

# A Study on The Operational Performance and Satisfaction with the Service Quality of Trans Mebidang Buses in Corridor 1 and Corridor 2 based on Passengers' Perception

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**Keywords:** Transportation; Operational Performance; Service Quality.

**Abstract:** As one of the metropolitan cities in Indonesia, Medan has an increasingly acute level of traffic congestion. To create a better, orderly, efficient, effective transportation condition, it is recommended that people should use public transportation. In 2014, the Provincial Administration of North Sumatera issued a public transportation policy on the operation of the Trans Mebidang Bus Rapid Transit (BRT) to minimize the problems of traffic congestion in Medan and surrounding areas. The purpose of this study was to know the operational performance of Trans Mebidang buses and the level of satisfaction of the public as users of the Trans Mebidang bus service. Measurement of operational performance was carried out through a dynamic survey, and measurement of Trans Mebidang bus service quality was carried out using the Importance-Performance Analysis (IPA) method. The results of the overall weighting in this study show that the operational performance of the Trans Mebidang buses in corridor 1 and corridor 2 in this study had yet to fulfil the expectations of the passengers, with an average value of suitability between performance and expectations based on the 22 question items in the questionnaires distributed of -1.41. The performance and quality of the service provided by the operator management need to be maintained to keep the passengers use the public transportation.

## 1 INTRODUCTION

Transportation is the movement of people and goods from one place to another. Movements of people and goods have always been fundamental components of human societies. As one of the metropolitan cities in Indonesia, Medan has an increasingly acute level of traffic jams. The number of motor vehicles is continuously increasing to the extent that the road facilities in Medan are no longer capable of accommodating the number of motor vehicles, which are predominantly privately owned. The use of a great number of private motor vehicles in Medan causes the road capacity to be decreasing.

One of the efforts made by the Medan Government to deal with this problem is broadening the road surface. In consequence, land area dwindles because it is used for road widening and parking lots. People are also reluctant to use public transportation since the services in network, facility,

infrastructure, etc. are poor. The bad quality of public transportation services in terms of security, comfort, feasibility, simplicity, and efficiency, which gives inconveniences and insecurity to urban public transportation passengers, has encouraged the passengers to use private motor vehicles.

To create a transportation condition which is better, more orderly, more efficient, and more effective, it is recommended that people should use public transportation. This is one of the ways to reduce the problems of traffic congestion in Medan and its surrounding. The Provincial Administration of North Sumatera issued a policy on Bus Rapid Transit (BRT)-based public transportation in 2014 to cope with transportation problems in North Sumatera Province, particularly in Medan, Binjai, and Deli Serdang (Mebidang).

Trans Mebidang BRT is a bus transportation system which is expected to be fast, comfortable, safe, and punctual in terms of infrastructure, vehicles, and schedule. Operationally, the Bus Rapid

Transit (BRT) in North Sumatera is managed by Perum Damri.

For a city, good performance and services of public transport will make its traffic better and support its economic activities efficiently and effectively. The operation of Trans Mebidang buses under a mass transportation system is expected to directly or indirectly shift the use of private vehicles to public transportation vehicles to reduce the congestion that began to be felt in Medan-Binjai and Medan-Lubuk Pakam stretches.

Passengers' satisfaction is defined as a judgment that a product or service is provided at a pleasurable level of consumption-related fulfilment. The growth of the passenger road transport and the adequacy of the transport sector focus more on the supply and demand situations. The demand can be seen from the passengers' side and the supply is from the side of operators. On the other hand, it shows the ease of use of the supply and demand of transport and other related issues in the sector. Passengers' satisfaction is one of the important issues, and it may be challenged by different factors. Identifying these factors from both sides and forwarding intervention mechanisms for the problems are necessary to provide quality transportation service.

The purposes of our research were (1) to review the operational performance of Trans Mebidang buses and (2) to include the IPA model to measure the levels of passengers' satisfaction with the service quality.

## 2 METHODS

As it has been clearly stated in the introduction section, the main purpose of this study was to assess the operational performance, and the level of passengers' satisfaction with, the service delivery of Trans Mebidang buses in the public transport sector.

To attain this objective, the researchers used a dynamic survey to specify the operational performance of the buses and a descriptive survey in the research design to specify the service quality from the passengers' perception. In carrying out this research, the researchers contacted some bus passengers. Respondents were randomly chosen and given forms at bus stops or on buses. The survey was targeted mostly at people who used public transport. The total sample size was 100. The identified variables were the demographics of the respondents and the respondents' perception of the experience (satisfaction) taking the Trans Mebidang buses. The level of satisfaction with the public transport service was measured with a five-point Likert scale. The respondents were asked to rate 22 items relating to effectiveness based on their experiences using the Trans Mebidang bus service.

