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## Service quality of public road passenger transport in Thailand

Pittawat Ueasangkomsate

*Department of Management, Kasetsart Business School, Kasetsart University, Bangkok 10900, Thailand*

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### Abstract

The service quality of public road passenger transport in Thailand was investigated. The research applied a modified SERVQUAL approach to evaluate service quality. The modified SERVQUAL model consisted of five dimensions—1) tangibility, 2) reliability, 3) responsiveness, 4) assurance, and 5) access—using 17 attribute that expressed expectations and perceptions of service quality. This research used a questionnaire to acquire 2,729 usable samples by stratified sampling from 16 large provinces in six regions in Thailand. The results showed the biggest gap was the assurance dimension followed by the access and tangibility dimensions, respectively, at the .01 significance level, while tangibility was the most influential dimension affecting perceived service quality followed by the assurance and reliability dimensions, respectively at the .01 significance level. The results indicated that perceived service quality for passengers in both the Bangkok metropolitan area and the East region had the same level of poor perceived service quality that definitely required improvement. The study indicated that the on-board security attribute contributed to the service quality of passenger transport followed by staff courtesy and knowledge, and bus driver's ability, respectively. Finally, the results could be used to identify the key attribute in each region that should be improved with respect to the modified SERVQUAL model in Thailand.

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### Introduction

Public passenger transport is essential for people in most countries as it moves passengers from one location to another with ease (Ojo, Mireku, Dauda, & Nutsogbodo, 2014). Public passenger transport has been considered as a broader strategy to mitigate the major economic and environmental problems with regard to the massive use of private automobiles (Cruz, Barata, & Ferreira, 2012). In Thailand, public road passenger transport is the most important mode compared to train, air, and water transport. Public road passenger transport can involve long-distance and local services, regular and charter services, and buses and taxis (OECD, 2000) including buses, coaches, vans, and other vehicles. Public road passenger transport should be treated as a key component of the city development strategy or structure plan for all income groups (World Bank, 2002). In 2015, the number of public road passengers traveling by bus and coach within domestic areas in Thailand was 333 million people comprising around 55 percent of total public passenger transport followed by water

transport at 17 percent (Ministry of Transport, 2015). In 2014, the Department of Land Transport evaluated the nationwide service quality of public road passenger transport and found a passenger satisfaction level of 73.32 percent. The Department introduced increased efforts to improve the courtesy of drivers, service, security, and cleanliness to meet passengers' requirements (Department of Land Transport, 2014). Thailand Development Research Institute (TDRI) surveyed the service quality of public buses and found that drivers standards and the public buses needed to be improved. Most public buses lacked safety equipment including seat belts (TDRI, 2016). In addition, Thipkaisorn (2011) indicated that Thai passengers wanted improvements and more development regarding public passenger transport. SERVQUAL is an important model to measure the service quality of customer satisfaction (Buttle, 1996). Findings from measuring the service quality of public road passenger transport in Thailand based on SERVQUAL will lead to improvement in service quality in accordance with Thai public road passengers' requirements. Recent studies have not explored each region in Thailand (Earsakul, 2014; Hayeesa, 2011; Promchat, 2009; Siriwat, 2008). Therefore, the current study aimed to apply a SERVQUAL query to investigate the service quality of general public road passenger transport as defined by OECD (2000) within six regions in Thailand. The

E-mail address: [pittawat.u@ku.th](mailto:pittawat.u@ku.th)

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purpose was twofold. The first aim was to provide understanding of service quality from the passenger's point of view in different regions in Thailand. Development of public road passenger transport in each region is economically and socially important to the nation in maintaining expected standards of consumption and quality of life (Redman, Friman, Gärling, & Hartig, 2013). Secondly, the results can better guide related institutions in the transport sector to improve their performance regarding the service quality provided by public road passenger transport in Thailand. This paper is organized as follows. Section 1 describes the measurement of service quality and service quality on public passenger transport. Section 2 presents the methodological approach to measure the service quality of public passenger transport. The results are introduced in section 3; and finally, section 4 presents the conclusions including limitations and future research.

## Literature Review

### *Measuring Service Quality*

The measurement of service quality has been studied since 1980 (Khoshrafi & Rozan, 2014). Service quality is seen as a service that meets customers' needs, expectations, and requirements (Mikhaylov, Gumenuk, & Mikhaylova, 2015; Wisniewski, 2001). Service is intangible, inseparable, perishable, and heterogeneous within the service industry, which makes it more difficult to quantify (Ladhari, 2009; Wang, Feng, & Hsieh, 2010). Quality and customers' requirements are not easily articulated by consumers (Parasuraman, Zeithaml, & Berry, 1985). Tangible evidence is limited to just service provider's physical facilities, equipment, and personnel (Parasuraman et al., 1985). Lewis and Booms (1983) argued that measuring service quality involves finding out how well-perceived service matches with customers' expectations. Grönroos (1984) indicated that the quality of the service involves two variables: expected service and perceived service. Then, Grönroos (1984) introduced a service quality model to evaluate the quality of service on a sample of the service sector. Parasuraman et al. (1985) expressed measuring service quality, which is a measure of how well the service level delivered matches customer expectation, as the comparison of customer expectation with the perception of the service. This approach was designed in response to the lack of published research relating to measuring service quality (Bryson & Curry, 2001).

