

Original Article

Mass Transit Route Network Planning in Makassar City

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Abstract - Mass transit transportation in Makassar City has not been able to attract public interest in meeting their transportation needs. This is due to population growth, and the growth rate of mass transit is lower than the growth in private transportation in Makassar City. The objectives of this study are 1) Analyzing the location of nodes and potential demand for mass transit transportation services, 2) Analyzing the characteristics of mass transit modes and planning mass transit routes, and 3) Formulating indications of mass transit route network programs. Data sources come from data from previous research and related documents. They are using spatial analysis, population projections, projections of the Origin of Destination Matrix average method in 2040, Analytical Hierarchy Process (AHP), Network Analysis, Buffering Analysis, and SWOT analysis. There are 43 nodes and 5 main transport route networks, and the mode used is Large Bus. The program indications are as follows: there is a difference in departure time between school and work, the operating time for 10 (ten) wheeled vehicles is 9.00 pm to 05.00 am, adequate road infrastructure for mass transit modes to pass, special lanes for mass transit, improvement of mass transit services (procurement of new modes/maintenance of old modes), application of the Complete Streets concept, application of the concept of Transit Oriented Development (TOD), Park and Ride, and Kiss and Ride..., routing to be integrated between modes, limiting the number of occupied vehicles (carpooling/3 in 1), implementing Road Pricing (Electronic Road Pricing/Area Licensing System), implementing transportation information systems such as the Teman Bus application.

Keywords - Route Network Planning, Large Buses, Main Route.

1. Introduction

Mass Transit Transportation in Makassar City has not been able to attract public interest in meeting their transportation needs, and this can be seen from the ratio of the number of private vehicles and the total population of 1.187 in 2020 [1]. The lack of public interest in using mass transit is also indicated by a decrease in the number of operating fleets for the Mikrolet 'Pete-Pete' mode from 4,113 vehicles to 2,500 vehicles; Mamminasata Bus Rapid Transit (BRT) in 2020 stopped operating in 2022 Mamminasata Bus Rapid Transit (BRT) is back in operation but with a smaller capacity but only connecting activity centers in the Mamminasata area so that Makassar City does not yet have an adequate mass transit route to connect activity centers in Makassar City. The objectives of this study are 1) Analyzing the location of nodes and potential demand for mass transit transportation services, 2) Analyzing the characteristics of mass transit modes and planning mass transit routes, and 3) Formulating indications of mass transit route network programs.

2. Research Methods

In the planning of mass transit route networks, there are 5 variables, namely nodes, bus stops, the potential demand for transportation services, and modes. However, this study only includes node locations, estimates of the number of transportation requests, modes, and main route network routes in Makassar City. This research uses quantitative and qualitative descriptive methods.

2.1. Mass Transit Needs

2.1.1. Node

The main route is a route that serves between the main areas and the main areas and supporting areas. Feeder routes function as feeders to the main route and serve transportation in supporting areas and settlements [2]. The nodes used are centers of activity based on movement patterns and the Regional Spatial Plan (RSP). The data used in determining the nodes are the results of the analysis of the Origin-Destination Matrix (MAT) in 2018 [3] and Service Centers and Service Sub centers in the Makassar City Regional Spatial Plan 2015-2034 [4], both of which are the results of literature studies processed using spatial analysis with ArcGIS applications to determine the location of each node.

2.1.2. Potential Demand

Analysis of the potential demand for transportation services in the next 20 years requires data on the population growth rate of Makassar City in the last 10 years and the results of the Makassar City Origin-Destination Matrix (MAT) analysis in 2018 [3] and then processed with Population Growth Projection analysis to project the population in 2040 and Analysis of Origin-Destination Matrix Projections with the Average Method.

2.2. Mode and Route Characteristics of the Network

2.2.1. Mode

Modes that can be used on the main route network in metropolitan cities are Large Buses with a capacity of 79



passengers standing and sitting, Maxi Bus Cars with a capacity of 100 passengers 40-43 sitting and the rest standing, Double Decker Buses with a capacity of 79 passengers sitting and standing, and Outboard Buses with a capacity of 150 passengers 44 sitting and 106 standing, while feeder routes for metropolitan cities can use Small Buses with a capacity of 19 passengers sitting and Public Passenger Cars with a capacity of 8 passengers sitting [2]. Determination of the appropriate mass transit mode for Makassar City requires data on the estimated number of transportation requests at each node and the questionnaire results; determination of the appropriate mode is processed using the Analytical Hierarchy Process (AHP) with Expert Choice application.

2.2.2. Route

The road network that becomes the route is the national road network, provincial road network, and/or district/city road network [2], roads with a road width of more than 8 meters [5], and route selection depends on the shortest, fastest, and cheapest alternative [6]. The data needed are road network data, road width, road class, and node location processed using Network Analysis and Buffering analysis in the ArcGIS application.

