

## Evaluating the Quality of Service for Bus Performance in Kuantan

Muhammad Fadhlullah Abu Bakar<sup>1</sup>, Shuhairy Norhisham<sup>1,2</sup>,  
Chow Ming Fai<sup>1,2</sup>, Nur Lyana Baharin<sup>3</sup>

<sup>1</sup>College of Engineering, Universiti Tenaga Nasional, 43000 Kajang, Selangor, Malaysia,

<sup>2</sup>Institute of Energy Infrastructures (IEI), Universiti Tenaga Nasional, 43000 Kajang, Selangor, Malaysia, <sup>3</sup>College of Business Management & Accounting, Universiti Tenaga Nasional,

43000 Kajang, Selangor, Malaysia.

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### Abstract

Today Malaysia still moving forward reaching towards developed countries. Rapid development in Malaysia has caused traffic problem in cities these country. Major cities such as Kuala Lumpur, Penang, Johor Bahru and Kuantan faced a serious traffic problem especially during peak hours. Improving public transport is one of the alternative to reduce daily traffic congestion. Recently, Government has implemented numerous initiative to improve public transport such as centralized several operator in major cities through Syarikat Prasarana Negara Berhad. Recently, there are several issues raised up regarding quality of service of bus performance in Malaysia. Therefore, these studies is aimed to evaluating the quality of service for bus performance in Kuantan. Service quality of bus would be determine based the bus operation by operator. There are routes have been selected in these studies. Kuantan has been selected in these studies as Kuantan is main cities in East Coast Peninsular of Malaysia and bus services operated by Rapid Kuantan. The result shows that four different attributes have been selected in these studies which are hours of service, passenger load, service frequency and on time performance. Based on the results, it shows that only passenger load factor has classified as A quality of service in these studies. These three attributes should be made some improvement on their quality of service. On time performance, also should be focused by operator as there are a several punctuality issues have done by bus driver.

**Keywords:** Public Transportation, Quality of Services, Bus Performance, Kuantan, East Cost Malaysia

### Introduction

Many years ago, public transport consider as main transportation mode form one place to another. Bus services still play its role to serve for people not just in big cites like Kuala Lumpur but also small town like Kuantan, Kuala Terengganu and Kota Bahru.

Government should provide more convenience and efficient public transport towards customers' satisfaction in urban and rural areas (Yao et al., 2014). The issues of traffic congestion in big cities such as Kuala Lumpur still consider major problem for a government all over the world. In 2010, approximately more than 1.25 million daily trips in Klang Valley represent almost 25% of road users have used the public transport as a main transportation daily (Margaret, 2018; Calvo et al., 2018). Therefore, it is necessary to analyses the quality service of bus services provides by operators (Adebola et al., 2014). Increasing of population would reflect the public transport demand and related issue (Aziz & Mohamad, 2013). Government has start the initiative improve bus services outside Kuala Lumpur through selected operators.

Most transportation expert agree that bus service must be improve from time to time with some latest technologies such as intelligent transportation systems to solve traffic congestion problems which enable people to handling to schedule (Wahjono, 2010). Real time information also one of the issues have been addressed by people using bus services. Public transport services do not always operates exactly based on the original schedule (Suh et al., 2011). Trustworthiness between bus operators and user also could be one of issues and it would cause a bad experience and rise negative perceptions for both parties (Saber et al., 2013). Passenger would demand to receive less time waiting as possible and yet it required high number on service frequency and increase the capital and operation cost for operators (Vien et al., 2010). Normally, the service quality refers to selection of destinations and its demands (Attrad, 2013). Lately, a lot of improvement have been made by authorities and operators to improve the service quality of public transport such as management systems, controlling and monitoring (Saber et al., 2013). Good quality of service based on good customer's perceptions and understanding to identify the customers demand (Azadi et al., 2015). The overall performance important aspect to evaluated and determined the service quality of bus services (Chuen et al., 2014).

