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AN EXPLORATORY STUDY OF THE DIMENSIONS OF TECHNOLOGY-ENABLED SERVICE QUALITY IN APSRTC BUS SERVICES

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ABSTRACT

This research paper explores the dimensions of technology-enabled service quality (TESQ) within the context of Andhra Pradesh State Road Transport Corporation (APSRTC) bus services. Guided by established scale development procedures and drawing upon insights from service quality and technology adoption literature, the study employs exploratory factor analysis (EFA) to uncover the key dimensions of TESQ as perceived by passengers. Data from focus group interviews informed the design of the survey instrument, which was then administered to a sample of 446 APSRTC passengers. The subsequent EFA identified six underlying dimensions of TESQ: Tangibility, Reliability, Responsiveness, Assurance, Empathy, and Technology. The study provides reliability statistics, sample adequacy, and inter-correlation tests. The findings emphasize the importance of both traditional and technology-specific aspects of service quality in public transport and contribute to the body of knowledge related to service quality in technology-integrated public transport settings. This work offers an empirically grounded basis for future research in this area and offers a practical framework for public transport providers seeking to improve service quality in rapidly changing technological environment.

1. INTRODUCTION

The public transportation sector plays a vital role in the socio-economic landscape of any region, facilitating mobility for individuals and communities alike (Eboli & Mazzulla, 2007; Wall & McDonald, 2007). In India, State Road Transport Corporations (SRTCs) such as the Andhra Pradesh State Road Transport Corporation (APSRTC) provide essential and affordable transportation services to a large portion of the population. However, with rapid advancements in technology, the need for SRTCs to integrate digital solutions to enhance service quality and customer satisfaction is becoming increasingly important (Bakar et al., 2022; Redman et al., 2013). Technology adoption, such as online ticketing, mobile applications, and real-time tracking systems, presents an opportunity to modernize services and meet the changing expectations of passengers (Currie, 2005; Nelson & Mulley, 2013).

While the importance of traditional service quality dimensions like Tangibility, Reliability, Responsiveness, Assurance, and Empathy remains (Parasuraman et al., 1988; Prioni & Hensher, 2000), the integration of technology introduces new dimension that significantly affect passenger perceptions. It is important for public transport providers to understand the impact of technology on service quality, as well as to understand how to combine technology with more traditional approaches to service delivery. This study aims to explore the key dimensions of technology-enabled service quality (TESQ) in the context of APSRTC bus services, and to identify how these dimensions combine to influence the overall passenger experience. This research adopts an exploratory approach to uncover the salient aspects of TESQ in the APSRTC context using an exploratory factor analysis (EFA) to identify the underlying dimensions of the construct. The initial stages of this research included a thorough review of existing literature and qualitative data collection through focus group interviews with APSRTC users. This approach enabled the identification of the dimensions of service quality that are relevant in a technology integrated public transport setting.

2. LITERATURE REVIEW

This section provides a review of the existing literature relevant to this study, focusing on the theoretical underpinnings of service quality, the role of technology in service delivery, and the application of these concepts within the public transportation sector, and also highlighting the relevance of the literature to the proposed study.

2.1. Foundations of Service Quality

The concept of service quality has been extensively explored in marketing and management literature, with a range of different conceptualizations of the topic (Gronroos, 1984; Parasuraman et al., 1988). The seminal work of Parasuraman, Zeithaml, and Berry (1988) introduced the SERVQUAL model, which defines service quality through five key dimensions: *tangibility*, *reliability*, *responsiveness*, *assurance*, and *empathy*. *Tangibility* refers to the physical aspects of the service, including facilities and equipment (Parasuraman et al., 1988), while *reliability* pertains to the consistency and dependability of the service (Prioni & Hensher, 2000). *Responsiveness* reflects the willingness of service providers to help customers and address their requests or complaints (Parasuraman et al., 1988; Eboli & Mazzulla, 2007). *Assurance* relates to the competence, courtesy, and credibility of service providers (Parasuraman et al., 1988),

It has also been recognised that service quality needs to be measured in a way that takes the customer's experience into account, and therefore the use of performance based measures has become more prevalent in studies in this area (Cronin & Taylor, 1992; 1994). This paper also acknowledges the importance of traditional service quality dimensions, particularly as they relate to the public transport setting, as they are still an important part of the overall customer experience.