2.3. Route Network Plan

In determining the indication of the mass transit route network plan program in Makassar City, SWOT analysis and the Analytical Hierarchy Process (AHP) method are used.

3. Results and Discussion

3.1. Mass transit needs

3.1.1. Node

Mass transit is needed to serve activity points or nodes, as shown in Figure 1.

3.1.2. Potential Demand

The population of Makassar City in 2020 amounted to 1,423,877 people, with a growth of 1.02% in the last 10 years [7]; the growth rate was used in population projections in 2040 by considering differences in growth rates for each sub-district in Makassar City as in Table 1.

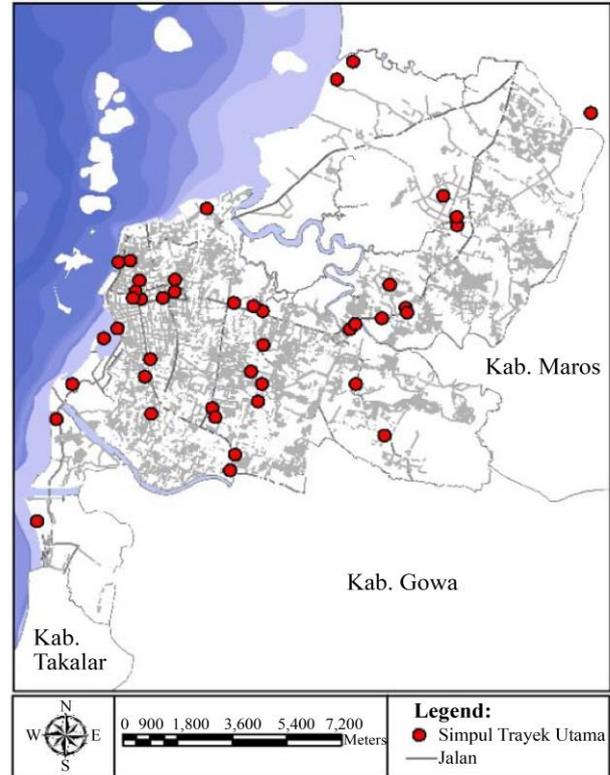


Fig. 1 Transportation nodes in makassar city
Source: Analysis results, 2023.

Table 1. Population projection per sub-district in makassar city

District	2020	2025	2030	2035	2040
Mariso	57.426	60,385	63,497	66,769	70,210
Mamajang	56.049	58,879	61,852	64,975	68,255
Tamalate	180.824	190,330	200,336	210,868	221,954
Rappocini	144.587	152,038	159,872	168,110	176,773
Makassar	82.067	86,211	90,563	95,136	99,939
Ujung Pandang	24.526	25,739	27,012	28,347	29,749
Wajo	29.972	31,470	33,042	34,693	36,427
Bontoala	54.996	57,773	60,690	63,754	66,973
Ujung Tanah	35.789	37,559	39,416	41,365	43,411
Tallo	144.977	152,523	160,462	168,814	177,601
Panakkukang	139.590	146,783	154,347	162,301	170,664
Manggala	146.724	154,667	163,040	171,866	181,170
Biringkanaya	209.048	220,583	232,755	245,598	259,150
Tamalanrea	103.177	108,547	114,197	120,142	126,395
Kota Makassar	1.423.877	1,497,991	1,575,963	1,657,994	1,744,294

Source: Analysis Results, 2022.

The projection of movement patterns in 2040 in Makassar City uses the movement pattern from the analysis of the Origin of Destination Matrix (MAT) in 2018 [3] with a sample size of 384 people; there are 528 movements on weekdays; namely Monday to Friday and on holidays, namely Saturday and Sunday there are 685 movements, the sample data can be synchronized into a population movement pattern based on the number of populations

referring to the sample size, then the data is projected into a movement pattern based on the population in 2040 using the analysis of the Projected Origin of Destination Matrix (MAT) average method. Based on these results, the percentage of movement patterns for each sub-district is obtained in Figure 2 for weekdays and Figure 3 for holidays, and the table of results of the Origin-Destination Matrix (MAT) Projection analysis is in the appendix.