The twenty-two satisfaction items were gleaned from a literature review and a pilot study that reflected the respondents' experiences and problems faced when commuting by Trans Mebidang buses. The descriptive statistics from a total of 22 questions outlining the various statements of the level of service quality from passengers' perception can be analysed.

Public bus transport enables mobility for people within urban areas throughout the world. In analyzing transportation performance, there are some parameters that can be used. The indicators for the analysis of transportation performance and the data input needed are as follows.

In this study, the following is the levels of transportation performance established:

- G = Good
- R = Regular
- A = Average
- B = Bad
- VB = Very Bad

Table 1: The Indicator for Analysing the Transportation Performance (World Bank, 1987).

Parameters	Units	Standard	Criteria				
			G	R	A	B	VB
Journey Time	hour	1-3	≤ 3	1-1.30	2-2.30	2.30-3	> 3
Load Factor	%	≤ 100	100-90	90-80	80-70	70-50	< 50
Trip Length	bus/day		≥ 8	7	6	5	< 5
Distance Traveled by Buses	km	230- 260	≥ 260	260-230	230-200	200-170	< 170
Cycle Time	hour		≤ 2:09	2:10-2:38	2:39-3:07	3:08-3:36	> 3:36
Number of Passengers/Buses/Day		250-300	≥ 250	249-187	186-124	123-61	< 62
Availability Factor	%	80-90	≥ 90	90-60	60-40	40-20	< 20
Circulation Time	hour		≤ 2:22	2:01-2:50	2:51-3:25	3:26-3:40	> 3:00
			5	4	3	2	1

The discussion on the operational performance of Trans Mebidang bus transportation includes journey time, load factor, trip length, distance travelled by buses, cycle time, number of passenger/bus/day, availability factor, and circulation time, which were used to know the standard of public transport service. This can be used as the basis for the identification of the needs for Trans Mebidang bus transportation to serve the demand well.

## 2.1 Bus Service Quality Management

The term service quality in transport literature has long been investigated and defined in many forms. It has been defined as the quality criteria and the accurate measures for which the providers are responsible to provide, the measurements process of how the service quality level delivered matches the customer satisfaction, the measurements that reflect users' perceptions towards the service, the pre-defined standard of service attributes relative to the actual service quality, and the measuring of customer expectation on a constant service standard base.

## 2.2 Importance-Performance Analysis (IPA)

Importance-Performance Analysis (IPA) was formulated by Martilla and James (1977). This simple technique has been a popular tool for understanding customer satisfaction and prioritizing service quality improvements. It is a powerful evaluation tool for practitioners and academics to find out attributes that are doing well and attributes that need to be improved, which require actions immediately. In short, this IPA evaluation tool is used to prescribe the prioritization of attributes for improvement, and it can also provide guidance for strategic development. In principle, IPA combines dimensional measurements to the expectations and importance two grids, then both dimensions were plotted into it. Importance value is plotted as the vertical axis, while the expected value is plotted as the diagonal axis by using the mean value contained in importance and expectation dimensions as the centre line cutting. The diagram consists of four quadrants that show the level of importance to service attributes. In this research, Importance-Performance Analysis (IPA) was used to assess the levels of importance and satisfaction of bus service quality from the passengers' perception. The instruments used in this research were 22-question-item questionnaires that measured service quality attributes. An example of an IPA grid is shown in Figure 1.

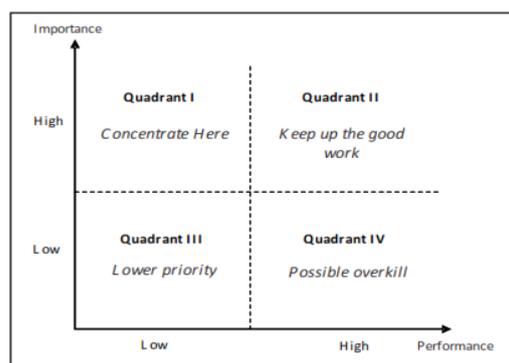


Figure 1: This caption has one line so it is centered.

## 3 RESULTS AND DISCUSSION

With regard to gender of the respondents, 48% were men, and 52% were women. As for the age of the respondents, 31% were 15–24 years old, 28% were 25–34 years old, 25% were 35–44 years old, and 16% were 45–54 years old. With regard to the number of bus usages a week, 38% used less than 3 times a week, 29% used 4 times a week, 19% used 5 times a week, and 14% used more than 5 times a week. In terms of occupation, 34% were students, 23% were private employees, 17% were civil servants, 14% were enterprisers, and 12% were out-of-works.

### 3.1 Operational Performance

The operating performance of Trans Mebidang buses was evaluated using the World Bank's performance measuring parameters, namely journey time, load factor, trip length, distance travelled by buses, cycle time, number of passenger/bus/day, availability factor, and circulation time. This section tries to address the extent to which the available fleets were utilized by the public through a survey of buses. Utilization normally varied between different times of the day (i.e. between peak and off-peak periods), different days of the week, and different times of the year.

