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Evaluation of Tramway Transport Service Quality: An Analytical Study of Ouargla Tramway Using the SERVQUAL Model

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ABSTRACT:
This research evaluates the quality of tramway transport service in Ouargla, Algeria, using the SERVQUAL model across six dimensions: tangibility, reliability, empathy, communication, assurance, and responsiveness. A descriptive analytical approach was adopted, with data collected from 208 tramway users via a five-point Likert scale questionnaire. Statistical analysis using SPSS and the One-Sample T-test revealed that all dimensions exceeded the theoretical average (\(M = 3\)), confirming good service quality, particularly in cleanliness, safety, and communication. Areas for improvement include response speed and communication clarity. Recommendations include enhancing customer awareness programs and implementing rapid response mechanisms. Limitations include a single-city sample, suggesting future studies expand to other regions and integrate qualitative methods.

Keywords: Service quality, urban transport, tramway, customer satisfaction.

Jel Classification Codes : L15 ; R41 ; R42; M31.

Introduction

Public transport systems, especially tramways, are essential components of infrastructure that play a vital role in the growth and development of cities (Terefe, 2018). With increasing urban mobility challenges, traffic problems, and environmental issues, providing high-quality transport services has become an indispensable necessity for achieving sustainable development in modern cities.

Recent studies indicate that service quality has become one of the main issues in the contemporary business environment characterized by intense competition between service providers (Parasuraman et al., 1988). In the tramway transport sector, operating companies seek to improve the quality of services provided to passengers to ensure their satisfaction and continued use of this mode of transport (Zeithaml et al., 1988). From here emerges the importance of measuring and evaluating service quality from the users' perspective to better understand and meet their needs.

The SERVQUAL model, developed by Parasuraman, Zeithaml, and Berry, is one of the most widespread and used research tools for measuring service quality across various sectors, including the transport sector (Parasuraman et al., 1988). Studies have shown that the SERVQUAL model is an effective tool for measuring service quality in public transport in

general (Pefok, K. C., & Mikhailov, A. 2010), and can be applied to tramway services in particular due to its suitability for the service nature of this sector.

This study aims to answer the main question:
What is the reality of tramway transport service quality in Ouargla city according to the SERVQUAL model?
In order to answer this question a main hypothesis has been structured stating that there is good quality of tramway transport service in Ouargla city according to the SERVQUAL model.

I. 2. Theoretical Framework for Service Quality Indicators in Tramway Transport

This section addresses the theoretical framework for service quality indicators in tramway transport using the SERVQUAL methodology, which itself is divided into six main elements as follows:

I.2.1 Tangibility

Tangibility refers to the physical and visible aspects of the service, including facilities, equipment, staff, and communication materials (Parasuraman et al., 1988). In the context of tramway services, tangibility includes the appearance of vehicles, stations, platforms, ticket vending machines, and other physical elements of the service. An applied study on Zagreb Tramway showed that the quality of seats and lighting directly affects passenger satisfaction (Bakti & Sumaedi, 2019).
According to the Victoria Transport Policy Institute (2023), public transport service quality objectives related to tangibility include: cleanliness and attractiveness of waiting areas at stations, providing shelters at busy or exposed stops, good maintenance of facilities, using modern and well-presented vehicles, and keeping vehicles clean both inside and out.

I.2.2 Reliability

Reliability is defined as the ability of the service provider to perform the promised service dependably and accurately (Parasuraman et al., 1988). This dimension is related to adherence to schedules and minimizing breakdowns. A study in Granada revealed that reducing waiting time by 20% increases passenger confidence by 35% (de Oña et al., 2014).
According to the Victoria Transport Policy Institute (2023), reliability objectives in public transport services include: operating all scheduled trips, reducing vehicle breakdowns, providing on-time service, ensuring connections are made during transfers, and implementing public transport priority measures to eliminate schedule delays.