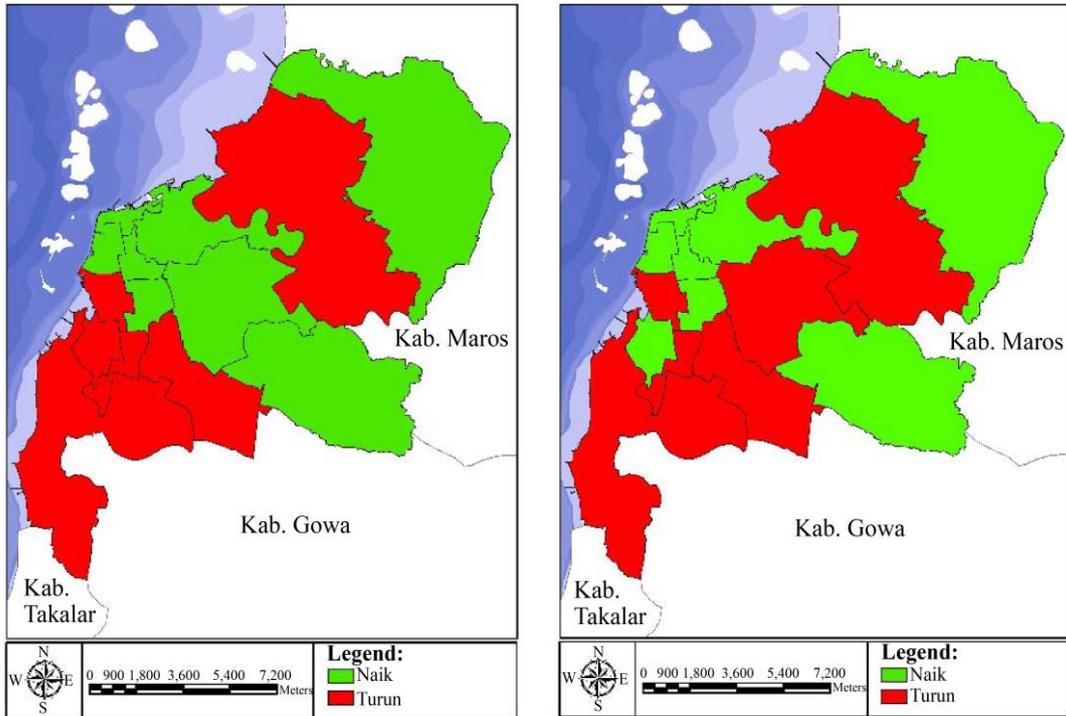


Fig. 2 Trends in weekday generation and demand in makassar city

Source: Analysis results, 2023.

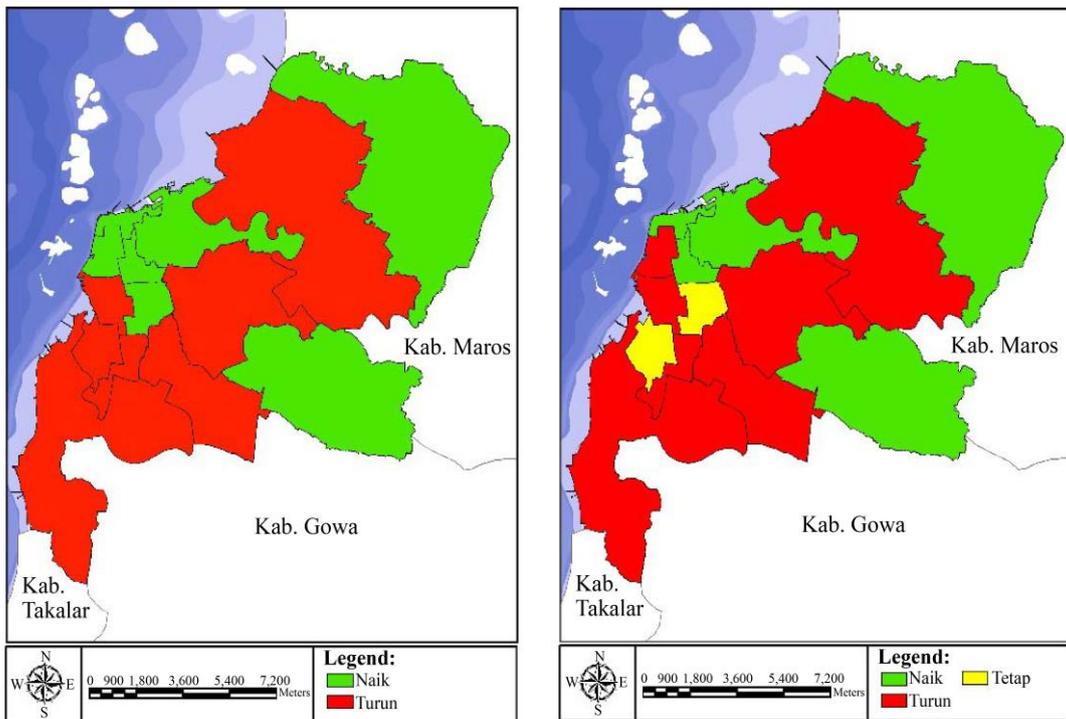


Fig. 3 Trends in holiday generation and attraction in makassar city

Source: Author, 2023

3.2. Analyzing the Characteristics of Mass Transit Modes and Planning the Main Route Network in Makassar City

3.2.1. Mode

Makassar City is a city with a metropolitan category with mass transit mode options, namely Large Buses, Maxi Buses, Double-Decker Buses, and Outboard Buses for main routes while Small Buses and Public Passenger Cars for feeder routes [2]. Based on the analysis results by combining all the results of the respondents, the appropriate mass transit modes in Makassar City are Large Buses for main routes and Small Buses for feeder routes.