Table 2 shows the weighting results of the Trans Mebidang buses of the Pusat Pasar-Binjai route and the Pusat Pasar-Lubuk Pakam route.

Overall weighting results, operational performance of Trans Mebidang buses on corridor 1 and corridor 2 according to World Bank standard with the result of dynamic survey, operational performance of Trans Mebidang buses in category 3, Average category.

Table 2: The Weighting Results of Trans Mebidang Buses.

Parameters	Units	Standard	Pusat Pasar-Binjai Route			Pusat Pasar-Lubuk Pakam Route		
			Monday-Thursday	Saturday	Sunday	Monday-Thursday	Saturday	Sunday
Journey Time	hour	1–3	1	1	1	1	2	2
Load Factor	%	≤ 100	4	5	5	2	2	4
Trip Length	buses/day		4	4	4	3	3	3
Distance Traveled by Buses	km	230–260	2	2	3	3	3	4
Cycle Time	hour		1	1	1	2	3	3
Number of Passengers/Buses/Day		250–300	5	5	5	5	5	5
Availability Factor	%	80–90	3	4	4	3	3	3
Circulation Time	hour		1	1	1	3	4	4
Average	hour		3	3	3	3	3	4
Score			A	A	A	A	B	B

Table 3: Expectations and Perceptions of Passengers of Service Quality Dimensions.

Variables	Dimensions	Perception	Expectation	Gap
Security on the Bus	Reliability	3.12	4.22	-1.1
Rapidness		2.56	4.17	-1.61
Consistency and the Suitability with the Predetermined Schedule		2.80	4.29	-1.49
Congestion Solution	Responsive ness	2.79	4.17	-1.38
Cheap Rates		3.70	4.48	-0.78
Availability of Travel Time Information		3.61	4.34	-0.73
Officers' Readiness to Lift Passengers' Excess Baggage onto the Bus	Assurance	3.04	4.29	-1.25
The Bus Driver's Dropping Off and Picking Up Passengers on the Passengers' Request		3.04	4.40	-1.36
Good Driver Skills		3.21	4.59	-1.38
Convenience in the Bus	Empathy	2.93	4.57	-1.64
Whether or not the Concierge Had Good Engineering Skills in the Event of Bus Breakdown		3.00	4.37	-1.37
Availability of Insurance		1.69	3.40	-1.71
Whether or Not the Officer Will Aid Passengers	Tangibles	2.52	4.02	-1.50
Complaint Contact		2.47	4.16	-1.69
Maintenance of Good Relationship with Passengers		2.54	3.96	-1.42
Operational Hours Suiting Passengers' Needs	Tangibles	2.65	4.05	-1.40
Decent Condition of the Bus		2.85	4.48	-1.63
Support Facilities		3.14	4.47	-1.33
Condition of Station/Bus Stop		2.70	4.49	-1.79
Cleanliness Station/Bus Stop		2.73	4.62	-1.89
Well-Functioning Aircon Facilities on the Bus		3.40	4.47	-1.07
Bus Seating Conditions		3.32	4.81	-1.49
		-1.41		

### 3.2 Bus Services Quality Management

The data from this study were analysed using the Statistical Package for Social Science (SPSS) software. Firstly, an exploratory data analysis in which the data

were examined and cleaned was conducted. A descriptive analysis was conducted for each variable. This section presents the results of the analysis of the specific expectations versus perceptions for each of the five dimensions of service quality.

### Importance-Performance Analysis (IPA) for Service Quality

The IPA method has helped divide the public transportation service quality according to the passengers' perceptions into four identifiable quadrants, so that the bus operators as decision makers will be better able to understand how passengers perceive their services. This is a useful, effective way for decision makers to identify what problems exist. A Cartesian diagram in this research is shown in Figure 2.

Quadrant I:

Quadrant I shows that the handling of the attributed variables which influenced the satisfaction of the users of Trans Mebidang buses with the service provided by the operators of the Trans Mebidang buses should have been prioritized because the existence of these attributed variables was very important, while the performance was still not satisfactory. This condition indicates that the variables performance/service provided by the operators of the Trans Mebidang buses was worse than what had been expected by the passengers, so it should be improved optimally.

Quadrant II:

Quadrant II shows that the handling of the variables which influenced the satisfaction of the passengers of Trans Mebidang buses with the service provided by the operators of the Trans Mebidang buses should have been maintained because the level of performance was generally in accordance with the expectation/interest of the passengers of the Trans Mebidang buses.

Quadrant III:

In Quadrant III, the attributed variables which influenced the satisfaction of the passengers of Trans Mebidang buses with the service provided by the operators of the Trans Mebidang buses were regarded unimportant by the passengers as users of the service, while the quality of its implementation was considered common.