Kuantan is the capital state of Pahang Darul Makmur, Malaysia. Kuantan town is beside the Kuantan River and the South China Sea. Kuantan is the ninth largest city in Malaysia. Government has transform the public transport systems in Kuantan through Syarikat Prasarana Negara Berhad (Prasarana) to managing and operating Rapid Kuantan Sdn. Bhd. Rapid Kuantan operating from Hentian Bandar, Kuantan for local destination (Baharom, 2014). Rapid Kuantan is one public bus service in Malaysia besides Rapid KL and Rapid Penang owned by Prasarana Malaysia Berhad. Currently, Rapid Kuantan operated with fleet of 80 Scania K-Series buses (Wahjono et al., 2017). Each bus provided by operators would be measured their quality of service (Eboli & Mazzulla, 2008; Juan et al., 2014). The consistency of service quality provided by operator should be measured and evaluated continuously (Shaaban & Khalil, 2013). People always addressed common issues such as inappropriate schedule, expensive ticket and lack of service information. It could be one of the factors why people not chooses bus services as their daily transportation mode (Bekhet, 2014; Soh et al., 2014). Bus terminal and bus stop should be repaired for people convenient, increase safety purposes and reduce total of transit (Enzor, 2004; Mazzulla & Eboli, 2006).

There are several problems facing by passenger especially in Malaysia such as overcrowding during peak hours (passenger load factor), long waiting time (service frequency) and poor time management of bus hours (hours of service) (Abdullah, 2013). Low frequencies would affect operator to fit transit trip into a time schedule of activities that carried out at locations. Meanwhile, the hour or time of studies is important as the most crucial or peak hours of the day should be chosen as to obtain the most critical results as

possible to determine quality of service of a transit systems (Eboli & Mazzulla, 2008). It is importance for passenger load in determining bus comfort where 40% probability getting a seat, passenger would feel uncomfortable. Previous studies indicated that the perceived value determined by service quality positively affects overall satisfactions, involvements, and behavioral intentions (Lai & Chen, 2011; Purba, 2015). Comfort is one of the key factors leading to high service quality and significantly influences passenger satisfactions with bus transit (Eboli & Mazzulla, 2008; Rohani et al., 2013). Passenger's judgements about certain service attributes can be considered a subjective measure of service quality, while performance measures contingent on bus operators can serve as objective measure of service quality (Eboli et al., 2018). Therefore, these paper is to determine the service quality of bus performance in Kuantan, Pahang.

### Methodology

These studies were covered on the steps described to determine the service quality for bus services in Kuantan, Pahang. These studies were conducted in March 2019. Figure 1 shows the area covered in these studies. Service quality data have been take at Terminal Hentian Bandar, Kuantan. All route is operated by Rapid Kuantan owned by Prasarana Berhad. For Rapid Kuantan bus, the total capacity is 25 seated and 40 standing passengers. There are 15 route in Kuantan operated by Rapid Kuantan. The routes are Gambang Resort (100), Indera Sempurna (101), Teluk Cempedak (200), Taman Impian (300), Bukit Sagu (301), Indera Mahkota (302), Terminal Sentral Kuantan (303), Pekan (400), Kuala Pahang (401), Ubai (402), Sungai Lembing (500), Balok Makmur – Jalan Beserah (600), Polisas (602), Balok Makmur – Kuantan Baypass (602) and Pasdec 603.

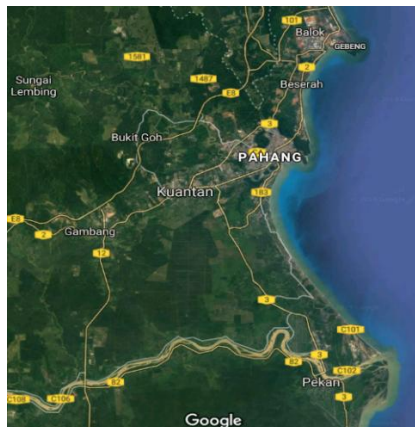


Figure 1: The area covered in these studies.

Transit Capacity and Quality of Service Manual (TCRPM) has been referred as a specific guidelines and key indicators to determine the quality service of bus performance in designated area. 4 specific areas would be focused in these studies such as hours of service, service frequency, passenger load factors, on time performance. The hours of service for the bus service for that particular route can be obtained from the service operator and it will be considered from the first trip of services until the last trip of services. It is also can be obtained through the website updated by Land Public Transport Commission (SPAD) for all routes. Hence, by comparing the hours of service between the service operators, the quality of service performance can be obtained as shown in Table 1.

Table 1

*Quality of Services (QOS) for Hours of Services (TCQSM, 2013)*

Quality of Services	A	B	C	D	E	F
Hours of Service (Hr)	19 - 24	17 - 18	14 - 16	15 - 12	11 - 4	0 - 3

The analysis gave a quality of service for five routes in five route of Rapid Kuantan for the passenger load factor. Quality of Service could be determine based on specific variable. The method to determine the service frequency of the bus service is using bus schedule timetable in order to evaluate to get the time average for departure time interval of the bus. The bus schedule timetable will be obtained from Rapid Kuantan bus counter at the station where the route begins. Table 2 shows quality of service (QOS) for service frequency to classify the quality of service based average departure time interval.