3.2.2. Route

In determining the route in the main route network for mass transportation in Makassar City in accordance with the mode, namely the Large Bus, Network Analysis is used in determining the appropriate route; with the results, there are five main routes for mass transportation in Makassar City, namely:

Route A: Sultan Hasanuddin International Airport - Losari Beach Anjungan

- Departure: Sultan Hasanuddin International Airport - Jl. Perintis Kemerdekaan - Jl. Urip Sumorharjo - Jl. Gunung Bawakaraeng - Jl. Kartini - Jl. Botolempangan - Jl. Arif Rate - Jl. Cendrawasih - Jl. Kakatua - Jl. Crow - Jl. Rajawali 1 - Jl. Rajawali - Jl. Penghibur.
- Return: Jl. Penghibur - Jl. Pasar Ikan - Jl. Ujung Pandang - Jl. Riburane - Jl. Ahmad Yani - Jl. Jend. M. Jusuf - Jl. Mesjid Raya - Jl. Urip Sumoharjo - Jl. Perintis Kemerdekaan - Sultan Hasanuddin International Airport.

Route B: Fly Over - Panakkukang Mall - Telkom Plaza

- Departure: Jl. A. P. Pettarani - Jl. Boulevard - Jl. Pandang Raya Barat - Jl. Mirah Seruni - Jl. Pengayoman - Jl. A. P. Pettarani.

- Return: Jl. A. P. Pettarani - Jl. Pengayoman - Jl. Mirah Seruni - Jl. Pandang Raya Barat - Jl. Boulevard - Jl. A. P. Pettarani.

Route C: Malengkeri Terminal - Soekarno Hatta Port

- Departure: Jl. Sultan Alauddin - Jl. Andi Tonro - Jl. Kumala - Jl. Dr. Sam Ratulangi - Jl. Jend. Sudirman - Jl. HOS Cokroaminoto - Jl. Timor - Jl. Dr. Wahidin Sudiro Husodo - Jl. Irian - Jl. Tentara Pelajar - Jl. Nusantara.
- Return: Jl. Nusantara - Jl. Riburane - Jl. Ahmad Yani - Jl. Sudirman - Jl. Dr. Sam Ratulangi - Jl. Sultan Alauddin.

Route D: Herstaning

- Departure: Jl. Letjen. Herstaning - Jl. Aroepala
- Return: Jl. Aroepala - Jl. Letjen. Herstaning.

Route E: Center Of Point Indonesia - Barombong

- Departure: Tanjung Bunga Metro Road - Alam Baths Road
- Return: Jl. Permandian Alam - Jl. Metro Tanjung Bunga.

There are 5 (five) main mass transit route networks that serve the main areas between the main areas and supporting areas that can be reached with road infrastructure in accordance with the route determination criteria so that there are several main areas that cannot be reached because the road width is inadequate or the width is not enough 8 meters, the main areas that cannot be reached are Makassar New Port, Untia Area, Campus 2 PIP, Mega Rezky University, and Campus 2 of the Indonesian Parahikma Institute (IPI) so that in serving these areas must go through feeder routes or feeders that function as feeders to the main route and serve transportation in supporting areas and between supporting areas and settlements with predetermined modes, namely Small Buses with 5-meter wide road supporting infrastructure.

