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Comparison of the Performance of AKDP Route Network Systems in Gorontalo and Indonesia: A Meta-Analysis Approach

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Abstract:- This study aims to compare the performance of the Angkutan Kota Dalam Provinsi (AKDP) route network system in Gorontalo Province with other regions in Indonesia using a meta-analysis approach. This study integrates data from various scientific literature and technical reports related to AKDP performance, which includes indicators such as route service coverage, route overlap, route deviation, route density, and route density ratio. The meta-analysis results indicate that the AKDP route system in Gorontalo has deficiencies in performance system aspects and alignment with local needs compared to other regions in Indonesia. Similarly, in terms of operational efficiency and sustainability, Gorontalo still faces significant challenges, particularly related to road infrastructure capacity and fleet management. These findings underscore the need for more integrated transportation planning and regulatory strengthening to improve the performance of the AKDP system, both in Gorontalo and nationally. This study makes an important contribution to the development of transportation policies based on empirical data and supports the planning of sustainable transportation systems. The meta-analysis approach used also offers a methodological framework that can be applied to similar studies in the future.

Keywords:- *City Transport Within the Province (AKDP), Route Network, System Performance, Meta-Analysis, Gorontalo, Public Transport.*

I. INTRODUCTION

Transportation is one of the important elements in supporting the mobility of people, goods, and services, which directly affects the social and economic development of a region. In the context of Gorontalo Province, Intercity Transportation within the Province (AKDP) plays a vital role as a public transportation system that connects various cities and regencies within the provincial area. Based on data from the Central Statistics Agency (2024) [1], [2], Gorontalo Province has a population of 1,171,681 people, with a population growth rate of 1.16% per year. The high growth rate increases the demand for an efficient, affordable, and reliable transportation system. However, various challenges such as uneven access, overlapping routes, and deviations from operational paths often hinder the optimization of the AKDP system. Specifically, the AKDP is designed to serve intercity travel within provinces using buses or other public vehicles with established routes. According to the Ministry of Transportation of the Republic of Indonesia (2007) [1], [3], AKDP routes should meet certain standards, such as adequate coverage, operational efficiency, and user comfort. However, in practice, many routes do not operate as initially planned, such as routes that are too long or deviations that occur due to low passenger volume on certain lines. In addition, the lack of coordination between local governments and transportation operators exacerbates this condition.

The performance of the AKDP route network system can be measured through various indicators, including service coverage, route overlap rate, density in each zone, and route deviations [3], [4]. Service coverage reflects the extent to which routes can serve specific areas and is an important parameter in assessing transportation accessibility. Route overlap indicates the presence of efficiency or inefficiency in route management, which can lead to conflicts between drivers or operators. The density of routes per zone reflects the distribution of routes within an administrative area, while route deviations indicate the extent to which routes operate outside the established paths.

Research on the performance of AKDP in Gorontalo has been conducted by several previous studies, but the results tend to be scattered and not integrated. For example, Rinofianto's (2022) study [1], [3] shows that route overlaps can reach 70% on several main corridors, leading to a decrease in transportation efficiency. Another study by Lestari & Silalahi (2021) identified that route deviations occur more frequently on lines with low passenger volumes, resulting in neglect of remote areas [1], [3].

To gain a deeper and more holistic understanding of the performance of the AKDP route network in Gorontalo Province, an approach that can integrate results from various previous studies is needed. Meta-analysis becomes a relevant approach to unify and analyze data from various

sources, thereby generating broader and more focused insights. With this approach, this research aims to:

- Identifying the dominant factors that influence the performance of the AKDP route network.
- Comparing system performance based on key indicators such as service coverage, route overlap, density in each zone, and route deviations.
- Providing strategic recommendations for the improvement and management of the route system in the future.

This research is expected to make a significant contribution to the development of the public transportation system in Gorontalo, while also serving as a reference for policymakers and transportation operators in improving the efficiency, accessibility, and comfort of transportation services. With a better understanding of the existing challenges and opportunities, strategic steps can be taken to make AKDP a more inclusive and sustainable transportation system.

II. RESEARCH METHOD

In this study, the method used is meta-analysis to compare the performance of the intercity public transportation route network system (AKDP) in Gorontalo Province with previous studies conducted in various regions of Indonesia. Meta-analysis is used to combine and analyze data from various related studies, in order to obtain a more comprehensive picture of the factors influencing the performance of the AKDP system.

The following is a comprehensive description of the type and approach of the research, population and sample, inclusion and exclusion criteria, as well as data collection and analysis techniques.

A. Type and Research Approach

This research falls under the category of quantitative research with a meta-analysis approach. Meta-analysis is a statistical method used to combine results from various studies with similar topics, in order to produce stronger and more generalizable conclusions. This approach allows for the identification of clearer patterns or trends related to the performance of the AKDP route network system in various regions, including Gorontalo. By integrating previous research findings, the meta-analysis provides advantages in the form of increased statistical power and a broader understanding of the existing data variability.