Table 2

*Quality of Services (QOS) for Service Frequency (TCQSM, 2013)*

Quality of Service	A	B	C	D	E	F
Average Departure Interval (min)	<10	10 – 14	15 – 20	21 – 30	31 – 60	>60

As per journey, the average of passenger load will be counted. The number of passenger would be divide with number of seats to determine the load factor and this analysis will give a Quality of service 5 different routes in Kuantan for load factor. Passenger load only be taking on weekdays only. The Load Passenger is calculated by dividing the total passenger selected time and the total seat provided in each bus. Table 3 shows quality of services based on load passenger factor.

Table 3

*Quality of Services (QOS) for Load Factor (TCQSM, 2013)*

Quality of Service	A	B	C	D	E	F
Load Passenger (Passenger/seat)	0.00 – 0.50	0.51 – 0.75	0.76 – 1.00	1.01 – 1.25	1.26 – 1.50	>1.50

On time performance percentage measured the degree of bus departure based on schedule times. The measurement has been conducted at Hentian Bandar, Kuantan. On time performance usually measure the bus do not arrive and late. The users may feel uncomfortable to hurry outside to meet the early arrival time. In certain cases, early arrival may also result no shows of passengers. Table 4 shows the classification of service quality based on percentage of on time performance.

Table 4

*Quality of Services (QOS) for on time Performance Percentage (TCQSM, 2013)*

Service Quality	A	B	C	D	E
On Time Performance Percentage (%)	95 - 100%	90 - 94%	80 - 89%	70 - 79%	< 70%

**Results**

The data were collected based on 4 specific areas as mention in methodology section. The service hours were recorded from first trips of the service until last trip of that day. Table 5 shows the quality service for hours of service for all routes.

Table 5  
*The Quality of Service for hours of services for all routes*

Route	First Trip	Last Trip	Hours of Services	QOS
100	6.00 AM	11.00 PM	17:00	B
101	5.20 AM	11.00 PM	17:40	B
200	6.20 AM	11.00 PM	16:40	C
300	6.40 AM	11.00 PM	16:20	C
301	8.05 AM	6.00 PM	9:55	E
302	6.50 AM	11.00 PM	16:10	C
303	6.00 AM	11.00 PM	17:00	B
400	6.00 AM	11.00 PM	17:00	B
401	6.00 AM	8.00 PM	14:00	C
402	6.00 AM	6.40 PM	12:40	D
500	6.10 AM	7.20 PM	13:10	D
600	6.20 AM	11.00 PM	16:40	C
601	7.00 AM	11.00 PM	16:00	C
602	6.30 AM	7.40 PM	13:10	D
603	6.45 AM	7.35 PM	12:50	D
Average				C

Service frequency have been determined for all routes in these studies. Table 5 shows the number of intervals in all routes for respective minute’s intervals. The level of service for service frequency was checking using Fixed Route Service Frequency LOS. The average of QOS for service frequency is QOS E. There are two routes have reached service quality of D which are route T100 and T303 only.

Table 6  
*The Quality of Service for Service Frequency for all routes*

Route	Minute																		QOS
	170	120	105	100	90	80	75	70	60	55	50	45	40	35	30	25	20	Average Interval	
T100															31			30.00	D
T102		1						3	3		6		3		4		1	50.95	E
T200													1	26	1	1		34.14	E
T300								2	4		7		4		3			49.76	E
T301	1		1	1			1	1	1			1						89.29	F
T302									7		7		5					51.05	E
T303															34			30.00	D
T400									4						26			34.00	E
T401									2	10				4				49.41	E
T402		3		1	1									1				96.67	F
T500					1	1				10							1	71.82	F

T600				2		4	9	10	41.6	E
T601	1	1	1	4	5	1	2		48.00	E
T602			1				10		44.55	E
T603				11					70.00	F
									<b>Average</b>	<b>E</b>

Passenger load factor would be determine based on numbers of passenger seating on the bus was divided by numbers of seats in the bus. This passenger the collection was done in one time frame only. Table 6 shows Load Factors Summary for Kuantan Routes. The data for return also recorded. Finally, average passenger load factor was translated to percentage to analyzed quality of service. Based on Table 6, it shows that the average of load factors for Kuantan routes is 0.19 which classified as service quality of A for these attributes.

