

# Literature Review Study on “SERVQUAL” & “Metro Rail

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## Abstract

*SERVQUAL scale was first published in year 1988, developed by Parasuraman, Zeithaml, and Berry. The scale is a measurement tool to assess the service quality based on user experience of the service and subsequent user opinion evaluation. Though earlier researchers have fairly used this measurement tool to assess the service quality of a variety of services, its application for assessing the service quality of metro rail has been limited. This research paper aims at studying the previous published research work on application of SERVQUAL scale to assess the service quality of metro rail. It was found that the literature available on this topic on Google Scholar search engine was limited. The keywords were searched on Google Scholar. The keywords search produced relevant research papers published on the topic of “SERVQUAL” & “Metro Rail”. These research papers were then filtered to find out the research papers that were closely relevant to the keywords. This research study is carried out with an objective of studying the earlier research studies published on the keywords “SERVQUAL” & “Metro Rail”. Also this research study aims at reporting the methodologies adopted, findings and conclusions drawn in earlier published research studies on the keywords mentioned above.*

**Keywords:** Literature Review, Metro Rail, RATER analysis, SERVQUAL, Traveller Expectations, Traveller Perception.

## INTRODUCTION

Rapid urbanisation, increasing density of population and sustain ability concerns have significantly raised the demands for an efficient high quality public transportation systems in urban cities. The current state of metro rail systems are driving solutions to urban passenger mobility due to its

energy efficiency, high passenger carrying capacities and environmental friendly operations. (Jain et al., 2024) and (Flores et al., 2025) are the recent studies in the field of transportation research that highlight the importance of perceived service quality in influencing the traveller satisfaction and trust in metro rail systems.

The empirical research conducted in last five years

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have consistently proved that even in the technologically advanced and newly built metro rails, service quality gaps are persistent in metro rail systems. (Jain et al., 2024) pointed out significant gaps in the service quality of Mumbai Metro Rail services using the SERVQUAL model. The said service quality gaps were identified particularly in the items in 'Responsiveness' and 'Empathy' dimensions. Similarly (Rajan & Sasidharan.V, 2025) in their study on Kochi Metro Rail, reported that passengers' expectations exceeded the perceived service performance across all the RATER dimensions of the SERVQUAL model, where the dimension of 'Empathy' emerged as the weakest dimension. The same study also showed that demographic factors like age has an influence on service quality perceptions. The 'Empathy' in RATER dimensions of the SERVQUAL model is related to the human centric service delivery, which has also been highlighted as a concern in the research by (Jain et al., 2024).

International research studies further supports the contemporary relevance of the evaluation of service quality in metro rail systems. (Flores et al., 2025) in a study on the Doha Metro Rail, published in World Electric Vehicle Journal, established that the SERVQUAL model significantly influenced the passenger satisfaction, while also affecting the passengers perception for the sustainable urban transportation. The study suggested an extension in the traditional SERVQUAL model by adding the contextual variables like 'Accessibility' and "perceived economic benefits'. The study indicated that in the highly automated transit environment like metro rail, the service quality assessments needs a contextual adaption rather than solely relying upon the traditional SERVQUAL model service quality assessment scale.

Recent evidences in the research study carried out by (Bhanu, 2023) indicates that a shift in certain SERVQUAL dimensions for service quality assessment in mature metro rail systems. The researchers observed that the dimension of

'Reliability', which is considered as to be the prime predictor of the service quality, is a bare minimum baseline expectation dimension, rather than a differentiating factor of service delivery in a well-established metro rail network. In contrary for the developing and operationally constrained metro rail systems, the study (Bucu et al., 2023) reports the 'Reliability' related service attributes as a major culprits of commuter dissatisfaction. Hence there is a divergence in moderating the influence of metro rail system maturity on commuter service quality perception.

A very recent empirical application of the SERVQUAL model (Kruadsungnoen & Upayokin, 2025) in the field of public transportation indicates that the service quality dimensions namely; 'Responsiveness' and 'Tangibility' play a significant role in user perception and satisfaction in shaped. Such studies emphasize the relevance of the SERVQUAL as a diagnostic tool for assessing and improving the service quality in urban mobility transits systems.

