



Volume 114

2022

p-ISSN: 0209-3324

e-ISSN: 2450-1549

DOI: <https://doi.org/10.20858/sjsutst.2022.114.2>



Journal homepage: <http://sjsutst.polsl.pl>

Article citation information:

Girma, M., Woldetensae, B. Evaluating users' satisfaction in public transit service: a case of Addis Ababa city, Ethiopia. *Scientific Journal of Silesian University of Technology. Series Transport*. 2022, **114**, 15-30. ISSN: 0209-3324.

DOI: <https://doi.org/10.20858/sjsutst.2022.114.2>.

Mulugeta GIRMA¹, Berhanu WOLDETENSAE²

EVALUATING USERS' SATISFACTION IN PUBLIC TRANSIT SERVICE: A CASE OF ADDIS ABABA CITY, ETHIOPIA

Summary. Rapid urbanization has resulted in a slew of issues, including urban transportation, in most emerging countries' cities. Public transportation provides transportation for the community and plays an important role in the daily lives of the city's citizens, particularly the urban poor, by reducing travel costs and providing job opportunities. Thus, evaluating public bus service performance from the perspective of users is critical for identifying service operators' strengths and deficiencies. Consequently, the primary goal of this research is to determine the level of consumer satisfaction with public bus service in the city and identify the most important factors that influence satisfaction. Hence, a survey was carried out between December and January 2020. Stratified sampling approaches were used to obtain data from 500 travelers. Factor analysis and customer satisfaction index were used to analyze the data collected. Lastly, the findings show that users were quietly satisfied (0.54) with the quality of the bus services supplied in the city. Moreover, travelers were better satisfied with attributes that related to availability (0.64) and less satisfied with attributes under timeliness (0.50) and security (0.48). Therefore, service operators and other concerned stakeholders should give urgent attention to

¹ Ethiopian Institute of Architecture, Building Construction, and City Development, Addis Ababa University, Ethiopia. Email: muleraddis@yahoo.com. ORCID: <http://orcid.org/0000-0002-5548-8010>

² Ethiopian Institute of Architecture, Building Construction, and City Development, Addis Ababa University, Ethiopia. Email: berhanu.woldetensae@eiabc.edu.et. ORCID: <http://orcid.org/0000-0003-4569-5144>

attributes under timeliness and security to enhance users' satisfaction in the provision of bus service in the city.

Keywords: public bus, service quality, customer satisfaction, factor analysis, Addis Ababa, Ethiopia

1. INTRODUCTION

The transportation sector contributes significantly to a country's overall growth [1]. The movement of people and goods is mostly dependent on transportation, which is also an important aspect of maintaining a healthy economy [2]. Because of its low startup and operating costs, route flexibility, and permeability into town and city centers, the conventional bus is the most popular means of public transportation in most developing countries [2- 6]. Furthermore, rapid development in the use of public bus transportation can be attributed to its numerous benefits, including improved personal and economic prospects, reduced congestion and fuel consumption, and reduced carbon dioxide emissions [7]. Accordingly, public transportation is identified as a critical component of the country's economic, energy, and environmental challenges, as well as a means of enhancing the quality of life [2, 7, 8,].

Therefore, one of the most critical components for the well-being of increasing and expanding metropolitan regions is the provision of sufficient and proper public bus transportation services [10]. Although public transportation plays an important role in metropolitan areas, as [7] pointed out, its services are frequently insufficient to meet travel demand, and even when they are, they are often laden with inefficiencies, hence low efficiency. On the other hand, it is stated that growing transportation supply does not always imply an increase in travel demand and satisfaction [11]. It posits that assuring value for money or returns on investment in sustaining existing and attracting new consumers, as well as knowledge of satisfaction and service performance, should give policymakers and public transportation operations managers' useful information.

Furthermore, a scholar proposed that transportation research should shift from a purely theoretical investigation to an empirical approach to identify practical instruments for improving service quality [12]. Various components of customer value should be investigated as well [13]. This will assist service providers in transitioning from an operationally-based to a customer-focused dispensation, allowing them to not only satisfy existing customers but also to invite new ones, which is critical for the organization's long-term viability[14, 15]. However, the question remains as to which specific factors predominate in the supply of services and passenger satisfaction; this is the target of this study.

Importantly, the purpose of this study is to examine the satisfaction level of users in services delivered in the city. Besides, it attempts to identify the key factors that influence the satisfaction of users in the provision of public bus transportation in Addis Ababa.

2. LITERATURE REVIEW

Service quality is a method of managing business operations to provide complete customer satisfaction on all levels (internal and external). It improves the company's overall competitiveness, effectiveness, and flexibility [16]. Service quality is a measure of how well the level of service supplied meets customer expectations [17]. It has also been defined as the gap between consumers' expectations for service performance and their perceptions of

the service delivered [18]. Thus, knowing the quality of the supplied service is critical for business companies to ensure their survival and market competitiveness [19]. Furthermore, investing in the quality of service by industries accrue a variety of benefits, for example, improvement of customer happiness, loyalty, repeat purchases, and long-term profit through positive word of mouth [20].

Bus transit service quality is determined by a variety of variables, including average journey time and reliability, transit waiting time, monetary costs, riding comfort, information, and personal security [21, 22]. Hence, 31 service quality attributes were chosen from existing literature and studies [23-30] (Table 1) and a questionnaire was developed for this study based on specified characteristics.