I.2.3 Responsiveness

Responsiveness reflects the service provider’s willingness to help customers and provide prompt and efficient service (Parasuraman et al., 1988). In tramway services, this relates to the speed of handling complaints and providing information. Results from the application of the SERVQUAL model in Mexico indicated that staff interaction with passengers reduces complaints by 40% (Valenzo-Jiménez et al., 2019).

I.2.4 Assurance

Assurance refers to the knowledge and courtesy of employees and their ability to convey trust and confidence to customers (Parasuraman et al., 1988). In the context of tramway transport, assurance is related to the safety of the transport system, the competence of drivers and staff, the safety procedures in place, and providing a secure environment for passengers. A study in

Iran showed that improving safety procedures reduces accidents by 50% (Sahraei et al., 2023).

I.2.5 Empathy

Empathy is providing caring and individualized attention to customers and understanding their specific needs (Parasuraman et al., 1988). In tramway services, empathy is reflected in considering the needs of special groups such as the elderly and people with disabilities, providing dedicated services for them, as well as friendly and courteous staff interactions. Research in Malaysia showed that reserving seats for the elderly increases service loyalty by 28% (Kamil et al., 2019).

I.2.6 Communication

Communication is considered an additional important element in evaluating the quality of transport services, even though it was not among the final five dimensions of the developed SERVQUAL model. Communication was one of the original ten dimensions before they were merged into the current five (Parasuraman et al., 1985). In tramway services, communication includes providing accurate and clear information to passengers about service schedules, emergency changes, and guidance, in addition to the effectiveness of customer contact channels such as customer service centers, hotlines, and electronic applications (Zeithaml et al., 1988).

According to Zeithaml et al. (1988), communication processes and control over service delivery play a pivotal role in managing service quality. These processes include how to communicate with customers and manage their expectations, as well as controlling service delivery operations to ensure quality.

Methods and Materials

In order to answer the main question of the study, this section is dedicated to presenting the study method, which consists of the study methodology, the population, the study sample and study tools.

1. Study population and sample

The study population included all users of the Ouargla Tramway service. The sample was selected using a non-probability random method, with 210 questionnaires distributed and 208 returned and valid for analysis.

2. Study tools

To test the main hypothesis, the study tool-a questionnaire-was designed based on several previous studies. Below is a clarification of the questionnaire components:

The first section included personal information (gender, age, status, age).

The second section consists of twenty-six statements measuring the quality of transport service, divided into six determinants as follows:

The first dimension:

- Tangibility, which included statements numbered (1, 2, 3, 4, 5);
- The second dimension: Reliability, which included statements numbered (6, 7, 8, 9, 10, 11, 12, 13);
- The third dimension: Empathy, which included statements numbered (14, 15, 16);
- The fourth dimension: Communication, which included statements numbered (17, 18, 19, 20);
- The fifth dimension: Assurance, which included statements numbered (21, 22, 23);

- The sixth dimension: Responsiveness, which included statements numbered (24, 25, 26).

The questionnaire was designed using the five-point Likert scale, and the following table explains it

Table 01: The direction of opinion for the five-point Likert scale used in the study.

MEAN value	Degree of agreement
1 – 1.80	Strongly disagree
1.81 – 2.40	Disagree
2.41 – 3.40	Neutral
3.41 – 4.20	Agree
4.21 – 5	Strongly agree

Source: prepared by the researcher.

3. Reliability of the study tool

Cronbach's Alpha has been used which is an internal consistency that measures the degree of correlation among the items in the scale, that is, how closely these items express the same dimension or variable. Cronbach's alpha value ranges between 0 and 1, and the closer the value is to 1, the higher the degree of reliability. The reliability coefficient is considered acceptable in studies if it exceeds 0.60, good if it exceeds 0.70, and very good if it exceeds 0.80 (Cohen et al., 2018).

Table 02: Cronbach's Alpha Reliability Coefficient

Number of items	Cronbach's Alpha Reliability Coefficient
26	0.882

Source: prepared by the researcher using SPSS.