There has been a growing body of recent research related to SERVQUAL, but its literature applying specifically to metro rail services remains limited. These is also a lack of consolidated understanding on how SERVQUAL model can be modified, adapted and extended for the modern metro rail service quality research, resulting into lack of adequate knowledge on consistent patterns and research gaps that emerge from these studies. Accordingly, the present study undertakes a literature review on the publications on the application of SERVQUAL model to assess the service quality of metro rail.

### **Need of Metro Rail**

Modernisation and increasing population is demanding for a better urban public transportation infrastructure. This demand is fulfilled by modern modes of public transportation, for example metro rails. Metro rails are usually considered to be one of the most affordable, efficient, comfortable, fast and

safe modes of local transportation. As the demand for a modern mode of urban public mode of transportation increases, the metro rails systems will keep on evolving. With the time to come, urban population's dependency on the metro rail as a medium of transportation will go on increasing. Hence there is a need to focus on not only operational efficiency but also the overall service quality of metro rail.

### **The concept of SERVQUAL**

SERVQUAL is a scale developed by (Parasuraman et al., 1988). The scale is used to measure the service quality across service industry. It is a multi-dimensional scale that measures the gap between customer expectations and their perceptions regarding service performance. The core foundation of this scale is in understanding how the service quality is experienced and perceived by customers.

The scale was originally developed as a result of need for a more structured and sophisticated way to measure the service quality. Researchers noticed that the core concept of service quality from the point of view of customer for a service is way different than that for a product. Since a product is characterised by tangible attributes (for example shape, size, colour, strength etc.) it is easier to measure the service quality of a product. Service in its true nature is intangible hence more abstract and subjective in nature.

The researcher addressed this by the way of proposing a model that was based on the idea that the measurement of the service quality can be understood through a gap that exist between customers' per use expectations from a service and the post use perceptions of the actual service delivered. This gap model was primarily based on the assumption that the nature of service quality is to offer dynamic and subjective experience to its users but not static.

### **5 dimension of SERVQUAL scale**

SERVQUAL scale is constructed around 5 key critical elements of service quality namely;

1. Tangibl
2. Reliabilit
3. Responsiveness
4. Assurance
5. Empathy

Here is a detailed discussion on each key critical element of SERVQUAL scale.

1. Tangibles are the physical appearance of the service facilities, equipment, materials and communication.
2. Reliability is the ability of the service provider to deliver the promised service accurately and dependably.
3. Responsiveness is the ability and willingness of the service provider to help its customers and deliver the service promptly.
4. Assurance is the competence, knowledge and courtesy of the service provider's employees and their ability to inspire confidence and trust.
5. Empathy is the service provider's ability to provide individualised attention and care of the customers.

### **Evolution of SERVQUAL Scale**

The early application of the scale took place from 1988 to 1990. The scale originally consisted of a total of 22 items i.e. questions for all the five dimensions. Users' 'expectations' and 'perception' is measured on this scale by a survey questionnaire. During the time period the scale was widely adopted by the researchers and the service providers to assess service quality in the field of retail, hospitality, banking etc. The service business could identify the service gaps to improve service delivery. The scale was introduced to measure service quality by quantifying the difference between expected service and perceived service (Augustyn et al., 2022). (Ma et al., 2007) suggested that performance based measures may serve as an effective indicators for service quality perceptions than only the traditional

'expectations - perception' gap model. (Ma et al., 2007) added one more dimension namely, 'service outcome' to the existing scale to enhance it. Recent researchers also indicate that the application of the measurement of service quality shall be considered as a multi-level idea that can redevelop and restructure a model that can empirically fit better (Ma et al., 2007).

### **Criticism for SERVQUAL Scale**

Though SERVQUAL scale is a scale with five dimensions, researchers have often argued that these dimensions are somewhat narrow to include the wide spectrum of measurement of service quality (Gupta, 2016). Also, there are a few questions on the applicability of the scale to the complex service business. The scale is also usually criticised for its concept of measurement of service quality using gap analysis between service expectation and service perception. The scale may fail to reflect the complexities of evaluation of service quality from users' perspective (Moolla & PJ du Plessis, 1997; Sureshchandar et al., 2001). The difference of score formulation in the SERVQUAL scale has its own concerns with respect to its reliability and validity (Ladhari, 2009; Sureshchandar et al., 2001). (Moolla & PJ du Plessis, 1997) noted that the scale also fails to sufficiently distinguish between service processes and service outcomes. This may result to some confusion in interpretation of data.