B. Research Location and Time

➢ *Research Location:*

This research was conducted through desk research by analyzing secondary data from various sources, both national and regional. The main geographic focus is the Province of Gorontalo, Indonesia, which will be compared with other regions in Indonesia that also have an urban transportation route network system within the province. (AKDP). In addition, data were also collected from studies involving other major cities in Indonesia, such as Jakarta, Surabaya, Yogyakarta, and Medan, to obtain a broader comparison of the performance of the AKDP system.

Administratively, the research locations are shown in Figure 1 [1][3][5].

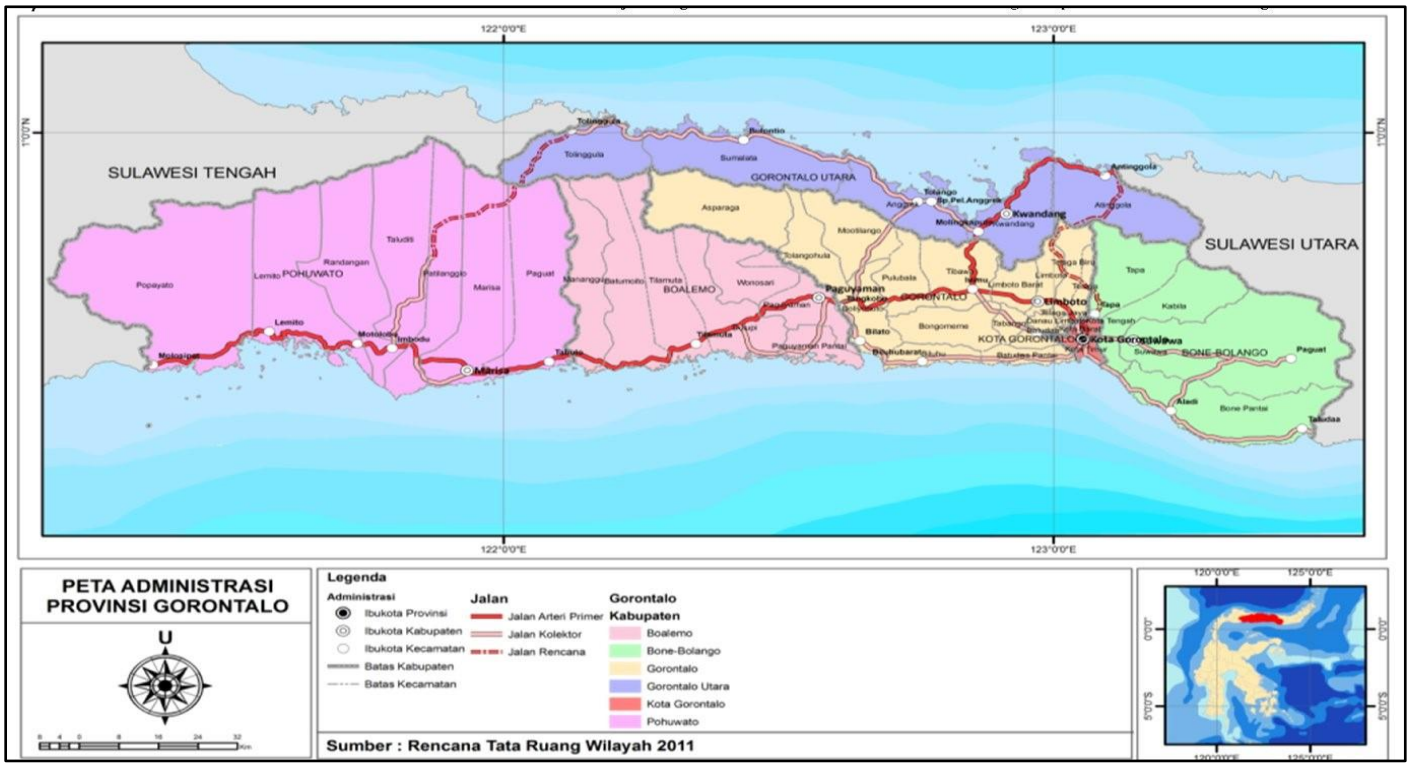


Fig 1: Administrative Map of Gorontalo Province

➢ *Research Time:*

This research uses secondary data collected from studies published within the last five years, from 2018 to 2023. The research period includes the publication period of relevant studies and reports that focus on the evaluation of the AKDP system in Indonesia. This is done to ensure that the analyzed data remains relevant to current conditions and reflects the latest developments in transportation infrastructure and policies. Researchers will also consider changes in transportation policies that occur during this period, as well as developments in infrastructure and demographics that may affect the performance of AKDP routes in various regions of Indonesia, including Gorontalo Province.

C. Population End Sampling

➢ *Population*

The population in this meta-analysis study consists of all relevant research discussing the performance of the AKDP route network system in Indonesia. The studies must include data related to performance indicators, such as route service coverage, route overlap, route deviations, route density, and route density ratios that affect the performance of the urban transportation network system within the province.

Meanwhile, the population in the study in Gorontalo province includes all the routes of Urban Transportation within the Province (AKDP) operating in Gorontalo Province as well as AKDP service users. This population consists of two main groups.

