

## A Study On Evaluating Service Quality Of Mumbai Metro Trains Using Servqual Model - Line 1, Line 2a And Line 7

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### Abstract:

*The main aim of the study is to measure the service quality of Mumbai metro trains in general and to evaluate the service quality gap between the perception and expectation of commuters, as there are many metro lines under construction but the present study focuses only on 3 metro lines that are in operation currently, the two new lines of the Mumbai metro viz Line 2A - Andheri West to Anand Nagar and Line 7 - Gundavli to Dahisar started in January 2023 whereas line 1- from Ghatkopar to Versova has operated since 2014. The SERVQUAL Model is used to analyze the service quality gap, 5 constructs of the model were studied consisting of 3 factors in every i.e.15 questions of the SERVQUAL model were used in the study, Data has been collected from 120 Metro travelers of Mumbai City using Google forms. (Minimum sample required at 0.5 effect size, Alpha of 5%, and power of test 95% to apply paired t-test = 54) non-probability convenience sampling technique was used for the current study. Both primary and secondary data collection techniques have been used for the present study. SPSS 26 has been used for the current study, and the technique applied for the analysis is paired t-test. As per the findings of the research, there is no service gap in the constructs of Reliability, Tangibility, and Assurance but there exists a service gap in a few items of empathy and responsiveness.*

**Keywords:** Mumbai metro, line 1, line 2A, line 7, SERVQUAL, service gap.

### 1. Introduction:

Mumbai is considered the financial capital of India and the capital city of Maharashtra, people from different cities and states of India migrate to Mumbai for employment opportunities, at present the population of Mumbai is estimated as 21,296,517 ([worldpopulationreview.com](http://worldpopulationreview.com)), so Mumbai is an urban agglomeration that requires large transportation network and infrastructure facilities. To fulfill the demand for large network connectivity via transportation depending only on roadways will lead to traffic problems as well as pollution that is hazardous to the environment, public transport such as BEST buses and Mumbai locals are overloaded with commuters, and due to lots of rush the cases of rail and road accidents were common, to tackle this challenge modern transportation networks and connectivity need to get developed, to meet this demand Mumbai metro line 1 also known as blue it operates between Ghatkopar to Versova started its operation from the year 2014. Metro Line 1 is the 11.40 km elevated corridor, it provides connectivity between eastern and western suburbs and western and central