In spite of all these shortfalls, the scale still provides valuable insights for measurement of service quality. The scale is still a useful tool to understand users' perception of service quality and to evaluate the quality of service (Ladhari, 2009).

### **Contemporary Relevance of the Topic**

The assessment of the service quality has emerged as a critical tool in evaluation of the urban public transportation system like the metro rail services that cater to the large and diverse travelling population. As the metro rail systems expand and mature over a

period of time, passenger expectations shall increasingly extend just beyond the operational efficiency to encompass the attributes related to service responsiveness, accessibility, human interaction of service etc. Hence the systematic assessment of the service remains essential for maintaining the passenger satisfaction and trust.

In fact (Kruadsungnoen & Upayokin, 2025) states the SERVQUAL framework to be a widely applied tool to evaluate the service quality in diverse industries and services such as public transportation, where a methodological assessment of the expectations versus perceptions is essential. The structural flexibility of the SERVQUAL scale has enabled the researchers to modify and apply the scale to suit the contextual characteristics of a metro rail systems. Also the present nature of the urban mobility solutions and the current passenger behaviour underlines the need to reassess how SERVQUAL model is interpreted in contemporary metro rail context.

Hence, a consolidated review of prior studies is required to understand the prevailing methodology approaches, prominent findings and upcoming research gaps in the field of assessment of service quality of metro rail using the SERVQUAL model. This has been presented in the upcoming sections mentioned below in form of literature review and its tabular analysis, discussions, research gap identification and conclusion.

### **Objectives of the Study**

1. To study and report the methodologies applied in previous research studies on "SERVQUAL" AND "Metro Rail".
2. To analyse the results and findings of the earlier research studies on "SERVQUAL" AND "Metro Rail".
3. To study and report the conclusions drawn in earlier research studies on "SERVQUAL" AND "Metro Rail".
4. To critically review the application of

SERVQUAL scale to measure service quality.

5. Identify and report the research gaps in the studies carried out previously.

#### **“SERVQUAL” & “Metro Rail” – Literature Review**

1. (Bharadwaj & Singh, 2020) investigated various service quality attributes and their impact on commuter satisfaction focusing on Delhi Metro Rail Corporation (DMRC). The researchers aimed at understanding the relationship between three variables namely ‘service quality’, ‘commuter satisfaction’ and ‘organisational image’ by the method of structural equation modelling (SEM). The authors included two key elements from the SERVQUAL scale namely; reliability (6 variables) and assurance (4 variables).

The primary objective of the researchers was to assess the impact of attributes of service quality on commuter satisfaction. The researchers also aimed at examining the role of commuter satisfaction in influencing the use of metro services. The study was also carried out to evaluate the mediating effect of organisation’s image on the relationship between service quality and commuter satisfaction.

The authors employed the convenience sampling method to select 850 commuters to collect data through a self-administered questionnaire on a five point Likert scale. SPSS 20.0 and AMOS 20.0 were used to analyse data for SEM.

The study proposes a conceptual framework model which states that independent variables namely; ‘service quality attribute’ encompassing ‘reliability’, ‘safety and security’, ‘assurance’ and ‘commuters’ friendliness’ has an impact on dependent variable namely; ‘commuter satisfaction’ where ‘organisational image’ is a mediating variable.

The researchers also state that ‘commuters’

friendliness’ is the most significant determinant of ‘organisational image’ and ‘commuter satisfaction’. ‘Organisational image’ is a crucial factor in enhancing ‘commuter satisfaction’ and ‘promoting the adoption of metro services’. It was also discussed that though ‘safety and security’, ‘assurance’ and ‘reliability’ are important but these attributes have a lesser impact on ‘commuter satisfaction’ and ‘adoption behaviour’.

2. (Bucu et al., 2023) applied SERVQUAL approach to assess commuter perception of service quality for Philippine Light Rail Transit system. The study was carried out to identify the gaps between commuters’ expectations and perceptions. The researchers applied the method of Multi-Criteria Decision Making (MCMD) to identify service quality gaps.

