

Importance-Performance Analysis (IPA) of Bus Services in Kota Kinabalu

Rima Abdul Rahman¹, Harifah Mohd Noor¹,
Ubong Imang¹, Mario Tartaglia²

¹ Faculty of Social Sciences and Humanities, University Malaysia Sabah, Malaysia,

² School of Humanities and Education, Università Degli Studi di Firenze, Italy

rimar7299@gmail.com, harifah@ums.edu.my, ubong@ums.edu.my, mario.tartaglia@unifi.it
Tel: +60165837148

Abstract

This study applies Importance-Performance Analysis (IPA) to assess user satisfaction with bus services in Kota Kinabalu, Sabah, Malaysia. Key dimensions analyzed include bus facilities, accessibility, safety, and fare, crucial in evaluating public transportation efficiency. 450 questionnaires were distributed using a quantitative approach and descriptive design. The findings indicate that while certain aspects meet user expectations, improvements are needed in bus accessibility and public transport facilities to enhance overall service quality. This study provides valuable insights for transportation authorities to prioritize service improvements, ultimately promoting increased public transport usage.

Keywords: Public Transport; Bus Service; Satisfaction

eISSN:2514-7528 © 2025. The Authors. Published for AMER by e-International Publishing House, Ltd., U.K. This is an open access publication under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>). Peer-review under responsibility of AMER (Association of Malaysian Environment-Behaviour Researchers).

DOI: <https://doi.org/10.21834/jabs.v10i31.464>

1.0 Introduction

Transport is a vital aspect of society in the age of globalization, whether in the city or the countryside. According to Noor et al. (2016), transport is one of the indicators of improving the quality of life and community well-being. Among the forms of transport that play a significant role in meeting these needs is public transport. Public transport plays a role in helping people to move from one place to another more efficiently, especially individuals who are entirely dependent on public transport. Public transportation is the lifeblood of modern cities, offering more than just mobility; it connects communities, reduces congestion, and supports environmental sustainability.

The effectiveness of a public bus is typically judged in terms of accessibility, facilities supplied, safety, and rates.

This was supported by Zakaria et al. (2024), who stated that significant public transportation can assist users in easily getting to the bus. This concept emphasizes justice to various layers of society without discrimination, how it affects community mobility and quality of life, and plays a significant role in urban planning and sustainable development to create an inclusive and user-friendly environment.

The ineffectiveness of public transport services is one of the main challenges for a country in making an effort to develop a more efficient transport system to increase population mobility. Local authorities only rely on public complaints as a guide to improve the weaknesses of public transport services (Noor et al., 2016). Kota Kinabalu which has reached the status of a city on 02 January 2000 should have high accessibility to public transport due to better infrastructure facilities and roads, which have been upgraded from time to time. However, in 2016 the number of private vehicle users in Kota Kinabalu increased to four percent of vehicles each year. This has been supported by a report from August Dean (2023) that only 20% of people use public buses in Kota Kinabalu as of 2023.

As a result, the goal of this research is to help the government prepare for improvements to public bus transportation in Kota Kinabalu. In this study, the Importance-Performance Analysis (IPA) approach is utilized to assess user satisfaction and the importance of public bus transportation services.

2.0 Literature Review

This study applies a cloud transport effectiveness model (Eboli and Mazulla, 2011) and model accessibility (Geurs and Wee, 2014) to measure user perception of public bus effectiveness.

2.1 Factors of Public Transport Effectiveness

Effective public transport facilitates users to do their daily routines better and more efficiently. Therefore, to provide good mobility to users, public transport must be effective in terms of convenience, accessibility, safety, and fares.

2.1.1 Public Transportation Facilities

According to Zakaria et al (2024), to improve user satisfaction and perceived safety, authorities should enhance public transport facilities, which involve bus stops, footpaths, and also comfort on the bus. Especially in the urban area. The planning and management of public transport is important for every society because if public transport is not comfortable and suitable, the negative effects will be obvious when society starts to feel comfortable using public transport, which can lead to even worse effects such as environmental pollution, road congestion, and poor mobility. According to Kang (2025), a nearby bus station with residential or workplace areas also increases user accessibility to public transportation and less stress to individuals while traveling. Minimizing the distance to public transportation amenities improves accessibility (Eboli and Mazulla, 2011).