Tab. 1

Selected service quality attributes for this study

| Service Quality Attributes | |
|--|---|
| 1. Service coverage | 17. Cleanliness of bus interior, seats, and windows |
| 2. Availability of bus stops and their proximity | 18. Cleanliness of bus exterior |
| 3. Service frequency | 19. Ticket cost/fare |
| 4. Total hour of service | 20. Availability of timetable/map on bus/bus stop |
| 5. Availability of service on weekends/holidays | 21. Provision of information using media and other ways |
| 6. Availability of services at night | 22. Safety and competence of drivers |
| 7. Convenience of the bus for everybody | 23. Security against crime on a bus |
| 8. Punctuality of bus (runs on schedule) | 24. Security against crime at bus stops and stations |
| 9. Waiting time at the bus stop | 25. Staff behavior (drivers and conductors) |
| 10. Journey time (operating speed) | 26. Personnel helpfulness and friendliness |
| 11. Bus crowding level | 27. Ease of buying a ticket |
| 12. Comfort while riding the bus | 28. Administration of complaints |
| 13. Bus stop comfort | 29. Ease of service use |
| 14. AC – Availability on bus | 30. Accessibility of bus for people with disability |
| 15. Shelter and benches at a bus stop | 31. Image of the company |
| 16. Level of noise on buses | |

3. METHODOLOGY

3.1. Study Area

Ethiopia's capital city is Addis Ababa. It is usually referred to as Africa's "political capital" due to its historical, diplomatic, and political significance. It is situated in the country's middle, at a height of 2,400 meters above mean sea level, with a rolling hilly surface. The city covers a total area of 527 square kilometers. Addis Ketema, Akaki Kality, Arada, Bole, Kolfe Keranio, Gulele, Kirkos, Lideto, Nifasilk Lafto, and Yeka are among the city's ten sub-cities. These sub-

cities are further divided into 116 woredas levels for administrative purposes. The city's mass transit service is delivered by state-owned buses, such as Anbessa city bus, Sheger city bus, and Public Service Employees Transport bus and Light Rail Transport. However, the focus of this study is on road-based public bus transport of the city.

3.2. Sampling and data collection

To reach actual respondents for this study, a multistage sampling procedure was conducted. To choose terminals, stratified sampling was used first, followed by systematic sampling to select route lines from the terminals chosen for the study. Finally, respondents were chosen using convenience sampling while traveling on the chosen bus route line. The study had a sample size of 500 people. Yamane's (1967) formula was used to discover it. To gather data for the study, a questionnaire survey of regular bus riders in the city was conducted. On a Seven-point Likert scale, respondents were asked to rate the importance and performance level of 31 service quality attributes. The survey was done on a specific route line (bus) from Monday to Sunday for one month, starting December 2019 to January 2020.

3.3. Analytical methods

Factor analysis

This is a multivariate data analysis method for examining the fundamental factors that influence the collection of associated variables in a survey [31, 32]. Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) are the two types. The latent (unobserved) variables are determined using EFA. While CFA is used to confirm or assess the association between observed variables and common factors [33].

Customer Satisfaction Index (CSI)

The customer satisfaction index was conducted to measure user satisfaction levels based on selected variables using their factor loading (Table 2). The following formula is used to compute CSI:

$$CSI = \sum_{k=1}^N [\bar{S}_k \cdot W_k] \quad (1)$$

in which:

\bar{S}_k is the average of user satisfaction ratings for the service quality k attribute.

W_k (importance weight) is a k attribute weight that is calculated based on the importance ratings provided by users. Precisely, it is the ratio between the mean of the importance rates stated by users on the k attribute and the sum of the average importance rates of all the service quality attributes [24].

Finally, the value of CSI can be inferred from the categories proposed by Supranto (1977).

Tab. 2

Criteria for customer satisfaction index

| CSI score ranges | Interpretation |
|------------------|-----------------|
| 0.81 – 1.00 | Very Satisfied |
| 0.66 – 0.80 | Satisfied |
| 0.51 – 0.65 | Quite satisfied |
| 0.35 – 0.50 | Less Satisfied |
| 0.00 – 0.34 | Not satisfied |

Source: [34, 35]

4. RESULTS AND DISCUSSION

4.1. Profile of sample respondents

Males accounted for 59.4% of the sample, while females were 40.6%. Further, 35.0% of participants were between the ages of 26 and 35, and 30.6% were between the ages of 36 and 50. For employment, the majority (38.8%) worked in private institutions, while 28.8% were self-employed. Table 3 shows the summary statistics for the other variables.

Tab. 3

Socio-economic characteristics of the survey sample

| Variables | Response | Frequency | Percent |
|------------------------|---------------------------------|-----------|---------|
| Gender | Male | 297 | 59.4 |
| | Female | 203 | 40.6 |
| Age category | Under 18 years | 11 | 2.2 |
| | 18-25 years | 107 | 21.4 |
| | 26-35 years | 175 | 35.0 |
| | 36-50 years | 153 | 30.6 |
| | 51-60 years | 52 | 10.4 |
| | Above 61 | 2 | 0.4 |
| Education level | Read and write | 8 | 1.6 |
| | Primary school graduate | 27 | 5.4 |
| | High school Graduate | 90 | 18.0 |
| | Vocational/ diploma graduate | 176 | 35.2 |
| | BA graduate | 185 | 37.0 |
| | MA and above | 14 | 2.8 |
| Average Monthly Income | Less than and equal to 600 birr | 57 | 11.4 |
| | 601-1650 birr | 70 | 14.0 |
| | 1651-3200birr | 106 | 21.2 |
| | 3201-5250 birr | 131 | 26.2 |
| | 5251-7800birr | 94 | 18.8 |
| | 7801-10,900 birr | 34 | 6.8 |
| | 10,901 and above | 8 | 1.6 |

| | | | |
|------------------|-----------------------|-----|------|
| Travel Frequency | Daily | 134 | 26.8 |
| | 4-5 times a week | 182 | 36.4 |
| | 2-3 times a week | 126 | 25.2 |
| | Sometimes, not always | 58 | 11.6 |
| Journey Purpose | Work | 192 | 38.4 |
| | Education | 134 | 26.8 |
| | Market/shopping | 67 | 13.4 |
| | Social activities | 89 | 17.8 |
| | Other | 18 | 3.6 |

4.2. Factor analysis

Factor analysis was used in this part to identify the crucial item that influences customer satisfaction. Accordingly, EFA was used initially to investigate the most influential variables on the city's public transportation system service quality. The fitness of the model identified by EFA is then tested using CFA. However, before moving on to factor analysis, a reliability test was performed. The Cronbach's alpha test value was 0.857 (Table 4), indicating that the data was consistent and valid for factor analysis.