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railway, it reduces the journey time between Versova to Ghatkopar from 71 minutes to 21 minutes. There are 12 stations in Metro Line 1: Ghatkopar, Jagruti Nagar, Asalpha, Sakinaka, Marol Naka, Airport Road, Chakala JB Nagar, Western Express Highway, Andheri, Azad Nagar, D N Nagar, Versova, Ghatkopar-Andheri-Versova Metro Corridor is a (public-private partnership) PPP, MMOPL - Mumbai Metro One Private Limited an SPV - Special Purpose Vehicle incorporated jointly by MMRDA - Mumbai Metropolitan Region Development Authority, REL - Reliance Energy Limited and Veolia Transport France for implementation, operation and maintenance of MRTS-Mass Rapid Transport System along Versova- Andheri-Ghatkopar (VAG) corridor, at par the average ridership daily is approximately 3 lacs. Metro Line - 1 | Mumbai Metropolitan Region Development Authority (maharashtra.gov.in) Within a few days of the Metro Line 1 opening, most of the commuters shifted from using BEST buses and autos. Authorities have estimated that there was a 25% reduction in BEST commuters Bus Route Number 340, the most popular bus route between Andheri and Ghatkopar, has dropped by ₹ 1.5 lakh in the first 3 days of Line 1's opening. Line 1 (Mumbai Metro) - Wikipedia. Mumbai metro line 2A also known as the yellow line which is from Dahisar to DN Nagar (18.6km) and Line 7 also known as the red line which is from Andheri East to Dahisar East (16.5 km) both started operating in January 2023. Line 2A provides connectivity between the western, central Mumbai, and northern suburban Mumbai. It also provides internetworking between Metro Line 1 (Ghatkopar to Versova), In the ongoing Metro Lines 2B (D N Nagar to Mandale) & 7 (Andheri (E) to Dahisar (E)). The Metro Line 6 (Swami Samarth Nagar to Vikhroli), with the operation of line 2A, will ease traffic congestion on one of the most buzzing routes (New Link Road) of Mumbai from Dahisar (E) to DN Nagar. There are 9 stations in Phase 1 of metro Line 2A: Dahisar East, Upper Dahisar Station (Anand Nagar), Kandarpada (Rushi Sankul), Mandapeshwar (IC Colony), Eksar, Borivali West (Don Bosco), Pahadi Eksar (Shimpoli or Shimpawali), Kandivali West (Mahavir Nagar) and Dahanukarwadi (Kamraj Nagar). There are 8 stations in Phase 2 of metro line 2A: Valnai, Malad(West), Lower Malad, Pahadi Goregaon, Goregaon (West), Oshiwara, Lower Oshiwara, Andheri (West). Line 7 provides connectivity between Central Mumbai and Northern suburban Mumbai and it also provides internetworking between the existing station of the Metro Line 1(Ghatkopar to Versova), Western Express Highway, the ongoing Metro Line 2A (Dahisar to D N Nagar), and the Metro Line 6 (Swami Samarth Nagar to Vikhroli). There are 10 stations in Phase 1 of metro Line 7: Dahisar East, Ovaripada, National Park, Devipada, Magathane, Poisar (Mahindra & Mahindra), Akurli (Bandongri), Kurar (Pushpa Park), Dindoshi (Pathanwadi) and Aarey. There are 4 stations in Phase 2 of metro Line 7: Gundavali, Mogra, Jogeshwari(East), and Goregaon(East). Mumbai metro trains provide wide networking and interconnectivity, helping to reduce traffic congestion and control pollution in the densely populated city. It is important to understand the experience of Mumbaikars with Mumbai metro trains, the present study focuses on understanding the experiences of metro riders in general without comparing the services of metro lines. There are tangible services provided by Mumbai Metro such as The cleanliness and appearance of the metro stations and trains, The maintenance of overall physical facilities, and The appearance of metro staff is neat and professional. There are various services provided by the Mumbai metro that measure reliability such as The metro services adhering to the published schedule, The frequency of metro services meeting commuting needs, and The metro system providing accurate and reliable information about service changes or disruptions. There are various services provided by the Mumbai metro that measure the assurance of the service such as the feeling of safety and security when using the metro, Metro staff is knowledgeable and capable of assisting passengers, Information provided by the metro system is accurate and trustworthy. There are various services provided by the Mumbai Metro that measure empathy such as Metro staff showing a genuine interest in helping passengers and the metro system providing personalized assistance when required. The metro system is

attentive to the needs of elderly or disabled passengers. There are various services provided by the Mumbai Metro that measure responsiveness such as The metro system is responsive to passenger feedback and suggestions. The metro system addresses and resolves passenger complaints efficiently and Metro staff is prompt in assisting passengers with inquiries or issues. The present study measures the expectation mean score and perception mean score of the passengers and identifies the service quality gap.

## 2. Literature Review

### 2.1 Recent studies on Mumbai Metro:

Name of the Author	Objectives of the study	Key findings of the study	Research Gap
<b>Barve. et al.,2021</b>	The main aim of the study is to evaluate the perception of metro passengers towards certain services provided by Mumbai Metro line 1 in the lockdown period and also to understand which factors play a major role in influencing passengers to travel through metro rail over other modes of transport.	Maximum respondents are satisfied with the services provided by Mumbai metro line 1 such as ticketing services, staff behavior, display of information, and security system. The study also found that the cost of tickets is too high than other modes of public transportation so reasonable charges should be acceptable.	The study focuses only on metro line 1, two more lines of the Mumbai metro train have been in operation since January 2023 i.e. metro line 2A and Line 7.
<b>Sharm. et al., 2018</b>	The main aim of the study is to investigate the quality of service provided to commuters of Mumbai Metro train Line 1.	The study found that Platform Service Quality is good, And more than half of the respondents are Satisfied with the service provided by Metro Line 1.	The study highlighted only one service provided by Mumbai metro line 1 i.e. quality of platform but there are many other services provided by Mumbai metro that can be measured by using the servqual model.

