

# Youth Perception on Features and Accessibility of Bus Rapid Transit Mebidang in Bridging Interconnected Areas in North Sumatera

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## ABSTRACT

One of Indonesian problems in infrastructure development is how to nationally avail Bus Rapid Transit having transit rail system in its development system. In the macroeconomic perspective, the availability of urban transport infrastructure services can affect the marginal productivity of private capital, while in the microeconomic perspective; such services can also decrease production costs. Moreover, the contribution of urban transport infrastructure to improving quality of life is indicated by the increase in welfare, productivity and access to employment, as well as macroeconomic stability. This research is descriptive trying to gain youth's perception on Bus Rapid Transit in Medan. In this study, the primary and secondary data sources are used and the populations include all users of Trans Mebidang. The samples are taken from those using the routes of Tanjung Anom to Down Town (or Pusat Kota), Jamin Ginting to Down Town, and Simpang Pos to Down Town and the samples chosen are only 15% of population. Sampling technique is purposive and accidental. It can be concluded that partially the Feature Perception (X1) gives impacts on the utilization of Trans Mebidang and partially the Accessibility Perception also brings effect to the utilization of Trans Mebidang.

**Keywords:** perception, features, accessibility, bus rapid transit, Medan

## INTRODUCTION

### Background of the study

One of Indonesian problems in infrastructure development is how to nationally avail Bus Rapid Transit (BRT) which has the capacity like the transit rail system in the BRT's development system. There are 16 cities in Indonesia that have provided public BRT such as Jakarta (the BRT is named Trans Jakarta), Bogor (TransPakuan), Yogyakarta (Trans Jogja), Bandung (Trans Metro Bandung), Palembang (Trans Musi), Semarang (Trans Semarang), Pekanbaru (Trans Metro Pekanbaru), Solo (Batik Solo Trans), Denpasar (Trans Sarbagita), Padang (Trans Padang), and Makassar (Busway Trans

Mamminasata). Several other cities i.e. Medan, Surabaya, and eastern Indonesia's other cities will have soon (beritatrans.com). Following Trans Jakarta several BRTs, for instance Trans Semarang, Solo Trans Batik, Trans Jogja, and Trans Musi have provided electronic cards but they do not have path separator except the Trans Jakarta. They have interconnected links to airports, railway stations, and even to water bus docks such as Trans Jogja, Solo Trans Batik, Trans Semarang, Trans Musi, and Trans Metro Pekanbaru. Indonesian Government has spent big money to build BRTs; the BRT's road construction for about 5 km costs US \$ 5 million and if the cost is mainly relied on national budget,

Indonesian Government will have big problem in building perfect BRTs.

In the macroeconomic perspective, the availability of urban transport infrastructure (UTI) services can affect the marginal productivity of private capital, and in the microeconomic concept, such services will decrease the production costs. Moreover, the contribution of UTI to the improvement of quality of life is indicated by the increasing levels of welfare, productivity, and access to employment as well as macroeconomic stability.

The Government of Indonesia has issued the Presidential Regulation No. 2 in 2015 regarding the National Medium-Term Development Plan from 2015-2019, which is directed to improve the UTI's qualified services, to prioritize on urban mass transportation (UMT) development, and to focus on road-based mass transport infrastructure, rail-based mass transport, and maintenance of UMT's network quality. The targets by the end of 2019 are to get 32% shared-capital increase, to reach 70% of 29 cities having BRTs, to increase the public transport capacity amounting to 80% and the traffic speed with at least 20 km/hour, to expand the application of urban traffic management technology and the improvement of non-road alternative modes in the potential cities, to utilize gas-based energy, especially for urban public transport, to improve urban traffic safety, and to reduce environmental impacts, especially urban air emissions. The government considers the need to involve other parties such as the private sectors, national state companies (or BUMN), and donor countries including GIZ-SUTIP to improve the urban transportation system; government also explains its plans to local governments and communities.