2.1.2 Bus Accessibility

According to Twardzik et al (2024), accessibility of public transport, especially bus services, refers to the ability of a transport system to reach and serve users efficiently, ensuring that all sections of society can access it without barriers. It is an important concept in ensuring equitable mobility, whereby every individual, regardless of socioeconomic background or geographic location, can use public transportation to meet their daily needs (Gálvez-Arango, 2025). Besides that, high accessibility to public transportation allows people to access employment opportunities, education, and health services more easily, directly contributing to an improved quality of life (Lin & Cui, 2021). Route planning, service frequency, and integration with other modes of transportation play an important role in determining bus accessibility (Zuo et al., 2020). When public transport accessibility is good, it can reduce dependence on private vehicles, thereby reducing residents' cost of living and increasing social equality (Geurs & Wee, 2014).

2.1.3 Safety

Effective public transport is also measured through safety, where safety is one of the factors that affect individual access to bus services. When users feel safe, they are more likely to use the bus as their daily transportation option (Stjernborg, 2024). Furthermore, traffic accidents involving buses or pedestrians can undermine public confidence in using public bus services. Gutiérrez-Rodríguez et al (2025) highlighted that public vehicles in many African and Asian countries are often poorly maintained, with drivers receiving insufficient training. In addition, circuit cameras around the bus waiting area are also important to ensure that users feel safe when accessing public transport.

2.1.4 Fare

Bus fares are one of the factors that affect individual access to public buses. According to Wang (2025), affordable fares ensure that more individuals, including those from low-income groups, can use basic transportation as their primary mode of transportation. Wang (2025) argued that passengers with different financial capabilities should be given a fare discount appropriate to the situation of their economy to achieve more prosperous journeys.

Therefore, reasonable fares allow residents to use public transportation more frequently and can increase their satisfaction when accessing public transport services.

3.0 Methodology

3.1 Data Collection and Sampling Approach

This study uses a descriptive, quantitative approach. A five-point Likert scale was used in the questionnaire to assess the satisfaction level of users about accessibility of public buses. This five-point scale is 1) very dissatisfied, 2) dissatisfied, 3) moderate, 4) satisfied, and 5) very satisfied. The questionnaires were distributed in the Kota Kinabalu district, Sabah, Malaysia.

The sample calculation in this study uses the Krejcie and Morgan formulas. With a population of 527,600 people in Kota Kinabalu (Jabatan Perangkaan Malaysia, 2020), the minimum sample required for this study is 384 people. Therefore, the maximum sample taken in this study is 450 people. This study also uses a qualitative approach as support for quantitative data by conducting field observation methods. In addition, data collection methods through secondary data have also been done in this study to support the raw data. In this study, the researcher used non-random sampling, which is a purposive sampling technique. Purposive sampling refers to a sampling procedure in which a group of subjects with certain characteristics are selected according to criteria set by the researcher as respondents to the study. The selection of respondents is from a background that often uses public bus transport. A pilot study was conducted to ensure the reliability of the instruments.

3.2 Data Analysis

As for data analysis, this study uses descriptive analysis, which is the percentage in the demographic profile of the respondents. In addition, inferential analysis is also used, where researchers use Importance-Performance Analysis (IPA) to understand users' perspectives on the level of satisfaction in accessing public bus services and aspects that are perceived as important to accessing public buses. Therefore, data was analyzed using IBM SPSS Statistics software by displaying tables and graphs as a result of the study.

4.0 Results

4.1 Demographic Profile of Respondents

Data show that 35.7% of bus users between 20 and 25 years old are utilizing public buses in Kota Kinabalu. Females are also among those who use public buses the most (67.4%). Meanwhile, regarding marital status, single individuals had an increased number of people using public buses (70.2%). Educational background shows that high schools were more

likely to use public buses (43.4%). Finally, users who are citizens are more public bus users (93.4) compared to non-citizens (6.6%)

Table 1. Demographic Profile

Age	Percentage (%)
<19 years old	20.3
20-25 years old	35.7
26-30 years old	17.8
31-35 years old	8.6
36-40 years old	5.8
41-45 years old	5.8
46-50 years old	1.8
51-55 years old	1.8
56-60 years old	.9
>60 years	1.2
Gender	Percentage (%)
Male	32.6
Female	67.4
Marital status	Percentage (%)
Single	70.2
Married	25.5
Divorced/Widowed	4.3
Educational	Percentage (%)
Primary	7.1
Secondary	43.4
Diploma/A Level	33.8
Degree	12.3
Never school	3.4
Citizenship Status	Percentage (%)
Citizen	93.4
Non-Citizen	6.6