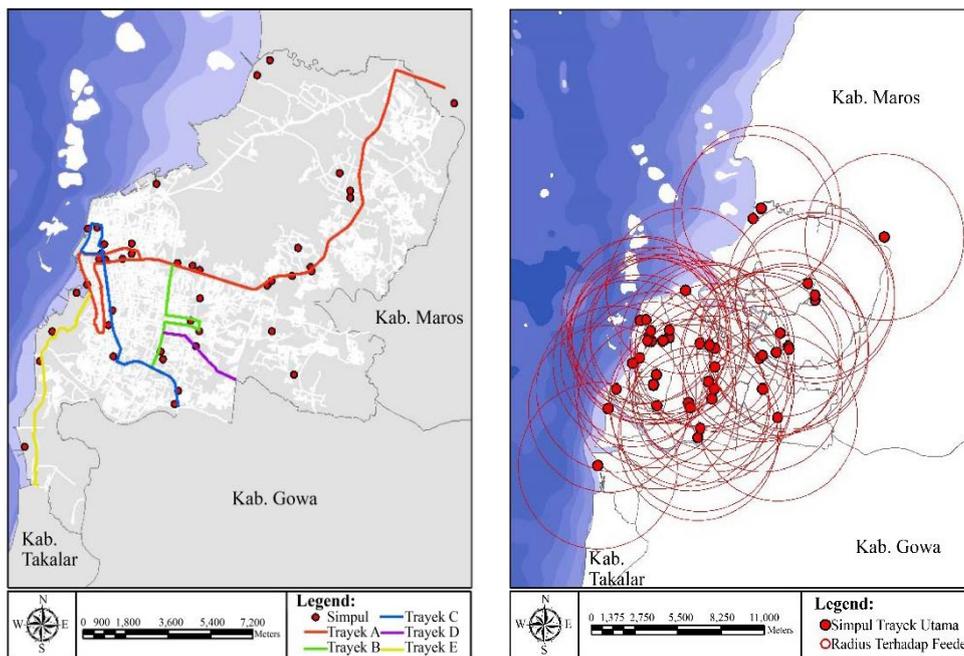


Fig. 4 Route plan map of main mass transit routes and radius map of feeders in makassar city

Source: Analysis Results, 2023

Route D Herstaning and Route E Center Of Point Indonesia - Barombong can be developed into a Trans Mamminasata route so that it can connect to the main Mamminasata area, namely Galesong Port in Takalar Regency and Campus II Faculty of Engineering Hasanuddin University in Gowa Regency, to accommodate movements from suburban areas to urban areas and vice versa. Each node has a service radius to the feeder or feeder route of 5 km [8]. A Buffering analysis is carried out to determine the service coverage of each node and identify the service coverage of the mass transit route network plan in Makassar City.

3.3. Formulate an Indication of the Mass Transit Route Network Plan Program in Makassar City

In an effort to realize a sustainable transportation system on the main mass transit route network in Makassar City, several concepts such as an integrated transportation system, Transportation Demand Management (TDM) [9], Transit Oriented Development (TOD) system, Park and Ride, Kiss and Ride, Complete Street, and mobile application-based information systems are used. Based on these concepts, an indication of the Makassar City mass transit route network program was formulated using SWOT analysis and Analytical Hierarchy Process (AHP).

Internal Factor Analysis on Strength: There is a difference in departure time between school and work, Operating time for 10-wheeled vehicles is 9.00 pm to 05.00

am, and Adequate road infrastructure for mass transit modes. Weakness: Private transportation is more desirable, Routes are not integrated between modes, Mass transit modes are not suitable, and growth in the number of requests for transportation services is not managed.

Analysis of External Factors on Opportunities, namely special lanes for mass transportation, Improvement of mass transportation services (procurement of new modes/maintenance of old modes), Application of the Complete Streets concept, Application of the concept of Transit Oriented Development (TOD), Park and Ride, and Kiss and Ride, Route arrangements to be integrated between modes, Limiting the number of vehicle occupancy (carpooling / 3 in 1), Application of Road Pricing (Electronic Road Pricing / Area Licensing System), Implementation of transportation information systems such as the *Teman Bus Application*.

Threat: People are difficult to adapt, people still prefer private transportation, and there is rejection from the community, especially those who work in the replaced mode. From these internal strategic factors and external strategic factors, IFAS (Internal Strategic Factors Analysis Summary) and EFAS (External Strategic Factors Analysis Summary) analyses are carried out based on the weights and rankings obtained by the Analytical Hierarchy Process (AHP), resulting in quadrants in Figure 5.