Parasuraman, Berry, and Zeithaml (1991) presented the service quality model (SERVQUAL model) which they used to measure service quality and it can be adapted to any service industry. SERVQUAL has become an important model with regard to customer satisfaction (Buttle, 1996). SERVQUAL contains five dimensions consisting of tangibility, responsiveness, assurance, empathy, and reliability. SERVQUAL is an instrument to analyze the gap between the expectations and perceptions of service (Curry & Sinclair, 2002; Erdoğan, Bilişik, Kaya, & Baraç, 2013). Expectation defines what customers feel they should receive, whereas perception is the actual performance of the service quality (Ladhari, 2009). A positive gap score indicates that perceived service quality is more satisfied, while, a negative gap indicates that perceived service quality is unsatisfied (Ojo et al., 2014; Ramseook-Munhurrin, Lukea-Bhiwajee, & Naidoo, 2010; Zeithaml, Parasuraman, & Berry, 1990). The SERVQUAL model has been used to measure service quality in many service industries including banking, food, building, housing repair,

telecommunication, retail, information systems, leisure service, library service, and transportation (Ladhari, 2009; Wisniewski, 2001).

### *Service Quality on Public Road Passenger Transport*

Public transport is an activity type of service. Therefore, service quality is one of the most important factors which extend the use of public transport (Fujii & Van, 2009). The understanding of service quality on public transport leads to a high service quality that meets the passengers' satisfaction (Freitas, 2013).

In recent decades, several studies and surveys have been developed to improve the service quality of public transport. SERVQUAL is one of the most widely used methods for measuring service quality with regard to public transport (Barabino, Deiana, & Tilocca, 2012; Erdoğan et al., 2013; Freitas, 2013; Hu & Jen, 2006; Mikhaylov et al., 2015; Muthupandian & Vijayakumar, 2012; Ojo et al., 2014; Prasad & Shekhar, 2010; Randheer, Al-Motawa, & Vijay, 2011; Too & Earl, 2010; Wang et al., 2010; Zakaria, Hussin, Batau, & Zakaria, 2010) as summarized in Table 1.

Hence, the SERVQUAL model could be applied to measure service quality in the context of Thai public road passenger transport. However, there are some modified SERVQUAL models with regard to public road passenger transport. Barabino et al. (2012) applied a modified SERVQUAL with a European standard of service quality in public transport to measure service quality in urban buses. Too and Earl (2010) studied the service quality of bus riders using the SERVQUAL model; however, the study did not include the empathy dimension in the model because it was difficult for the service provider to meet the individual needs of each customer. Erdoğan et al. (2013) and Muthupandian and Vijayakumar (2012) considered an access dimension in the service quality of public transport including ease of transition with other components of the public transport system. A reasonable fare was also considered a condition for the provision of an adequate service in the access dimension. It was applied to evaluate the service quality implying no restriction on the passenger access to meet the fundamental need for transportation (Freitas, 2013).

Therefore, this research applied a modified SERVQUAL model, adapted from Barabino et al. (2012), Muthupandian and Vijayakumar (2012), Too and Earl (2010), Erdoğan et al. (2013), and Freitas (2013), to measure the service quality of public road passenger transport. The modified SERVQUAL model proposed in this research consisted of five dimensions: 1) tangibility 2) reliability 3) responsive 4) assurance and 5) access. A description of each dimension in this model is provided in Table 2. Attribute of the five dimensions with regard to public road passenger transport are also presented in Table 3.

## Methodology

### *Questionnaire*

The study developed a questionnaire according to the framework of the modified SERVQUAL model with five dimensions: 1) tangibility 2) reliability 3) responsiveness 4) assurance, and 5) access. The questionnaire contained three parts. The first part involved the demographics and personality traits of respondents. Questions regarding expectation and perception of service on public road passenger transport

regarding the modified SERVQUAL model were used in the second and third parts, respectively. Respondents were asked to evaluate the questions on a scale 1–5, where 1 indicated the least importance/satisfaction and 5 the most importance/satisfaction. The outcome based on evaluation produced the modified gap which was calculated from the difference between expectation and perception of service on public road passenger transport.