2.2. Technology Integration and Service Quality in Transportation

The integration of technology into service delivery has transformed customer experiences across various industries, and also within the transport sector. Studies have shown that technology can enhance service efficiency, accessibility, and convenience (Bitner et al., 2000) while also creating new challenges if the technology is not implemented correctly. The Technology Acceptance Model (TAM) (Davis, 1989) highlights the importance of perceived usefulness and perceived ease of use in driving technology adoption, and is therefore highly relevant in the analysis of technology enabled services. Furthermore, specific technologies such as smart ticketing systems (Currie, 2005), and real-time information displays (Watters et al., 2013) have also had a direct impact on the service delivery in public transport, by making systems more efficient and providing more accessible information for customers. However, the integration of technology also raises concerns about system reliability, security breaches, and user-friendliness (Collier & Sherrell, 2010), and so it is important that these factors are taken into account when planning the adoption of new technology within a service context (Bhatnagar & Teo, 2011).

2.3. Service Quality Dimensions in Public Transportation

Research in the area of public transport has focused on specific dimensions of service quality that are important in this setting. These include punctuality, safety, comfort, and accessibility (Eboli & Mazzulla, 2007), all of which are relevant to a good customer experience. Furthermore, there is now an increasing focus on technology integration in the public transport sector, and the way that technology can enhance the service being delivered (Ranawana & Hewage, 2015; Wu et al., 2018), and studies have highlighted the importance of aspects such as the user-friendliness of mobile apps, the accuracy of real-time tracking information and the efficiency of digital ticketing. However, research is still lacking on how technology impacts the overall customer experience in a public transport setting. Therefore there is a need for further investigation into the specific dimensions of technology-enabled service quality within the public transportation sector.

2.4. Identifying Research Gaps and Need for this Study

While existing literature provides valuable insights into service quality and technology adoption, there is still a clear gap in the research that focuses on the integration of both technology and traditional aspects of service delivery within the context of public transportation. This is the key gap that this research will address. This study aims to contribute to both theory and practice, by exploring the dimensions of technology-enabled service quality in the context of public transportation using an exploratory approach. This will include identifying the

key dimensions that can be used to create a valid measure of service quality in public transportation and will also provide transport providers with insights that can be used to enhance the customer experience.

Table 2.2: Consolidated Dimensions of Service Quality in Public Transportation

S.No.	Author(s) & Year	Key Dimensions Identified
1	Bakar et al. (2022)	Service quality dimensions in public transport
2	Deb & Ahmed (2018)	Passenger perceptions and expectations of service quality in public transport
3	Parasuraman et al. (1988)	Tangibles, Reliability, Responsiveness, Assurance, Empathy
4	Bitner et al. (2000)	Efficiency, Accessibility, Convenience, Responsiveness (related to Self Service Technologies)
5	Eboli & Mazzulla (2007)	Service Quality, Customer Satisfaction, Loyalty, Perceived Value (in public transport)
6	Prioni & Hensher (2000)	Service quality dimensions in bus services
7	Currie (2005)	Convenience, Efficiency, Accessibility, Cost Savings (Specifically in relation to Smart Ticketing)
8	Watters et al. (2013)	Accuracy, Reliability, Usefulness, Accessibility (Specifically in relation to Real-Time Information)
9	Collier & Sherrell (2010)	Control, Convenience, Ease of Use, Perceived Usefulness (related to Self Service Technologies)
10	Bhatnagar & Teo (2011)	Perceived Usefulness, Perceived Ease of Use, Security, Convenience (related to mobile payments)
11	Okazaki (2008)	Convenience, Personalization, Accessibility (related to mobile advertising)

3. THEORETICAL FRAMEWORK

Theoretical framework that guides the present study on technology-enabled service quality (TESQ) in public transportation. This framework integrates core concepts from established service quality models with technology adoption theories to provide a comprehensive understanding of the key factors that influence passenger perceptions of service quality when technology is used in the delivery of the service.

3.1. A Multi-Dimensional Conceptualization of Technology-Enabled Service Quality

The framework posits that TESQ is a multi-dimensional construct that is composed of both traditional service quality dimensions and technology-specific attributes (Parasuraman et al., 1988; Bitner et al., 2000). This approach acknowledges that while technology can transform the delivery of services, the core principles of good service remain relevant and important to the overall customer experience (Gronroos, 1984).