Trans Mebidang (TM) began its operations in November 2015 after being delayed from the schedule in 2013; it has large capacity with short travel time at a reasonable cost. The TM is hoped to switch people from private vehicles to UMT and to reduce both congestion and high fuel

consumption. It has a fleet of 30 bus units giving services into two corridors, namely Medan-Binjai and Medan-Deli Serdang and in the future, seven corridors will soon be developed. About supporting facilities, the TM is supported by 47 bus stops along the routes; passengers are required to wait for buses at shelters. Due to the field situations and conditions, there are only 17 units operating for two corridors with an average number of passengers is 22 per trip although a bus has the capacity of 80 people (30 people may be seated but 50 stand).

Three questions are formulated: 1. Do youth perceptions partially influence the features and increase the interest in the TM?, 2. Do youth perceptions partially influence the accessibilities and increase the interest in the TM?, and 3. Do youth perceptions simultaneously influence the features and the accessibilities and increase the interest in the TM?

### **Literary studies**

Charisma (2016) did a research about the perception and public participation in the infrastructure development (case study in the construction of route for South-South corridor, phase 1, Lebak Bulus South Jakarta). She concluded that poor perceptions from communities about the infrastructure development should be eliminated so that they have the same views and ideas about such development. Such eliminations would develop awareness and critical thinking among them; moreover, community's participation should also be improved so that the development ran smoothly, effectively, efficiently and in accordance with expectations. In her study the level of community participation was quite good and such such participation affected positively the infrastructure development.

Kartika (2013) did her research on "Perception of Bandar Lampung society towards the implementation of Mayor's Policy on Bus Rapid Transit (BRT)" and showed in her results that of 60 respondents, 33 of them (55%) felt satisfied on BRT's

tariff, security, and crews' hospitality services. When doing research on "Bus Rapid Transit System of TransJakarta In Social Engineering Studies" Tangkudung (2011) indicated that the highest quality of service is related to the empathy dimension and the lowest quality of service associated with the tangible or real dimension. Astuti (2011) when focusing on "Factors influencing people's interest in choosing Trans Jogja in Malioboro" in her research stated that people's perception on the existence of Trans Jogja is very enthusiastic because this trans has adequate facilities of structure and infrastructure and of affordable price. Inhibiting factors are bus delays, lack of bus stops, and of paths themselves.

Various views on perceptions can be referred to Slameto (2010: 102), Young (in Adrian 2010: 1), Suranto (2010), Pride & Ferrel (in Fadila 2013: 45), Kotler and Keller (2016: 228), Natalia (2012: 3). Factors that influence perception are two, namely internal factors such as psychological needs, educational background, sensory equipment, nerves or central nervous system, personality and experience of self-acceptance and individual circumstances at any given time, and external factors for instance a. size and placement of the object or stimulus, b. colors of objects, c. uniqueness and contrast of stimulus d. the intensity and strength of the stimulus, and e. motion or movement (Walgito 2010: 54).

BRT is a flexible mode with rubber wheels, having fast-moving transit and access to station, other transport vehicles, services, roads and to Intelligent Transportation System (ITS) elements in an integrated system with strong identity "(Levinson et al., 2003,: 12). BRT is a high-quality, client-oriented transit offering speed, convenience, and affordable pricing (Wright, 2003: 1) and it is also a rapid mode of transportation that combines the quality of rail transport and bus flexibility" (Tomas, 2001).

The BRT's ideal features include the followings:

1. it is special bus line, or special line (or on exclusive path) right-of-way.
2. its benefit can be lowered since it is engineered to enter the safe zone when compared to the roads opened for non-professional drivers.
3. it consists of a tunable path on an asphalt surface with the right path can be modified into a right-of-way rail.
4. it has low infrastructure elements and can reduce the speed and the constraints of bus services including bus out of the way, bus breaking the rules and bus with high speed.
5. it has comprehensive line.
6. it has specific market with with everyday's high-frequency service.
7. if the system runs chaotic then the service will not serve a particular market.
8. bus priority/bus line.
9. it is categorized as vehicle having tram characteristics.
10. its main priorities are: guaranteed driving quality (waveguide bus and electronic drivetrain control for smooth control of operation), large capacity (dual and double buses), reduced cost of operation (hybrid electric power train), specific image with company's name such as Viva, TransMillenio, Trans Jakarta etc.), and specific stations with art features from countries that use BRT.
11. it has off-bus passengers.
12. Another alternative is when passengers can enter via an unclosed bus station or shelter area prior to bus arrival.
13. it has floor boarding: low-floor (or high-floor system) to facilitate passengers to enter the bus.
14. Halte/bus stop

Fig. 1 shows the effect analysis of perception on features and accessibility to the interests in the utilization BRT Mebidang.