Tab. 4

Reliability analysis result

| <i>Scale Reliability Statistics</i> | | | |
|-------------------------------------|------|-------|---------------------|
| N | mean | SD | Cronbach's α |
| 31 | 3.79 | 0.843 | 0.857 |

The Kaiser-Meyer –Oklin (KMO) and Bartlett's tests were also used to assess the data's validity and sample adequacy. The KMO test is used to determine the study's sample adequacy, and it must be more than 0.5 to proceed with proper factor analysis [32]. As shown in Table 5, the KMO test value is greater than 0.5, and Bartlett's test value is 0.000, which is highly significant.

Tab. 5

KMO and bartlett's spherical inspection

| KMO and Bartlett's Test | | |
|--|--------------------|----------|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | .861 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 3084.546 |
| | df | 465 |
| | Sig. | .000 |

The study similarly used Principal Component Analysis and Oblimin rotation, with 0.4 serving as a clear cut-off for assessing the variables. Consequently, five variables with a loading of less than 0.4 and one factor with a Cronbach's alpha of less than 0.5 were dropped from

the study's further research. Other factors had Cronbach alphas ranging from 0.520 to 0.614, which is acceptable for the study.

As indicated in Table 6, seven component factors explained 55% of the variance in service quality attributes satisfaction. Timeliness, Customer Care, Comfort, Facilities, Image, Availability, and Security were the categories assigned. Table 6 likewise shows the results for the satisfaction data set for factor loading, Eigenvalue, Variance Explained, and Cronbach alpha.

Tab. 6.

EFA results for the performance of service quality attributes

| Factor | Attributes | Code | Loadings | Eigenvalue | Variance Explained (%) | Cronbach's alpha |
|--------|---|------|----------|--------------|------------------------|------------------|
| 1 | Timeliness | | | 5.400 | 7.72% | 0.570 |
| | Availability of services at night | V6 | 0.714 | | | |
| | Availability of service on weekends/holidays | V5 | 0.634 | | | |
| | Punctuality of bus/runs on schedule | V8 | 0.521 | | | |
| | Journey time (operating speed) | V10 | 0.475 | | | |
| 2 | Customer care | | | 1.691 | 7.65% | 0.591 |
| | Drivers and conductors behavior | V25 | 0.699 | | | |
| | Ease of buying a ticket | V27 | 0.623 | | | |
| | Personnel helpfulness and friendliness | V26 | 0.563 | | | |
| | Ease of service use | V29 | 0.422 | | | |
| 3 | Comfort | | | 1.434 | 7.27% | 0.613 |
| | Cleanliness of bus exterior | V18 | 0.694 | | | |
| | Cleanliness of bus interior | V17 | 0.607 | | | |
| | Level of noise on buses | V16 | 0.430 | | | |
| | Bus crowding level | V11 | 0.415 | | | |
| 4 | Facilities | | | 1.306 | 6.93% | 0.614 |
| | AC – Availability on bus | V14 | 0.703 | | | |
| | Availability of shelter and benches at a bus stop | V15 | 0.696 | | | |
| | Bus stop comfort | V13 | 0.475 | | | |
| | Convenience of the bus for everybody | V7 | 0.434 | | | |

| | | | | | | |
|---|--|-----|-------|--------------|--------------|--------------|
| 5 | Image | | | 1.212 | 6.79% | 0.585 |
| | Accessibility of bus for disabled people | V30 | 0.829 | | | |
| | Image of the company | V31 | 0.608 | | | |
| | Administration of complaints | V28 | 0.480 | | | |
| 6 | Availability | | | 1.123 | 6.33% | 0.520 |
| | Ticket cost/fare | V19 | 0.717 | | | |
| | Availability of bus stops and their proximity | V2 | 0.565 | | | |
| | Safety and competence of drivers | V22 | 0.495 | | | |
| 7 | Security | | | 1.075 | 6.77% | 0.566 |
| | Security against crime on a bus | V23 | 0.758 | | | |
| | Security against crime at bus stops and stations | V24 | 0.730 | | | |

Timeliness is the first latent factor that received the highest score in the analysis as seen above. With an Eigenvalue of 5.400, it accounts for 7.72% of the overall 55.0% variation. In addition, this factor includes four bus service quality measure factors. This suggests that users' total satisfaction with bus service quality is most strongly linked to timeliness than any other factor. Thus, any improvement direction for bus service supply should emphasize these variables.

Customer care and comfort of service are the second and third latent factors, accounting for 7.65 and 7.27% of the variance, respectively, with eigenvalues of 1.691 and 1.434. They both have four quality of service variables. Accordingly, customer care and service comfort duties are the second and third most important factors influencing passengers' overall satisfaction.