Table 7

*Summary of Load Factors for Kuantan Routes*

Route	100	301	302	401	402	600	Average
Passenger Load Factors	0.28	0.16	0.17	0.17	0.08	0.28	0.19
Quality of Service	A	A	A	A	A	A	A

On time performance was compared with real schedule to get the classification the departure status of bus weather on time departure, early departure, late departure or no departure. Table 7 shows the on-time performance percentage details for all routes. As a result, it shows that only 301 achieves Quality of service A. and there are 6 routes achieves QOS E which have less than 70% of bus departed on exactly based on schedule provided by Management of Rapid Kuantan.

Table 8

*On Time Performance Percentage for all routes*

Route	Total Actual Departure	No. of On Time Departure	On Time Departure Percentage (%)	Quality of Service
100	31	24	77.42	D
101	23	14	60.87	E
200	30	24	80.00	C
300	21	19	90.48	B
301	7	7	100.00	A
302	20	18	90.00	B
303	35	25	71.43	D
400	31	25	80.65	C
401	18	9	50.00	E
402	10	5	50.00	E
500	14	12	85.71	C
600	26	17	65.38	E
601	16	13	81.25	B
602	12	7	58.33	E
603	12	3	25.00	E
			<b>Average</b>	<b>D</b>



Table 8 shows the quality of service score versus quality of service attribute. Overall quality of service could be determined based on quality of service based on attributes. Based on Table 8, it shows that hours of service, service frequency, passenger and on time performance have quality of service of C, E, A and D respectively.

Table 9

*QOS Score vs. QOS Attributes*

Attributes	QOS	QOS Score	Mean QOS	Overall QOS
Hours of Service	C	3		
Service Frequency	E	1		
Passenger Load	A	5	2.75	D
On Time Performance	D	2		
Total		11		

### Conclusion

These studies were aimed to determine the quality of service for bus performance in Kuantan, Pahang. These studies were done by using rating for service method and based on Transit Capacity and Quality of Service of Manual (TCPRM). Rapid Kuantan have operated the total of 15 routes including few routes to another district such as Pekan, Kuala Pahang and Ubai. Four different attributes have been selected in these studies which are hours of service, passenger load, service frequency and on time performance. Based on the results, it shows that only passenger load factor has classified as A quality of service in these studies. These three attributes should be made some improvement on their quality of service. On time performance, also should be focused by operator as there are a several punctuality issues have done by bus driver. As conclusion, the overall quality of service for Kuantan route is D, which is moderate and there some improvement should be made in certain area. The outcome of these studies could be used by operators to evaluate their on-site operation. Authorities also could use the outcome of these studies to determine and identifies the significant improvements for bus service on these areas. Further studies in these areas are highly recommended in future.

### Corresponding Author

Dr. Shuhairy Norhisham

Senior Lecturer at Universiti Tenaga Nasional, Malaysia. College of Engineering Jalan Ikram – Uniten, 43000, Kajang, Selangor, Malaysia.

Email: shuhairy@uniten.edu.my

### References

- Abdullah, A. A. (2013). Rapidkl Bus Service in City Center , Kuala Lumpur, Malaysia : An Epitome of Good Service? *International Journal of Academic Research in Business and Social Sciences*, 3(4), 333–349.
- Adebola, O., Samuel, O., Feyisola, A., & Eno, O. (2014). An Assessment of Public Transport Security and Safety: An Examination of Lagos Bus Rapid Transit (BRT), Nigeria. *Journal Civil and Environment Research*, 6(4), 105–117.
- Attrad M. (2013). Effects on Service Quality Following Regulatory Reforms in Public Transport in Malta. *Transportation Research Board 92<sup>nd</sup> Annual Meeting*, 1–18.

