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Synthesizing Insights: A Meta-Analysis of Global Public Transport Service Quality Research

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Abstract
This meta-analysis compiles data from 30 studies on the quality of public transport services conducted in different countries. The studies collectively investigate different forms of public transportation, such as buses, paratransit, and rail services, utilizing a range of methodological approaches. The recurring themes in service quality are key dimensions such as reliability, responsiveness, assurance, empathy, and tangibles. The analysis demonstrates that these dimensions have a significant impact on user satisfaction, perceived value, and behavioural intentions. This emphasizes the widespread relevance of service quality measures such as SERVQUAL and SERVPERF. Furthermore, the results emphasize the differences in how service quality is perceived in different regions and the urgent requirement for targeted policy interventions to improve public transportation systems worldwide.

Keywords: Meta-Analysis, Service Quality, User Satisfaction, Public Transport, Customer Perceptions

1. INTRODUCTION

Public transportation is an essential element of urban infrastructure, with a significant impact on the quality of life, economic development, and environmental sustainability. Effective and dependable public transportation systems have the potential to decrease traffic congestion, diminish greenhouse gas emissions, and offer cost-effective mobility choices for urban populations. Therefore, it is crucial to comprehend the determinants that impact the calibre of public transportation services and the contentment of its patrons in order to improve service provision and promote increased utilization of public transportation.

The quality of service in public transportation is determined by several factors, such as reliability, responsiveness, assurance, empathy, and tangibles. These factors collectively influence the experiences and perceptions of users. Enhanced public transportation services have the potential to enhance user contentment, promote favourable behavioural intentions, and boost ridership, thereby enhancing the overall efficiency and long-term viability of urban transportation systems.

Although these service quality dimensions are universally important, there are significant differences in how they are perceived and prioritized among various regions and modes of transportation. In developing countries with persistent infrastructure challenges, ***RELIABILITY AND SAFETY*** are of utmost importance. However, in developed countries with advanced transport systems, factors like ***COMFORT AND ACCESSIBILITY*** take on greater significance.

This meta-analysis consolidates results from 30 studies carried out in multiple countries, such as the ***USA, Australia, Sweden, India, Indonesia, Malaysia, Portugal, Greece, Taiwan, Italy, Qatar, Serbia, Kenya,***

South Africa, Spain, Ghana, Nigeria, and Ethiopia. These studies encompass a wide variety of public transportation modes, such as scheduled bus services, paratransit, air transportation, urban buses, shuttle services, and rail-based transportation. This meta-analysis seeks to gain a comprehensive understanding of the key factors that globally influence public transport service quality by analysing the similarities and differences in determinants of service quality and user satisfaction across various studies.

This synthesis aims to determine the key factors of service quality that have the greatest impact on user satisfaction and behavioural intentions. It also aims to examine variations in service quality across different regions and modes of public transport, as well as highlight the different methods used to assess service quality. The findings of this meta-analysis will provide valuable information to policymakers, transport planners, and service providers. They will learn how to improve public transport systems to meet the changing needs and expectations of users. This will help to promote sustainable urban mobility.

2. DISCUSSION

2.1.Methodology

The studies incorporated in this meta-analysis encompass a range of countries and public transport modes, utilizing both quantitative and qualitative methodologies. The key factors assessed encompass reliability, responsiveness, assurance, empathy, tangibles, accessibility, comfort, safety, perceived value, and customer satisfaction. An analysis was conducted to identify recurring patterns, variations across regions, and different research methods used, to gain a comprehensive understanding of the current state of research on the quality of public transport services.

2.2.Dimensions of Service Quality

2.2.1 Reliability

Consistently recognized as a crucial factor affecting user satisfaction in various studies (Parasuraman, Zeithaml, & Berry, 1988; Prioni & Hensher, 2000; Eboli & Mazzulla, 2011; Barabino, Deiana, & Tilocca, 2012). Reliability refers to the timeliness, regularity, and uniformity of service.

2.2.2. Responsiveness

The capacity of service providers to promptly attend to user needs and grievances (Parasuraman, Zeithaml, & Berry, 1988; Prioni & Hensher, 2000; Jain & Gupta, 2004).