4.2 Importance-Performance Analysis (IPA) of Bus Service

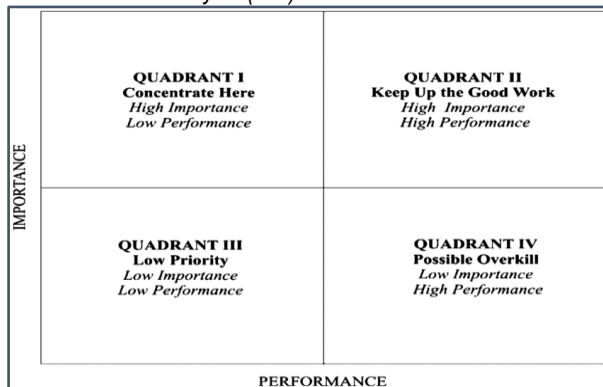


Figure 1: Importance of Performance Analysis (IPA)
(Source: Nik 'Azyyati et al., 2016)

Quadrant analysis is the mean values of both importance and performance plotted on a graph, where the X-axis represents performance and the Y-axis represents importance. This forms four quadrants to help identify priority areas for improvement.

4.2.1 Public Transportation Facilities

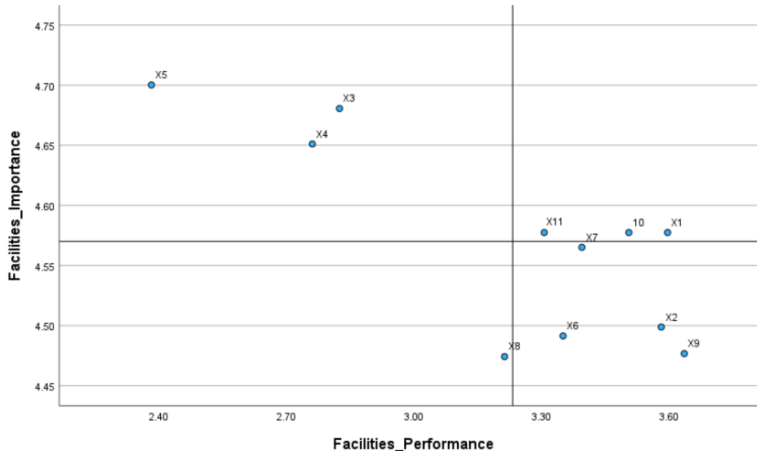


Figure 2: Importance Performance Analysis on Public Transportation Facilities

The findings demonstrated that there are three aspects (X3, X4, and X5) that should be concentrated on, X3: Bus stop near a residential area, X4: Bus stops near public facilities, and X5: Good footpath to the bus stop. This quadrant 1 mentioned high important low performance. Quadrant 2 keeps up the good work which indicates high performance and high importance. Three aspects fall into quadrant 2; X1: Streetlights work well, X10: The bell to stop the bus works well, and X11: The bus is clean and fragrant. However, quadrant 3 only has 1 aspect X8: The luggage parking facility on the bus. Quadrant 3 states low important low performance. Last quadrant 4 is low-important and high-performance for X2, X6, and X7. X2: Well-paved roads make it easier for individuals to walk to the bus station, X6: The air conditioner on the bus is in good condition, X7: Comfortable space on the bus.

Table 2: Public Transport facilities

No	Facilities Factor	Mean Value		Quadrant
		Perfomance	Imporance	
X1	Streetlights work well	3.597	4.577	2

X2	Well-paved roads make it easier for individuals to walk to the bus station.	3.582	4.499	4
X3	Bus stop near a residential area	2.826	4.681	1
X4	Bus stops near public facilities	2.762	4.651	1
X5	Good footpath to the bus stop	2.383	4.700	1
X6	The air conditioner on the bus is in good condition.	3.351	4.491	4
X7	Comfortable space on the bus	3.396	4.565	4
X8	Luggage parking facility on the bus	3.214	4.474	3
X9	Bus stairs that are easy to climb.	3.636	4.477	4
X10	The bell to stop the bus works well	3.506	4.577	2
X11	The bus is clean and fragrant.	3.307	4.577	2