It is noted from the above table that the reliability coefficient value for the tool as a whole is (0.882), which is estimated at 88.2%. This value is greater than 0.60 and indicates a very good level of reliability of the results.

Results and discussion

This section presents the results obtained after analyzing the field study data (questionnaires) using SPSS v26 software.

1. Results

The main hypothesis stated that: "There is good quality of tramway transport service in the city of Ouargla according to the SERVQUAL model." To answer this hypothesis, the arithmetic means and standard deviations were calculated for the responses of the study sample individuals to the statements representing service quality according to its component dimensions (tangibility, reliability, communication, empathy, responsiveness, and assurance).

1.1 Tangibility dimension

The table below shows the arithmetic means and standard deviations according to the extent of the study sample's agreement on the availability of quality in the service provided to them in terms of the tangibility dimension.

Table (3): Service Quality Assessment in Terms of Tangibility Dimension

N	Statements	Mean	Standard deviation	evaluation
1	Ouargla Tramway is clean	3.88	0.83	Agree
2	Ouargla Tramway seats are comfortable	3.98	0.73	Agree

3	There are enough seats available at stations	2.84	1.13	Neutral
4	Overcrowding is managed appropriately to ensure your comfort	2.44	1.13	Not agree
5	Tramway cars are equipped with air conditioning	4.19	0.71	Agree
-	**Overall Mean**	**3.46**	**0.91**	**Agree**

Source: prepared by the researcher using SPSS.

From the table above, which represents the statements of the tangibility dimension, the evaluation degree for statement 1 was "Agree" with a mean value of 3.88. The mean for statement 2 was 3.98 with an "Agree" evaluation. The mean for statement 3 was 2.84, while the mean for statement 4 was 2.44 with a "Disagree" evaluation. The mean for statement 5 was 4.19 with an "Agree" evaluation.

1.2 Reliability dimension

The table below shows the arithmetic means and standard deviations according to the extent of the study sample's agreement on the availability of quality in the service provided to them in terms of the reliability dimension.

Table (4): Service Quality Assessment in Terms of Reliability Dimension

N	Statements	Mean	Standard deviation	evaluation
6	Tramway ticket kiosks and sales points are close to boarding stations	3.93	0.86	Agree
7	Tramway operating hours throughout the day are convenient	3.99	0.81	Agree
8	Tramway stations are sufficient and close to each other	3.74	1.04	Agree
9	The tramway station is close to my workplace/study place	3.82	1.02	Agree
10	I can use the ticket vending machines at the stations easily	3.41	1.04	Agree
11	The tramway adheres to the scheduled arrival and departure times	3.52	1.02	Agree
12	Ticket kiosks are open throughout the tramway operating period	3.18	1.15	Neutral
13	The cost of riding the tramway matches the level of services provided	3.73	1.03	Agree
-	**Overall Mean**	**3.67**	**1.00**	**Agree**

Source: prepared by the researcher using SPSS.

The above table shows that customers' evaluations of the reliability dimension were generally high, (except for the evaluation for statement (12) being at the neutral level, as the mean reached 3.18). These results indicate that the majority of tramway customers expressed agreement with most statements related to this dimension, reflecting a high level of satisfaction with the quality of services provided and confirming the service provider's competence in performing its tasks according to customer expectations.

1.3 Empathy dimension

The table below shows the arithmetic means and standard deviations according to the extent of the study sample's agreement on the availability of quality in the service provided to them in terms of the empathy dimension.

Table (5): Service Quality Assessment in Terms of Empathy Dimension

N	Statements	Mean	Standard deviation	evaluation
14	Service providers are polite and well-mannered	3.12	1.12	Neutral
15	Tramway staff show empathy towards people with special needs	3.63	0.85	Agree
16	There are enough seats available at stations	2.82	1.20	Neutral
-	**Overall Mean**	**3.19**	**0.91**	**Neutral**

Source: prepared by the researcher using SPSS.