The other main latent factors are facilities, image, availability, and security, which account for 6.93, 6.79, 6.33, and 6.77% of the 55.0% variation, respectively, and have eigenvalues larger than one. The overall result demonstrates that these factors are critical and have varying degrees of impact on users' overall satisfaction with bus transportation quality.

Finally, CFA is used to confirm the data acquired previously. Standardized factor loading is the first step. As shown in Figure 1, the loading of V2 to V31 ranges from 0.31 to 0.67, and the majority of the variables are over the cut-off value (that is, 0.4), except for three variables that are less than 0.4 (that is, V5, V6, and V2). However, a factor loading of 0.3 can be significant for sample sizes of 350 and above [32]. Hence, it can be used in research.

Model Fit: The CMIN/DF value is 1.709, which is less than 3.00, as stated in Table 7. CFI, TLI values are greater than 0.9, RMSEA is less than 0.08. By using the Modification index on the first model, all of the fit indices meet the appropriate requirements. Thus, the index system depicted in Figure 1 is thought to be acceptable.

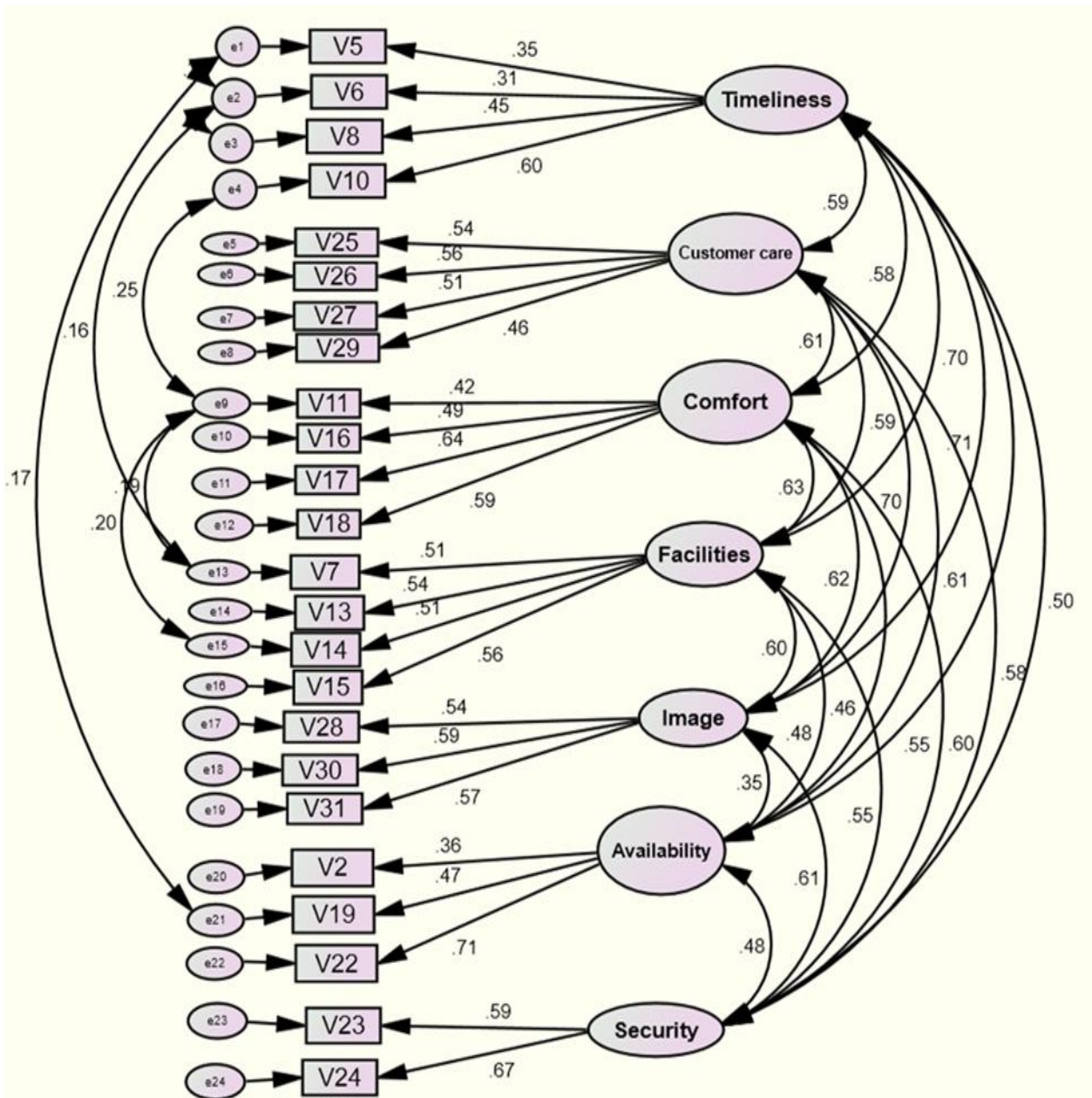


Fig. 1. Confirmatory factor analysis

Tab. 7.

The goodness of fit statistics

| Modal Fit Parameters | Fit Standard | Results |
|--|--------------|---------|
| CMIN/DF** | < 3.00 | 1.709 |
| Comparative Fit Index (CFI) | ≥0.90 | 0.920 |
| Root Mean Square Error of Approximation(RMSEA) | ≤ 0.08 | 0.038 |
| Tucer Lewis Index(TLI) | ≥0.90 | 0.901 |

**CMIN/DF: Minimum Discrepancy Function Divided by Degree of Freedom

4.3. Customer satisfaction analysis

Then, based on the factor analysis results, a customer satisfaction index study was performed on the data set to quantify consumers' satisfaction levels using a variable with a loading cut-off of 0.4 and above. Table 8 displays the outcome.