➢ *The Steps for Sampling are as Follows[1], [3], [5]:*

- AKDP Routes: The population of routes includes all registered and active AKDP operational routes in Gorontalo Province. This includes routes serving intercity routes within the province, connecting both urban and rural areas. Data on the total number of routes was obtained from the Gorontalo Provincial Transportation Agency.
- AKDP Service Users: The user population includes all passengers who use the AKDP service in Gorontalo Province during the research period. The users of this service vary from daily passengers who regularly use AKDP for work or school trips, to passengers who use AKDP for occasional needs.

➢ *Sampling*

The samples used in this meta-analysis are studies that meet the predetermined inclusion criteria. (terdapat dalam bagian berikutnya). This sample is not limited to one region or one type of urban transportation only, but rather includes various areas in Indonesia, with a primary focus on Gorontalo Province. The selected sample must contain sufficient data related to the performance of the AKDP system, so that a comparative analysis can be conducted between Gorontalo and other regions.

Meanwhile, the sampling in the research in Gorontalo Province uses sampling techniques to obtain representative data from the population. Two sampling techniques used are purposive sampling for AKDP routes and random sampling for AKDP service users [2][4].

- Purposive Sampling for AKDP Routes: The purposive sampling technique is used to select routes that will be analyzed in depth. The selection of routes is based on certain criteria, such as:
- ✓ Passenger Density: Routes with high and low passenger density were selected to compare performance differences.
- ✓ Coverage Area: Routes serving urban and rural areas were selected to observe variations in service coverage.
- ✓ Operational Frequency: Routes with varying operational frequencies were selected for a more comprehensive analysis.

From the total population of routes, a sample of 30% of the total operating routes was taken, ensuring representation from various established criteria.

- Random Sampling for AKDP Service Users: To obtain representative data from service users, random sampling technique was used. This study conducted surveys on passengers at various stops and during the journey on routes selected through purposive sampling.
- Sample Size: Using the Slovin formula with a 5% margin of error [6][7][8], the required sample size was determined to obtain representative results.

Table 1: Calculation of AKDP Vehicle Sample Size in Gorontalo Province

No.	Code	Route with Round Trip Route	Population (Vehicles)	Minimum Sample Size (Vehicles)
1.	(AB-05)	Gorontalo Regency, Route Dungingi Terminal-Limboto Terminal-Isimu Terminal	38	8
2.	(AA-01)	Gorontalo City, Route Gorontalo City Center Terminal-Iluta-Batudaa-Bongomeme Terminal	190	10
3.	(AB-01)	North Gorontalo Regency, Route Dungingi-Isimu Terminal Kwandang	112	10
4.	(AB-02)	Boalemo Regency, Route Dungingi Terminal – isimu Terminal-Tilamuta	89	10

5.	(AB-06)	Pohuwato Regency, Route Dungingi Terminal-Isimu Terminal-Marisa	56	9
6.	(AC-01)	Bone Bolango Regency, Route Leato Terminal-Bonepantai-Taludaa	2	2
Total			**487**	**49**

Fig 2: Random Sampling of AKDP Service Users

➢ *Kriteria Inklusi end Eksklusi*

To ensure that this research uses relevant and high-quality data, the following inclusion and exclusion criteria are applied:

➢ *Inclusion Criteria:*

- Research published in scientific journals, government reports, or other credible sources.
- Studies that discuss the performance of the AKDP route system in Indonesia, including studies that contain quantitative data related to service coverage, route overlap, route density, and route deviations, as well as factors affecting performance.
- Research that includes quantitative data that can be compared across regions or time periods.
- Research conducted within the last five years (to ensure data relevance).

➢ *Exclusion Criteria:*

- Research that only discusses qualitative aspects of service quality without measurable quantitative data.
- Research that does not include data or performance indicators related to the AKDP route system.
- Research that cannot be accessed in a suitable format for analysis (e.g., research that does not provide complete data or is not publicly accessible).
- Research that only focuses on types of transportation other than AKDP, such as urban public transport or other modes of transportation that are not relevant to this study.

D. Validity and Reliability

To ensure that the data collected represents the population and is reliable, validity and reliability testing is conducted.

- Content Validity: Ensure that the survey questions cover all aspects relevant to the research.
- Reliability: Reliability testing using Cronbach's Alpha to ensure the internal consistency of the survey questionnaire.

E. Data and Data Sources

This research uses two types of data:

➢ *Primary Data:*

- In-depth interviews with AKDP transportation operators.
- Questionnaires distributed to passengers to understand their perceptions of service coverage, overlap levels, route density, and route deviations.

➢ *Secondary Data:*

- Existing AKDP route network maps.
- Transport and route code data.
- Passenger terminal locations.
- Population growth and transportation needs statistics from the Central Statistics Agency (BPS).
- Previous research results related to AKDP route performance, taken from indexed journals. (Sinta dan Scopus).