From the table above, which represents the statements of the empathy dimension, it is noted that customer evaluation for the empathy dimension was at the "Neutral" level. Their evaluation for statements 14 and 16 was "Neutral" with mean values of 3.12 and 2.82, respectively, while statement 15 was evaluated as "Agree" with a mean of 3.63. These results indicate that Ouargla tramway customers are being neutral to satisfied with most of the empathy dimension statements, as well as with the empathy shown by Ouargla tramway staff towards people with special needs.

1.4 Communication dimension

The table below shows the arithmetic means and standard deviations according to the extent of the study sample's agreement on the availability of quality in the service provided to them in terms of the communication dimension.

Table (6): Service Quality Assessment in Terms of Communication Dimension

N	Statements	Mean	Standard deviation	evaluation
17	Tramway ticket kiosks and sales points are close to boarding stations	2.94	0.83	Neutral
18	Tramway operating hours throughout the day are convenient	3.20	0.85	Neutral
19	Tramway stations are sufficient and close to each other	3.32	0.90	Neutral
20	The tramway station is close to my workplace/study place	4.30	0.61	Strongly Agree
-	**Overall Mean**	**3.44**	**0.80**	**Agree**

Source: prepared by the researcher using SPSS.

From Table (6), it is noted that the customers evaluation for the communication dimension was at the "Agree" level, with an arithmetic mean of 3.44. This is attributed to the existence of direct communication between customers. It is also noted that the majority of respondents rated statements (17, 18, 19) as "Neutral," with mean values of 2.94, 3.20, and 3.32, respectively.

1.5 Assurance dimension

The table below shows the arithmetic means and standard deviations according to the extent of the study sample's agreement on the availability of quality in the service provided to them in terms of the assurance dimension.

Table (6): Service Quality Assessment in Terms of Communication Dimension

N	Statements	Mean	Standard deviation	evaluation
21	Tramway stations are equipped with surveillance cameras	3.92	0.76	Agree
22	You feel safe and undisturbed inside the tramway	3.48	1.16	Agree
23	I trust the tramway driver's ability to drive safely	3.88	0.88	Agree
-	**Overall Mean**	**3.76**	**0.93**	**Agree**

Source: prepared by the researcher using SPSS.

From Table (7), it can be observed that the customer evaluation for the assurance dimension was at the "Agree" level, with an arithmetic mean of 3.76. This is due to the high level of safety in the service provided by the Ouargla Tramway company.

1.6 Responsiveness dimension

The table below shows the arithmetic means and standard deviations according to the extent of the study sample's agreement on the availability of quality in the service provided to them in terms of the responsiveness dimension.

Table (8): Service Quality Assessment in Terms of Responsiveness Dimension.

N	Statements	Mean	Standard deviation	evaluation
24	Your inquiries are answered quickly through communication channels	3.02	0.74	Neutral
25	When you face a problem (such as losing a payment card), it is handled quickly	3.16	0.93	Neutral
26	You are informed about service changes due to weather conditions or technical issues	3.62	0.96	Agree
-	**Overall Mean**	**3.27**	**0.88**	**Neutral**

Source: prepared by the researcher using SPSS

Table 8 shows that the customers' evaluation of the responsiveness dimension fell within the "Neutral" category, with an arithmetic mean of 3.27. The results for statements (24 and 25) showed means of 3.02 and 3.16, respectively, indicating that customers' satisfaction with the speed of response to inquiries and problem-solving remains at a moderate level. This neutral evaluation can be interpreted as a sign that there is room for improvement in the speed and effectiveness of responsiveness in the service provided

2. Discussion

This section attempts to discuss the results obtained in the previous section.

2.1 Discussion of Results Related to the Tangibility Dimension

- Statements (1) and (2) received an "Agree" evaluation, indicating that Ouargla Tramway has a good level of cleanliness and comfort. This is attributed to the effectiveness of the adopted internal control system, which includes periodic cleaning procedures that are subject to continuous follow-up and monitoring by the maintenance department to ensure compliance with specified standards.
- The fourth statement received a "Disagree" evaluation due to some passengers not validating their tickets, which hinders the control center from obtaining accurate data. This prevents taking measures such as sending an additional train to reduce overcrowding, in

addition to the absence of a culture of waiting for the next train, which increases pressure on the trams and negatively affects the passenger experience.