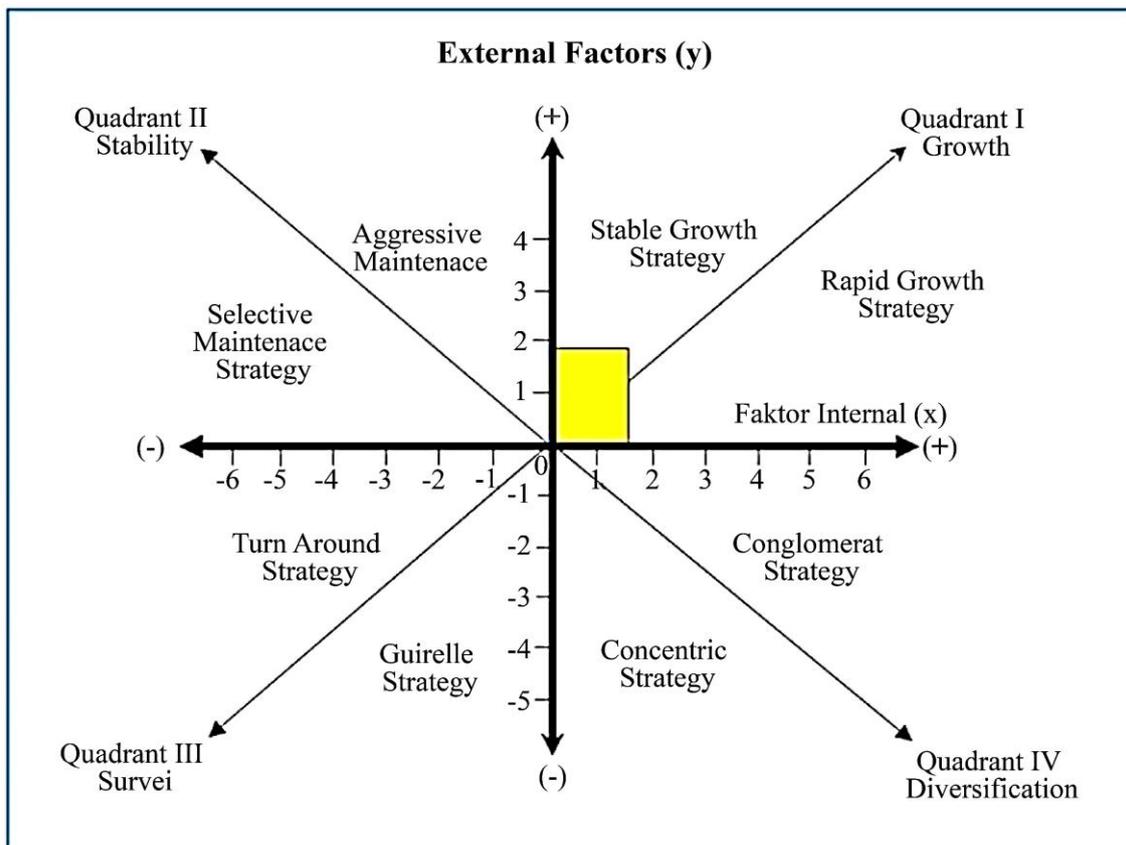


Fig. 5 SWOT Quadrant results

Source: Analysis Result, 2022

The results of the SWOT quadrant show that the position of the mass transit route network plan in Makassar City is in quadrant I (Growth) which identifies the need to maximize existing opportunities, then the development priority lies in the S-O strategy with the following description: There is a difference in departure time between school and work, the operating time for 10-wheeled vehicles is 21.00 pm to 05.00 am, adequate road infrastructure for mass transit modes, special lanes for mass transit, improvement of mass transit services (procurement of new modes / maintenance of old modes), application of the Complete Streets concept, application of the concept of Transit Oriented Development (TOD), Park and Ride, and Kiss and Ride, setting routes to be integrated between modes, limiting the number of occupied vehicles (carpooling / 3 in 1), implementing Road Pricing (Electronic Road Pricing / Area Licensing System), implementing transportation information systems such as the *Teman Bus Application*.

4. Conclusion

The results of this plan explain that there are 43 main route node locations in Makassar City, and the potential

demand for transportation services in 2040 increases in Biringkanaya District, Manggala District, Tallo District, Ujung Tanah District, Wajo District, and Bontoala District. The appropriate mass transit modes in Makassar City are Large Buses for main routes and Small Buses for feeder routes. Mass transit routes are divided into 5 main routes, namely Route A: Intl Airport. Sultan Hasanuddin Airport - Anjungan Losari Beach, Route B: Fly Over - Panakkukang Mall - Telkom Plaza, Route C: Malengkeri Terminal - Soekarno Hatta Port, Route D: Herstaning, Route E: Center Of Point Indonesia - Barombong. Indication of mass transit route network program as follows: operating time for 10-wheeled vehicles, namely 9.00 pm to 05.00 am, adequate road infrastructure for mass transit modes, special lanes for mass transportation, improving mass transit services (procurement of new modes/maintenance of old modes), implementing the concept of Complete Streets, implementing the concept of Transit Oriented Development (TOD), Park and Ride, and Kiss and Ride, setting routes to be integrated between modes, limiting the number of vehicle occupancy (carpooling/3 in 1), implementing (Electronic Road Pricing / Area Licensing System), implementing transportation information systems such as the *Teman Bus Application*.