Tab. 8.

CSI result

| Factor | Attributes | Code | Perfor | Importance | Weight | Weight | CSI |
|----------|---|------|--------|------------|--------|--------|-----------------------|
| | | | mance | | factor | score | |
| | | | MSS | MIS | MIS/Av | MSS*W | |
| | | | | | .MIS | F | |
| 1 | Timeliness | | | | | | 0.50 (50%) |
| | Availability of services at night | V6 | 3.1 | 5.34 | 1.05 | 3.26 | 0.47 |
| | Availability of service on weekends/holidays | V5 | 3.6 | 5.18 | 1.02 | 3.67 | 0.52 |
| | Punctuality of bus/runs on schedule | V8 | 3.29 | 5.31 | 1.05 | 3.44 | 0.49 |
| | Operating speed | V10 | 4 | 4.47 | 0.88 | 3.52 | 0.50 |
| 2 | Customer care | | | | | | 0.53 (53%) |
| | Drivers and conductors behavior | V25 | 3.58 | 5.15 | 1.01 | 3.63 | 0.52 |
| | Ease of buying a ticket | V27 | 3.19 | 5.14 | 1.01 | 3.23 | 0.46 |
| | Personnel helpfulness and friendliness | V26 | 3.85 | 4.96 | 0.98 | 3.76 | 0.54 |
| | Ease of service use | V29 | 4.14 | 5.07 | 1.00 | 4.13 | 0.59 |
| 3 | Comfort | | | | | | 0.56 (56%) |
| | Cleanliness of bus exterior | V18 | 4.66 | 4.55 | 0.96 | 4.46 | 0.64 |
| | Cleanliness of bus interior | V17 | 4.34 | 5.37 | 1.13 | 4.91 | 0.70 |
| | Level of noise on buses | V16 | 3.32 | 3.94 | 0.83 | 2.75 | 0.39 |
| | Bus crowding level | V11 | 3.39 | 5.15 | 1.08 | 3.68 | 0.53 |
| 4 | Facilities | | | | | | 0.54 (54%) |
| | AC – Availability on bus | V14 | 3.84 | 4.55 | 0.95 | 3.65 | 0.52 |
| | Availability of shelter and benches at a bus stop | V15 | 4.02 | 4.65 | 0.97 | 3.90 | 0.56 |
| | Bus stop comfort | V13 | 3.41 | 4.67 | 0.98 | 3.33 | 0.48 |
| | Convenience of the bus for everybody | V7 | 3.76 | 5.28 | 1.10 | 4.15 | 0.59 |
| 5 | Image | | | | | | 0.55 (55%) |
| | Accessibility of bus for disabled people | V30 | 3.64 | 5.1 | 1.01 | 3.68 | 0.53 |
| | Image of the company | V31 | 4.45 | 5.08 | 1.01 | 4.48 | 0.64 |
| | Administration of complaints | V28 | 3.42 | 4.96 | 0.98 | 3.36 | 0.48 |
| 6 | Availability | | | | | | 0.64 (64%) |
| | Ticket cost/fare | V19 | 4.75 | 5.08 | 1.00 | 4.73 | 0.68 |
| | Availability of bus stops and their proximity | V2 | 4.33 | 5 | 0.98 | 4.25 | 0.61 |

| | | | | | | | |
|----------|--|-----|------|------|------|----------|-----------------------|
| | Safety and competence of drivers | V22 | 4.37 | 5.21 | 1.02 | 4.46 | 0.64 |
| 7 | Security | | | | | | 0.48 (48%) |
| | Security against crime on a bus | V23 | 3.6 | 5.09 | 1.00 | 3.59 | 0.51 |
| | Security against crime at bus stops and stations | V24 | 3.16 | 5.12 | 1.00 | 3.17 | 0.45 |
| | Mean | | 3.80 | 4.98 | | CSI res. | 0.54 (54%) |

Subsequently, the overall CSI score for public transportation in Addis Ababa is 0.54 (54%), indicating that users are quietly satisfied with the service.

In addition, with a CSI score of 0.51 to 0.65, users are quietly satisfied with factors such as availability, image, facilities, comfort, and customer care. Furthermore, on the one hand, users were dissatisfied with security and timeliness, scoring 0.48 and 0.5, respectively, on the CSI scale. While on the other hand, users were more satisfied with a factor of availability with a CSI value of 0.64 and less satisfied with security indicators with a CSI value of 0.48.