F. Data Collection Techniques

Data in meta-analysis research is collected through literature review or secondary research. The data collection techniques are carried out with the following steps:

- Identification of Data Sources: The search and selection of relevant studies are conducted through academic databases, such as Google Scholar, JSTOR, Scopus, and PubMed, as well as reports from government or related institutions like BPS (Central Statistics Agency) and the Transportation Department. Reliable sources published within the relevant period will be selected for inclusion in the meta-analysis.
- Study Screening: After identifying various sources, researchers then conduct screening based on the previously established inclusion and exclusion criteria. This screening process aims to ensure that only studies meeting high quality and relevance standards are used in the analysis.
- Data Extraction: After the relevant studies are selected, the necessary data is extracted from each study. The data collected includes information about the study location, type of transportation, performance indicators (travel time, transport capacity, fares, user satisfaction), and other relevant variables for comparison.

➢ *Meanwhile, Data Collection in the Gorontalo Province Study was Carried out with the Following Steps:*

- *Field Observation*

Conducted to verify the actual conditions of the AKDP route network, including route length, coverage area, and level of route deviation.

- *Documentary Study*

Collecting official documents, such as route maps and regional transportation performance reports, from the Gorontalo Transportation Agency.

- *Questionnaires and Interviews*

✓ Questionnaires containing questions about service satisfaction, travel time, and ease of access.
✓ In-depth interviews conducted with transportation operators, drivers, and local government officials.

- *Data Analysis Techniques*

Data analysis is conducted through two main stages:

- *Descriptive Analysis*

✓ Measuring performance indicators, such as service coverage, route overlap, route density, and AKDP route deviations occurring in Gorontalo Province.
✓ Results are presented in the form of tables and graphs to provide a comprehensive overview of the AKDP route network performance.
✓ Formulas Used [3]:

$$AKDP\ Route\ Network\ Service\ Coverage\ (\%) = \frac{Service\ Coverage\ Area\ (km^2)}{Total\ Area\ (km^2)} \times 100\%$$

$$Overlap\ Level = \frac{Length\ of\ Overlapping\ Routes\ (km)}{Length\ of\ Original\ Route\ (km)} \times 100\%$$

$$Deviation\ Level = \frac{Length\ of\ Route\ Deviation\ (km)}{Length\ of\ Original\ Route\ (km)} \times 100\%$$

$$Route\ Density\ (\%) = \frac{Length\ of\ Operational\ Routes\ (km)}{Total\ Area} \times 100\%$$

- Meta-Analysis: After the data is collected, the next step is to conduct a meta-analysis statistical analysis. The analysis steps taken are:
- Data sources were obtained from 11 national journal-based studies in Indonesia, which were analyzed to identify the dominant factors affecting the performance of the AKDP route network.
- Each factor (service coverage, route overlap, zone density, and route deviation) was converted into a percentage contribution to the overall system performance.

- Data Coding: The data obtained from each selected study will be coded in a uniform format. The variables used include travel time, fares, transport capacity, and user satisfaction, all of which are coded with consistent standards to allow for comparison.
- Homogeneity Test: Before proceeding with further analysis, a homogeneity test is conducted to check whether the results from different studies have uniform variance or not. If the study results are highly varied, analysis with a random effect model will be used.
- Random Effect or Fixed Effect Model: Based on the results of the homogeneity test, the researcher will choose the appropriate model for analysis. If the selected study results show high variance, the random effect model will be used to combine those results. Conversely, if the variance is low, the fixed effect model can be used.
- Subgroup Analysis: If there is sufficient relevant data, a subgroup analysis will be conducted to explore differences in the performance of the AKDP system based on factors such as population density, infrastructure conditions, or transportation policies.
- Result Interpretation: After the analysis is conducted, the results will be interpreted to compare the performance of the AKDP route system in Gorontalo Province with other regions in Indonesia. The researchers will conclude the factors affecting public transportation performance in various regions and provide recommendations based on those findings.

III. RESULTS AND DISCUSSION

The context of the research on the coverage of the urban transport route network within the province (AKDP) in Gorontalo Province has received significant attention from the Gorontalo government. Optimizing this transportation service requires a deep understanding of the extent to which the coverage of these routes is evenly distributed across the Gorontalo Province. Administratively, Gorontalo Province consists of 5 regencies and 1 city, with 33 AKDP network routes. The layout of the 5 regencies and 1 city, along with the 33 AKDP network routes, is shown in Figure 3 [1], [3], [5].