4.2.2 Public Transportation Accessibility

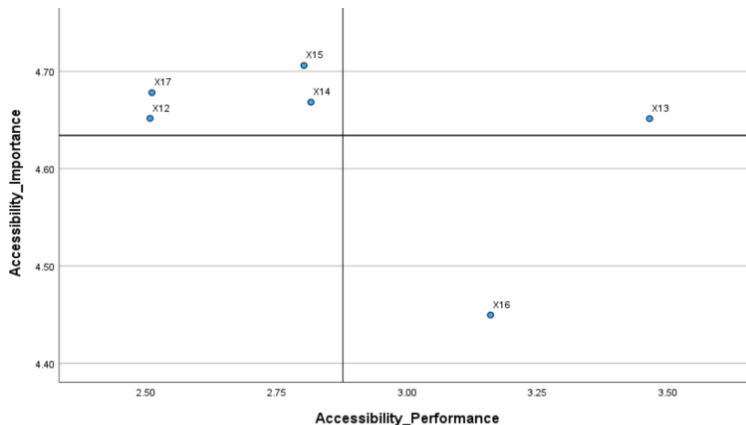


Figure 3: Importance of Performance Analysis on Public Transportation Accessibility

Findings on the accessibility factor show that there are four aspects (X12, X14, X15, and X17) that need to be paid attention to in quadrant 1 (concentrate here), X12: Easy to change other bus transportation modes when reaching the destination, X14: The waiting time for a

bus is short, X15: Easy bus access at peak times, and X17: Efficient bus line system. Quadrant 1 is the part that explains that the performance for both aspects is low, but that aspect is very important to users. However, quadrant 2 (keep up the good work) only shows one aspect which is X13: Buses go to all public facility locations. Quadrant 2 explained that this aspect is an aspect that needs to be defended because it gives satisfaction and high importance to bus users. Quadrant 4 (possible overkill) notes that there is one aspect which is X16: Easy bus access during off-peak hours. Quadrant 4 explains that those aspects are not important for users even though the performance of those aspects is high. Therefore, it can be concluded that in the accessibility factor of public transport, the aspects that need to be given attention for improvement in the future are X12, X14, X15, and X17.

Table 3: Public Transport Accessibility

No	Accessibility Factor	Mean Value		Quadrant
		Performance	Importance	
X12	Easy to change other bus transportation modes when reaching the destination	2.5075	4.6517	1
X13	Buses go to all public facility locations.	3.4644	4.6514	2
X14	The waiting time for a bus is short	2.8157	4.6683	1
X15	Easy bus access at peak times	2.8023	4.7060	1
X16	Easy bus access during off-peak hours	3.1597	4.4496	4
X17	Efficient bus line system	2.5111	4.6781	1

4.2.3 Public Transportation Safety

The safety factor shows that there are two aspects that are in quadrant 1, namely X19: Drivers obey road rules and X21: Efficient bus drivers. Quadrant 2 shows that there is one aspect that needs to be defended which is X18: The condition of the used bus is safe. Whereas, quadrant 3 has no variables identified in this analysis. Quadrant 4 notes one aspect which is X20: Safe to use the bus at night. However, aspects in quadrant 4 are aspects that are not of interest to consumers. Therefore, X19 and X21 in quadrant 1 only need to be given attention for improvement in the safety factor.