<p><b>Soni. et al., 2018</b></p>	<p>The main aim of the study is to analyze the reduction of harmful gas emissions due to the shift in passenger modes of transportation. The study also examines the savings in the travel time of the commuters.</p>	<p>The study found that with the increase in ridership, there is a reduction in emissions. The study also found that there is a saving in the value of travel time.</p>	<p>The study highlighted only 2 factors i.e. environment factor and the value of the time-saving factor. It could have provided more insight into understanding the factors that directly impact consumers' satisfaction levels.</p>
<p><b>Waghulkar. et al., 2017</b></p>	<p>The main aim of the study is to analyze the customer churn for Mumbai Metro and the patterns of customer churn based on various characteristics such as gender and month-wise analysis, and ultimately develop strategies to address the problems identified and to optimize customer satisfaction.</p>	<p>The key findings of the study highlighted that the cost of the Mumbai Metro train is higher than any other mode of transportation. Ticket fare, job location, route change, and other modes of transportation, and relocation were identified as the main reasons for customer churn.</p>	<p>The study focuses majorly on understanding and analyzing customer churn it could have provided more insight into the research study by focussing on the various parameters that measure the expectations and perceptions of the customers.</p>

**2.2 Empirical contribution of SERVQUAL model in the research study based on public transportation:**

**AlOmari., 2021** aims to measure the service gap between patients’ perceptions and expectations in 5 private hospitals in the capital city of Syria Damascus, the study adopted the SERVQUAL model to measure the service quality gap in health care service, the finding of the study indicates that tangibility factor plays a significant role in creating balance in between deficiency in other service quality dimension. The study also suggests that the communication skills of the medical and paramedical staff should be improved.

**Luke. et al., 2019** aims to measure the service quality of public transport modes in Johannesburg-south Africa by identifying the gaps between passengers ' expectations and the service they have received. The study incorporates the SERVQUAL model to compare

passengers' perceptions of the current service levels with their expectations. the study identified that there exists a huge dissatisfaction with all forms of public transport services in Johannesburg.

**Ali. et al., 2017** aim to measure the relationship between service quality and customer satisfaction among the customers of Pakistani Islamic banks, the sample size of the study is 450 walk-in customers of Islamic banks, and the study is statistically supported by CFA and SEM, the findings of the study indicates that multidimensional service quality scale is significantly and positively associated with the undimensional scale of customer satisfaction. The study has practical implications for policymakers.

**Priyadarshini. et al., 2016** evaluate the service quality and the passengers' satisfaction with Southern Railway-India, the main aim of the study is to analyze the socio-economic background of the passengers and to identify the service quality gap in passengers' expectations and perception of the service provided by Southern Railway for this the study employs the SERVQUAL model given by Parasuraman, Valarie Zeithaml, and Leonard Berry, 1988. The study successfully found the gaps in various parameters such as Tangibility, Reliability, Responsiveness, Empathy, and Assurance. The study also provides suggestions to the railway authorities on filling up the huge gap between the expectations and perceptions of the commuters.

**MIKHAYLOV. et al., 2015** analyze the service quality of public transportation by incorporating the SERVQUAL model in Kaliningrad, Russia, the study was successful in identifying the service quality gaps in the expectation and perception of the commuters in different parameters of the SERVQUAL model, As per the results of the study, the tangibles dimension - service environment received the largest expectations-perceptions gap, the antecedents within the assurance dimension also hurt the overall measurement of the service quality of public transportation in the city of Kaliningrad.

### **3. OBJECTIVES OF THE STUDY:**

1. To compare the expected and perceived mean score of Tangibility and determine if there is a significant difference.
2. To compare the expected and perceived mean score of reliability and determine if there is a significant difference.
3. To compare the expected and perceived mean score of Assurance and determine if there is a significant difference.
4. To compare the expected and perceived mean score of empathy and determine if there is a significant difference.
5. To compare the expected and perceived mean score of responsiveness and determine if there is a significant difference.
6. To give appropriate suggestive measures for improving the service quality of Metro.

### **4. THE HYPOTHESIS OF THE STUDY:**

Ho: There is no significant difference in the expected and perceived mean scores of tangibility.

H1: There is a significant difference in the expected and perceived mean scores of tangibility.