Data was collected from 400 commuters by the method of survey questionnaire. SERVQUAL scale was used to measure the commuters’ response. The results of the study showed that commuters reported their concerns on the cleanliness and maintenance of physical facilities. The said point is related to the determinant of ‘Tangibility’. The commuters also reported inconsistent schedules and delays thereby suggesting a need for improvement. The said point is related to the determinant of ‘Reliability’. The commuters also reported an absence of a responsible assistance from the staff members during the event of service disruptions. The said point is related to the determinant of ‘Responsiveness’. The commuters also reported a deficiency in the ability of staff members when it came to instil confidence. The said point is related to the determinant of ‘Assurance’. The commuters also felt that personal/individual need and concerns aren’t adequately addressed, hence indicating a need for better service. The said point is related to the determinant of ‘Empathy’.

The said research study reports that there is a significant service gap in Philippine railway system for the determinants of 'Reliability' and 'Tangibility'. Researchers also suggest that the issues related to train punctuality and time schedule should be addressed so that commuters trust can be rebuilt. It was also suggested that there is a need to improve cleanliness of the stations and the trains. Also staff members to provide prompt assistance in an event of service disruption.

3. (Bhanu, 2023) used SERVQUAL model to make an analysis of service quality of Kochi Metro. The researcher aimed at studying the passenger perception for the service quality of Kochi Metro. Data was collected through questionnaire on a 5 point Likert scale from the 100 passengers of all age groups with different educational qualification.

Data analysis and interpretation shows that the overall mean score for perception for 'Tangible' determinant is 3.29, which is considered as to be good, while in the same determinant the attribute of 'safe and comfortable travel experience' scored highest on mean score while the attribute of 'waiting times for purchasing tickets' scored lowest on the mean score. The determinant of 'Reliability' scored an overall mean score of 3.23 which is again a good one. For the same determinant the attribute of 'metro trains arrive and depart as per the announced timetable' and 'timely information about service disruptions' scored the highest mean score of 3.55 each while the attribute of 'minimal delays and interruptions' had a mean score of 2.61 which was the lowest. The determinant of 'Responsiveness' score a mean score of 2.92 which is on a lower side while for the same determinant the attribute 'personnel are willing to go the extra mile to help' scored the mean score of 3.3 which was highest for the same determinant while the attribute of 'staff responds promptly to customer inquiries' had

the mean score of 2.87 which was on the lower side. The determinant of 'Assurance' had an overall mean score of 3.094 which is on the higher side when compared to the other two determinant of RATER analysis namely; 'Empathy' and 'Responsiveness'. The attribute of 'courteous and professional' metro staff has the lowest mean score of 2.32 while the attribute of 'transparency in communication' has the highest mean score of 3.09. The determinant of 'Empathy' has a lowest mean score of 2.68 amongst all the other determinants of RATER analysis. The attribute of 'willingness of metro staff to personalise service' has the lowest mean score while the attribute of 'showing genuine interest in understanding customer specific requirement' score highest mean score of 3.22 in the determinant of 'Empathy'.

The aggregate SERVQUAL scale score was at 3.05, suggesting that the quality of service was just satisfactory. The study also reported that the mean service quality score rated by males was 3.12 and the mean service quality score rated by females was 2.91. The statistical tests applied though didn't show any significant difference between genders. The respondents with a graduation degree and a post-graduation degree qualification reported a better perception of service quality when compared to the respondents who were less qualified. Senior citizens were the most positive respondents with a mean score of 3.5. The teenagers the service quality mean score was 2.76 which was lowest of all. Students reported a lower service quality satisfaction score with 2.87 mean. The study also reported that older and more educated and retired passengers held a more positive perception than younger passengers. Occasional and frequent travellers reported a positive response for the service quality. Whereas the traveller who travellers who travelled often reported a slightly lower mean score of 2.94.

The study also reported that the determinants of

'Responsiveness' and 'Empathy' were weak, while the determinant of 'Assurance', 'Tangibility' and 'Reliability' has better service quality ratings.