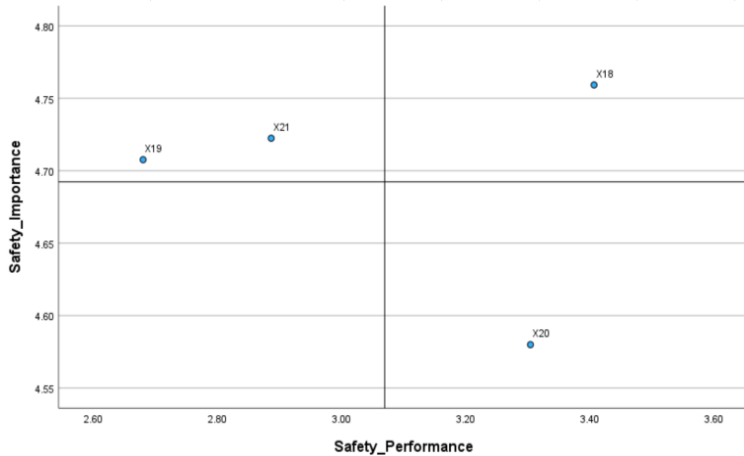


Figure 4: Importance of Performance Analysis on Public Transportation Safety

Table 4: Public Transport Safety

No	Safety Factor	Mean Value		Quadrant
		Perfomance	Importance	
X18	The condition of the used bus is safe	3.4072	4.7592	2
X19	Drivers obey road rules	2.6806	4.7076	1
X20	Safe to use the bus at night	3.3047	4.5799	4
X21	Efficient bus drivers	2.8870	4.7224	1

4.2.4 Individu

There is one aspect that needs to be paid attention to in the individual factor which is in quadrant 1, X24: It is important to have knowledge about bus operations. Quadrant 2 there is one aspect X22: Good health when using the bus service. Quadrant 2 refers to high satisfaction and high importance (keep up the good work) towards the X22 aspect which means that health gives satisfaction to users and it is very important to have good health to access public buses. Meanwhile, aspect X23: Sufficient financial resources for bus transportation is in quadrant 4 which is high satisfaction and low importance. In conclusion, the aspect that needs to be emphasized is the X24 aspect in individual factors.

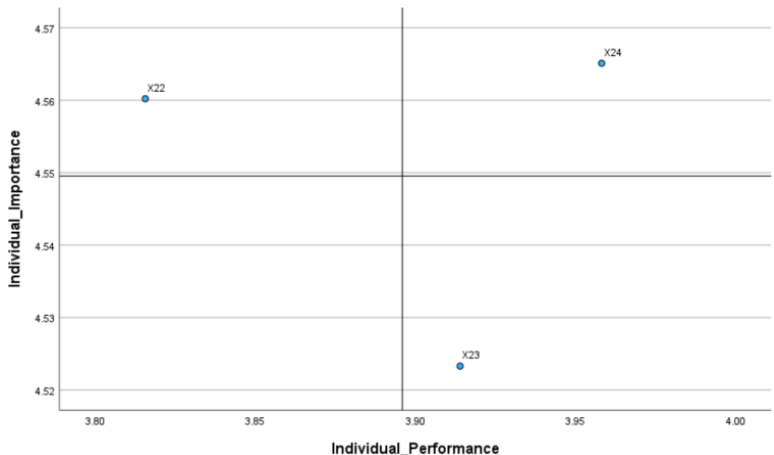


Figure 5: Importance of Performance Analysis on Public Transportation Individual

Table 4: Individu

No	Individual Factor	Mean Value		Quadrant
		Performance	Importance	
X22	Good health when using the bus service	3.9582	4.5602	2
X23	Sufficient financial resources for bus transportation	3.9140	4.5233	4
X24	It is important to have knowledge about bus operations.	3.8157	4.5651	1

4.2.5 Fare

Based on diagram 5, there are 2 aspects in quadrant 1, namely X25: The bus fare is reasonable for the distance, and X26: Bus fares are displayed on the passenger side. Quadrant 1 explained that these two aspects need to be improved because the performance of this aspect is low, causing users to be less satisfied, even though it is very important to users. Quadrant 2 also shows that there is one aspect that needs to be defended which is X28: Bus fares are cheap, because this aspect gives high satisfaction to users and it is important. Meanwhile, in quadrant 4, X27: The fare method is easy and fast

is an aspect that records good performance and satisfies users, but it is less important to them. Therefore, the aspects that need to be emphasized in this factor are aspects X25 and X26.