3.2. Integrating Technology Acceptance Model (TAM)

To understand the drivers behind user perceptions of technology-enabled services, this framework incorporates elements of the Technology Acceptance Model (TAM). TAM posits that the user's intention to use technology is primarily determined by *perceived usefulness* and *perceived ease of use* (Davis, 1989). *Perceived usefulness* is the degree to which a passenger believes that using the technology will enhance their experience and make it more efficient. *Perceived ease of use* relates to the extent to which a passenger believes that using the technology is free of effort. It is proposed that technology that is both useful and easy to use will be more likely to enhance the overall perception of service quality, and also to lead to increased levels of customer satisfaction and loyalty.

3.3. Linking Service Quality and Technology Adoption

This theoretical framework proposes that the various dimensions of TESQ, which includes both the traditional service dimensions, and also technology focused dimensions, interact to influence passenger perceptions. By combining these concepts into a single theoretical framework, it becomes possible to explore the different elements of service delivery, and also to consider how to deliver a high standard of service that incorporates both technology and more traditional elements. This framework provides a basis for empirical exploration of the relative importance of these different factors in the context of APSRTC bus services.

4. METHODOLOGY

The methodological approach employed in this study, detailing the research design, data collection procedures, and data analysis techniques. The focus is on exploring the dimensions of TESQ in APSRTC bus services using a mixed-methods approach, with a strong emphasis on exploratory factor analysis.

4.1. Research Design

This study employed a mixed-methods approach, combining qualitative and quantitative data collection techniques, (Creswell & Creswell, 2018; Leedy, 1993). This approach was chosen to provide a rich understanding of passenger perceptions, as well as allowing for a statistical basis for identifying underlying dimensions of TESQ (Churchill, 1979; Burns & Bush, 2002; De Vaus, 2002). The study began with exploratory focus groups to gain a deeper understanding of passengers' experiences, followed by a quantitative survey, which was designed to explore the dimensions of technology-enabled service quality.

4.2. Qualitative Data Collection

The qualitative data was gathered through focus group discussions with APSRTC passengers. Participants were selected using a purposive sampling method, to ensure inclusion of diverse opinions from different geographical areas and a representation of both male and female perspectives. The focus group interviews allowed for the identification of key themes and issues related to technology adoption and service quality in the specific context of APSRTC bus services which also helped to identify items for the survey instrument.

4.3. Quantitative Data Collection

A structured questionnaire was designed and used to collect quantitative data from APSRTC passengers. The development of the questionnaire was informed by the literature review (Parasuraman et al., 1988) and also the insights from the focus group discussions. The questionnaire was divided into two sections: Part A: This section included 32 items designed to measure facets of technology-enabled service quality. This also included items to measure passenger satisfaction and loyalty. All items were measured using a 7-point Likert scale. Part B: This section included 14 items to capture the demographic profile of the respondents, and concluded with an open-ended question inviting suggestions for service improvement.

4.4. Sampling Strategy

A purposive sampling technique was adopted for selecting participants for the focus group interviews. A convenience sampling method was used for the main quantitative survey, with data collected at 12 major APSRTC bus depots across Andhra Pradesh. This non-probability sampling method was used to ensure a broad range of opinions could be gathered, and also to facilitate data collection across a diverse geographical area. A sample size of 446 was used for the quantitative data who suggest a minimum of 5 observations for each variable being studied. A sample of 446 respondents was deemed to be adequate for factor analysis.

4.5. Pilot Study

To ensure the reliability and relevance of the survey instrument, a pilot study was conducted prior to the main data collection. Data was collected from 50 long-distance travellers at 5 selected depots. The pilot study allowed the instrument to be refined and finalized and also ensured that the items were measuring what was intended

4.6. Data Analysis Techniques

The data analysis was performed using SPSS statistical software. The data analysis process included:
Descriptive Statistics, Exploratory Factor Analysis, and Reliability Analysis were performed.

5. RESULTS/ANALYSIS

This section presents the findings of the data analysis, including descriptive statistics, the results of the exploratory factor analysis, and an analysis of the reliability of the derived factors. The focus is on the identification of key dimensions of technology-enabled service quality (TESQ) in APSRTC bus services.