- Azadi, M., Shabani, A., Khodakarami, M., & Farzipoor, S. R. (2015). Planning in feasible region by two-stage target-setting DEA methods: An application in green supply chain management of public transportation service providers, *Transportation Research Part E: Logistics and Transportation Review*, 74, 22-36.
- Aziz, A., & Mohamad, J. (2013). Urban Public Transport in Penang: Some Public Considerations, *Conference of Eastern Asia Society for Transportation Studies*, 9, 1-9.
- Baharom, N. (2014). *The study of services quality by Rapid Kuantan bus*. Faculty of Civil Engineering and Earth Resources, Universiti Malaysia Pahang.
- Bekhet, H. A., & Ivy, Y. L. L. (2014). Highlighting energy policies and strategies for the residential sector in Malaysia. *Int. J. Energy Econ. Policy*, 4(3), 448–456.
- Calvo, F., Eboli, L., Forciniti, C., & Mazzurall, G. (2018). Factors influencing trip generation on metro system in Madrid Spain, *Transportation Research Part D Transport and Environment*, 67, 156-172.
- Chuen, C. O., Karim, R. M., and Yusoff, S. (2014). Mode Choice between Private and Public Transport in Klang Valley, Malaysia. *The Scintific World Journal*, 2014, 14.
- Eboli, L., Forciniti, C., & Mazzulla, G. (2018). Spatial variations of the perceived transit service quality at rail stations. *Transportation Research Part a Policy and Practice*, 114, 67-83.
- Eboli, L., & Mazzulla, G. (2008). A Stated Preference Experiment for Measuring Service Quality in Public Transport, *Journal of Planning and Transportation Technology*, 31(5), 510–521.
- Eboli, L., & Mazzulla, G. (2012). Performance indicators for an objective measure of public transport service quality. *Journal of Public Transportation*, 51, 1–21.
- Ensor, J. D. (2004). *MALAYSIA TRANSPORT PRICING STRATEGIES, MEASURES, AND POLICIES INCEPTION REPORT*. Malaysia Transport Research Group Massachusetts Institute of Technology.
- Juan, D. O., Rocia, D. O., Eboli, L., & Mazzulla, G. (2014). Heterogeneity in Perceptions of Service Quality among Groups of Railway Passengers. *International Journal of Sustainable Technology*, 9(8), 612-626.
- Lai, W., & Chen, C. (2011). Behavioral intentions of public transit passengers—the roles of service quality, perceived value, satisfaction and involvement. *Transportation Policy*, 18, 318–325.
- Margaret, J. D. L. (2018). Spatial dynamics of tour bus transport within urban destinations. *Tourism Management*, 64, 129-141.
- Mazzulla, G., & Eboli, L. (2006). A Service Quality experimental measure for public transport Gabriella. *European Transport*, 34, 42–53.
- Rohani, M. M., Wijeyesekera, D. C., & Karim, A. T. A. (2013). Bus operation, quality service and the role of bus provider and driver. *Procedia Engineering*, 53, 167–178. <https://doi.org/10.1016/j.proeng.2013.02.022>.
- Purba, A. (2015). *A study on evaluating urban bus service performance in developing countries: case study of medium - sized cities in Indonesia*. Ph.D. dissertation. Yokohama National University.
- Saberi, M., Zockaie, A. K., Feng, W., & El-Geneidy, A. (2013). Definition and Properties of Alternative Bus Service Reliability Measures at the Stop Level, *Journal of Public Transportation*, 16(1), 97–122.
- Shaaban, K., & Khalil, R. F. (2013). Investigating the Customer Satisfaction of the Bus Service in Qatar. *Procedia - Social and Behavioral Sciences*, 104(1), 865–874. doi: 10.1016/j.sbspro.2013.11.181.



- Soh, K. L., Chong, C. Le, Wong, W. P., & Hiew, Y. H. (2014). Proclivity of University Students to Use Public Bus Transport Service. *Comprehensive Research Journal of Education and General Studies*, 2(2), 24–34.
- Suh, W., Park, S., and Lee, E. (2011). *Fault Tolerant intelligent transportation systems with an agent*. In the 3th International Conference, Advanced Computer Science and Information Technology, Seoul, Korea: 16 - 25. Available online at: <http://link.springer.com/content/pdf/10.1007/978-3-642-24267-0.pdf#page=28>.
- TCQSM. (2013). *Transit Capacity and Quality of Service Manual*, 3rd Edition. Transit Capacity and Quality of Service Manual.
- Vien, L. L., Bagheri, Y., & Sadullah, A. F. B. M. (2010). Analysis of Headways on Passenger Loads for Public Bus Services: Case Study of Penang Island, Malaysia. *European Scientific Research Journal*, 45(3), 476–483. <http://www.eurojournals.com/ejsr.htm>.
- Wahjono I. S. (2010). *Bisnis modern*. Graha Ilmu Publisher, Yogyakarta, Indonesia.
- Wahjono, I. S., Bachok, K. Y. M., Marina, A., & Mochklas, M., (2017). The importance of MPIS on RK for futher ITS implementation in Malaysia, *International Journal of Advanced and Applied Science*, 4(9), 53-6.
- Yao, L., Siali, F., Darun, M. R., & Ismail, M. F. (2014). Service Quality and Customers Satisfaction: Rapid Kuantan In Kuantan Route, Malaysia. *Proceedings of SOCIOINT-14-International Conference on Social Science and Humanities*. 8-10 Sept.