References

- [1] Central Bureau of Statistics, South Sulawesi in Figures, 2021. [Online]. Available: <https://sulsel.bps.go.id/publication/2021/02/26/0747cef62696e4a91bf5224c/provinsi-sulawesi-selatan-dalam-angka-2021.html>
- [2] Minister of Transportation of the Republic of Indonesia, Regulation of the Minister of Transportation of the Republic of Indonesia Number PM 15, 2019. Concerning the Implementation of Transportation of Persons by Public Motor Vehicles on Tracks, 2019. [[Publisher Link](#)]
- [3] Emha Sofyan, "Determination of Potential TOD Locations in Makassar City," Thesis: Hasanuddin University, Makassar, 2019.
- [4] Makassar City Regional Regulation, Makassar City Regional Spatial Plan 2015-2034, Regional Development Planning Agency, 2015. [[Publisher Link](#)]
- [5] Directorate of Land Transportation, Technical Guidelines for the Implementation of Public Passenger Transport in Urban Areas in Fixed and Regular Routes, Ministry of Transportation of the Republic of Indonesia, 2002. [[Google Scholar](#)] [[Publisher Link](#)]
- [6] Ofyar Z. Tamin, *Transportation Planning and Modeling*, 2nd Ed., Bandung: Publisher of ITB, 2000. [[Google Scholar](#)] [[Publisher Link](#)]
- [7] Central Bureau of Statistics, Makassar in Figures, 2021. [Online]. Available: <https://makassarkota.bps.go.id/publication/2021/02/26/be312e3f776bcfd005978bda/kota-makassar-dalam-angka-2021.html>
- [8] Shirly Wunas, and Venny Veronica Natalia, "Transportation Infrastructure Development in Makassar City," *Transportation Journal* vol. 15, no. 3, pp. 169-178, 2015. [[CrossRef](#)] [[Google Scholar](#)] [[Publisher Link](#)]
- [9] Ofyar Z. Tamin, "Towards the Creation of Sustainable Transportation Systems in Major Cities in Indonesia," *Jurnal Transportasi*, vol. 7, no. 2, pp. 87-104, 2007. [[CrossRef](#)] [[Google Scholar](#)] [[Publisher Link](#)]
- [10] *Florida TOD Guidebook*, Florida Department of Transportation, 2012. [[Google Scholar](#)] [[Publisher Link](#)]
- [11] Errol C. Noel, "Park and Ride: Alive, Well, and Expanding in the United States," *ASCE Journal of Urban Planning and Development*, vol. 114, no. 1, pp. 2-13, 1998. [[CrossRef](#)] [[Google Scholar](#)] [[Publisher Link](#)]
- [12] Robert J. Spillar, *Park and Ride Planning Design Guideline*, Parsons Brinckerhoff, pp. 1-203, 1997. [[Publisher Link](#)]
- [13] W. Ng et al., *Sidewalk Labs Street Design Principles Version 1.0*, New York: Sidewalk Labs, 2019. [[Publisher Link](#)]
- [14] Yos Sunitiyoso et al., "Road Pricing in Indonesia: How Will Public Respond?," *Transportation Research Procedia*, vol. 47, pp. 123-130, 2020. [[CrossRef](#)] [[Google Scholar](#)] [[Publisher Link](#)]
- [15] Hayati Sari Hasibuan et al., "The Role of Transit Oriented Development in Constructing Urban Environment Sustainability, the Case of Jabodetabek, Indonesia," *Proceeding Environmental Sciences*, vol. 20, pp. 622-631, 2014. [[CrossRef](#)] [[Google Scholar](#)] [[Publisher Link](#)]
- [16] Jamalunlaili Abdullah, and Mohd Hafiy Mazlan, "Characteristics of and Quality of Life in a Transit Oriented Development (TOD) of Bandar Sri Permaisuri, Kuala Lumpur," *Proceeding - Social and Behavioral Sciences*, vol. 234, pp. 498-505, 2016. [[CrossRef](#)] [[Google Scholar](#)] [[Publisher Link](#)]

- [17] Aditya Manish Pitale, Manoranjan Parida, and Shubhajit Sadhukhan, "Factors Influencing Choice Riders for Using Park-and-Ride Facilities: A Case of Delhi," *Multimodal Transportation*, vol. 2, no. 1, 2023. [[CrossRef](#)] [[Google Scholar](#)] [[Publisher Link](#)]
- [18] Shahrbanoo Rezaei et al., "Park-and-Ride Facility Location Optimization: A Case Study for Nashville, Tennessee," *Transportation Research Interdisciplinary Perspectives*, vol. 13, 2022. [[CrossRef](#)] [[Google Scholar](#)] [[Publisher Link](#)]

Appendix 1

Table of the results of the Makassar City origin-destination matrix projection analysis on weekdays in 2040 by population