### Data Collection

The questionnaire was applied as a tool to acquire data from respondents who were Thai public road passengers traveling domestically in Thailand. The study considered the service quality based on general public road passenger transport as defined by OECD (2000) involving both urban and interurban routes on long-distance and local services, regular and charter services, and on buses and taxis (bus, coach, van and/or others). Stratified random sampling in Thailand was used to select the sample based on the geography of the six regions in Thailand. This research considered the dominant area in relation to gross provincial product (GPP) in nominal terms for each region in Thailand (Office of the National Economic and Social Development Board. 2013). The 16 selected provinces had a quota of 200 samples from each province grouped into six regions. The first region was Bangkok and its metropolitan area which contained four provinces: 1) Bangkok (68.1%), 2) Samut Prakarn (13.0%), 3) Samut Sakhon (6.0%), and 4) Pathum Thani (5.6%). The Northeast region included three provinces: 1) Khon Kaen (14.4%), 2) Ubon Ratchathani (7.6%), and 3) Nong Khai (2.7%). The North region contained three provinces: 1) Chiang Mai (16.7%), 2) Chiang Rai (7.9%), and 3) Tak (3.6%). The South region had three provinces: 1) Songkha (19%), 2) Nakhon Si Thammarat (12.7%), and 3) Phuket (10.7%). The fifth region contained one province, Rayong (37.8%), as representative of the East region. Finally, the Central region contained two provinces: 1) Nakhon Sawan (10.3%), and 2) Phitsanulok (8.1%). The completed questionnaires were then returned to

the researcher by mail. The number of usable questionnaires was 2,729 units from 3,200 units or 85 percent of the total.

Reliability analysis of the questionnaire was determined using Cronbach's Alpha, which for each dimension reached 0.784–0.905, and this was considered acceptable. Descriptive statistics were used to analyze the data and to explore the characteristics of sample size and mean value between expectation and perception of quality service for each dimension in a modified service quality.

### Data Analysis

A t-test was applied to investigate significant differences between expectation and perception of service quality in terms of the dimension, attribute, area, and factor. Multiple regression was used to study the impact of expected dimensions influencing perceived quality of public transport. One-way ANOVA and Scheffe's test were used to test for significantly different gaps in the scores for each region with regard to the modified SERVQUAL model at the .01 or .05 significance level.

### Results

Of the respondents, 50.6 percent were female. Most respondents were single and were aged 20–40 years with 57.8 percent of the respondents having an income over USD 430 per month. Approximately 70 percent of the sample had education to at least the Bachelor degree level. Residential addresses were split evenly at 20 percent among Bangkok metropolitan, Northeast region, North region, and South region with fewer in Central and East, respectively. The descriptive statistics showed that 24.3 percent of respondents reported having children in the house. Nearly three-quarters (72.1%) owned a motorcycle and approximately half (52%) of the respondents used a private car for regular trips. Public road passenger transport was used for personal business (64%) and travel (49%), respectively, with most using a van, bus, or coach for public road transport. Approximately 70 percent of travel routes involved urban to upcountry travel.

**Table 1**  
Articles focusing on service quality of public passenger transport

	Contribution
Hu and Jen (2006)	Applied SERVQUAL and Churchill's paradigm to develop a service quality model of the city bus service in Taipei, Taiwan with seven dimensions: tangibles, reliability, responsiveness, competence, courtesy, credibility, security, and access.
Prasad and Shekhar (2010)	Used RAILQUAL based on SERVQUAL and Rail Transport quality to evaluate the service quality in India with five dimensions: assurance, empathy, reliability, responsiveness, and tangibles.
Too and Earl (2010)	Used a SERVQUAL framework to measure service quality of public transportation within a master-planned community in Australia. The public transport service quality dimensions in this paper included tangibles, responsiveness, reliability, and assurance.
Wang et al. (2010)	Proposed an instrument based on SERVQUAL to measure urban transport service quality in Taipei metropolitan area, Taiwan. The article used the original dimensions of: tangibles, reliability, responsiveness, assurance, and empathy.
Zakaria et al. (2010)	Studied service quality of Malaysian public transport which is buses and taxis in Kedah Darul Aman using SERVQUAL. The dimensions were: service quality involves: tangible, reliability, and responsiveness.
Randheer et al. (2011)	Examined perceptions of service quality in public transport on commuters of twin cities of Hyderabad and Secunderabad in India. The dimensions were: service quality containing tangibility, reliability, responsiveness, assurance, and empathy.
Barabino et al. (2012)	Applied a modified SERVQUAL approach with EN13816 to find the gap between perceptions and expectations of public transport in Cagliari, Italy. The modified SERVQUAL considered four dimensions: tangibles, reliability, responsiveness, and assurance.
Muthupandian and Vijayakumar (2012)	Employed SERVQUAL based on the gap model of service quality in public road transport in Tamil Nadu, India. Five dimensions were considered for service quality: tangibles, reliability, responsiveness, assurance, and empathy.
Erdoğan et al. (2013)	Applied a customer satisfaction model based on SERVQUAL and fuzzy TOPSIS methods to evaluate the service quality of public transport in Istanbul. The SERVQUAL dimension involved tangibles, reliability, responsiveness, assurance, and empathy.
Freitas (2013)	Assessed the service quality of intercity road transport of passengers in Brazil. The necessary conditions for the provision of an adequate service included up-to-date services, punctuality, regularity, security, continuity, efficiency, generality, courtesy, and reasonable fares.
Ojo et al. (2014)	Used SERVQUAL model with five dimensions (reliability, assurance, tangibility, empathy, and responsiveness) to investigate customer satisfaction of public transport on the Cape Coast-Accra route in Ghana.
Mikhaylov et al. (2015)	Used SERVQUAL model to measure service quality of public transport in Russia with five dimensions: reliability, responsiveness, assurance, empathy, and tangibles.

