarakan City cannot be separated from the need for urban transportation that arises because the location of population activities is spatially scattered so that the journey also spreads to all parts of the city area. The distribution pattern is based on the land use plan that has been planned in the RTRW of Tarakan City 2010 - 2030. Under these conditions, it is possible to identify the variables that cause transportation needs or demand for movement or population in each sub-district in Tarakan City.[10]

Analysis of demand for movement or transportation in Tarakan City which is calculated by correlation statistics and multiple regression analysis, variables: population (x1), socioeconomic (x2), land use (x3), service level (x4), transportation prices/costs (x5 ), the convenience of transportation services (x6), and travel time (x7) the results are as follows:[11]

[10] Atik Wahyuni, Sri Wiwoho Mudjanarko, and Emil Adly, "Importance and Performance of Public Transportation Services Based on Women's Perceptions," *Jurnal Rekayasa Sipil dan Lingkungan* 4, no. 1 (2020): 31, https://doi.org/10.19184/jrsl.v4i1.13580.

[11] Laura Eboli and Gabriella Mazzulla, "Performance Indicators for an Objective Measure of Public Transport Service Quality," *European Transport /Trasporti Europei* 51, no. 51 (2012): 21.

1. The regression equation for the prediction of sub-district ranking with factors that affect the demand for population movement per sub-district in Tarakan City (East Tarakan, Central Tarakan, West Tarakan, and North Tarakan) is Y = 101.26- 0.103X1+ 4112X2+ 0.11X3+ 0.737X4-2.12 X5+ 1.007X6- 1.567X7.
2. The correlation coefficient in general is not significant (mean sig 0.026 > alpha value), but the correlation between rank and service level (x4), convenience (x6), and travel time (x7) is significant.
3. The results of the Summary Model projection identify the multiple correlation coefficient between the seven variables with a rating of 0.948 and the value of the coefficient of determination of the regression equation is 0.889 and the value of the coefficient of determination adjusted for more than one independent variable is 0.779, which means the coefficient of determination is statistically significant.
4. The mean for the kecamatan rankings is 27.8; total population (x1) 41.5; socioeconomic (x2) 24.6; land use (x3) 51.7; service level (x4) 38.9; transportation costs (x5) 24.7; comfort (x6) 26.9; and travel time (x7) 79.4. The highest mean values are travel time (x7), land use (x3), and population (x1) where the highest standard deviation affects land use (x3) and population (x1).

The demand for population movement of Tarakan City based on activity and spatial distribution of locations in each sub-district is predicted to be very significantly influenced by factors: population (x1), socioeconomic (x2), land use (x3), service level (x4), price/cost transportation (x5), the convenience of transportation services (x6), and travel time (x7).

The projected population movement demand based on sub-districts in Tarakan City will decrease in line with the increase in population (x1: - 0.103), transportation costs (x5: -2.12), and travel time (x7: -1.566). While the factors that have a positive effect on the demand for population movement are socioeconomic (x2: 4.112), land use (x3: 0.114), service level (x4: 0.737), and comfort (x6: 1.27).

Based on the display of the relationship between the seven independent variables, it is shown that there are three categories of a grouping of factors that affect the transportation demand for Tarakan City, namely the low category (0-30%), medium (31-67%), and high (68-100%). In addition, the factors that influence the demand for transportation in each sub-district in Tarakan City (East Tarakan, Middle Tarakan, West Tarakan, and North Tarakan) are also identified. The categories of grouping of influential factors are 0-19% (very low), 20-39% (low), 40-59% (moderate), 60-79% (high), and 80-100% (very high).

Several problems related to these conditions, including low accessibility due to the large number of areas in Tarakan City that have not been served and the low level of TAP services due

to relatively high waiting times between 33-46 minutes. In addition, long travel times because the service hierarchy is not optimal has an impact on the occurrence of long-distance routes (Long Boom Terminal – Juata Kerikil, and Gusher Terminal – Juata Laut) and there is accumulation or overlapping of routes on several routes between areas within the city and has direct implications for the increase in public transport fares.[12]

## D. TAP Route Performance

The performance of the TAP route in Tarakan City is assessed based on effectiveness, efficiency, and user satisfaction as well as its qualitative function in the form of measuring the ability, effort, and opportunity for entrepreneurs in providing TAP. The results of the study of each independent/independent variable of the performance of the Tarakan City TAP route: load factor/filling (x8), number of passengers transported (x9), passenger waiting time (x10), causes of delay (x11), transportation provision (x12 ), the level of fuel consumption (x13), the time between (x14), and travel speed (x15), in 4 sub-districts in Tarakan City the relationship is evident, especially on the 3 (three) main routes, namely routes A, B, and C with a scale the sum of the route priorities.[13]