District	Generation			Pulls		
	2018	2040	Trend	2018	2040	Trend
Biringkanaya	188.496 (12.50%)	223.946 (12.97%)	0.47% (Increase)	191.352 (12.69%)	227.773 (13.19%)	0.50% (Increase)
Tamalanrea	157.080 (10.42%)	177.638 (10.29%)	-0.13% (Decrease)	202.776 (13.45%)	228.652 (13.24%)	-0.21% (Decrease)
Panakkukang	217.056 (14.39%)	248.785 (14.41%)	0.02% (Increase)	279.888 (18.56%)	319.104 (18.48%)	-0.08% (Decrease)
Tallo	108.528 (7.20%)	131.744 (7.63%)	0.43% (Increase)	85.680 (5.68%)	104.081 (6.03%)	0.35% (Increase)
Ujung Tanah	48.552 (3.22%)	58.463 (3.39%)	0.17% (Increase)	31.416 (2.08%)	38.057 (2.20%)	0.12% (Increase)
Wajo	45.696 (3.03%)	52.726 (3.05%)	0.02% (Increase)	68.544 (4.55%)	79.387 (4.60%)	0.05% (Increase)
Makassar	79.968 (5.30%)	92.888 (5.38%)	0.08% (Increase)	68.544 (4.55%)	80.018 (4.63%)	0.08% (Increase)
Bontoala	88.536 (5.87%)	102.580 (5.94%)	0.07% (Increase)	59.976 (3.98%)	69.947 (4.05%)	0.07% (Increase)
Mamajang	48.552 (3.22%)	54.014 (3.13%)	-0.09% (Increase)	59.976 (3.98%)	66.853 (3.87%)	-0.11% (Decrease)
Manggala	102.816 (6.82%)	121.575 (7.04%)	0.22% (Increase)	77.112 (5.11%)	93.871 (5.44%)	0.33% (Increase)
U. Pandang	37.128 (2.46%)	40.427 (2.34%)	-0.12% (Decrease)	59.976 (3.98%)	65.690 (3.80%)	-0.18% (Decrease)
Mariso	48.552 (3.22%)	54.963 (3.18%)	-0.04% (Decrease)	34.272 (2.27%)	39.492 (2.29%)	0.02% (Increase)
Rappocini	197.064 (13.07%)	212.550 (12.31%)	-0.76% (Decrease)	177.072 (11.74%)	192.479 (11.15%)	-0.59% (Decrease)
Tamalate	139.944 (9.28%)	154.390 (8.94%)	-0.34% (Decrease)	111.384 (7.39%)	121.284 (7.02%)	-0.37% (Decrease)

Appendix 2

Table of the results of the Makassar City origin-destination matrix projection analysis on weekdays in 2040 by population

District	Generation			Pulls		
	2018	2040	Trend	Generation	Percentage	Trend
Biringkanaya	178362 (11.82%)	212740 (12.20%)	0.38% (Increase)	184968 (12.26%)	226188 (12.97%)	0.71% (Increase)
Tamalanrea	121110 (8.03%)	135977 (7.80%)	-0.23% (Decrease)	140928 (9.34%)	159287 (9.13%)	-0.21% (Decrease)
Panakkukang	193776 (12.85%)	222783 (12.77%)	-0.08% (Decrease)	275250 (18.25%)	315609 (18.09%)	-0.16% (Increase)
Tallo	134322 (8.91%)	163013 (9.35%)	0.44% (Increase)	83676 (5.55%)	102425 (5.87%)	0.32% (Decrease)
Ujung Tanah	59454 (3.94%)	70946 (4.07%)	0.13% (Increase)	44040 (2.92%)	53319 (3.06%)	0.14% (Increase)
Wajo	59454 (3.94%)	68861 (3.95%)	0.01% (Increase)	96888 (6.42%)	111713 (6.40%)	-0.02% (Decrease)
Makassar	68262 (4.53%)	83681 (4.80%)	0.27% Increase)	35232 (2.34%)	40877 (2.34%)	0.00% (Stay)
Bontoala	88080 (5.84%)	109588 (6.28%)	0.44% (Increase)	83676 (5.55%)	98903 (5.67%)	0.12% (Increase)
Mamajang	72666 (4.82%)	81249 (4.66%)	-0.16% (Decrease)	77070 (5.11%)	86371 (4.95%)	-0.16% (Decrease)
Manggala	105696 (7.01%)	126462 (7.25%)	0.24% (Increase)	57252 (3.80%)	69141 (3.96%)	0.16% (Increase)
U. Pandang	63858 (4.23%)	69697 (4.00%)	-0.23% (Decrease)	134322 (8.91%)	147318 (8.45%)	-0.46% (Decrease)
Mariso	37434 (2.48%)	42772 (2.45%)	-0.03% (Decrease)	33030 (2.19%)	38215 (2.19%)	0.00% (Stay)
Rappocini	143130 (9.49%)	154798 (8.87%)	-0.62% (Decrease)	96888 (6.42%)	105021 (6.02%)	-0.40% (Decrease)
Tamalate	182766 (12.12%)	201717 (11.56%)	-0.56% (Decrease)	165150 (10.95%)	189899 (10.89%)	-0.06% (Decrease)