**Table 2**

Description of each dimension in modified SERVQUAL model

Dimension	Description
Tangibility	Physical facility, equipment, personnel, and communication materials
Reliability	Ability to perform a service reliably and accurately
Responsiveness	Willingness to help and provide customers with prompt service
Assurance	Knowledge and courtesy of employees and their ability to inspire trust and confidence among customers
Access	Ease to connect with other public transport by proper fare

**Source:** Barabino et al. (2012); Brysland and Curry (2001); Erdoğan et al. (2013); Freitas (2013)

**Table 3**

Modified SERVQUAL by attribute level

Dimension	Attribute
Tangibility	1. Bus stop proximity (A1)
	2. On-board comfort (A2)
	3. On-board cleanliness (A3)
	4. On-board space availability (A4)
	5. Facilities at bus stops (A5)
	6. Low-pollution emissions (A6)
Reliability	7. Information at bus stops (A7)
	8. Bus reliability (A8)
Responsiveness	9. Bus frequency (A9)
	10. Ticket availability (A10)
	11. Ease of ticket validation (A11)
	12. Bus route travel time (A12)
Assurance	13. Bus drivers' ability (A13)
	14. Staff courtesy and knowledge (A14)
	15. On-board security (A15)
Access	16. Appropriate fare (A16)
	17. Ease to connect with other public transport (A17)

**Source:** Adapted from Barabino et al. (2012); Erdoğan et al. (2013); Freitas (2013); Muthupandian and Vijayakumar (2012); Too and Earl (2010)

### Modified SERVQUAL Scores at Dimension Level

Table 4 shows the negative gaps between the expectation and perception of Thai passengers in all dimensions with regard to public road transport. This result suggests a lack of service quality to Thai passengers in general. Based on the replies, responsiveness received the highest least negative gap score (-0.179) followed by reliability (-0.181). On the other hand, the biggest gap in the dimensions in the modified SERVQUAL model refers to assurance with a gap score of -0.246 followed by the access dimension (-0.218). These negative gaps are heavily influenced by the high expectation from Thai public road passengers (more than 3.7 on the 1–5 scale). The assurance and access dimensions are of major concern and there should be more focus on improving customer satisfaction with regard to public road transport in Thailand. Figure 1 shows the gap score of each dimension and overall.

Multiple regression analysis was applied using the SPSS software to explain the effects of the five dimensions with regard to expectation of the overall perceived service quality. The results are shown in Table 5, with the variance of the regression model being 0.251. In addition, the model provided a good fit to the data with  $F$ -prob. < .01. The study showed that tangibility was the most influential dimension of perceived service quality based on the standardized coefficient's beta (-0.280) and was significant at the .01 level, followed by the

assurance (-0.178) and reliability (-0.089) dimensions, respectively. Hence, decreasing expectation in relation to tangibility will positively affect a substantial improvement in the overall perceived service quality of public road passenger transport in Thailand. However, the responsiveness and access dimensions did not have a significant effect on perceived service quality at the .01 level.

### Modified SERVQUAL Scores at Dimension Level by Region

Samples were collected from 16 selected provinces grouped by six regions in Thailand: 1) Bangkok metropolitan 2) Northeast region 3) North region 4) South region 5) East region, and 6) Central region. Table 6 presents the scores for the expectation and perception of Thai passenger respondents with regard to public transport in each region. Each region had a negative gap between expectation and perception which indicated dissatisfaction with service quality at the significance level of .05.