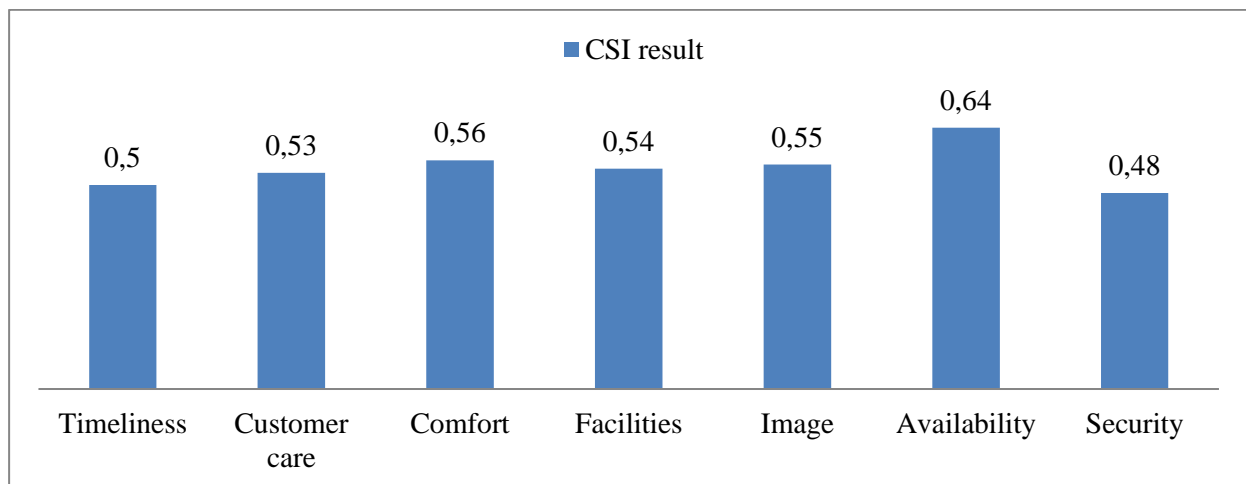


Fig. 2. CSI result

4.3.1. Satisfaction analysis on gender

It is critical to understand the relationship between a client's perception of service quality and demographic factors like age, gender, education, and income level [36]. Demographic characteristics are a recognized basis for segmenting markets and consumers [37]. Investigating gender perceptions of service quality may thus assist public transportation operators in far more detailed market segmentation by specifying which service quality attributes are preferable for different passenger segments [38].

Therefore, this study tried to determine customer impression differences based on gender, based on the aforementioned factors. As demonstrated in Figure 4, male and female users of the city's public transportation have somewhat similar levels of satisfaction, that is, both male and female users were quite satisfied with the CSI score of 0.55 and 0.54, respectively.

Furthermore, as indicated in the graph below, female consumers are more satisfied with availability (CSI score of 0.63) and least satisfied with security (CSI score of 0.47). Similarly, male customers are most satisfied with the availability element, which has a CSI score of 0.65 and least confident in the security, which has a score of 0.49.

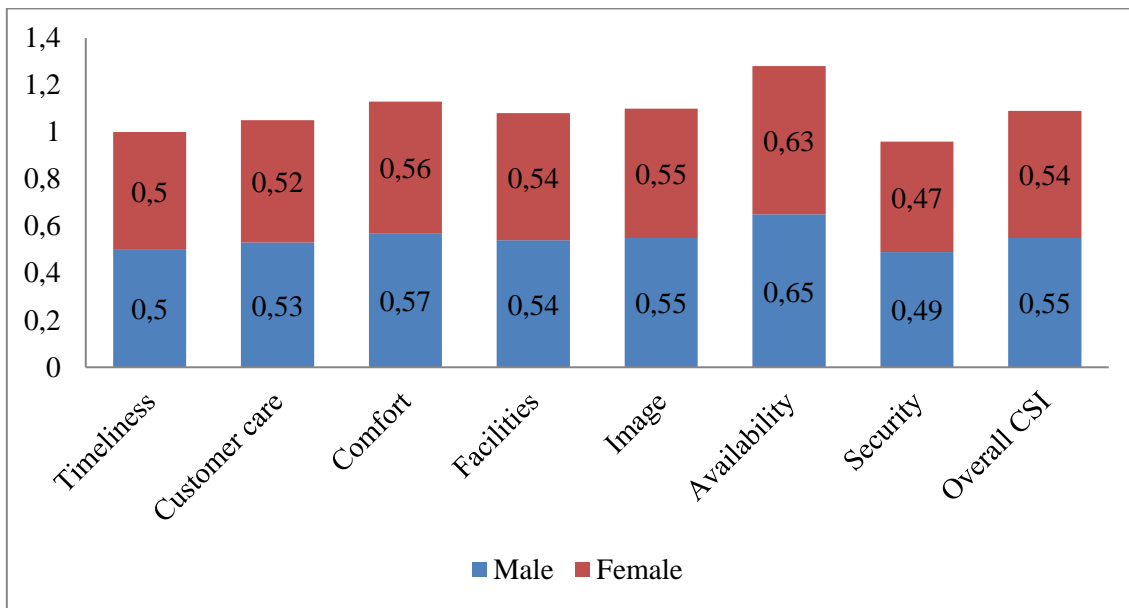


Fig. 3. Segmentation satisfaction analysis

5. CONCLUSION

This research aims to evaluate customers' satisfaction level with the quality of delivered public bus transport service in the city. A questionnaire was used to collect data from 500 users while they were traveling on the systematically selected bus route. The study used factor analysis and customer satisfaction index to analyze the data. Variables with a loading of 0.4 and higher were chosen using the factor analysis approach.

Based on the findings, 24 variables were identified as robust indices to assess passengers' satisfaction with the quality of bus transportation in the city. The variables were grouped into seven factors, that is, timeliness, customer care, comfort, facilities, image, availability, and security.

The findings of this study are consistent with other studies such as [33, 39-42]. These studies agree that timeliness, security, safety, comfort, facilities, convenience, reliability, availability, customer service, and images of the company are the most significant factors that affect passengers' overall satisfaction level in the provision of public transport service in various experiences. Furthermore, findings from city surveys [43, 44] show that service quality is insufficient, and customers are dissatisfied with the Anbessa and Higher city bus transportation services. However, these studies did not illustrate user satisfaction levels in detail based on components or identify traits that need to be improved in service delivery.

Importantly, the customer satisfaction index was conducted to determine the overall user satisfaction level in this study. The CSI result shows the general satisfaction level of users in the city as 54%. This indicates that users were not very satisfied with the public bus transport service in the city. Further, users were also better satisfied with the component of availability and less satisfied with factors of timeliness and security in the city. Given the overall findings, this study recommends that the local government, transit service providers, and other interested parties focus on components with low CSI scores, particularly on timeliness and security to enhance customer satisfaction levels in the city.