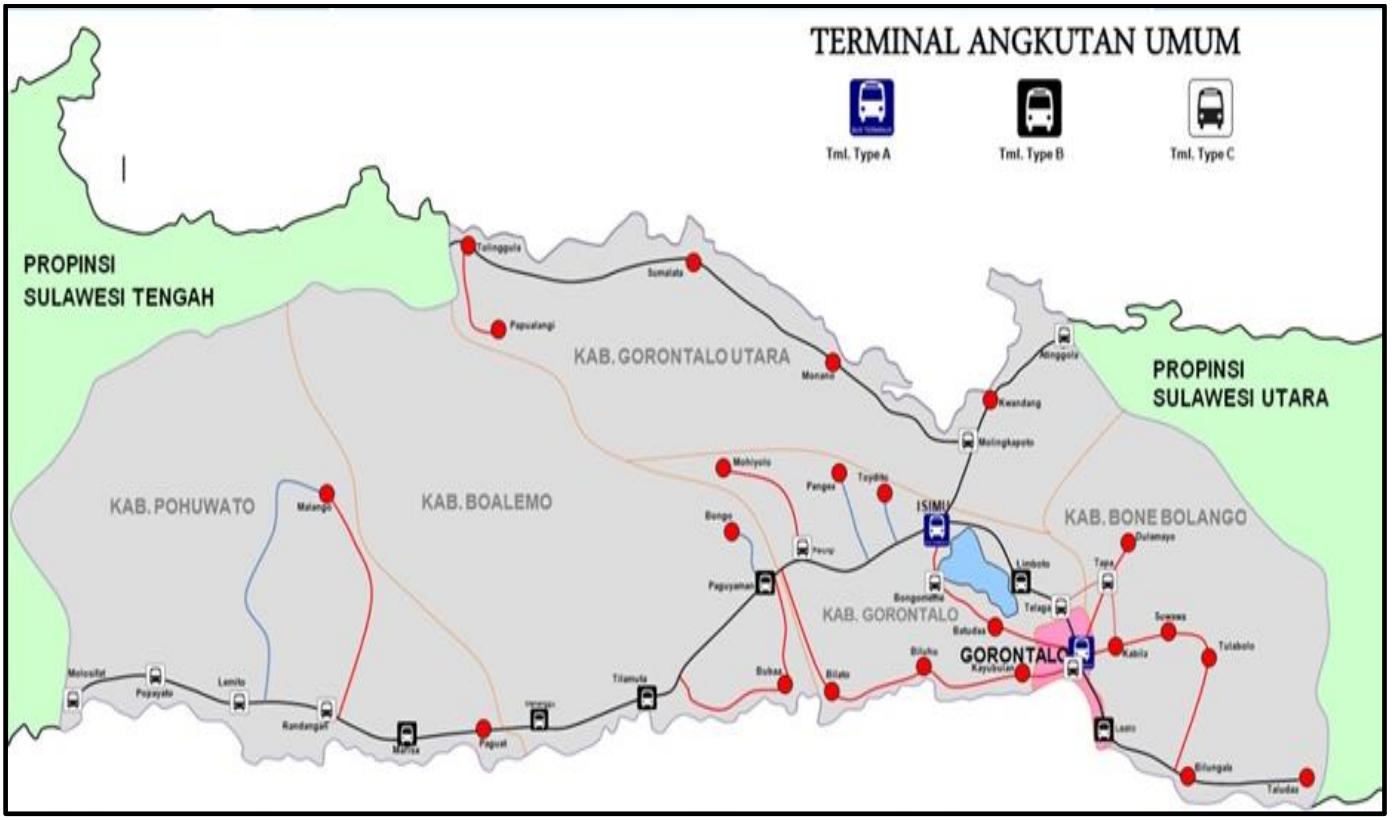


Fig 3: AKDP Transport Route Network Map for Gorontalo Province

A. *Analysis of the Service Coverage of Intercity Public Transport Routes (AKDP) in Gorontalo Province*

➢ *Coverage of AKDP Route Services Based on a Distance of 0.8 KM*

The standard coverage of the public transportation route network is calculated based on the walking distance of AKDP users, not the distance between service routes, but the distance between stops (Terminals or Haltes) from AKDP users in several nearby sub-districts. The service network is considered good if 70% to 75% of the population lives 400 meters or more away from the stops, and if 50% to 60% of the population lives 800 meters or more away from the stops. (Terminal atau Halte).

Based on the results of field surveys in various administrative regions of the research area, the following was obtained:

Table 2: Coverage of AKDP Route Network Services Based on Distance from Stops/Terminals 0.8 KM

No	Code	Walking Distance (KM)	Route Length (KM)	Service Coverage (KM^2)	Coverage Area (KM^2)	Coverage Area (%)
	(a)	(b)	(c)	(d) = (c)*(b)	(e)	(f) = {(d)/'(e)}*100
1	AB 05	0.8	114	91.2	366.1	24.91%
2	AA 01	0.8	14	11.2	391.29	2.86%
3	AB 01	0.8	102	81.6	890.59	9.16%
4	AB 02	0.8	71	56.8	985.44	5.76%
5	AB 06	0.8	194	155.2	2306.57	6.73%
6	AC 01	0.8	212	169.6	261.39	64.88%
Average		**0.80**	**117.83**	**94.27**	**866.90**	**19.05%**

➢ *Coverage of AKDP Route Services Based on a Walking Distance of 0.2 KM*

Theoretically, the willingness to walk (0.2 to 0.4 km) from either the right or left side of the route constitutes the service coverage area of the route. If overlapping paths are counted only once, the route length used in this service coverage calculation is the total route length that passes through the zone. Based on the results of the questionnaires distributed in various administrative areas of the research region, the following was obtained:

Table 3: Coverage of AKDP Route Network Services Based on Walking Distance 0.2 KM