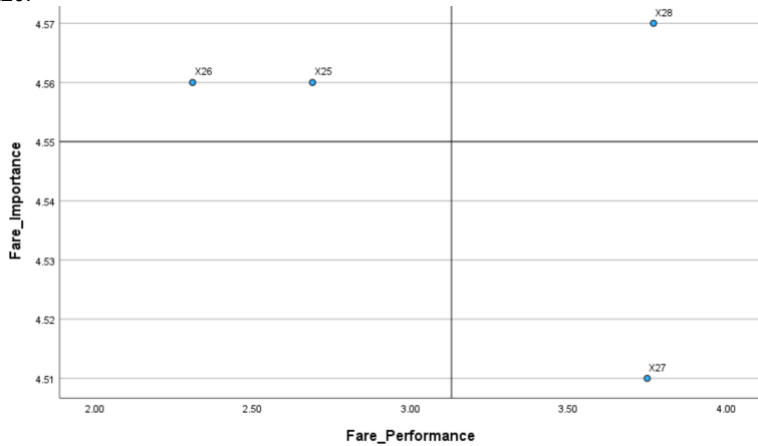


Figure 6: Importance of Performance Analysis on Public Transportation Fare

Table 5: Fare

No	Fare Factor	Mean Value		Quadrant
		Performance	Importance	
X25	The bus fare is reasonable for the distance	2.6900	4.5600	1
X26	Bus fares are displayed on the passenger side.	2.3100	4.5600	1
X27	The fare method is easy and fast.	3.7500	4.5100	4
X28	Bus fares are cheap.	3.7700	4.5700	2

5.0 Discussion

5.1 Residents Needs Towards Public Transport Improvements

The IPA analysis used in this study has helped in identifying the needs of public bus users in Kota Kinabalu. Through this analysis, the mean value was used to see the value of

performance and importance in the aspect of public transport services. The IPA analysis also has four quadrants that are used as a reference in aspects that need to be improved in public transport services. The findings through this analysis can also be used as a reference for determining aspects that need to be improved in public transport services in the future.

5.1.1 Factor 1: Public Transport Facilities

Findings have shown that in the factor of public transport facilities, namely the items bus stop near a residential area, bus stop near public facilities, and good footpath to the bus stop are aspects that need immediate attention. According to Lopatynskiy et al (2022), if bus or train stations are close to residential areas or workplaces, then public transport accessibility will be better and provide satisfaction and less stress to individuals when traveling.

5.1.2 Factor 2: Public Transport Accessibility

In this factor, easy to change other bus transportation modes when reaching the destination, the waiting time for a bus is short, easy bus access at peak times, and an efficient bus line system is accessibility that is important to users. As a result of interviews with public bus users, the uncertain waiting time caused them to be unable to manage their time efficiently in carrying out their daily routine. This is in line with what was stated by Tiznado-Aitken et al (2020), who stated that the main problem of the transit bus is the failure to ensure the accuracy of the time while taking passengers.

5.1.3 Factor 3: Public Transport Safety

The safety factor is one of the factors that needs to be improved, especially from the aspect of the need for drivers to obey road rules and efficient bus drivers. According to Wang et al (2025), the understanding and awareness of the user, including the driver is the most important variable to improve the condition. Meanwhile, in the study of Noor et al (2016), education and awareness about the importance of drivers ensuring that all passengers wear seat belts while sitting needs to be further improved. Therefore, this shows the urgent need to strengthen education and awareness campaigns on road safety. A more interactive and simulated training program could be introduced to help drivers understand the real risks of not wearing a seat belt and how it can save lives.

5.1.4 Factor 4: Individual

Individual factors in public transport often play a role in determining whether users are interested in using public transport. The results of the analysis that has been done on individual factors show that the main need that needs to be addressed and given attention is helping users improve their knowledge of public bus operations. Individual factors play a crucial role in the effectiveness of public transport systems. Educating individuals on how to utilize public transportation can significantly enhance its attractiveness. For instance, the Spanish government's 2024 campaign employed a rap-style video to inform citizens about

the benefits of public transport, aiming to shift preferences from private cars to trains and buses by highlighting advantages such as time savings, economic benefits, safety, accessibility, and reduced emissions (La Moncloa, 2024). This approach underscores the importance of targeted knowledge dissemination in promoting public transport usage.

5.1.5 Factor 5: Public Transport Fare

The fare factor is an important aspect in determining whether users use public transport. Discussing the results of the study, the aspect that needs to be paid attention to in this factor is the bus fare is reasonable for the distance and bus fares are displayed on the passenger side. Findings obtained in the field prove the study by Wang et al (2025). It is indeed relevant that cheap fares are attractive to low-income users, especially those who do not have private transportation to travel.