6. IMPLICATIONS OF THE STUDY

The ramifications of this study are considerable for both practitioners and scholars. From a management standpoint, the findings of this study may help managers and decision-makers understand how satisfied users are with the city's public bus service quality. It would also assist them in improving service quality by identifying the primary features that require immediate attention depending on users' perceptions. Furthermore, by using the proposed framework to regularly measure their service performance in their company, they may allocate resources for the service's significant quality attributes.

From a research standpoint, this study fills a research gap by employing factor analysis with CSI as an alternative framework for assessing the quality of bus service in the city. Consequently, using this framework, similar techniques can also be used to discover possible areas for policy insight in many service sectors (for example, hospitals, banks, schools, etc.).

References

1. Agarwal Shivi. „Measuring the efficiency of public transport sector in India: an application of data envelopment analysis”. In: *Proceedings of the conference in Philadelphia, USA*. Available at: <http://astro.temple.edu/banker/dea2009/paper/Agarwal.pdf>. 2009.
2. Iles Richard. *Public transport in developing countries*. Vol. 478. Amsterdam: Elsevier. 2005. DOI: <https://doi.org/10.1186/cc13998>.
3. Ashish V., T.V. Ramanayya. *Public transport planning and management in developing countries*. CRC Press. 2019.
4. Cetin U., N. Ince, P. Bayindir, S. Savasaneril. 2013. “Route Selection and Scheduling for Urban Public Bus Transportation”. *Communications - Scientific Letters of the University of Zilina* 1: 19-24.
5. Tsekeris Theodore, Stefan Voß. 2010. “Public transport and road pricing: a survey and simulation experiments”. *Public Transport* 2: 87-109.
6. Covic F., S. Voß. 2019. “Interoperable smart card data management in public mass transit”. *Public Transport* 11: 523-548.
7. Ali Alphonsus Nwachukwu. 2010. „An assessment of the quality of intraurban bus services in the city of Enugu, Enugu State, Nigeria”. *Theoretical and Empirical Researches in Urban Management* 5(6): 74-91.
8. Mokwena O.H., M. Zuidgeest. 2020. “Identifying transport policy gaps in student travel demand management in South Africa”. *Journal of Transport and Supply Chain Management* 14: 1-13.
9. Luke R. 2020. “The impact of COVID-19 on transport in South Africa”. *Journal of Transport and Supply Chain Management* 14: 1-6.
10. Murray Alan T., Rex Davis, Robert J. Stimson, Luis Ferreira. 1998. „Public transportation access”. *Transportation Research Part D: Transport and Environment* 3(5): 319-328. DOI: [https://doi.org/10.1016/S1361-9209\(98\)00010-8](https://doi.org/10.1016/S1361-9209(98)00010-8).
11. Friman Margareta, Markus Fellesson. 2009. „Service supply and customer satisfaction in public transportation: The quality paradox”. *Journal of Public transportation* 12(4). DOI: <https://doi.org/10.5038/2375-0901.12.4.4>.

12. Morfoulaki Maria, Yannis Tyrinopoulos, Georgia Aifadopoulou. 2010. „Estimation of satisfied customers in public transport systems: a new methodological approach”. *Journal of the Transportation Research Forum* 46(1). DOI: <https://doi.org/10.5399/osu/jtrf.46.1.981>.
13. Mokonyama Mathetha, Christoffel Venter. 2013. „Incorporation of customer satisfaction in public transport contracts – A preliminary analysis”. *Research in Transportation Economics* 39(1): 58-66. DOI: <https://doi.org/10.1016/j.retrec.2012.05.024>.
14. Anderson Richard, Benjamin Condry, Nicholas Findlay, Ruben Brage-Ardao, Haojie Li. 2013. „Measuring and valuing convenience and service quality: a review of global practices and challenges from mass transit operators and railway industries”. *International Transport Forum Discussion Papers* 16. OECD Publishing.
15. Lai, Wen-Tai, Ching-Fu Chen. 2011. "Behavioral intentions of public transit passengers—The roles of service quality, perceived value, satisfaction and involvement." *Transport Policy* 18(2): 318-325.
16. Gržinić J. 2007. "Concepts of service quality measurement in hotel industry." *Concepts of Service Quality Measurement in Hotel Industry* 1: 81-98.
17. Parasuramam A., Valarie A. Zeithaml, Leonard L. Berry. 1985. „A conceptual model of service quality and its service quality perspectives and customer implications for future research”. *Journal of marketing, satisfaction in commercial banks working in Jordan* 49: 41-50. DOI: <https://doi.org/10.2307/1251430>.
18. Mercangöz Asst Burcu Adigüzel, Mahmut Paksoy, Asst Ali Özgür Karagülle. 2012. „Analyzing the Service Quality of a Fast Ferry Company by Using Servqual Scores: A Case Study in Turkey”. *International Journal of Business and Social Science* 3(24).
19. Allen Jaime, Maria Grazia Bellizzi, Laura Eboli, Carmen Forciniti, Gabriella Mazzulla. 2021. „Identifying strategies for improving airport services: introduction of the Gap-IPA to an Italian airport case study”. *Transportation Letters* 13(3): 243-253.
20. Noor Sarina Muhamad, Noraini Nasirun. 2015. „Service Quality and Customer Satisfaction in a Natural Monopoly Company”. In: *Proceedings of the Colloquium on Administrative Science and Technology*: 61-68. Springer, Singapore. 2015.
21. Cascetta Ennio, Armando Carteni. 2014. „A quality-based approach to public transportation planning: theory and a case study”. *International Journal of Sustainable Transportation* 8(1): 84-106. DOI: <https://doi.org/10.1080/15568318.2012.758532>.
22. Michalski R., S. Wierzbicki. 2008. „An analysis of degradation of vehicles in operation”. *Eksplatacja i Niezawodność – Maintenance and Reliability* 1: 30-32.
23. Dell’Olio Luigi, Angel Ibeas, Patricia Cecin. 2011. „The quality of service desired by public transport users”. *Transport Policy* 18(1): 217-227. DOI: <https://doi.org/10.1016/j.tranpol.2010.08.005>.
24. Eboli Laura, Gabriella Mazzulla. 2009. „A new customer satisfaction index for evaluating transit service quality”. *Journal of Public Transportation* 12(3). DOI: <https://doi.org/10.5038/2375-0901.12.3.2>.
25. Friman Margareta. 2004. „Implementing quality improvements in public transport”. *Journal of Public Transportation* 7(4). DOI: <http://doi.org/10.5038/2375-0901.7.4.3>.
26. Haron S., S. Noor, F. Sadullah. 2015. „New dimension of bus service quality performance measure”. In: *Proceedings of International Conference on Advances in Civil and Environmental Engineering (ACEE 2015)*.