No	Code	Walking Distance (KM)	Route Length (KM)	Service Coverage (KM^2)	Coverage Area (KM^2)	Coverage Area (%)
	(a)	(b)	(c)	(d) = (c)*(b)	(e)	(f) = {(d)/'(e)}*100
1	AB 05	0.2	30	6	366.1	1.64%
2	AA 01	0.2	26	5.2	391.29	1.33%
3	AB 01	0.2	63	12.6	890.59	1.41%
4	AB 02	0.2	104	20.8	985.44	2.11%
5	AB 06	0.2	164	32.8	2306.57	1.42%
6	AC 01	0.2	64	12.8	261.39	4.90%
Average		**0.20**	**75.17**	**15.03**	**866.90**	**2.14%**

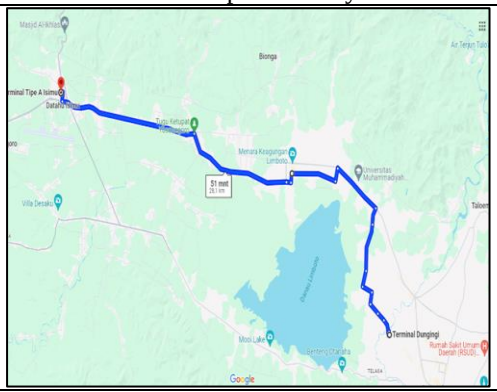
B. Analysis of Overlapping and Deviations in Intercity Within Province Transportation Routes (AKDP) in Gorontalo Province

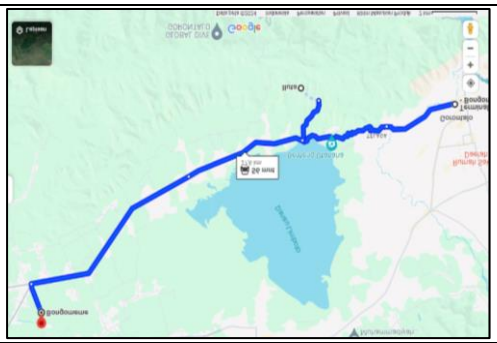
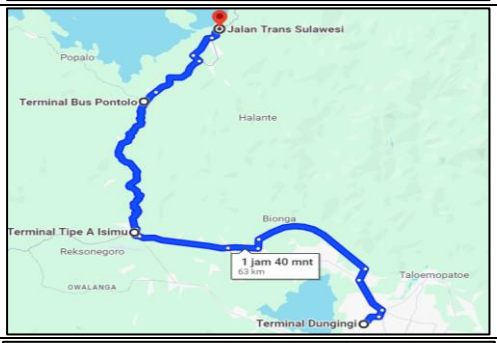
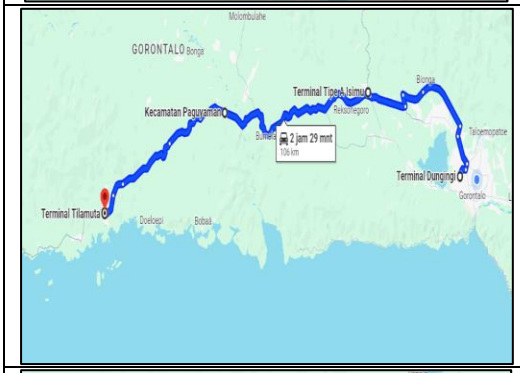
Based on the analysis results, it is known that the overlap occurs mainly on the main public transportation corridors in urban areas. The overlap that occurs includes the length of the routes, the routes involved, and the percentage of overlap. It was found that several routes, such as AB-05, AB-02, and AB-06, have very high overlap rates, reaching 89.87%, 68.86%, and 44.78% respectively. This overlap can lead to conflicts among AKDP drivers due to competition for passengers and operational areas.

Similarly, the level of route deviation, which refers to the extent to which public transportation vehicles operate outside the established routes, is caused by routes that are considered to have no passengers or are less productive. In the SPM LLAJ standards, route deviations can be tolerated if they are less than 25%.

This indicates the need for better management in the regulation of AKDP routes to reduce overlaps and route deviations. Spatially, the results of the analysis of route overlap and deviation of AKDP routes that occurred in Gorontalo Province are as follows:

Table 4: Results of Spatial Analysis of Overlapping and Deviations in AKDP Route Networks in Gorontalo Province

Province Spatial Analysis	Overlapping Analysis	Deviation Analysis
	Code : AB-05 Route Length: 28,1 km Overlapping: 25,1 km (89%), happened from Terminal Limboto to Terminal Isimu.	Code : AB-05 Route Length: 28.1 km Deviation: 15.7 km (55.87%), happened from Terminal Limboto to Terminal Isimu.