However, the Bangkok metropolitan area had the lowest satisfaction rating with the most negative gap score (-0.595) followed by the East region (-0.488) indicating that these two areas certainly need to improve the service quality of public road passenger transport. The Northeast and North regions had small negative gaps between expectation and perception suggesting that improvement should not be too difficult in order to meet customer satisfaction. The gap scores in the Central and South regions were also negative but were almost zero at -0.051 and -0.053, respectively. Therefore, the Central and South regions could most easily meet customer satisfaction with regard to public transport. The average gap scores of the six regions were analyzed using one-way ANOVA and the results indicated that there was a significant difference in the average gap scores in at least two regions at the .01 level. Scheffe's test for pairwise comparison of the gap scores in each region was applied and the results are shown in Table 7, indicating that the average gap score in the Bangkok metropolitan area was the same as in the East region only, whereas, the average gap scores for the Northeast, North, South, and Central regions were not significantly different.

Figure 2 shows the gap score of each dimension regarding the modified SERVQUAL analysis by region. It indicates that the assurance dimension in the Bangkok metropolitan area is the critical aspect that certainly needs service quality improvement with regard to public road transport followed by the tangibility and reliability dimensions. In the East region, the reliability dimension is the most important dimension indicating passengers' dissatisfaction followed by the assurance and access dimensions. Improving the access dimension will lead to increased customer satisfaction in the Northeast region, whereas Thai passengers in the North region prefer improvements in the assurance dimension. In the South and Central regions, the assurance and access dimensions, respectively, are the primary aspects requiring improvement to increase customer satisfaction for local passengers.

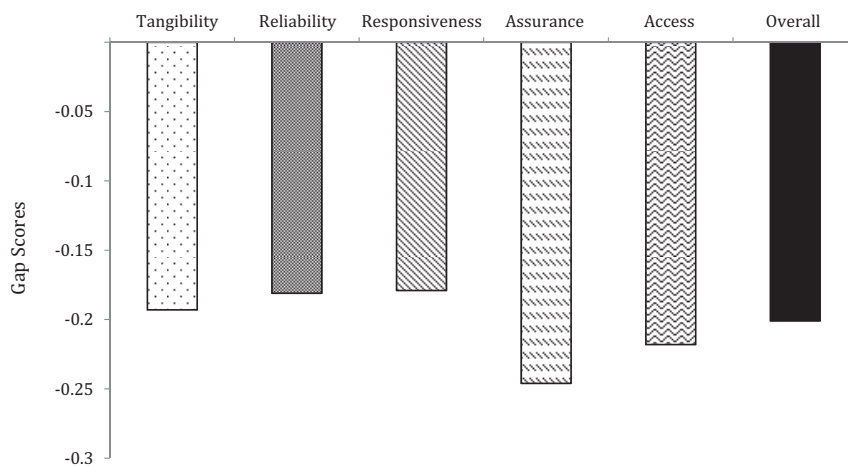
**Table 4**

Modified SERVQUAL scores at dimension level

Modified SERVQUAL	Perception (P)	SD (P)	Expectation (E)	SD (E)	Gap score (P-E)	p
Tangibility	3.405	0.784	3.598	0.828	-0.193	.000*
Reliability	3.443	0.881	3.624	0.928	-0.181	.000*
Responsiveness	3.469	0.800	3.648	0.857	-0.179	.000*
Assurance	3.486	0.840	3.732	0.921	-0.246	.000*
Access	3.568	0.912	3.786	0.949	-0.218	.000*
Overall	3.458	0.731	3.660	0.783	-0.201	.000*

\*significant at  $p < .01$ ;  $n = 2,729$





**Figure 1** Modified SERVQUAL gap scores at dimension level

**Table 5**

Effects of the five dimensions with regard to expectation of the overall perceived service quality

Regression model	Nonstandardized coefficients		Standardized coefficients		t-stat	p
	B	Std. Error	Beta			
Constant	1.277	0.052			24.782	.000*
Tangibility	-0.219	0.023	-0.280		-9.356	.000*
Reliability	-0.062	0.019	-0.089		-3.327	.001*
Responsiveness	-0.032	0.023	-0.042		-1.350	.177
Assurance	-0.125	0.022	-0.178		-5.604	.000*
Access	0.031	0.019	0.045		1.637	.102

