Chapter 6

Distribution of bus stops at train stations: A comparison between Kyoto subway line and Kelana Jaya line

Siti Fadhilina Muhammad Fisal, Nur Sabahiah Abdul Sukor, Herni Halim, Munzilah Md Rohani and Sitti Asmah Hassan

6.1 Introduction

In this era of high mobility, private vehicles are still dominating the traffic despite various alternatives such as bus and train had been implemented to increase the public transport ridership. For instance, in Penang, a free shuttle service between Weld Quay and Komtar (launched in 2009) and Bridge Express Shuttle Transit (BEST) Park and Ride (launched in 2011) had faced difficulties to get high ridership. Thus, a headway study by Haron et al. [1] had improved the bus schedule on most of the bus routes.

However, those efforts seem not effective enough as the traffic in Penang remains congested until today. People are still resists to choose bus ride as their mode choice even though traffic congestion is getting worse. One of the factors that may have influenced the unlikeness to ride on the bus services is the accessibility factor to get the services that includes the existence of the bus stops.

One of the significant indicators for the good provision of bus stop at the train stations is short walking distance between the bus stops and the transit stations. If the bus stop exists within the appropriate walking distance, the probability to use the transit system will also increase [2]. 800m was found as the acceptable walking distance among the public transport users [3]. Meanwhile suitable walking distance to bus service was also reported to be in between 400 meters to 600 meters and to train station in between 800 meters to 1,000 meters [4].
Murray and Wu [5] also support that access to transit service is important in transit service planning. Chee and Fernandez [6] found that, poor regularity of bus arrival and departure was actually one of the factors that decline the ridership of bus in Penang. In addition, service quality such as accessibility, availability and reliability of the bus service also give impact to the bus ridership [7]. It is also argued that the failure of the bus operators to maintain good standards of punctuality, the frequency of buses, efficient routes, cleanliness, and well-planned bus stops were among factors that constrain the likeliness to ride the buses [8].

Japan has been known as a developed country that has high quality of public transport service. Meanwhile, Kyoto is among the cities in Japan that received high number of tourists, similar with Kuala Lumpur. Therefore, this topic compares the differences in the distribution of bus stops near the train stations between Kyoto Subway Line and Kelana Jaya Line in Kuala Lumpur. Kyoto Subway Line was selected for its similarity in terms of land use and development activities with Kelana Jaya Line, Kuala Lumpur. Kelana Jaya Line consists primarily of elevated stops and a handful of underground and at-grade stations. Of the 37 stations 31 are elevated, 1 at ground level, and 5 underground stations. Meanwhile, Kyoto Subway Line consists of 2 lines which are Karasuma Line and Tozai Line with altogether 32 stations which are totally operated underground.

6.2 Methodology

The data for the analysis was obtained and measured by using google maps. The comparison was made by selecting the stations that have the similar type of land use and development activities between Karasuma Line and Kelana Jaya Line. Tozai Line was not suitable to be compared as it serves to less dense population areas. Therefore, four stations were found to be suited to compare including Kyoto Station vs Kuala Lumpur Sentral and Sanjo Station vs Masjid Jamek Station. Kyoto Station and Kuala Lumpur Sentral stations have similar purpose which is as a transit hub at the urban and dense areas. Meanwhile, Sanjo Station and Masjid Jamek Station are similar in terms of serve as the interchange stations. Next, a radius of 500 meter to 1-kilometer circular buffer in the maps has been determined from each station. The criteria that should be considered for the
accessibility to the train stations such as the number and distribution of bus stops, the average distance between each bus stops, the closest distance of car parks to the train station, the closest distance of bus stop to the train station and type of land use will be discussed in the results and discussion.

6.3 Results and Discussion

6.3.1 Distribution of Bus Stops

Based on the data harvested from the Google maps, a comparison study is made regarding the accessibility of bus stops to the train station between Karasuma Line, and Kelana Jaya Line. Fig. 1 shows the distribution of bus stops at 1km radius from Sanjo Station whereas Fig. 2 shows the distribution of bus stops with the same radius at Masjid Jamek Station. The red dots in the figures represent the location of the bus stops. Sanjo Station and Masjid Jamek Station were selected to be compared based on the similar type of land use and development activities which located at the business and office areas. Whereas, Fig. 3 and Fig. 4 show the Kyoto Station and Kuala Lumpur (KL) Sentral, respectively. Both stations act as the terminal hubs.