Ho: There is no significant difference in the expected and perceived mean scores of reliability.

H2: There is a significant difference in the expected and perceived mean scores of reliability.

Ho: There is no significant difference in the expected and perceived mean scores of Assurance.

H3: There is a significant difference in the expected and perceived mean scores of Assurance.

Ho: There is no significant difference in the expected and perceived mean empathy scores.

H4: There is a significant difference in the expected and perceived mean empathy scores.

Ho: There is no significant difference in the expected and perceived mean scores of responsiveness.

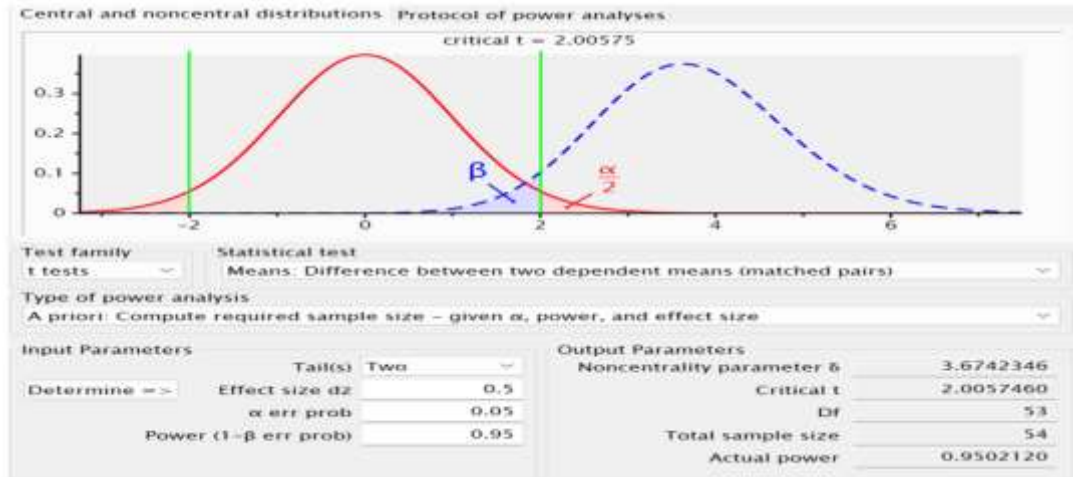
H5: There is a significant difference in the expected and perceived mean scores of responsiveness.

### 5. Theoretical Framework - Constructs and Items:

Constructs	Items
<b>Tangibility</b>	The cleanliness and appearance of the metro stations and trains meet my expectations. The overall physical facilities of the metro system are well-maintained. The metro staff's appearance is neat and professional.
<b>Reliability</b>	The metro services adhere to the published schedule. The frequency of metro services meets my commuting needs. The metro system provides accurate and reliable information about service changes or disruptions.
<b>Assurance</b>	I feel safe and secure when using the metro. Metro staff is knowledgeable and capable of assisting passengers. Information provided by the metro system is accurate and trustworthy.
<b>Empathy</b>	Metro staff shows a genuine interest in helping passengers. The metro system provides personalized assistance when required. The metro system is attentive to the needs of elderly or disabled passengers.
<b>Responsiveness</b>	The metro system is responsive to passenger feedback and suggestions. The metro system addresses and resolves passenger complaints efficiently. Metro staff is prompt in assisting passengers with inquiries or issues.

Source: Parasuraman et al. (1994, p. 207)

### 6. Research Methodology:6.1 Data Collection:



The Data was collected in August and September 2023, For collecting the data the researcher has taken the help of students who travel through the metro regularly in Line 1, Line 2A, and Line 7 of the Mumbai metro train. Data has been collected from 120 Metro travelers of Mumbai City using a survey questionnaire. Students used to ask the respondents randomly to fill out the survey forms. (Minimum sample required at 0.5 effect size, Alpha of 5%, and power of test 95% to apply paired t-test = 54) non-probability convenience sampling technique was used for the current study. Both primary and secondary data collection techniques have been used for the present study. SPSS 26 has been used for the current study, and the technique applied for the analysis is paired t-test. The survey questionnaire was designed on a Point-5 Likert scale.