4. (Mukesh Singh, 2021) carried out a research study to analyse the commuters' perception towards service quality for Delhi Metro Rail Corporation. The researchers framed the concept of service quality as a global evaluation of services, and narrated it distinct from transactional satisfaction. According to the researchers the earlier studies emphasised on the concept of service quality in transportation to be not merely functional but as an essential differentiator for competitiveness. The researchers adopted a five-dimensional measure of service quality taking the base model of SERVQUAL (Parasuraman et al., 1988). The researchers used the 3 determinants of RATER model namely; 'Reliability', 'Tangibility', 'Empathy' while using the other 2 determinants namely; 'Safety and Security' and 'Commuters Friendliness', which aren't a part of the original SERVQUAL model.

The researchers used liberty to replace the determinants of the original SERVQUAL scale while keeping the core concept of measurement intact for their research study. On further investigation it was found that, there have been research studies in the past as well, where the researchers have adopted a similar approach to replace a few determinants of the original SERVQUAL model, to fit the measurement tool / scale to their research needs. A notable few of such instances are reported below:

(Bhanu, 2023) modified the statements suggested in original SERVQUAL scale to fit the measurement statements for his research study. (Randheer et al., 2011) modified a determinant of the original RATER elements of the original SERVQUAL scale by completely eliminating the 'Tangibility' dimension. The said dimension was

replaced with a new dimension namely; 'Culture', to increase the suitability of the measurement scale. Also, (Dianawati et al., 2019) integrated the original SERVQUAL scale and Kano model to make use of 24 service quality measurement attributes instead of the originally proposed 22 attributes in SERVQUAL mode.

(Mukesh Singh, 2021) collected 1045 valid responses and analysed the data using Structural Equation Model (SEM) with a high reliability, Cronbach's  $\alpha = 0.892$ . The study shows that the determinants of 'Tangibility', 'Empathy', 'Safety and Security' and 'Commuters' Friendliness' significantly affected commuter satisfaction. The determinant of 'Reliability' though showed no major significant effect, which is actually in contradiction to the traditional SERVQUAL model findings, where the said determinant is mostly the strong predictor of the service quality. The determinant of 'Commuter Friendliness' emerged to be the most influential factor of service quality, indicating that 'ease of use', 'comfort' and 'commuter centred services outweigh the 'operational reliability' in shaping commuters' satisfaction.

The insignificant effect of 'Reliability' determinant acts as a divergence from the broader consensus established in earlier studies. This suggests that the determinant of 'Reliability', in the case of Delhi Metro is a baseline expectation; hence, commuters no longer view it as a differentiator of satisfaction. Having said that, this comes as a contrast with the earlier study by (Beirão & Sarsfield Cabral, 2007), where the determinant of 'Reliability' was concluded to be the most critical predictor for the service quality.

## Research Methodology

### A. Search Strategy

1. Databases Utilized - "Google Scholar"
2. Software tool used for keyword search -

“Harzing’s Publish or Perish”

3. Query run date - The query with the keywords mentioned in point number 4 below was run on 24-01-20258:21:10 PM.
4. Keywords, Bullions and Search Terms - “SERVQUAL” AND “Metro Rail”
5. Publication date range - Publication date range is from year 2013 to year 2024
6. Click here to access the search report in excel format.

B. Screening Process

Manual screening of the title of research papers/articles/case studies was done followed by the inclusion & the exclusion criteria(s) which is mentioned below in point number C (1), C (2) and D.

C. Inclusion Criteria & Exclusion Criteria

1. Relevance to the topic of study - Keywords specific and relevant/related to the topic of study were included in the Harzing’s Publish or Perish software.
2. Nature of the article / papers included & Inclusion Criteria - Research articles, papers and case studies indexed in Google Scholar are included for this research study. While including the research articles, papers and case studies from Google Scholar it was

made sure that only the articles/papers/case studies closely relevant to the topic of research are included while excluding other results published at Google Scholar. Articles/papers/case studies which had both the keywords in its title viz. “SERVQUAL” AND “Metro Rail” are included for this research study. A total of 94 research papers/articles/case studies were obtained in the search results to which manual screening was carried out. 82 articles/papers/case studies were rejected because they lacked the searched keywords combination study. This lead to an appropriate filtration and there was a final selection of 6 articles/papers/case studies. The above mentioned paragraph gives an idea on the nature of the research articles/papers/case studies considered and included for this literature review research study.

- D. Exclusion Criteria - The search operation executed in the “Harzing’s Publish or Perish” software produced a total of 94 results. Title / abstract / studies that didn’t contain the keywords mentioned in point number C (2) above were excluded for this literature review research study.