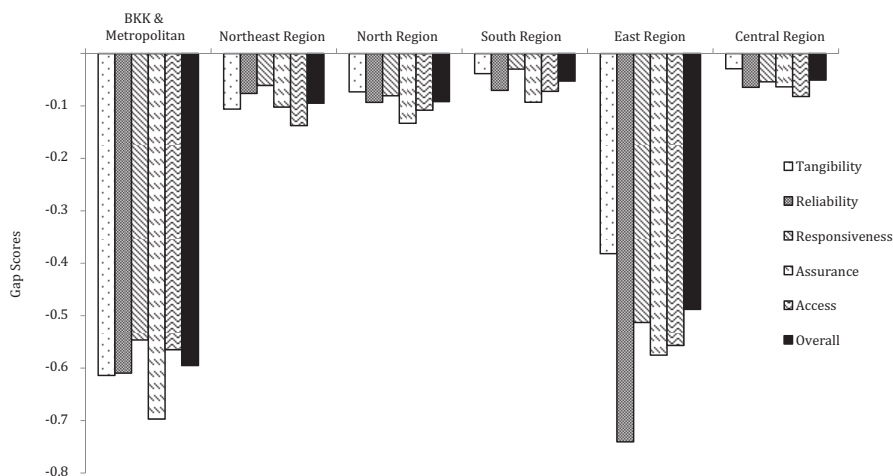
\*significant at  $p < .01$ ;  $F = 182.941$ ;  $F\text{-prov} < 0.01$ ;  $R^2 = 0.251$ ; Adjusted  $R^2 = 0.250$ ;  $n = 2,729$

**Table 6**

Modified SERVQUAL scores by region

Area	Sample	Perception (P)	SD (P)	Expectation (E)	SD (E)	Gap score (P-E)	p
Bangkok metropolitan	565	3.245	0.774	3.841	0.816	-0.595	.000*
Northeast	546	3.411	0.707	3.501	0.786	-0.095	.000*
North	569	3.489	0.727	3.581	0.763	-0.092	.000*
South	553	3.745	0.705	3.798	0.770	-0.053	.023**
East	124	3.311	0.670	3.799	0.741	-0.488	.000*
Central	372	3.428	0.621	3.480	0.689	-0.051	.017**
Overall	2,729	3.458	0.731	3.660	0.783	-0.201	.000*

\*significant at  $p < .01$ ; \*\*significant at  $p < .05$ ;  $n = 2,729$



**Figure 2** Modified SERVQUAL gap scores at dimension level by region

**Table 7**

Pairwise comparison of the average gap scores by region

Region	Northeast	North	South	East	Central
Bangkok metropolitan	0.000*	0.000*	0.000*	0.686	0.000*
Northeast		1.000	0.940	0.000*	0.953
North			0.954	0.000*	0.964
South				0.000*	1.000
East					0.000*

\*significant at  $p < .01$ ;  $n = 2,729$ 

Interest in the service quality in both the Bangkok metropolitan area and the Central region, based on evidence from Office of the National Economic and Social Development Board (2013) indicated that public road passengers in Rayong and Bangkok, representing both the Bangkok metropolitan area and the Central region in this research and having the highest GPP per capita in Thailand, lacked satisfaction regarding service quality in the public transport system. The statement supported exploring the relationships among public road passenger's income, expectation, perception, and gap score for further analysis. The t-test results indicate that the higher income of passengers relates significantly to a higher expectation ( $p < .01$ ) and bigger gap score ( $p < .01$ ) regarding the modified SERVQUAL model.

#### *Modified SERVQUAL Scores at Attribute Level by Region*

Initially, the study explored the modified SERVQUAL gap scores at the attribute level with regard to the service quality of overall public road passenger transport. The results in Table 8 show that the least satisfied attribute was on-board security followed by staff courtesy and knowledge, which are both in the assurance dimension. The third and fourth least satisfied attributes were ease of connection with other public transport and the bus drivers' ability, respectively, which are in the access and assurance dimensions, respectively. Bus stop proximity was the fifth least satisfied attribute in the modified SERVQUAL model. The results imply that Thai public road transport definitely needs to improve these attributes in order to enhance service quality. The results indicate that overall, public road passengers are currently dealing with a security issue. Furthermore, staff courtesy and knowledge, and drivers' ability are dominant attributes required by Thai public passengers. In addition, public road passengers in Thailand still confront a lack of connection among public transport system components that also indeed need development.

However, the most satisfied attribute as indicated by the smallest gap score among all attributes was ticket availability followed by bus frequency, which are both in the responsiveness dimension. Low-pollution emissions, information at bus stops, and facilities at bus stops were in the third to fifth rankings, respectively, with the smallest gap scores with regard to the service quality of public road passenger transport and these attributes are in the tangibility and reliability dimensions of the modified SERVQUAL model.

The modified SERVQUAL gap scores in the Bangkok metropolitan area with regard to the service quality of public road transport at the attribute level. All attributes in this area had high gap scores, indicating there is definitely a need for improvement in service quality in all attributes. However, the assurance dimension, which consists of three attributes (staff courtesy and knowledge, on-board security, and appropriate fare) were the first to third least satisfied attributes of service quality, respectively. Bus stop proximity and on-board space availability in the tangibility dimension were the fourth and fifth least satisfied attributes, respectively, according to Bangkok metropolitan passengers. Hence, development of the service and knowledge provided by staff, enhancing security standards, and decreasing public fares will improve substantially the service quality of public road transport in the

Bangkok metropolitan area.