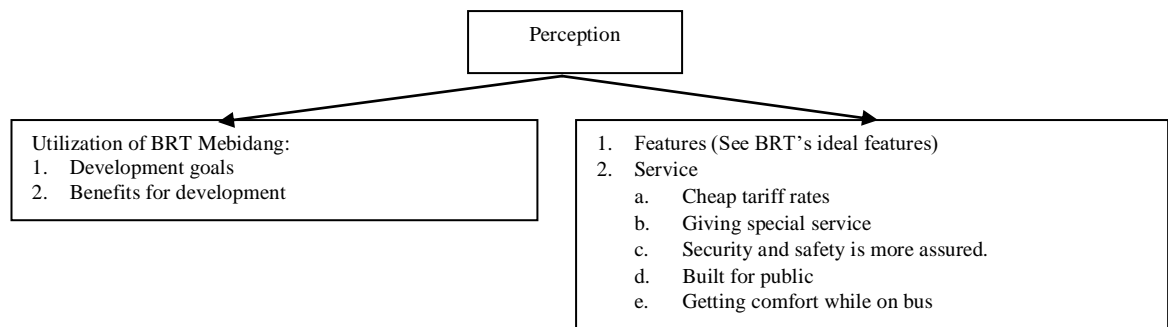


Figure 1. Research framework

Meanwhile, the research conceptual framework is shown in Fig. 2 in the following:



Figure 2. Conceptual framework

This research has the following hypotheses: Partially, features influence youth perception to increase the interest in BRT Mebidang.

Partially, accessibilities influence youth perception to increase the interest in BRT Mebidang.

Simultaneously, features and accessibilities influence youth perception to increase the interest in BRT Mebidang.

## MATERIALS AND METHODS

This study is descriptive (Sugiyono 2014: 53) to describe the youth perception on BRT development in Medan and has two data sources. Primary source is collected directly by the researchers from 360 passengers using BRT from Medan to Binjai to Deli Serdang routes. Meanwhile, secondary source is gathered from documents and questionnaires. The population in this study refers to 360 passengers using public BRT Mebidang and the samples amount to 54 (or 15%) passengers taking routes from Tanjung Anom to Down Town, from Jamin Ginting to Down Town and Simpang Post to Down Town. Sampling technique involves purposive and accidental samplings. Data collection in this study covers primary and secondary data. The first was conducted through giving questionnaires which consist of multiple choice answers but the answers are ticked secretly. The second was

carried out through literature studies from books, scientific journals, regulations, and experts' opinions.

## RESULTS AND DISCUSSION

Totally, there are 47 bus stops scattering along the bus routes, starting from Binjai City to Deli Serdang regency. The Medan-Binjai corridor was built by Binjai municipality. From Medan the bus stops can be found at Simpang Megawati, Simpang KM 18, KM 19, Binjai Terminal and from Binjai, the bus stops can be found at Simpang Tanah Tinggi, KM 19, KM 18, and Simpang Megawati. The Medan-Lubukpakam corridor was built by Deliserdang regency and from Lubukpakam, the bus stops can be found at Lubukpakam Terminal, Penara/Pasar 7, KIM Star Tanjungmorawa, Subsidi, Sinalco, and Madirsan while from Medan, the bus stops can be found at Madirsan, Subsidi, Sinalco, KIM Star, Penara/Pasar 7.