2.2.3. Assurance

This criterion evaluates the expertise, politeness, and capability of the staff to effectively communicate trust and confidence (Parasuraman, Zeithaml, & Berry, 1988; Agus, Barker, & Kandampully, 2007).

2.2.4. Empathy

The act of providing compassionate and personalized attention to passengers (Parasuraman, Zeithaml, & Berry, 1988; Prioni & Hensher, 2000).

2.2.5. Tangibles

The tangible aspects of a service, such as vehicles, infrastructure, and cleanliness, which can be observed and measured (Parasuraman, Zeithaml, & Berry, 1988; Agus, Barker, & Kandampully, 2007).

2.2.6. Comfort and Safety

Recognized as essential elements in various studies (Eboli & Mazzulla, 2011; Barabino, Deiana, & Tilocca, 2012; Govender, 2014). The satisfaction level is greatly influenced by the presence of comfortable seating, smooth rides, and effective safety measures.

2.2.7. Accessibility

Highlighted in research that examines inclusivity and the convenience of accessing transportation services (Too & Earl, 2010; Govender, 2014).

2.2.8. User Perceptions and Behavioural Intentions

The studies conducted by Chen (2008) and Sumaedi, Bakti, & Yarmen (2012) emphasize the interconnectedness of service quality, perceived value, satisfaction, and behavioural intentions.

2.3. Model Used

Various methodological approaches have been utilized in research on the quality of public transport services to evaluate and comprehend the various factors that lead to user satisfaction. These methodologies cover a wide range of approaches to user perception and attitude research, including well-established quantitative models like SERVQUAL and SERVPERF, Custom surveys, advanced statistical methods like Structural Equation Modelling (SEM), qualitative and exploratory studies, and Broader Contexts and Integrated Methodologies. This section elaborates on these methodologies in detail, drawing on the findings of 30 important studies.

2.3.1. SERVQUAL and SERVPERF

Parasuraman, Zeithaml, and Berry's (1988) SERVQUAL model is a well-known instrument for evaluating service quality in many sectors, including the transportation sector. According to this model, one way to measure service quality is by looking at how far it is from what the customer expected compared to what they got. The five pillars of service quality that SERVQUAL has identified are:

The capacity to provide the promised service consistently and correctly is known as ***Reliability***.

The ability to respond to consumer needs and inquiries quickly and cheerfully is an example of ***Responsiveness***.

The competence, politeness, and knowledge of staff members, as well as their capacity to inspire faith and assurance is known as ***Assurance.***

Causing customers to feel cared for and receiving personalized attention is known as ***Empathy.***

Physical assets, tools, employees, and written and visual content are all considered ***Tangibles***.

To evaluate the quality of public transportation services in different settings, this model has been used and confirmed in multiple studies. One example is the application of SERVQUAL to scheduled bus services in Australia by Prioni & Hensher (2000). They showed that it effectively captured critical service quality dimensions. The reliability and validity of SERVQUAL were confirmed in a meta-analysis by Carrillat, Jaramillo, and Mulki (2007). The SERVPERF model, which is based on SERVQUAL and measures performance, removes the expectations component from service delivery and focuses only on performance. For evaluating the quality of public transportation in India, Jain and Gupta (2004) discovered that SERVPERF was a useful tool.

2.3.2. Custom Surveys and Structural Equation Modelling

Several studies make use of location-or mode-specific questionnaires designed to meet the unique requirements of the research subjects. The goal of these surveys is to collect in-depth data on how people feel about and interact with public transportation. For instance, Friman & Gärling (2001) surveyed Swedes to find out how often bad things happen and how it affects satisfaction. Similarly, Tyrinopoulos & Antoniou (2008) created a survey to draw attention to the fact that people's experiences with Greece's public transportation vary greatly, highlighting the necessity for individualised policies.

An advanced statistical technique called Structural Equation Modelling (SEM) is utilized to examine the intricate connections between different aspects of service quality and user satisfaction. Using structural

equation modelling (SEM), researchers can test hypotheses about the relationships between variables, illuminating all the aspects that affect the quality of public transportation services. In the context of Taiwanese air travel, Chen (2008) employed structural equation modelling to investigate the interplay between service quality, perceived value, satisfaction, and behavioural intentions. Insights into how to enhance service quality can be gleaned from this method, which allows for the detection of both direct and indirect effects among variables.