**6.2 Demographic profile:**

Characteristics	n=120	Percentage (%)
<b><u>Age</u></b>		
Below 25 years	52	43.1%
25-40 years	54	45.1%
40-60 years	13	10.8%
Above 60 years	1	1%
<b><u>Gender</u></b>		
Female	53	44.1%
Male	67	55.9%
<b><u>Marital Status</u></b>		
Married	40	33.3%
Single	80	66.7%
<b><u>Education</u></b>		
School level	11	8.8%
Graduation	33	28.4%
Post graduation	58	48%
Professional	11	8.8%
Others	7	5.9%

<b><u>Profession</u></b>		
Student	33	27.5%
Businessmen	7	5.9%
salaried	71	58.8%
Unemployed	9	7.8%
<b><u>Line of Metro</u></b>		
LINE 1 - Blue Line ( Ghatkopar to Versova)	46	38%
LINE 2A - Yellow Line ( Dahisar to Andheri West )	30	
LINE 7 - Red Line ( Dahisar East to Gundavali - Andheri East )	15	25.4%
LINE 1 AND LINE 7 ( Line 1 is connected with Line 7 from Western Express High way )	13	11%
LINE 1 AND LINE 2A ( Line 1 is connected with Line 2A from DN nagar metro station)	16	13%

### 6.3 Data Interpretation and Analysis:

**Table No: 1 Reliability Analysis**

Construct	Expected	Perceived
Tangibility	0.788	0.811
Reliability	0.700	0.860
Assurance	0.710	0.809
Empathy	0.756	0.824
Responsiveness	0.810	0.816



As per the above table, all the values of Cronbach's alpha  $> 0.7$  indicate that the responses are reliable.

**Table No. 2: Gap Analysis- Tangibility**

Items	Expectation mean score	Perception mean score	GAP	p-value
	Mean	Mean	(Perceived Mean Expected Mean)	
The cleanliness and appearance of the metro stations and trains meet my expectations.	3.00	4.22	1.22	0.000
The overall physical facilities of the metro system are well-maintained	2.74	3.99	1.25	0.000
The metro staff's appearance is neat and professional.	3.74	4.22	0.48	0.000

The above analyses prove the H1 hypothesis and As  $p$  (value)  $< 0.05$  all the items of the construct tangibility indicate a significant difference between the expected and perceived mean score. The perceived mean score is greater than the expected mean score this shows that the actual service received by the commuters is more than their expectations and their satisfaction level is also high in terms of tangible services like cleanliness of metro station, physical facilities, and neat and professional appearance of metro staff.

**Table No. 3: Gap Analysis- Reliability**

Factor	Expectation mean score	Perception mean score	GAP	p-value
	Mean	Mean	(Perceived Mean Expected Mean)	
The metro services adhere to the published schedule.	2.89	3.65	0.76	0.003
The frequency of metro services meets my commuting needs.	3.44	4.00	0.56	0.000
The metro system provides accurate and reliable information about service changes or disruptions.	2.90	3.11	0.21	0.007

The above analyses prove the H1 hypothesis and As  $p$  (value)  $< 0.05$  all the items of the construct reliability indicate a significant difference between the expected and perceived mean score. The perceived mean score is greater than the expected mean score this shows that the actual service received by the commuters is more than their expectations and their satisfaction level is also high in terms of reliable services like proper scheduling, frequency of trains, and information on service changes or disruptions.

**Table No. 4: Gap Analysis- Assurance**

Factor	Expectation mean score	Perception mean score	GAP	p-value
	Mean	Mean	(Perceived Mean Expected Mean)	
I feel safe and secure when using the metro	2.78	3.99	1.21	0.006
Metro staff is knowledgeable and capable of assisting passengers.	3.89	4.51	0.62	0.012
The Information provided by the metro system is accurate and trustworthy.	3.10	3.45	0.35	0.001

The above analyses prove the H1 hypothesis and As  $p$  (value)  $< 0.05$  all the items of the construct assurance indicate a significant difference between the expected and perceived mean score. The perceived mean score is greater than the expected mean score this shows that the actual service received by the commuters is more than their expectations and their satisfaction level is also high in terms of services that ensure assurance like safety and security, Knowledge of the staff to assists passengers and accurate information.