It was found that, the distribution of bus stops at both train stations has different patterns. The bus stops at Karasuma Line are more compactly distributed than the bus stops at Kelana Jaya Line, which is in more scattered locations. The provision of bus stops within 1km radius from each station of Karasuma Line is identified to be more than that have been provided around each station of Kelana Jaya Line, Kuala Lumpur. This pattern significantly affects the willingness to ride a train. With fewer provisions of bus stops, people will reluctantly take a train as they have to walk further and it will take longer time to arrive at the train station if they happen to take a bus. Figures 5 and 6 show the number of bus stop provided within 1-kilometer radius from each station for both type of train services. The results show that higher numbers of bus stops have been provided for Kyoto Subway Line compare to Kelana Jaya Line.
Fig. 1 The Distribution of Bus Stops within 1km radius from Sanjo Station (Karasuma Line), Kyoto, Japan. [9]

Fig. 2 The Distribution of Bus Stops within 1km radius from Masjid Jamek Station (Kelana Jaya Line), Kuala Lumpur, Malaysia [10]
Fig. 3 The Distribution of Bus Stops within 1km radius from Kyoto Station (Karasuma Line), Kyoto, Japan [11]

Fig. 4 The Distribution of Bus Stops within 1km radius from KL Sentral Station (Kelana Jaya Line), Kuala Lumpur, Malaysia [12]
Fig. 5 Number of Bus Stops within 1-kilometer radius from each station at Kyoto Subway Line

Fig. 6 Number of Bus Stops within 1-kilometer radius from each station at Kelana Jaya Line
6.3.2 Distance between bus stops

The approximate distance between the bus stops nearby the train stations of Kyoto Subway Line is in the range of 150 meter to 400 meters with the closest distance of 10 meter from the train station. For this aspect, there is no major difference for Kelana Jaya Line. The average distance between the bus stops is 200 meters to 500 meters approximately with the closest distance of 50 meter to 70 meters to the train station. The gap between bus stops become shorter when the area is the center of attraction and city center.

6.3.3 Facilities at bus stops

From the data extracted from street view, the train stations of Kyoto Subway Line provide bicycle lane and bicycle parking area for the cyclist. However, it is different for Kelana Jaya Line which bicycle parking area is occasionally provided for the cyclist but motorcycle parking is provided at almost every train station. Car parks either paid or free are available as close as 50 meters to 100 meters for both Kyoto Subway Line and Kelana Jaya Line. Bus routes are available for access and egress from each train stations. Thus, it can be assumed that there is no problem in term of bus accessibility to the train station for both Kyoto Subway Line and Kelana Jaya Line. For Kyoto Subway Line, car parks are available at almost every train station with as close as 30 meters to 100 meters approximately. Whereas for Kelana Jaya Line, mostly car parks are available at elevated train stations and very limited.

6.3.4 Type of land use and bus network

Type of land use for Kyoto Subway Line is mixed used development with some of the stations are located at the center of attraction or central business district (CBD) such as Kyoto Station and Karasuma Oike. The train also headed to the suburban regions with most of the land use is dominated by residential area. Nevertheless, the number of bus stops are not reducing. This is opposite with Kelana Jaya Line where the number of bus stops become lesser when it comes to suburban areas. Based on the figures showed above, it is found that there is a difference of bus network in both lines. By referring to the picture, the bus network within 1-
kilometer circular radius from Kyoto Subway Line is grid whereas the bus network from Kelana Jaya Line is linear. From this perspective of view, multi destination-based transit networks such as grid is claimed to be more effective in terms of mode share, service effectiveness and cost effectiveness [13]. Furthermore, Nielsen et al [14] suggested that, having this kind of network can increase the bus ridership. This network might be the reason behind the high dependency of Kyoto Subway Line.

6.4 Conclusion

From the comparison and analysis, there is a difference in distribution of bus stops between Kyoto Subway Line and Kelana Jaya Line. This distribution pattern does influence the bus ridership. The grid bus network practiced by Kyoto has made the bus system works more effectively and attract the users to take the train. One more difference that is identified is the provision of bicycle and motorcycle parking. From here it is found that there are two different mobility cultures which are bicycle ridership and motorcycle ridership. The Japanese do not use motorcycle as much as the Malaysians but the Malaysians do not use bicycle as much as the Japanese. Mobility culture does affect the dependency on public transport.

References