2.3.3. Qualitative and Exploratory Studies

When trying to interpret how people feel about, think about, and favour public transportation options, qualitative and exploratory research are vital. To collect detailed information about user expectations and experiences, these studies frequently use observational methods, focus groups, and interviews. Beirão and Cabral (2007) found that perceived convenience has a significant impact on mode choice in their qualitative study comparing users' attitudes towards public transport and private car usage in Portugal.

Standardized models, such as SERVQUAL, may miss some aspects of service quality that are unique to a given region. In such cases, exploratory studies can be very helpful in identifying these aspects. To find important service quality aspects that are specific to the Malaysian setting, Agus, Barker, and Kandampully (2007) performed an exploratory study in Malaysia. The results of these types of research allow for a more personalized strategy for evaluating and bettering service quality by illuminating contextual nuances.

2.3.4. Broader Contexts and Integrated Methodologies

Eboli and Mazzulla (2011) from Italy made a notable contribution as well; they stressed the need for objective and subjective metrics when evaluating the quality of public transportation services. Recognizing the wider influence of public transportation on social and environmental outcomes, Too & Earl (2010) argued for the integration of service quality and sustainability in Australia. The necessity for thorough and integrated methods was highlighted by De Oña & De Oña (2015), who examined various approaches to evaluating service quality.

Table 1. Summary of Service Quality Studies in Public Transport

Sr. No.	Author and year	Country	Public Transport Type	Nature of Paper	Key Findings	Factors Studied	Model Used
1	Parasuraman, Zeithaml, & Berry (1988)	USA	General Public Transport	Methodological Study	Introduces SERVQUAL as a reliable measure for service quality	Reliability, Responsiveness, Assurance, Empathy, Tangibles	SERVQUAL
2	Prioni & Hensher (2000)	Australia	Scheduled Bus Services	Empirical Study	Service quality dimensions significantly affect user satisfaction	Reliability, Responsiveness, Assurance, Empathy, Tangibles	SERVQUAL

3	Friman & Gärling (2001)	Sweden	General Public Transport	Empirical Study	Frequent negative incidents lower satisfaction levels	Frequency of Incidents, Satisfaction	Custom Survey
4	Jain & Gupta (2004)	India	General Public Transport	Empirical Study	SERVQUAL and SERVPERF are effective in measuring service quality	Reliability, Responsiveness, Assurance, Empathy, Tangibles	SERVQUAL, SERVPERF
5	Joewono & Kubota (2007)	Indonesia	Paratransit	Empirical Study	High satisfaction with current services but concerns for future competition	Satisfaction, Anticipation of Future Implications	Custom Survey
6	Agus, Barker, & Kandampully (2007)	Malaysia	General Public Transport	Exploratory Study	Identifies critical service quality dimensions in Malaysian public services	Reliability, Responsiveness, Assurance, Empathy, Tangibles	SERVQUAL
7	Beirão & Cabral (2007)	Portugal	General Public Transport and Private Car	Qualitative Study	Users' attitudes towards public transport are influenced by perceived convenience	Attitudes towards Public Transport and Private Car	Qualitative Study
8	Tyrinopoulos & Antoniou (2008)	Greece	Public Transit	Empirical Study	Variability in satisfaction highlights	Variability, Policy Implications	Custom Survey

					need for tailored policies		
9	Chen (2008)	Taiwan	Air Transport	Empirical Study	Structural relationships impact satisfaction and behavioral intentions	Service Quality, Perceived Value, Satisfaction, Behavioral Intentions	Structural Equation Modeling
10	Carrillat, Jaramillo, & Mulki (2007)	Various (Meta-analysis)	General Public Transport	Meta-analysis	SERVQUAL and SERVPERF are valid measures across contexts	Reliability, Responsiveness, Assurance, Empathy, Tangibles	SERVQUAL, SERVPERF
11	Too & Earl (2010)	Australia	General Public Transport	Conceptual Paper	Advocates for integrating service quality with sustainability	Reliability, Responsiveness, Accessibility	Custom Methodology
12	Eboli & Mazzulla (2011)	Italy	Transit	Methodological Study	Both subjective and objective measures are important	Reliability, Comfort, Safety, Accessibility	Custom Methodology
13	Sumaedi, Bakti, & Yarmen (2012)	Indonesia	Paratransit	Empirical Study	Service quality impacts perceived value and satisfaction	Service Quality, Perceived Sacrifice, Perceived Value, Satisfaction	Custom Survey
14	Barabino, Deiana, & Tilocca (2012)	Italy	Urban Bus	Empirical Study	Reliability and comfort are crucial for user satisfaction	Reliability, Comfort, Safety	Modified SERVQUAL