- Most statements received an "Agree" evaluation, reflecting passenger satisfaction with most aspects of the service provided.
- The fifth statement received a "Strongly Agree" evaluation, reflecting the efficiency of the internal control system in ensuring periodic maintenance of air conditioners. This positive evaluation is attributed to the effectiveness of the follow-up procedures and regular inspections carried out by the maintenance department, which contributes to maintaining the quality of the comfort environment inside the tramway and achieving user satisfaction.

2.2 Discussion of Results Related to the Reliability Dimension

- Most statements received an "Agree" evaluation, reflecting passengers' satisfaction with most aspects of the service provided. However, statement number twelve received an average "Neutral" evaluation, due to passengers' lack of knowledge about how to use ticket vending machines.

2.3 Discussion of Results Related to the Empathy Dimension

- The statement related to service providers being polite and well-mannered received a neutral evaluation, indicating that the level of politeness and good conduct may not be consistent or may vary among employees. Although the company provides training for employees in this area, there is variation in the actual implementation of this training, which is reflected in the passenger experience.

- The neutral evaluation related to handling violations indicates a potential problem in applying rules effectively and fairly. This may be related to the absence of continuous supervision or long periods without an effective supervisor, which may give users the impression of insufficient monitoring or oversight. This could contribute to a weaker sense of fairness among passengers regarding the handling of violations.

2.4 Discussion of Results Related to the Communication Dimension

Based on the neutral evaluations obtained regarding the availability of transparency in handling customer suggestions, ease of contacting customer service, and ease of accessing information related to the Tramway company, these results can be interpreted as follows:

- Despite the existence of appropriate procedures at the Tramway company, as confirmed during the interview with the customer service manager, the results indicate that the neutral evaluations may be due to passengers' lack of awareness about how to benefit from these services. The absence of sufficient awareness among customers about how to communicate with customer service or access information may lead to neutral results in their evaluations.
- The statement related to informing passengers about upcoming stations received "Strongly Agree" evaluation, reflecting passengers' high satisfaction with this service. This indicates that passengers find the system for announcing upcoming stations effective and clear.

2.5 Discussion of Results Related to the Assurance Dimension

- The results indicate general satisfaction from passengers regarding several aspects of the Ouargla Tramway service, as the statement related to the availability of surveillance cameras at stations received an "Agree" evaluation. This evaluation reflects the effectiveness

of the adopted internal control system, which includes periodic monitoring activities and control procedures aimed at enhancing security at stations through the use of surveillance technologies, which enhances passengers' sense of security and reduces potential risks such as theft and vandalism.

2.6 Discussion of Results Related to the Responsiveness Dimension

- Based on the neutral evaluations in the first and second statements, the results can be interpreted as passengers' lack of awareness possibly being the influencing factor. Despite the existence of communication channels and appropriate procedures for handling passenger inquiries and solving problems such as losing a payment card, passengers may lack sufficient knowledge about how to use them effectively.

3. Testing the study hypothesis

The main hypothesis of the study states that there is good quality of tramway transport service in the city of Ouargla according to the SERVQUAL model. In order to test this hypothesis, the One-Sample T-Test was adopted. It should be noted that to perform a One-Sample T-Test, the dependent variable must be quantitative, its data must follow normal distribution, observations must be independent, and the sample must be randomly selected - all of which are available in this study.

For the purpose of testing the study hypothesis, it needs to be divided into partial hypotheses based on the dimensions of the SERVQUAL model and formulated statistically as follows:
H1: There are statistically significant differences at the significance level (0.05) between the average customer satisfaction with the service and the theoretical average of 3 for all the dimensions.
H0: There are no statistically significant differences at the significance level (0.05) between the average customer satisfaction with the service and the theoretical average of 3 for all the dimensions.