**Table1 : Tabular Analysis of the Literature Review**

Study (Author, Year)	Context / Location	Methodology & Framework	Key Variables / SERVQUAL Dimensions Used	Major Findings	Key Contribution / Implications
Bharadwaj & Singh (2020)	Delhi Metro Rail Corporation (DMRC), India	Convenience sampling (n = 850); self-administered questionnaire; 5-point Likert scale; Structural Equation Modelling (SEM) using SPSS 20 & AMOS 20	Modified SERVQUAL: Reliability, Assurance, Safety & Security, Commuters’ Friendliness; Mediator: Organisational Image; Outcome: Commuter Satisfaction	Commuters’ friendliness emerged to be the most significant determinant of commuter satisfaction and organisational image. Organisational image significantly mediate the relationship between service quality and satisfaction. Reliability, safety and assurance carry a relatively low influence on satisfaction and adoption behaviour.	Highlights the importance of human interaction and organisational image in metro service quality. Suggests that operational factors alone are not sufficient to increase commuter satisfaction.

<b>Bucu et al. (2023)</b>	Philippine Light Rail Transit System	Survey method (n = 400); SERVQUAL instrument; Multi-Criteria Decision-Making (MCDM) approach	All five SERVQUAL dimensions: Tangibility, Reliability, Responsiveness, Assurance, Empathy	Significant service gaps were identified, particularly in Tangibility (cleanliness, maintenance) and Reliability (punctuality, delays). Responsiveness and assurance gaps were evident during service disruptions. Empathy gaps indicated less attention to individual commuter needs.	Provides a gap-based diagnostic assessment of metro service quality. Emphasize the need for improvement in punctuality, cleanliness, and staff responsiveness to rebuild commuter trust.
<b>Bhanu (2023)</b>	Kochi Metro Rail, India	Survey questionnaire (n = 100); 5-point Likert scale; Descriptive statistics; SERVQUAL (RATER) analysis	Tangibility, Reliability, Responsiveness, Assurance, Empathy	Overall SERVQUAL score (3.05) indicated just satisfactory service quality. Assurance, tangibility, and reliability received higher ratings, while responsiveness and empathy were weakest. Older, more educated, and retired passengers reported more positive perceptions than younger commuters and students.	Demonstrates demographic variation in service quality perception. Identifies responsiveness and empathy as critical improvement areas for Kochi Metro.
<b>Mukesh Singh (2021)</b>	Delhi Metro Rail Corporation (DMRC), India	Survey method (n = 1045); SEM analysis; Cronbach's $\alpha = 0.892$	Modified SERVQUAL: Tangibility, Reliability, Empathy, Safety & Security, Commuters' Friendliness	Tangibility, empathy, safety & security, and commuters' friendliness significantly influenced commuter satisfaction. Reliability showed no significant effect, suggesting it is a baseline expectation rather than a satisfaction driver. Commuters' friendliness was the strongest factor.	Challenges traditional SERVQUAL assumptions by showing that reliability may no longer differentiate satisfaction in mature metro systems. Emphasizes commuter-centric and ease-of-use factors.

## Discussion

This research study critically synthesizes the recent SERVQUAL scale based research on the metro rail systems. The findings in the literature review section reconfirm the importance of the SERVQUAL scale while also revealing prominent shifts in the application of SERVQUAL determinants in modern metro rail systems. The most significant concerns that the present review study identifies is the role of "Reliability" determinant. While the original SERVQUAL model identifies the said determinant as a prime predictor of the service quality, the evidence

from a mature metro rail system like the one in Delhi indicates that 'Reliability' fails to significantly influence the travel satisfaction. Another studies (Mukesh Singh, 2021) and (Bhanu, 2023) suggest that 'Reliability' is a baseline expectation of service quality rather than a differentiating determinant. This is in contrast to (Bucu et al, 2023) that report that the reliability gaps in Philippine Light Rail Transit system continue to damage commuter trust. This difference may to be though because of moderating influence of metro rail system maturity on the quality perceptions.

While the determinant of Tangibility remains consistent across contexts. Even for an efficient metro rail system like in Kochi the said determinant continue to influence commuter satisfaction levels, thereby establishing its relevance in the SERVQUAL framework.