27. Hensher David A., Peter Stopher, Philip Bullock. 2003. „Service quality – developing a service quality index in the provision of commercial bus contracts”. *Transportation Research Part A: Policy and Practice* 37(6): 499-517.
DOI: [https://doi.org/10.1016/S0965-8564\(02\)00075-7](https://doi.org/10.1016/S0965-8564(02)00075-7).
28. Nathanail Eftihia. 2008. „Measuring the quality of service for passengers on the Hellenic railways”. *Transportation Research Part A: Policy and Practice* 42(1): 48-66.
DOI: <https://doi.org/10.1016/j.tra.2007.06.006>.
29. Putra Adris A., M. Yamin Jinca, Bambang Riyanto, Agus Taufik Mulyono. 2014. „The satisfaction analysis for the performance of public transport urban areas”. *International Refereed Journal of Engineering and Science* 3(8): 38-44.
30. Islam Rabiul, Mohammed S. Chowdhury, Mohammad Sumann Sarker, Salauddin Ahmed. 2014. „Measuring customer's satisfaction on Bus Transportation”. *American Journal of Economics and Business Administration* 6(1).
31. Field Andy. 2009. *Discovering statistics using spss*. Third edition. SAGE.
32. Hair Joseph F., Rolph E. Anderson, Barry J. Babin, William C. Black. 2010. *Multivariate data analysis: A global perspective*. Prentice Hall.
33. Deb Saikat, Mokaddes Ali Ahmed. 2018. „Determining the service quality of the city bus service based on users' perceptions and expectations”. *Travel Behaviour and Society* 12: 1-10. DOI: <https://doi.org/10.1016/j.tbs.2018.02.008>.
34. Supranto J. 1977. „Measurement of customer satisfaction”. Jakarta: PT, Rineka Cipta.
35. Windyani Amita Rizka, Aida Vitayala S. Hubeis, Idqan Fahmi. 2012. „Customer satisfaction analysis on birth certificate registration in Depok, west Java”. *International Journal of Information Technology and Business Management* 17(1): 80-89.
36. Ganesan-Lim Cheryl, Rebekah Russell-Bennett, Tracey Dagger. 2008. „The impact of service contact type and demographic characteristics on service quality perceptions”. *Journal of services Marketing* 22(7): 550-561.
37. Kotler Philip, Gary M. Armstrong, Madéle Tait. 2010. *Principles of marketing: Global and Southern African perspectives*. Pearson Education South Africa.
38. Hensher David A., Paola Prioni. 2002. „A service quality index for area-wide contract performance assessment”. *Journal of Transport Economics and Policy (JTEP)* 36(1): 93-113.
39. Eboli Laura, Gabriella Mazzulla. 2007. „Service quality attributes affecting customer satisfaction for bus transit”. *Journal of Public Transportation* 10(3): 21-34.
DOI: <https://doi.org/10.5038/2375-0901.10.3.2>.
40. Jomnonkwao Sajjakaj, Thanapong Champahom, Vatanavongs Ratanavaraha. 2020. „Methodologies for determining the service quality of the intercity rail service based on users' perceptions and expectations in Thailand”. *Sustainability* 12(10).
DOI: <https://doi.org/10.3390/su12104259>.
41. Sonita S.U.M., Sajjakaj Jomnonkwao, Thanapong Champahom, Roodheer Beeharry, Vatanavongs Ratanavaraha. 2020. „Measuring the city bus service quality based on users' perceptions: City bus service in Phnom Penh, Cambo'dia”. *Engineering and Applied Science Research* 47(1): 47-55. DOI: <https://doi.org/10.14456/easr.2020.4>.
42. Weng Jiancheng, Xiaojian Di, Chang Wang, Jingjing Wang, Lizeng Mao. 2018. „A bus service evaluation method from passenger's perspective based on satisfaction surveys: A case study of Beijing, China”. *Sustainability* 10(8).
43. Aniley Belayneh, Rakshit Negi. 2010. „Service quality attributes affecting passengers' satisfaction with HIGER city bus”. *Ethiopian Journal of Business and Economics* 1(2): 70-98.

44. Mammo Mkonnen. 2010. „Assessment of customer satisfaction in transportation service delivery: The case of three terminals of Anbassa City Bus service enterprise”. *Ethiopian Journal of Business and Economics* 1(2): 29-69.

Received 30.10.2021; accepted in revised form 09.12.2021



Scientific Journal of Silesian University of Technology. Series Transport is licensed under a Creative Commons Attribution 4.0 International License