The One Sample T-Test will be calculated to all the dimensions of SERVQUAL (Tangibility, reliability, empathy, communication, assurance and responsiveness). The following table illustrates the statistical test:

Table 09: One-Sample T Test

	Test Value = 3					
	t	**df**	**Sig. (2-tailed)**	**Mean Difference**	**95% Confidence Interval of the Difference**	
					Lower	**Upper**
Tangibility	11.384	207	.000	.46442	.3840	.5449
Reliability	16.089	207	.000	.66526	.5837	.7468
Empathy	3.252	207	.001	.19071	.0751	.3063
Communication	11.267	207	.000	.43870	.3619	.5155
Assurance	14.910	207	.000	.75962	.6592	.8601
Responsiveness	6.099	207	.000	.27404	.1855	.3626

Source: prepared by the researcher using SPSS

The table presents the results of a One-Sample T Test comparing service quality dimensions against a test value of 3. It can be noted that all mean differences are positive, indicating ratings above the neutral point. It can be noted as well that all dimensions show statistically significant differences from the test value of 3 (all p-values < 0.05) which means that all

alternative hypotheses are accepted, and thus the main hypothesis which states that there is good quality of tramway transport service in the city of Ouargla according to the SERVQUAL model is accepted.

If a detailed analysis of each dimension has to be done it would be as follows:

- Assurance shows the strongest positive difference (mean difference = 0.76), suggesting this is the highest-rated quality dimension, with a t-value of 14.91.
- Reliability has the second-highest mean difference (0.67), with the highest t-value (16.09), indicating strong consistency in positive ratings.
- Tangibility and Communication show moderate positive differences (0.46 and 0.44 respectively.
- Empathy shows the smallest mean difference (0.19), though still statistically significant ($p = 0.001$).
- Responsiveness shows a moderate positive difference *(0.27)*

Statistical Significance

The narrow confidence intervals across all dimensions indicate precision in the estimates, with all intervals entirely above zero, confirming the statistical significance of the positive ratings.

This analysis suggests customers consistently rate all service quality dimensions above the neutral point, with particularly strong positive perceptions of Assurance and Reliability aspects of the service.

Conclusion

In light of the results obtained from the field study on the quality of tramway transport service in the city of Ouargla according to the SERVQUAL model, a set of fundamental conclusions can be drawn that directly answer the research problem. Statistical analyses showed that all six quality dimensions-tangibility, reliability, empathy, communication, assurance, and responsiveness-achieved arithmetic means exceeding the theoretical average, with strong statistical indications confirming the existence of good quality in the service provided by the Ouargla Tramway company. This was reflected in customer satisfaction with aspects of cleanliness, comfort, safety, and communication effectiveness, with the emergence of some areas requiring improvement, especially in responsiveness speed and clarity of communication channels.

Through the field study, a set of practical recommendations were proposed that could contribute to raising the level of service quality, including: enhancing awareness programs for customers about how to benefit from support and communication services, developing mechanisms for quick response to complaints and inquiries, and improving waiting conditions inside stations to address overcrowding. It is also recommended to intensify training sessions for employees in the areas of dealing with passengers and applying fairness in handling violations, in addition to continuous investment in facility maintenance and updating.

As for the theoretical and methodological level, the research identified some limitations that should be taken into consideration. The study was limited to a sample of Ouargla tramway users during a specific period of time, which may affect the possibility of generalizing the results to other cities or different time periods. Additionally, relying on the questionnaire as the sole tool for data collection may not reflect all dimensions of the actual passenger experience. From this standpoint, the researcher suggests in future studies expanding the

scope of research to include comparisons between different cities or integrating qualitative tools such as interviews and field observation to deepen understanding about the determinants of service quality.

In conclusion, this study confirms the importance of applying the SERVQUAL model in evaluating and improving the quality of urban transport services and highlights the need to adopt a comprehensive approach that combines quantitative and qualitative analysis to ensure user satisfaction and enhance the competitiveness of tramway transport services in Algeria.

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