Quadrant IV:

Quadrant IV shows that the attributed variables influenced the satisfaction of the passengers of Trans Mebidang buses with the service provided by the bus operators. The passengers considered that the performance in this quadrant was very good, but it should be improved so that it would meet what had been expected by the passengers as users of the service.

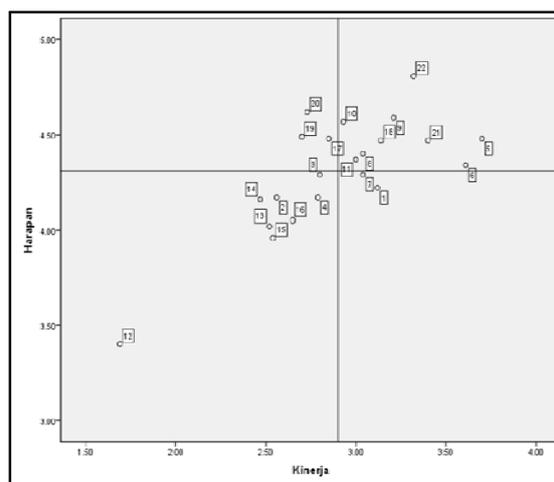


Figure 2: Importance-Performance Analysis (IPA) of the Service Quality.

## 4 CONCLUSIONS

Based on the results of the research and the discussion, and referring to the problems and the objectives of the research, it could be concluded that The overall weighting results show that the operational performance of the Trans Mebidang buses in corridor 1 and corridor 2, according to the World Bank's standard and the results of the dynamic survey, fell into category 3 (Average). As of the quality of the Trans Mebidang bus service in this study has not fulfilled the expectations of passengers, with an average value of the suitability level between performance and expectations based on the 22 questions items in the questionnaires distributed of -1.41. The negative mark indicates that the service quality had yet to meet the expectations of the passengers.

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## REFERENCES

- Adebambo, S. & Adebayo, I., 2009. 'Impact of bus rapid transit system (BRT) on passengers' satisfaction in Lagos Metropolis, Nigeria', *International Journal of Creativity and Technical Development*.
- Andriansyah., 2015. Manajemen Transportasi Dalam Kajian dan Teori. Penerbit FISIP Universitas Prof. Dr. Moestopo Beragama. Jakarta.
- Departemen Perhubungan., 2001. *Panduan Pengumpulan Data Angkutan Umum Perkotaan*. Jakarta: Direktorat Bina Sistem Lalu Lintas dan Angkutan Kota.
- Gary L. B., 2002. Public Journal of Transportation, Volume 5, No.2. Center for Urban Transportation Research (CUTR). University of South Florida.
- Hensher, D., Stopher, P. & Bullock, P., 2003. 'Service quality: Developing a service quality index in the provision of commercial bus contracts', *Journal of Transport Research* 37.
- Iles, R., 2005. Public transport in developing countries, Elsevier, Amsterdam.
- J. Martilla, and J. James., 1977. "Importance-Performance Analysis," *Journal of Marketing*, vol. 41, no. 1, pp. 77-79.
- Keputusan Direktur Jenderal Perhubungan Darat Nomor: SK.687/AJ.206/DRDJ/2002. *Pedoman Teknis Penyelenggaraan Angkutan Penumpang Umum di Wilayah Perkotaan Dalam Trayek Tetap dan Teratur*. Jakarta; Departemen perhubungan RI.
- Levinson, H., Zimmerman, S., Clinger, J., Gast, J., Rutherford, S. & Bruhn, E., 2003. *Bus rapid transit implementation guidelines, TCRP Report 90*, Transport Research Board, Washington, DC.
- Mason, R.D., dan Douglas, A.L., 1999. *Teknik Statistika Untuk Bisnis dan Ekonomi*. Jilid 2 Edisi 9, Erlangga. Jakarta.
- Mobereola, D., 2009. Africa's first bus rapid transit scheme: The Lagos BRT-lite system, Sub-Saharan Africa Transport Policy Program Discussion Paper 9, SSATP, Lagos.
- P. Agarwal, and A. Singh., 2010. "Performance improvement of urban bus system: Issues and solutions", *International Journal of Engineering Science and Technology* 2(9), 4759-4766
- Sugiyono., 2009. *Statistics for Research*. Alfabeta Publisher. Bandung.
- Tamin, O. Z., 2008. Perencanaan Dan Pemodelan Transportasi, Edisi 2. Penerbit ITB. Bandung.
- Tjiptono, F., 2012. Service Management Mewujudkan Layanan Prima (Edisi Kedua). Penerbit Andi. Yogyakarta.
- World Bank. (1987). *Bus Services: Reducing Costs and Raising Standards*. World Bank Technical Paper No. 68. Washington, DC