### The influence of perception on features of BRT Mebidang

We obtained the value of  $t$  calculation  $> t$  table ( $2.658 > 0.67933$ ) and this means that there is partially significant influence between perception on feature (X1) and sales volume. So, from this data, it can be concluded that partially the X1 influences the utilization of BRT Mebidang. The BRT is a term for various public

transport systems that use buses to provide faster and more efficient services than regular bus lines. It has special line to reach high efficiency based on its qualified service and systems. The result of the system is approaching the transit rail system which maintains security and bus fares. Countries that use BRT are found in North America, Europe and Australia but the BRT is named busway in those countries, while in other countries the BRT is called the quality bus or bus service.

Bus Rapid Transit looks like rapid transit that has high-capacity rail transport (or it can be called right-of-way). The rapid transit train which is relatively fast, has long body and is available for short lane uses underground tunnels. The transit speed of the BRT system is at an average of 19-48 km/hour depending on the road surface. Features commonly used in BRT might include: bus for special lanes, or special lines (or exclusive paths) right-of-way referring to a special lane where the path is free from the reach of private vehicles. Therefore, the BRT is operated at a high quality level and only professional bus drivers can operate. The BRT's benefit is to lower its construction costs since it is proclaimed and to enter the safe zone when compared to non-professional drivers. Consisting of a tunable path, on an asphalt surface, the right lane can be modified to a right-of-way rail. A street bus or street mall can be made in an urban setting by dedicating all the paths of the city road to be used exclusively for buses. Low infrastructure elements can reduce the speed and constraints of bus services including buses out of the way, or buses breaking the rules and buses with too high speed.

In case of comprehensive line the BRT can choose parts of roads and have road networks for private cars. This can make the time more efficient and faster than regular bus systems that take longer time. Serving specific markets with high daily service frequencies the BRT networks can serve a particular market (all passengers) by transporting passengers from a place to their

destinations in large amounts with faster times that can increase the public's appreciation. Compared to other transit systems this system works well. In case of bus line every bus line must have certain signs. The green light at a junction that has a signal should surely detect when the bus is passed. The priority of the intersection should be optimized and can be helpful during when BRT is crossing public line because the traffic can get chaotic because of this situation. Certain images with company names are Viva, TransMillenio, TransJakarta etc. with feature-specific stations art from countries that use BRT. About off-bus passengers the collections of conventional on board without passengers can lower the boarding process, usually when there are passengers with different destinations or class, or another alternative is when passengers enter via an unclosed bus station or shelter area prior to bus arrival. This system prevents passengers from standing at all bus stops. With regard to boarding floors many BRT systems use low-floor systems (or high-floor systems when the bus is high-floor bus) to make it easier for passengers to enter the bus and about the bus stops the BRT can serve high quality and deliver highly qualified features such as sliding glass doors, guarded ticket counters, information points, and many other features.

The collection of revenue/ticketing can be done in various ways such as at the bus stops which are equipped with booths selling tickets as the TransJakarta bus showed or through automatic dispenser/ticket to reduce humans' roles. About the bus using a prepaid card, the card is usually be used for various purposes and can be refilled through retail stores or shops or through banking. The trans Mebidang can have a flexible function as the main mode of transportation or feeder. Technically it requires physical combination of network, and system (transaction) and operation between the two modes of transportation. The Trans networks can still be expanded to reach the suburban communities. Never



imagine that the trans service should always be medium or large. If the physical condition of the road network is limited, it can be served by a small bus which looks like small public transport (or angkot); what is important is that the management system and its operational standard should be in accordance with the type of the trans Mebidang service. The BRT Mebidang is a highly qualified bus which is based on fast, convenient, and low cost transit system for urban mobility and provides pedestrian paths, infrastructure, fast and frequent service operations. It basically emulates the performance characteristics of modern rail transport system and typically costs 4 to 20 times less than the light rail transit (LRT) and 10 to 100 times less than the subway system.