The analysis of the performance of the Tarakan City TAP route was calculated by statistical correlation projections and multiple regression analysis, where Y2 or route performance was the dependent variable. While the independent variables are: load factor/filling (x8), number of passengers transported (x9), waiting time for passengers (x10), causes of delay (x11), transportation provision (x12), fuel consumption level (x13), the time between (x14), and travel speed (x15), which are assumed to be factors that can improve the performance of the TAP route in Tarakan City.[14]

Correlation and regression analysis of the performance of the TAP route in Tarakan City, the result is Y = 50.213 + 0.801X 8 - 4.348X 12. The correlation coefficient value of the Stepwise Method is 0.996 (coefficient of determination 0.995) where Sig constant < alpha while Sig load factor/filling (x8) < alpha is statistically significant and Sig transportation provision (x12) > alpha so that it is not statistically significant.[15]

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[12] Zhike Han, Luoyuan Liao, and Gui Wang, "Research on Performance Evaluation Method of Public Transit Routes Based on BCC Model," *Filomat* 32, no. 5 (2018), https://doi.org/10.2298/FIL1805887H.

[13] Mark Wardman, "Valuing Convenience in Public Transport: Roundtable Summary and Conclusions," *International Transport Forum Discussion Papers*, 2014, 73.

[14] A. Munawar, "Sustainable Urban Public Transport Planning in Indonesia, Case Studies in Yogyakarta and Jakarta," 2008, 6, https://www.semanticscholar.org/paper/Sustainable-Urban-Public-Transport-Planning-in-Case-Munawar/2e0b948125a64a60452030a18f2f3a852fa36abe.

[15] Johan Holmgren, "The Efficiency of Public Transport Operations – An Evaluation Using Stochastic Frontier Analysis," *Research in Transportation Economics* 39, no. 1 (2013): 50–57, https://doi.org/10.1016/j.retrec.2012.05.023.

The performance of the Tarakan City TAP route/route based on the route distribution is very significantly influenced by the load factor/filling (x8), and significantly by the provision of transportation (x12), while the number of passengers transported (x9), the time between (x14), passenger waiting time (x10), travel speed (x15), causes of slowness (x11), and level of fuel consumption (x13), are not significant. Thus it can be concluded that the distribution of route priorities has followed a normal distribution. Furthermore, the results of the analysis and assessment demonstrate that the factors that influence the performance of the TAP route in each route vary widely.[16] The category of routes based on various factors was varied and relatively low across all routes; medium category on Route B (Gusher – Juata Gravel), route C (Gusher – Juata Laut), and high category on Route A (Boom Panjang – Jalan Kusuma Bangsa – Jalan Yos Sudarso – Jalan Gajah Mada – Jalan Mulawarman – Jalan Sudirman – Jalan Martadinata – Sumatran Street (Ladang) – Patimura Street (Markoni) – Slamet Riyadi Street – inner city streets).[17]

Thus it can be interpreted that this condition is in line with several problems in the arrangement of the Tarakan City TAP, namely: the level of accessibility is still low so people have to make several transportation changes to get to their destinations, and there is still unofficial city transportation in addition to the use of other modes such as dark taxis. many of which originate at the SDF Tengkayu II Port, the waiting time for transportation is relatively high at off-peak hours, the route distance is quite long, especially to North Tarakan (Juata Laut and Juata Gravel), and the passenger load factor fluctuates with short frequency during peak hours ( peak hours: hours of going to and from work/school).[18]

## CONCLUSION

Based on the results of the analysis and discussion described above, it can be concluded as follows:

1. The existing performance of the transportation route pattern in Tarakan City is relatively not yet optimal in the level of main road services on secondary roads because the increase in vehicle volume is significantly influenced by the high population movement, land use, level of transportation service, transportation comfort, load factor, and road conditions;

[16] Vanessa Stjernborg and Ola Mattisson, "The Role of Public Transport in Society—A Case Study of General Policy Documents in Sweden," *Sustainability* 8, no. 11 (2016): 1120, https://doi.org/10.3390/su8111120.

[17] G K Sinniah, X Y Li, and S Abdulkarim, "The Framework for Assessing Public Transportation by Using Competitiveness Index Indicators," *IOP Conference Series: Materials Science and Engineering* 1153, no. 1 (2021): 012012, https://doi.org/10.1088/1757-899X/1153/1/012012.

[18] Theodorus Pandhu Bhaskoro Pradonoputro and Otsuka Kozo, "Understanding Commuter's Motivation of Transportation Choice: A Case Study of Greater Jakarta," *Jurnal Manajemen Transportasi & Logistik (JMTRANSLOG)* 8, no. 1 (2021): 91, https://doi.org/10.54324/j.mtl.v8i1.507.

2. The pattern of movement of passenger transportation in Tarakan City based on the origin of the trip in the same direction as the route and social activities predominantly occur in Central Tarakan District and West Tarakan District.
3. The areas of passenger transportation services in Tarakan City that need to be developed and improved in quality and quantity are North Tarakan District and East Tarakan District.

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