15	Dell'Olio, Ibeas, & Cecin (2011)	Spain	Public Transport	Empirical Study	Users prioritize reliability and comfort	Desired Service Quality	Custom Survey
16	Shaaban & Khalil (2013)	Qatar	Bus Service	Empirical Study	Customer satisfaction is influenced by several service quality factors	Customer Satisfaction	Custom Survey
17	Grujičić et al. (2014)	Serbia	Public Transport	Empirical Study	Customer perception of service quality is multifaceted	Customer Perception, Service Quality	Custom Survey
18	Murambi & Bwisa (2014)	Kenya	Shuttle Services	Empirical Study	High service quality leads to higher customer satisfaction	Service Quality, Customer Satisfaction	Custom Survey
19	Govender (2014)	South Africa	Bus and Minibus	Empirical Study	Accessibility and safety significantly influence satisfaction	Reliability, Accessibility, Safety	SERVQUAL
20	Yaya et al. (2015)	Spain	Public Transport	Empirical Study	Demographic characteristics influence service quality perceptions	Service Quality, Demographic Characteristics	Custom Survey
21	De Oña & De Oña (2015)	Spain	Public Transport	Review Paper	Evaluates different methodologies for assessing service quality	Service Quality, Customer Satisfaction	Review of Methodologies

22	Amponsah & Adams (2016)	Ghana	Public Transport	Empirical Study	Service quality drives customer satisfaction	Service Quality, Customer Satisfaction	Custom Survey
23	Ojo (2019)	Nigeria	General Public Transport	Integrative Review	Highlights gaps in current research on public transport service quality	Reliability, Responsiveness, Assurance, Empathy, Tangibles	Integrative Review
24	Getachew (2019)	Ethiopia	Public Transport	Empirical Study	Service quality significantly affects customer satisfaction	Service Quality, Customer Satisfaction	Custom Survey
25	Ranjan et al. (2020)	India	Railway	Empirical Study	Service quality attributes affect passenger satisfaction	Service Quality Attributes, Satisfaction	Custom Survey
26	Sinha, Swamy, & Modi (2020)	India	Public Transport	Empirical Study	User perceptions highlight key areas for service improvement	User Perceptions, Service Quality	Custom Survey
27	Ibrahim et al. (2020)	Malaysia	Rail-based Public Transport	Literature Review	Synthesizes literature on rail-based public transport service quality and satisfaction	Service Quality, User Satisfaction	Literature Review
28	Atombo & Wemegah (2021)	Ghana	High Occupan	Empirical Study	Satisfaction and usage are driven	Customer Satisfaction, Usage	Custom Survey

			cy Public Bus		by service quality		
29	Laisak, Rosli, & Sa'adi (2021)	Malaysia	Inter-District Public Bus	Empirical Study	Service quality directly influences customer satisfaction	Service Quality, Customer Satisfaction	Custom Survey
30	Simangunsong et al. (2023)	Indonesia	Bus Rapid Transit (BRT)	Empirical Study	Service quality and operation effectiveness impact user perceptions	Service Quality, Operation of BRT	Custom Survey

3. CONCLUSION

This meta-analysis demonstrates that certain crucial aspects, such as reliability, responsiveness, assurance, empathy, and tangibles, consistently influence the quality of public transport services. However, the perceived significance of these aspects differs depending on the specific regions and modes of transport. The text emphasizes the efficacy of models such as SERVQUAL and SERVPERF in evaluating service quality, while also indicating the necessity for more customized and situation-specific methodologies. The results emphasize the importance for policymakers to prioritize specific interventions that target regional needs and improve overall user satisfaction. This will help promote sustainable urban mobility and encourage greater utilization of public transportation systems.

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