#### **Effects of accessibility perception on utilization of BRT Mebidang**

The result of data analysis obtains  $t$  value  $> t$  table ( $9.716 > 1.66105$ ) meaning that there is partially significant influence between accessibility perception ( $X_2$ ) with sales volume ( $Y$ ). So it can be concluded that partially accessibility perception gives effect to utilization of BRT Mebidang. BRT is a flexible, fast-moving rubber mode and is accessed with station, vehicle, service, road and with ITS elements in an integrated system with strong identity (Levinson et al.2003,: 12). BRT is a high-quality, client-oriented transit offering speed, convenient, and affordable pricing (Wright, 2003: 1). BRT is a rapid mode of transportation that combines the quality of rail transport and bus flexibility (Tomas, 2001). All of these definitions determine that the BRT is different with the conventional bus service. In fact, the definitions tend to show that BRT has much in common with rail-based systems, especially in terms of operational performance and service to passengers. BRT has attempted to take on aspects of the LRT and metro systems and is most cherished by public transport customers and makes more attributes accessible to wider quotations. The main difference between BRT and rail

systems in urban areas is that BRT is usually able to provide high quality public transport services and the a cost that is easily accessible to the public.

#### **Influences of feature and accessibility perceptions on utilization of BRT Mebidang**

The percentage contribution of the independent variable (the feature and accessibility perceptions) to dependent variable (the utilization of BRT Mebidang) equals to 87,0% and the  $F$  calculation is 111.139. When the confidence level is 95% with  $\alpha = 5\%$ , the  $F$  table is 2.79. The value of  $F$  calculation is  $> F$  table ( $111.139 > 2.79$ ), then  $H_0$  is rejected. Because  $F$  calculation is  $> F$  table ( $111.139 > 2.79$ ), then  $H_0$  is rejected, meaning that there is a significant influence between feature and accessibility perceptions to the dependent variable (the utilization of BRT Mebidang). So this can be concluded that the feature and accessibility perceptions influence the variable of the utilization of BRT Mebidang.

In its initial operation, the BRT Mebidang had no special lanes (this is different with the Trans Jakarta), so it ran on the highway coincided with the public vehicles; moreover, this BRT was only operated at two corridors. This was certainly not able to meet the needs of public transportation for travelers who needed facilities outside the existing corridor. Although there were still shortcomings in its operation, but, in fact, the BRT Mebidang already had a lot of passengers (compared to the recorded data from Medan office of Perum DAMRI). In the beginning of BRT Mebidang operation in November 2015 the number of passengers at Corridor I (Medan-Binjai) amounted to 15,728 passangers. There was an increase in the coming months such as in December 2015 (36,246), in January 2016 (40,737), in February 2016 (40,549), in March 2016 (49,850), and in April 2016 (48,506). While at Corridor II (Medan-Lubuk Pakam) in November 2015 there amounted to 21,505 passengers, in

December 2015 (36,421), in January 2016 (34,697), in February 2016 (32,161), in March 2016 (35,977), and in April 2016 (34,070).

The data above only shows the number of passengers in each corridor but does not display the characteristics of the passengers. As a recently operated mode of transport, BRT Mebidang is necessary to recognize the characteristics of travelers and bus service system which can later become a source of information to overcome the challenges for the operation of this BRT in the future, so that BRT operators can revamp and improve various facets for the advancement of transportation in the Mebidang regions. The BRT Mebidang interested residents living in Medan, Binjai, and Deli Serdang and to transport passengers from Medan to other two cities, the BRT passengers waited in the junctions of M.T. Haryono/Bintang street. There are two buses serving from Medan to Binjai and from Medan to Lubuk Pakam. Most passengers were schoolchildren, students, and the public. In addition to Medan residents, most passengers came from Binjai or from Deli Serdang, who worked or studied in Medan. Average passengers waited at the provided bus stops. Unfortunately, the conditions of bus stops in Medan are generally damaged and not feasible. In fact, there is a bus stop with no seats. This condition is in contrast to the bus stops in Binjai. The average bus stops in Binjai are very good; the ceilings are plastered with ceramics so that the passengers who are waiting feel comfortable.