	Code : AA-01 Route Length: 27,6 Overlapping: 13,7 (49,63%), occurred from Terminal Dungingi-Batudaa-Bongomeme.	Code : AA-01 Route Length: 27.6 Deviation: 22.6 (81.87%), occurred from Terminal Dungingi-Batudaa-Bongomeme.
	Code : AB-01 Route Length: 63 km Overlapping: 31,5 km (50%), occurred from Terminal Isimu-Kwandang.	Code : AB-01 Route Length: 63 km Deviation: 29.2 km (46.35%), terjadi dari Terminal Dungingi- Kwandang.
	Code : AB-02 Route Length: 106 km Overlapping: 73 km (68,86%), occurred from the Isimu-Paguyaman Terminal - Tilamuta Terminal.	Code : AB-02 Route Length: 106 km Deviation: 79.8 km (75.28%), occurring from Terminal Dungingi-Terminal Isimu-Terminal Tilamuta.
	Code : AB-06 Route Length: 163 km Overlapping: 73 km (44,78%), occurred from the Isimu-Paguyaman Terminal to the Tilamuta Paguat Terminal to the Marisa Terminal.	Code : AB-06 Route Length: 163 km Deviation: 79,8 km (48.96%) occurred from the Isimu-Paguyaman Terminal to the Tilamuta Paguat Terminal to the Marisa Terminal.
	Code : AC-01 Route Length: 64.3 km Overlapping: 15.9 km (24.72%), happened from Terminal Leato to Taludaa.	Code : AC-01 Route Length: 64.3 km Deviation: 33 km (51.14%), happened from Terminal Leato to Taludaa.
Average	**Route Length 75.37 km** **Overlapping: 38.70 km (54,54%)**	**Route Length: 75.37 km** **Deviation: 43.5 km (59.91%)**

C. Analysis of Density and Route Ratio of Intercity Public Transport (AKDP) in Gorontalo Province

The density of the routes was uncertain during the observation. To obtain accurate data regarding the density in each route zone, questionnaires were distributed to passengers in various zones in each sub-district in Gorontalo Province. The division of zones is based on the administrative regions of sub-districts, taking into account land use aspects and road networks. From this division, the study area is ultimately divided into 20 zones arranged according to sub-district administration and land use.

In theory, route density can be calculated based on the comparison of the length of routes traversed by AKDP with the area of the case zone in Gorontalo Province. The results of the AKDP route network density analysis in Gorontalo Province are shown in Table 4. In that table, the total length of the route network traversed by public transportation is 664.5 km, with an average route density of 20.98%. Meanwhile, the results of the City Transport Route Density Ratio (AKDP) analysis in Gorontalo Province are shown in Table 5.

Table 5: Density of AKDP Route Network in Gorontalo Province

Zona	District	Land Use Pattern	Area (Km^2)	Route Length (Km)	Route Density (%)
1	Kota Timur	Offices, Shopping, Retail, Hospitality, Education, Trade, Residential, Worship	5.13	3.00	58.48
2	Telaga Biru	Offices, Shopping, Retail, Hospitality, Education, Trade, Residential, Worship	109.08	10.00	9.17
3	Limboto	Offices, Terminal, Government Center, Shopping, Education, Trade, Residential, Worship	72.45	15.70	21.67
4	Wonosari	Office, Shopping, Education, Trade, Residential, Worship	229.61	19.10	8.32
5	Marisa	Offices, Terminal, Government Center, Shopping, Education, Trade, Residential, Worship	34.65	6.80	19.62
6	Tibawa	Offices, Airport, Terminal, Shopping, Education, Trade, Residential, Worship	155.26	67.90	43.73
7	Tapa	Office, Shopping, Education, Trade, Residential, Worship	13.43	13.20	98.29
8	Kota Tengah	Office, Shopping, Education, Trade, Residential, Worship	4.82	3.20	66.39
9	Sumalata Timur	Settlement, Vegetable Farming, Forestry, Mountains, Industry	156.78	29.60	18.88
10	Pulubala	Offices, Shopping, Education, Trade, Residential, Worship, Industry	225.51	73.00	32.37
11	Dungalio	Offices, Shopping, Education, Trade, Residential, Worship, Industry	51.05	13.90	27.23
12	Pauwo	Office, Shopping, Education, Trade, Residential, Worship	206.72	103.00	49.83
13	Tulangohula	Office, Shopping, Education, Trade, Residential, Worship	5.93	3.20	53.96
14	Bongomeme	Office, Shopping, Education, Trade, Residential, Worship	458.41	22.50	4.91
15	Tilango	Office, Shopping, Education, Trade, Residential, Worship	501.85	57.60	11.48
16	Lemito	Offices, Education, Residential, Worship, Dock, Agriculture	148.13	29.60	19.98
17	Buntulia	Offices, Education, Residential, Worship, Agriculture, Industry	360.87	57.60	15.96
18	Angrek	Office, Education, Settlement, Worship, Agriculture	151.91	17.70	11.65
19	Dengilo	Education, Settlement, Worshi	170.15	73.00	42.90
20	Bone	Office, Shopping, Education, Settlement	104.35	44.90	43.03
Total			**3160,15**	**664,50**	**20.99**