6.0 Conclusion

In conclusion, every factor in public transport services that has been discussed in this study aims to improve the existing public transport services in Sabah, especially in Kota Kinabalu. Overall, the aspects that need attention for improvement are bus stops near a residential area, bus stops near public facilities, good footpath to the bus stop, the waiting time for a bus is short, easy bus access at peak times, efficient bus line system, drivers obey road rules and efficient bus drivers, increasing knowledge of public bus operations, and he bus fare is reasonable for the distance and bus fares are displayed on the passenger side.

Therefore, the results of the analysis that has been selected by the researcher, it is an analysis that is relevant in determining the aspects that are priorities for improvement in public transport services.

Article Contribution to Related Field of Study

This study contributes to improving public transportation services, especially in Kota Kinabalu, to increase user accessibility to buses.

References

- August, D. (2023, December 20). Only 20pc rely on Kota Kinabalu bus transport: Study. *Daily Express*. Retrieved from <https://www.dailyexpress.com.my/news/225656/study-only-20pc-rely-on-kota-kinabalu-bus-transport/>
- Eboli, L., & Mazzulla, G. (2011). A methodology for evaluating transit service quality based on subjective and objective measures from the passenger's point of view. *Transport Policy*, 18(1), 172-181.
- Gálvez-Arango, E. (2025). Access to public transportation at the regional scale: An analysis of bus services in Minas Gerais State, Brazil. *Case Studies on Transport Policy*, 19, 101348.

Geurs, K. T., & Van Wee, B. (2014). Accessibility evaluation of land-use and transport strategies: Review and research directions. *Journal of Transport Geography*, 12(2), 127-140.

Gutiérrez-Rodríguez, R., Rojí, E., & Cuadrado, J. (2025). Identifying relevant patterns between injury crashes and road safety inspection deficiencies. *Journal of Safety Research*, 93, 99-134.

Kang, C. D. (2025). Effects of Access Time via Travel Modes to Urban Service Facilities on Housing Prices: Evidence from Seoul. *Journal of Urban Planning and Development*, 151(2), 05025004.

Jabatan Perangkaan Malaysia. 2020. Kesejahteraan rakyat. Diakses dari <https://open.dosm.gov.my/ms-MY/dashboard/wellbeing> pada 28 Mac 2024.

La Moncloa. (2024, September 12). Transport launches a campaign to promote the use of public transport as the backbone of daily mobility. <https://www.lamoncloa.gob.es/lang/en/gobierno/news/Paginas/2024/20240912-public-transport-campaign.aspx>

Lin, D., & Cui, J. (2021). Transport and mobility need for an ageing society from a policy perspective: Review and implications. *International Journal of Environmental Research and Public Health*, 18(22), 11802.

Lopatynskyi, Y., Yekimov, S., Nianko, V., Pistunov, I., & Shevchenko, V. (2022). Improving the Quality of Transport Services of Urban Public Transport.

Noor, H. M., Marzuki, M., Mapjabil, J., & Eboy, O. V. (2016). *Keberkesanan perkhidmatan bas mini di Kota Kinabalu Sabah*.

Stjernborg, V. (2024). Triggers for feelings of insecurity and perceptions of safety in relation to public transport: The experiences of young and active travellers. *Applied Mobilities*, 1-21.

Tiznado-Aitken, I., Lucas, K., Muñoz, J. C., & Hurtubia, R. (2020). Understanding accessibility through public transport users' experiences: A mixed methods approach. *Journal of Transport Geography*, 88, 102857.

Twardzik, E., Schrack, J. A., Porter, K. M. P., Coleman, T., Washington, K., & Swenor, B. K. (2024). TRansit ACcessibility Tool (TRACT): Developing a novel scoring system for public transportation system accessibility. *Journal of Transport & Health*, 34, 101742.

Wang, L., Chen, X., Ma, Z., Zhang, P., Mo, B., & Duan, P. (2025). Data-driven analysis and modeling of individual longitudinal behavior response to fare incentives in public transport. *Transportation*, 52(1), 263-286.

Zakaria, A. M., Kamaluddin, N. A., Hashim, W., & D'Agostino, C. (2024). Age-inclusive transit environments: An exploration of public transportation systems for the elderly. *Environment-Behaviour Proceedings Journal*, 9(28), 149-158.

Zuo, Y., Liu, Z., & Fu, X. (2020). Measuring accessibility of bus systems based on multi-source traffic data. *Geo-spatial Information Science*, 23(3), 248-257