For the determinant of Responsiveness and Empathy, a recurring concern has been noticed. Both these interpersonal elements of service quality were found to be rated lower than the operational elements of the service, thereby emphasising on the need for a better human interactions. Also the evidence from a study on Delhi Metro Rail by (Bharadwaj & Singh, 2020) identifies commuter friendliness as a factor for travel satisfaction. Also the mediating role of organisation image, which has been though studied in limited studies, adds to a new dimension of satisfaction through service quality.

Overall it can be said that SERVQUAL framework is a robust framework for service quality evaluation in metro rail systems. The framework can do better if contextually adapted and implemented. This study contributed theoretically by reconceptualising the performance of Reliability determinant in mature metro rail systems. This study also validated an extended dimension of service quality in metro rail travel namely; commuters' friendliness.

### **Research Gap Identified**

1. Reliability Paradox - While earlier research studies (Beirão & Sarsfield Cabral, 2007) suggested the determinant of 'Reliability' to be the strong determinant of satisfaction, which is a contradiction with the study conducted by (Mukesh Singh, 2021). Further research may explore this hierarchical shift in service quality priorities.
2. Behavioural Outcomes Beyond Satisfaction - A big majority of the studies stop at satisfaction. There can be more to such kind of studies. Researchers may consider exploring an

extension to these kind of studies, for example; loyalty, word-of-mouth promotion, modal shift behaviours to better form a link of service quality with commuter retention.

3. Technology and Innovation Impact - The integration of technology and innovation in metro rail travel has changed the landscape of how people book tickets and use the travel services. Future research can focus on studying new variables like smart cards, AI enabled travel services, IoT based metro monitoring etc.
4. Online Reviews on Social Media - Future researchers can use the reviews posted by travellers on various online sources like Google, Instagram, X, Reddit etc. The reviews available on such social media platforms form rich database to study the service quality metrics for metro rail.

### **CONCLUSION**

The SERVQUAL framework continues to provide a robust and a structured methodology for the assessment of the service quality of the metro rail systems, through its multidimensional RATER analysis. The literature review carried out in this study highlights that while the operational efficiency dimensions such as the attributes related to the 'Reliability' and 'Tangibility' remain important yet only a baseline to assess the service quality of metro rail systems, the key interpersonal dimensions related to 'Responsiveness' and 'Empathy' often emerge as weaker areas that contribute to the key sources of service gaps. This research study finds evidences from both the mature as well as developing metro rail systems indicate that 'Reliability' dimension may function as the most baseline dimension of expectations in metro rail networks that are well established, whereas the 'Responsiveness' and 'Empathy' dimensions remain the dimensions of critical differentiators of passenger satisfaction.

This literature review also reveals that the application of the SERVQUAL framework in modern

and highly automated metro rail systems can be enhanced by including the contextual service quality attributes such as accessibility, economic benefits of using the metro rail services, co-passenger friendliness. Methodologically, this study also identifies a diverse range of approaches, ranging from structures surveys to multi criteria decision making tools, hence highlighting the need for consistency and comparability in future studies.

Viewing this study from practical perspective, the findings give emphasis to prioritising human centric service interventions alongside operational efficiencies. Addressing the service gaps related to the service quality attributes in 'Responsiveness' and 'Empathy' dimensions can improve the overall traveller satisfaction, foster trust and encourage long term use of metro rail systems, contributing to the sustainable urban mobility goals.

Finally, this literature review identifies various areas for future research. This include investigating behavioural outcomes beyond satisfaction or perception such as modal shifts and loyalty, exploring the longitudinal changes that occur in service quality perceptions, using the user posted data on social media platforms or online review platforms to capture real time travellers experiences and integration of emerging technologies in service quality evaluation. By addressing these gaps, the future studies can contribute to the enhancement of both the theoretical understanding and practical management of the metro rail service quality.

#### **Limitations of the Study**

1. The study is based on literature review as a secondary source of data.
2. The study is limited to the search results on only two keyword namely; "SERVQUAL" AND "Metro Rail".
3. Literature of past twelve years i.e. from year 2013 to 2024 is searched and taken into account for this research study.
4. Research papers available on Google Scholar

database are taken for this research study.

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