**Table No. 5: Gap Analysis- Empathy**

Factor	Expectation mean score	Perception mean score	GAP	p-value
	Mean	Mean	(Perceived Mean Expected Mean)	
Metro staff shows a genuine interest in helping passengers.	3.10	4.28	1.18	0.000
The metro system provides personalized assistance when required.	4.11	3.88	(0.22)	0.000
The metro system is attentive to the needs of elderly or disabled passengers.	3.80	4.87	1.07	0.000

The above analyses prove the H1 hypothesis and As  $p$  (value)  $< 0.05$  all the items of the construct empathy indicate a significant difference between the expected and perceived mean score. The perceived mean score is greater than the expected mean score this shows that the actual service received by the commuters is more than their expectations and their satisfaction level is also high in terms of services related to empathy like staff's genuine interest in helping passengers and attentive to the needs of elderly or disabled passengers. The actual service received is less than the expected service in providing personalized assistance when required so the metro authority and the staff need to work on this.

**Table No. 6: Gap Analysis- Responsiveness**

Factor	Expectation mean score	Perception mean score	GAP	p-value
	Mean	Mean	(Perceived Mean - Expected Mean)	
The metro system is responsive to passenger feedback and suggestions.	4.50	2.80	(1.7)	0.000
The metro system addresses and resolves passenger complaints efficiently.	3.44	4.00	0.56	0.000
Metro staff is prompt in assisting passengers with inquiries or issues.	2.89	4.90	2.01	0.000

The above analyses prove the H1 hypothesis and As  $p(\text{value}) < 0.05$  all the items of the construct responsiveness indicate a significant difference between the expected and perceived mean score. The perceived mean score is greater than the expected mean score this shows that the actual service received by the commuters is more than their expectations and their satisfaction level is also high in terms of services related to responsiveness like resolving passengers' complaints and promptness in assisting passengers with inquiries. The actual service received is less than the expected service in responding to the passenger's feedback and suggestions when required so the metro authority and the staff need to work on this.

## 7. Conclusion:

The investigation provided significant new information about the responsiveness and empathy of the metro system's services. It was seen that the metro system does not provide personalized assistance when required. The metro system needs to be more responsive to passenger feedback and suggestions. The results revealed a positive correlation between passenger expectations and the metro system's receptiveness to comments and recommendations, even though there is a notable discrepancy between the personalized assistance offered and the standards of care passengers expect. Implementing customized programs and increasing staff training may close the empathy gap and provide more attentive and consoling service. The good alignment shown would be sustained concurrently by preserving and enhancing the system's responsiveness, successfully incorporating input, and openly discussing changes. Together, these calculated actions may move the metro system toward a customer-centric strategy, which will boost passenger loyalty and happiness.

## 8. Recommendations:

- Educate employees so they can recognize and quickly meet the demands of passengers.
- Put in place individualized support plans or services for various passenger needs.
- Get input on the tailored support received, particularly to pinpoint areas that need attention.
- Passengers should be encouraged and given incentives to submit comments routinely.
- Create a systematic feedback process so that recommendations and issues brought up by passengers may be addressed quickly.
- Hold frequent training sessions to ensure employee comments and recommendations are handled effectively.
- For a more comprehensive and customer-focused service experience, combine efforts in improving empathy and responsiveness.

- The metro system can more efficiently customize services by using data analytics to learn about passenger preferences.
- Showcase the metro system's adaptability to the demands of passengers by communicating any adjustments made in response to input.
- The areas that need improvements should continuously assess service quality by comparing it to industry norms and best practices.

### 9. Practical Implication:

The research study attempts to elaborate the SERVQUAL model in public transportation that is Mumbai metro train. The research study does not provide a comparative study between the metro lines but it studies in general the perception and expectation of Mumbaikars for the service quality of Mumbai metro trains. The research study also opens a gateway for further research in Mumbai metro line 1, line 2A, and Line 7. There are many other lines in construction so the research gap could be filled by conducting further research to understand and analyze the service quality of Mumbai metro. The present study also provides logical recommendations to the metro authorities to design the service as per the expectations of the commuters so that the level of commuter satisfaction can be maximized.

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