Table 6: Ratio of AKDP Route Network Density in Gorontalo Province

Trayek	Zones traversed	Area (km²)	Route length (Km)	Route Network Density Ratio Per Zone (Km/Km²)	Total Density Ratio (Km/Km²)
AB-05	1	5.13	3	0.58	3.52
	7	13.43	13.2	0.98	
	8	4.82	3.2	0.66	
	2	109.08	10	0.09	
	3	72.45	15.7	0.22	
	6	155.26	67.9	0.44	
	13	5.93	3.2	0.54	
AA-01	1	5.13	3	0.58	7.01
	7	13.43	13.2	0.98	
	8	4.82	19.1	3.96	
	6	155.26	67.9	0.44	
	12	206.72	103	0.50	
	13	5.93	3.2	0.54	
AB-01	1	5.13	3	0.58	3.69
	7	13.43	13.2	0.98	
	8	4.82	3.2	0.66	
	2	109.08	10	0.09	
	3	72.45	15.7	0.22	
	6	155.26	67.9	0.44	
	9	156.78	29.6	0.19	
	10	225.51	73	0.32	
	16	148.13	29.6	0.20	
AB-02	1	5.13	3	0.58	3.81
	7	13.43	13.2	0.98	
	8	4.82	3.2	0.66	
	2	109.08	10	0.09	
	3	72.45	15.7	0.22	
	6	155.26	67.9	0.44	
	10	225.51	73	0.32	
	19	170.15	73	0.43	
	4	229.61	19.1	0.08	
AB-06	1	5.13	3	0.58	4.14
	7	13.43	13.2	0.98	
	8	4.82	3.2	0.66	
	2	109.08	10	0.09	
	3	72.45	15.7	0.22	
	6	155.26	67.9	0.44	
	10	225.51	73	0.32	
	19	170.15	73	0.43	
	4	229.61	19.1	0.08	
	17	360.87	57.6	0.16	
	15	501.85	57.6	0.11	
	14	458.41	22.5	0.05	
AC-01	1	5.13	3	0.58	1.13
	20	104.35	44.9	0.43	
	18	151.91	17.7	0.12	

D. Comparison Analysis of the Performance of the AKDP Route Network System in Gorontalo and Indonesia

Based on the results of a meta-analysis of eleven studies, the performance of the AKDP route network system in Indonesia and its comparison with the performance of the AKDP route network system in Gorontalo Province is presented in the table below**.**

Table 7: Findings from the Comparison of the AKDP Route Network System's Performance in Indonesia and Gorontalo

Performance Indicator	Average Performance of the AKDP Network System (%)		Explanation
	in Gorontalo	in Indonesia from Meta Analysis	
Coverage of AKDP Route Network Services Based on Distance from Stops/Terminals 0.8 KM	19.05%	50%	Because of the dispersion of stops, inadequate infrastructure, absence of an integrated network system, and low government priority for stop-based transportation systems, the coverage of the AKDP route network services based on stops/terminals in Gorontalo is comparatively smaller.
Coverage of AKDP Route Network Services Based on Walking Distance 0.2 KM	2.14%	40%	Because of the restricted geographic area and population served, the AKDP route network services' coverage based on people's willingness to travel 200 meters to the AKDP transport in Gorontalo is smaller; the terminal distribution is not directly connected with residential areas
Overlapping Route (%)	54.54%	50%	In Gorontalo, the AKDP route network overlaps more because to operator competition, inadequately managed licensing, limited road infrastructure, and a lack of integrated planning.
Route Deviation (%)	59.91%	13%	Inadequate road conditions, a lack of supervision, and passenger demand all contribute to the greater departure of the AKDP route in Gorontalo from official routes
Route Density (%)	32.33%	70%	Gorontalo's AKDP route network has a lower density due to the region's challenging topography and sparse road infrastructure, low passenger demand, limited resource availability, and immature transportation planning.
Route Density Ratio (km/km^2)	3.88	7.50	Because of the challenging topography and inadequate road infrastructure in the area, low passenger demand, limited resource availability, and immature transportation planning, the density ratio of the AKDP route network in Gorontalo is lower.

The level of route deviation refers to the extent to which public transport vehicles operate outside the established route, which is caused by routes that are no longer considered to have passengers or are less productive. In the SPM LLAJ standards, route deviations can be tolerated if they are less than 25%.

IV. CONCLUSION

- The coverage of the AKDP route network services based on stops/terminals in Gorontalo is relatively smaller due to the distribution of stops, limited infrastructure, the lack of an integrated network system, and the low government priority for stop-based transportation systems.
- The coverage of the AKDP route network services based on the willingness of people to walk 200 meters to the AKDP transport in Gorontalo is smaller because of the limited geographical radius and population served; the distribution of terminals is not directly integrated with residential areas.
- The overlap of the AKDP route network in Gorontalo is larger due to the lack of integrated planning, limited road infrastructure, operator competition, and poorly controlled licensing.
- The deviation of the AKDP route in Gorontalo is larger because of the mismatch between official routes and passenger needs; inadequate road conditions; lack of supervision; and passenger demand.
- The density of the AKDP route network in Gorontalo is lower because: the region's topography is difficult and road infrastructure is limited; passenger demand is low; resource availability is limited; transportation planning is not yet mature.
- The density ratio of the AKDP route network in Gorontalo is lower because: the region's topography is difficult and road infrastructure is limited; passenger demand is low; resource availability is limited; transportation planning is not yet mature.

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