5.1. Descriptive Statistics and Initial Item Analysis

Before conducting the EFA, a preliminary analysis of the data was undertaken. This included calculating the means, standard deviations, and corrected item-total correlations for all of the 32 items being used in the study. The standard deviations for all of the items were less than 2.0, which indicate a shared perception of service quality among the respondents. Based on the recommendations of Hair et al., (2015) and the seminal work of Nunnally (1970), four items were removed from the analysis, based on a low item-total correlation.

5.2. Exploratory Factor Analysis

Exploratory factor analysis using Principal Component Analysis with Varimax rotation was employed to identify the underlying dimensions of TESQ, using the data collected from 446 passengers. Before the analysis, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was calculated as .900, exceeding the recommended threshold of .50, thus indicating that the sample size was adequate for factor analysis (Hair et al., 2015). Bartlett's test of sphericity was also significant (χ^2 = 6052.953, p < .001), confirming the inter-correlations among the variables (Bartlett, 1954). Table 5.2 presents the eigenvalues, and the total variance explained. Kaiser's criterion (Kaiser, 1960), indicated that six factors had eigenvalues above 1.0, and this was confirmed by inspecting the scree plot (Cattell, 1966). The rotated solution indicated that six factors explained 61.67% of the total variance. The Varimax rotation was used to allow for greater interpretability of the results (Kaiser, 1958).

Table 5.1 presents the rotated component matrix, showing the factor loadings for each item. Items with factor loadings of less than ± 0.40 were suppressed, according to established guidelines (Hair et al., 2015; Costello & Osborne, 2005). Based on this, the following factors were identified and named: Tangibility, Reliability, Responsiveness, Assurance, Empathy, and Technology.

5.4. Reliability Analysis

The internal consistency of each extracted factor was assessed using Cronbach's alpha, and Table 5.4 presents these values. All factors demonstrate acceptable levels of internal consistency, with values above the recommended threshold of 0.70, suggesting that the measurement scales are reliable (Cortina, 1993).

Table 5.1: Rotated Component Matrix

Rotated Component Matrix[a]						
	Component					
	1	2	3	4	5	6
Digital ticketing provided by the bus service is straightforward and efficient.	.785					
The bus service's technology reduces the time needed for booking.	.779					
The real-time tracking feature of the bus service is accurate and helpful.	.756					
The mobile app provided by the bus service is user-friendly.	.747					
The integration of various technology features (e.g., online payment, real-time updates) meets my expectations.	.740					
Online booking through the bus service's platform is convenient.	.730					
The Buses maintain reliable service even during peak hours or festival seasons.		.773				
The bus service is dependable in terms of frequency.		.764				
The buses are generally punctual.		.759				
The buses operate consistently according to the published timetable.		.742				
The bus service provides accurate information regarding schedules and routes.		.719				
I can rely on the bus service to be available when needed.		.716				
I feel safe and secure while using the bus service.			.793			
I feel confident that my personal and payment information is secure when booking tickets online or through the app.			.782			
I trust the competence of the bus drivers and staff.			.767			
The bus service is reliable in terms of safety measures.			.760			
The bus service operates with high standards of professionalism.			.760			
Bus stops are clean and well-equipped.				.767		
The bus service provides comfortable seating arrangements.				.764		
Information boards and signage are clear and informative.				.760		

The bus service offers convenient facilities (e.g., restrooms, refreshments).				.758		
The buses are well-maintained and in good condition.				.738		
The bus service treats all passengers fairly and equally.					.773	
Bus drivers show consideration for passenger comfort by driving smoothly and avoiding sudden brakes.					.768	
Staff members demonstrate concern and understanding towards passengers.					.768	
Bus conductors show patience when passengers take time to find their fare or ticket.					.740	
Staff members are courteous and respectful in their interactions.					.712	
The bus service handles unexpected situations effectively.						.768
The bus service adjusts schedules promptly when needed.						.758
The staff members promptly respond to passenger's queries or complaints.						.753
Staff members are attentive to the needs of passengers.						.750
Staff members are quick to assist passengers during boarding.						.725
Eigenvalue	7.698	2.811	2.506	2.432	2.179	2.11
Variance%	11.512	11.285	9.948	9.699	9.647	9.586
Cumulative % of Variance Explained	11.512	22.797	32.745	42.444	52.092	61.678
Cronbach's Alpha	.847	.865	.837	.856	.839	.870
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.						
a. Rotation converged in 6 iterations.						

Note: This table presents the rotated factor loadings for each item, with factor loadings below 0.40 suppressed.