The hopes from local residents and from Medan city government to reduce traffic congestion is likely to be achieved by the existence of BRT Mebidang which is donated by the Ministry of Transportation and operated by Medan branch office of Perum Damri. The BRT routes from Medan to Lubuk Pakam corridor start at Central Market (Sambu terminal) then leading to Asia, Pandu, Sisingamangaraja, and Medan streets and going to Tanjung Morawa, and Lubuk Pakam Terminal. While at the

Medan-Binjai corridor the routes began at Binjai Terminal then running to Medan, Binjai, Gatot Subroto, Kaptan Maulana Lubis, Raden Saleh, City Hall, Bukit Barisan, Railway Station, and MT Haryono streets, then stopping at Pusat Pasar. A driver and a conductor are responsible for a BRT.

As it is expected to reduce traffic, the BRT Mebidang also serves and helps people with economy class with cheaper fare. For example, travelling from Binjai to Kampung Lalang Medan by using angkot a passenger has to pay IDR 5.000, and IDR 5.000 from Kampung Lalang using another angkot; so totally, such passenger pays IDR 10.000. Meanwhile, travelling by BRT Mebidang for such locations can be achieved with cheaper fare and with easy travelling and costs only IDR 6.000 for one trip from Binjai to Medan. Another advantage for passengers is the wide space in the BRT as well as the safety. The BRT Mebidang has 12 units of shelters in Deli Serdang, 8 units in Binjai, and 18 units in Medan and there are five planned shelters which have not been developed locating at Diski, Pasar Besar, Mandiri, KM 12, and Pardede.

The lack of bus stops in the Deli Serdang area caused the BRT Mebidang drivers to take passengers in the streets, but not at the bus stops. This made quarrels between the BRT and angkot drivers and many angkot drivers got angry. "Woy, from the bus stop you take your passengers," said Mr. Ranto (informant) mimicking angry angkot driver. The BRT Mebidang drivers experienced bad problems when operating their buses, such as they were stopped in the middle of the road, shouted or yelled with rough words. When many passengers argued that the BRT created smooth traffic, but Suriadi who was an angkot driver did not accept the BRT and argued that the BRT created traffic jams and reduced angkot passengers. When asked about his expectations, he quickly responded that the BRT is not hoped to be a barrier for public transportation drivers. Traffic jams is likely

to be overcome if the whole community realizes and empowers the utility of the BRT Mebidang and are no longer using private vehicles. If the community is not aware of the utilization, then whatever perfect the BRT is in providing service, traffic jams would continue to occur because the numbers of public and private vehicles are increasing each year.

Medan has already prepared budget of about IDR 4.4 billion although such budget has not been channelled. Currently the government budgeted IDR 382 billion to realize BTM in six major cities in Indonesia including North Sumatera. The BRT Mebidang was estimated to cost IDR 12.6 billion and Medan government provided a budget of IDR 1.2 billion to build 30 BTM stops, while provincial government only budgeted IDR 5 billion for operational purposes and infrastructure development. In relation to local economic growth, the BRT Mebidang creates efficiency either for users or operators and is considered to be a step forward as a mass transportation that can reduce the level of traffic of private vehicle volumes on the road. Related to the rejection from Organda and Kesper, Arifin (an informant) expected that the government's policy do not affect or shut down the business of certain group or groups. He considered there was a miscommunication so that one of the parties felt aggrieved by the policy. An effective and efficient public transport system would support better urban planning, in which city residents have equal access to mobility without being tortured by congestion and air pollution.

Until the end of 2014, out of 34 provinces and 505 municipal governments, there are only 18 units of road-based mass transit services and only new Trans Jakarta has special lanes although the operation of most mass transit services is not yet in accordance with the minimum service standards (SPM) specified by the government. Thus, it should be considered by decision makers at both national and local levels to support the financial

operation of public transport constantly with support from public funds in Indonesia, as long as energy costs do not increase substantially.

## CONCLUSIONS

1. Youth perception on features when they use BRT Mebidang is positive.
2. Youth perception on accessibility of BRT Mebidang is also positive.
3. Concurrently youth perception on both features and accessibility can increase their interest in using BRT Mebidang and this is positive.

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