The service quality of public passenger road transport in the Northeast region is explained, where only one attribute (ticket availability) had a small positive gap score indicating satisfaction with that service quality. The other attributes had small negative gap scores in the modified SERVQUAL model; however, the biggest gap score within the Northeast region was for on-board security followed by ease of connection with other public transport, which are both in the access dimension. In addition, the bus proximity attribute in the tangibility dimension was the third least satisfied attribute of service quality within this region. Consequently, the results provide that improvement of security standards and improvements in the ease of connection among transport system in the Northeast region will lead to passengers' satisfaction accordingly.

The service quality of public road passenger transport in the North region indicates that all attributes in the modified SERVQUAL model had small negative gap scores. Bus drivers' ability, and staff courtesy and knowledge, which are both in the assurance dimension, were the two attributes that public road passengers showed the most concern with regarding service quality followed by ease of connection to other public transport, with all these attributes being in the assurance dimension. The results suggest that public road passengers in the North region require improvement in service quality in relation to the driver's ability and the courtesy of staff, including the development of public transport system based on better connections to other public transport components.

The modified SERVQUAL gap scores at the attribute level in the South region indicates that there were four attributes that had small positive gap scores indicating passengers' satisfaction toward the service quality with regard to public road transport, namely: 1) facilities at bus stops, 2) low-pollution emissions, 3) bus frequency, and 4) ticket availability. Nevertheless, bus route travel time, ease of connection with other public transport, and bus stop proximity were the top-three least satisfied attributes with regard to the dissatisfaction of passengers in the South region. The findings in the South region imply that public road passengers confront the problem of uncertainty of travel time including ease of connection within the public transport system. In addition, the negative gap scores of attributes in the South region were much smaller than the gap scores in the Bangkok metropolitan area and the East region.

The modified SERVQUAL gap scores in the East region clearly show high dissatisfaction in each attribute with regard to the service quality of public road passenger transport. On-board security was the least satisfied attribute, having the biggest negative gap score followed by bus reliability, while the third and fourth least satisfied attributes were ticket availability followed by staff courtesy and knowledge, which all required improvement with regard to service quality. Thus, public road passengers in the East region are dealing with security concerns which need noticeable improvement. On-time scheduling of public road vehicles and ticket availability had the higher passenger satisfaction regarding public road passenger transport.

The Central region was the last area analyzed using the modified SERVQUAL model at the attribute level. The results show that three attributes had small positive gap scores: 1) on-board cleanliness, 2) bus frequency, and 3) ticket availability. The top-two least satisfied attributes in the Central area were ease of ticket validation and bus route travel time, respectively. However, the negative gap scores of these attributes were small, suggesting it should not be too difficult to improve on them and raise the service quality of public road passenger transport. As mentioned, if provided, improvements in these two attributes will enhance the service quality of public road passenger transport in the Central region.

### Modified SERVQUAL Scores at Dimension Level by Different Route

The gap score at the dimension level by route based on public road passenger transport was investigated. The different routes considered were: 1) urban within Bangkok, 2) urban within upcountry provinces, 3) interurban between Bangkok and upcountry provinces, and 4) interurban between two upcountry provinces. The results with regard to modified SERVQUAL in Table 9 reveal that interurban routes between Bangkok and upcountry provinces, and urban within Bangkok required improvement in the assurance dimension followed by the access dimension. Most of the passenger used public road passenger transport for their personal business, travel, and work. Therefore, they seek higher service quality from staff and the driver, including security standards to protect passengers' well being. In addition, the convenience of public road passenger to travel using an integrated transport system and having an appropriate fare are two attributes that affect the service quality of public road transport.

### Conclusions

This paper examined the service quality of public road passenger transport in Thailand. The study applied a modified SERVQUAL model to investigate service quality which consisted of five dimensions—1) tangibility, 2) reliability, 3) responsiveness, 4) assurance, and 5) access—which together encompassed 17 attributes. Based on the literature review, this research evaluated and compared service quality with regard to public transport within six regions in Thailand. The results based on the five dimensions in the modified SERVQUAL model indicated Thai passengers were dissatisfied with service quality in many attributes. The assurance dimension had the biggest negative gap scores followed by the access and tangibility dimensions. At the .01 significance level, tangibility was the most influential dimension affecting perceived service quality followed by the assurance and reliability dimensions, respectively. Based on analysis of the average gap scores of