6. DISCUSSION

This study aimed to explore the dimensions of TESQ in the context of Andhra Pradesh State Road Transport Corporation bus services. The results obtained through exploratory factor analysis have revealed a six-factor structure, providing a valuable understanding of passenger perceptions of service quality when technology is integrated into public transportation. This section discusses the identified factors, their implications, and the contributions of this study, with reference to the relevant literature.

6.1. Interpretation of the Extracted Factors

The six factors identified through EFA are:

1. **Tangibility:** This factor includes the physical aspects of the service, such as the condition of buses and bus stops, as well as comfort of seating arrangements and availability of facilities (Parasuraman et al., 1988). This reaffirms the importance of maintaining the physical environment of public transport, as it still has a key influence on the way customers view the service.
2. **Reliability:** This factor encompasses items related to the consistency and dependability of the service, including adherence to schedules, service frequency, and service availability. This factor emphasizes the core values of traditional service delivery (Parasuraman et al., 1988; Prioni & Hensher, 2000), and shows that reliability remains a key driver of customer perceptions even when technology is being adopted.
3. **Responsiveness:** This factor reflects the willingness of staff to assist passengers and address their queries or complaints promptly, and it also captures the importance of prompt and clear communication with the passengers (Parasuraman et al., 1988). This includes the ability to react to unexpected events, and to use technology to effectively communicate with customers during these events.
4. **Assurance:** This factor captures passenger perceptions of safety, security, and competence associated with the service, as well as the professionalism of the staff (Parasuraman et al., 1988). The high factor loadings emphasize the continued need to instil confidence in passengers in both the physical and digital aspects of the service.

5. **Empathy:** This factor relates to the level of care and individual attention shown by staff to passengers, and captures the human element of service delivery (Parasuraman et al., 1988). This factor emphasizes that even when technology is being implemented, the interactions between customers and service providers are still significant, and can influence the overall perception of the service.
6. **Technology:** This factor, which includes items related to digital ticketing, online booking, real-time tracking, and mobile app usability, underscores the significance of technology in shaping the modern passenger experience. The high factor loadings and reliability of this factor highlight the importance of user-friendly technology platforms within public transport, and also shows how the technology has come to be an independent factor in the overall perception of service quality (Collier & Sherrell, 2010; Parasuraman et al., 2005).

6.2. Implications of the Findings

The identification of these six factors has important implications for both theory and practice in public transportation:

Technology is a Core Component of Service Quality: The emergence of Technology as a separate factor confirms that technology is no longer just a supporting tool, but is a key element of service quality (Collier & Sherrell, 2010). This highlights the need for public transport providers to invest in user-friendly and reliable technologies.

Balancing Technology with Traditional Dimensions: Whilst technology is important, the continued relevance of traditional service quality dimensions (Parasuraman et al., 1988; Prioni & Hensher, 2000) highlights the need to maintain high operational standards alongside technology adoption. This means ensuring that the basics of service delivery are maintained and not undermined by the introduction of technology.

Emphasis on Security and Trust: The study highlights that the adoption of technology brings with it the need to focus on security and also on creating a sense of trust with customers. This is critical for effective technology adoption.

User Centric Design: It is important to ensure that new technology is well designed and is easy for customers to use and integrate into their day to day lives.

Strategic Resource Allocation: The six factors identified in this study provide a basis for allocating resources to key areas that impact on customer perceptions, and also to highlight the importance of a customer focused approach to service delivery. This could include areas such as technology upgrades, staff training and also a focus on the physical infrastructure.

7. CONCLUSION

This research paper presented an exploratory investigation into the dimensions of technology-enabled service quality (TESQ) within the context of Andhra Pradesh State Road Transport Corporation bus services. Drawing on relevant literature and qualitative data, the study used exploratory factor analysis to identify six underlying dimensions of TESQ from survey data collected from 446 APSRTC passengers. These dimensions were Tangibility, Reliability, Responsiveness, Assurance, Empathy, and Technology, and all were shown to be both theoretically sound, and also empirically robust, as indicated by the reliability analysis. This section provides a summary of the key findings and their implications, as well as an acknowledgement of the limitations of this research.

The key conclusions from this study are:

TESQ is a Multi-Dimensional Construct: The study has empirically demonstrated that TESQ is a multi-dimensional construct, encompassing both traditional service dimensions and also technology specific elements. It is not sufficient to focus only on one aspect of the service, and that transport providers need to adopt a more holistic approach that considers all of these aspects.