each region using one-way ANOVA and also Scheffe's test for pairwise comparisons, the Bangkok metropolitan area and the East region had the same level of poor perceived service quality that definitely was in need of improvement. Passengers in the Northeast, North, South, and Central regions all had similar perceived service quality levels which indicated minor dissatisfaction. This research investigated service quality at the attribute level and found that on-board security was the most important attribute regarding service quality followed by staff courtesy and knowledge, and bus drivers' ability, respectively. According to the modified SERVQUAL modeling, the gap scores of the 17 attributes investigated by region showed that the passengers in the Bangkok metropolitan area and the East region considered rapid improvement was needed in the attributes of service quality in terms of staff courtesy and knowledge, and appropriate fare, respectively, while passengers in the Northeast and North regions required improvements in on-board security, and in the bus drivers' ability with regard to public passenger road transport, respectively. In the South and Central regions, public riders wanted to see improved service quality on bus route travel time and ease of ticket validation, respectively.

The evidence showed that public road passengers lacked confidence in the security standards with regard to the existing public transport system. They needed the service providers of public road passenger transport to develop their staff and drivers in term of security, service, and knowledge. Moreover, inter-connection within the transport system is still a critical issue that will require action among related institutions to enhance this critical concern. Nevertheless, the higher income of passengers will lead to higher expectations of service quality regarding public road transport. Therefore, communication to passengers in this group is necessary to gain their understanding about some of the limitations and movements in relation to public road passenger transport which may possibly influence passenger satisfaction.

**Table 8**

Modified SERVQUAL scores at attribute level

Modified SERVQUAL	Perception (P)	SD (P)	Expectation (E)	SD (E)	Gap score (P-E)	p
Bus stop proximity	3.297	0.946	3.510	1.018	-0.213	.000*
On-board comfort	3.375	0.909	3.571	0.983	-0.196	.000*
On-board cleanliness	3.432	0.972	3.624	1.032	-0.192	.000*
On-board space availability	3.451	0.993	3.645	1.000	-0.194	.000*
Facility at bus stops	3.431	0.985	3.613	0.996	-0.182	.000*
Low-pollution emissions	3.447	0.993	3.623	1.003	-0.176	.000*
Information at bus stops	3.459	0.964	3.640	0.979	-0.181	.000*
Bus reliability	3.427	0.979	3.620	1.018	-0.193	.000*
Bus frequency	3.451	0.987	3.610	1.015	-0.159	.000*
Ticket availability	3.499	0.970	3.640	1.003	-0.141	.000*
Ease of ticket validation	3.459	0.961	3.660	0.994	-0.201	.000*
Bus route travel time	3.468	0.952	3.670	1.012	-0.202	.000*
Bus drivers' ability	3.489	0.947	3.710	1.012	-0.221	.000*
Staff courtesy and knowledge	3.465	0.970	3.710	1.027	-0.245	.000*
On-board security	3.504	0.975	3.770	1.054	-0.266	.000*
Appropriate fare	3.539	0.980	3.750	1.021	-0.211	.000*
Ease to connect with other public transport	3.597	0.995	3.822	1.008	-0.225	.000*
Overall	3.458	0.731	3.660	0.783	-0.201	.000*

\*significant at  $p < .01$

**Table 9**

Modified SERVQUAL scores at dimension level among different route

Modified SERVQUAL	Urban (BKK) Gap Score (P-E)	Urban (UPC) Gap Score (P-E)	Interurban (BKK-UPC province) Gap Score (P-E)	Interurban (between two UPC provinces) Gap Score (P-E)
Tangibility	-0.183*	-0.167*	-0.250*	-0.229*
Reliability	-0.177*	-0.173*	-0.247*	-0.174*
Responsiveness	-0.189*	-0.158*	-0.250*	-0.161*
Assurance	-0.325*	-0.212*	-0.323*	-0.238*
Access	-0.256*	-0.196*	-0.284*	-0.258*
Overall	-0.217*	-0.176*	-0.266*	-0.211*

BKK: Bangkok; UPC: Upcountry; \*significant at  $p < .01$

This study can help the Thai government, private enterprises, or related institutions to understand more clearly passengers' points of view regarding the service quality of public transport. The study has indicated areas in which to develop and enhance the service quality based on a modified SERVQUAL model in each of the six regions surveyed in Thailand. The research will contribute to improved conditions for Thai passengers on public transport through higher service quality by identifying focus areas in which to reduce the gap scores in perceived service quality with regard to both dimensions and attributes. The key limitation of the research was that data collection focused on the dominant provinces only where there were greater amounts of GPP based on geography. Future research should focus on rural areas in Thailand to better understand their problems and the limitations in their service quality and include canvassing public passenger requirements. In addition, researchers should investigate specific types of public road passenger transport regarding service quality in each region. Moreover, analysis of the profile from sampling in each region should be considered with regard to the gaps analysis to recognize customer behavior according to the service quality of public road passenger transport based on each region in Thailand.

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