Technology is a Distinct Dimension: This research has also highlighted the importance of Technology as a distinct factor in public transportation. This highlights that technology is now a core component of service quality, and that it is not just a supporting tool, but rather a key element of the overall customer experience. This underscores that technology design needs to be a key consideration in the planning and delivery of service.

Interconnectedness of Dimensions: All dimensions are interconnected and are important to the overall perception of service quality, which suggests that a system based approach to service delivery should be taken.

Provides a Basis for Future Research: This exploratory research provides a basis for future empirical investigations in this area. The six factors can be further explored using more confirmatory techniques, and also can form the basis for a validated measurement instrument.

8. LIMITATIONS OF THE STUDY

The findings of this research need to be interpreted in light of the following limitations:

- **Sampling Bias**: The use of a convenience sample means that the findings may not be generalizable to all contexts or all types of public transport.
- **Cross-Sectional Nature**: The cross-sectional nature of the study means that the findings are limited to one point in time and do not explore any causal relationships.
- **Context Specificity:** The research is conducted specifically in the context of APSRTC bus services, which means that the findings may not be directly applicable to other contexts or other types of public transport.

9. RECOMMENDATIONS FOR FUTURE RESEARCH

Based on the limitations of this research, and also on the areas that require further investigation, the following recommendations for future research are made:

- **Develop a Validated Instrument**: Future research should focus on developing and validating a reliable and valid instrument for measuring technology-enabled service quality in public transport.
- **Explore the Interplay with Customer Outcomes**: Future studies should explore the relationship between the dimensions of technology-enabled service quality, and also relevant customer outcomes, such as customer satisfaction and loyalty.
- **Test the Model in Different Contexts**: This study should be repeated across a variety of different contexts to allow for a more complete understanding of the generalizability of the model.
- **Use Longitudinal Studies**: Future research should use longitudinal studies to track the changing nature of customer perceptions and to identify causal relationships between service quality, and key outcomes such as satisfaction and customer loyalty.
- **Explore Other Mediating Factors**: Future studies should also explore other mediating factors that may influence the relationship between service quality and customer loyalty in technology driven public transport services.

REFERENCES

1. Bakar, M. F. A., Norhisham, S., Katman, H. Y., Fai, C. M., Azlan, N. N. I. M., & Samsudin, N. S. S. (2022). Service quality of bus performance in Asia
2. Bartlett, M. S. (1954). A note on the multiplying factors for various $\chi 2$ approximations. *Journal of the Royal Statistical Society*.
3. Bhatnagar, R., & Teo, T. S. (2011). An investigation of factors influencing the adoption of mobile payment in Singapore.
4. Bitner, M. J., Ostrom, A. L., & Morgan, F. N. (2000). Service blueprinting: a practical technique for service innovation. *California Management Review*, *42*(3), 66-94.
5. Burns, A. C., & Bush, R. F. (2002).
6. Camacho, T. D., Foth, M., & Rakotonirainy, A. (2012). Pervasive technology and public transport: Opportunities beyond telematics.
7. Cattell, R. B. (1966). The scree test for the number of factors.
8. Cheng, Y. H., & Huang, T. Y. (2013). High speed rail passengers' mobile ticketing adoption.
9. Churchill Jr, G. A. (1979). A paradigm for developing better measures of marketing constructs.
10. Collier, J. E., & Sherrell, D. L. (2010). Examining the influence of control on customers' acceptance of self-service technologies.
11. Cortina, J. M. (1993). What is coefficient alpha? An examination of theory and applications.
12. Costello, A. B., & Osborne, J. W. (2005). Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis

13. Cronin Jr, J. J., & Taylor, S. A. (1992). Measuring service quality: a reexamination and extension.
14. Cronin Jr, J. J., & Taylor, S. A. (1994). SERVPERF versus SERVQUAL: reconciling performance-based and perceptions-minus-expectations measurement of service quality.
15. Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches*.
16. Currie, G. (2005). Smart card ticketing for public transport and the future of urban public transport in the information age.
17. Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 319-340.
18. Deb, S., & Ahmed, M. A. (2018). Determining the service quality of the city bus service based on users' perceptions and expectations.
19. De Vaus, D. (2002). *Surveys in social research*. Psychology Press.
20. Eboli, L., & Mazzulla, G. (2007). Service quality attributes affecting customer satisfaction for bus transit.
21. Fabrigar, L. R., Wegener, D. T., MacCallum, R. C., & Strahan, E. J. (1999). Evaluating the use of exploratory factor analysis in psychological research.
22. Field, A. (2018). *Discovering statistics using IBM SPSS statistics*. Sage publications.
23. Ficko, S., & Kovacic, I. (2010). Evaluation of Passenger Satisfaction in Public Transport: A Case Study of Ljubljana.
24. Flynn, B. B., & Pearcy, D. H. (2001). Scale development in operations management research using a behavioral perspective.
25. Ford, J. B., Joseph, M., & Joseph, B. (1999). Importance-performance analysis as a strategic tool for service marketers: The case of service quality perceptions of business students in New Zealand and the USA.
26. Gefen, D., Karahanna, E., & Straub, D. W. (2003). Trust and TAM in online shopping: An integrated model. *MIS Quarterly*, *27*(1), 51-90.
27. Giannopoulos, G. A. (2004). The application of information and communication technologies in transport.
28. Gilbert, A. C., & Churchill Jr, G. A. (1979). Measuring and developing customer service.
29. Gronroos, C. (1984). A service quality model and its marketing implications.
30. Gronroos, C. (1988). New perspectives on marketing service
31. Guirao, B., García-Pastor, A., & López-Lambas, M. E. (2016). The importance of service quality attributes in public transportation:
32. Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2019).
33. Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2015).
34. Hensher, D. A., Stopher, P., & Bullock, P. (2003). Service quality—developing a service quality index in the provision of commercial bus contracts.
35. Hidayat, A. S., Nurhayati, N. S., Rismayani, R., & Diansyah, M. (2023). The Impact of Technology on E-Satisfaction and E-Loyalty with E-Service Quality and Perceived Price as Antecedents.
36. Hinkin, T. R. (1998). A brief tutorial on the development of measures for use in survey questionnaires. *Organizational Research Methods*, *1*(1), 104-121.
37. Hinkin, T. R., Tracey, J. B., & Enz, C. A. (1997). Scale construction: Developing reliable and valid measurement instruments
38. Hsu, C. L., & Tsai, Y. H. (2017). Effects of service quality on brand image, passenger satisfaction and loyalty in the airline industry
39. Jolliffe, I. T., & Cadima, J. (2016). Principal component analysis: a review and recent developments. *Philosophical Transactions of the Royal Society*
40. Kaiser, H. F. (1958). The varimax criterion for analytic rotation in factor analysis.
41. Kaiser, H. F. (1960). The application of electronic computers to factor analysis.
42. Kaplan, R. M., & Saccuzzo, D. P. (1993). *Psychological testing: Principles, applications, and issues*.
43. Khan, H. U. R., & Hussain, S. (2012). Passengers' perception of service quality and satisfaction in public transport.
44. Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and psychological measurement*, *30*(3), 607-610.

45. Kumar, A., & Sinha, P. K. (2012). Service quality and customer satisfaction in the Indian public transport sector.
46. Kumar, A., Singh, P., & Sharma, R. (2021). Impact of service quality on customer loyalty in the Indian public transport sector: the mediating role of customer satisfaction and brand image. *Benchmarking:*
47. Kuberkar, S., & Singhal, T. K. (2020). Factors influencing adoption intention of AI powered chatbot for public transport services within a smart city.
48. Lehtinen, U., & Lehtinen, J. R. (1991). Two approaches to service quality dimensions.
49. Leksono, R., Setyaningrum, D. K., & Nurhadi, I. (2019). The effect of service quality on passenger satisfaction and loyalty in public transportation.
50. Li, M., & Wu, H. (2012). Technology adoption and passenger safety in the transportation industry: Evidence from airlines.
51. Llusar, J. C., & Zornoza, A. (2002). A methodological approach to the design of questionnaires for measuring organizational climate.
52. Malhotra, N. K. (2010). *Marketing research: an applied orientation*.
53. Malhotra, N. K., & Dash, S. (2010). *Marketing research: an applied orientation*.
54. Meuter, M. L., Ostrom, A. L., Roundtree, R. I., & Bitner, M. J. (2000). Self-service technologies: understanding customer satisfaction with technology
55. Mojoodi, A., Najafizadeh, N. S., & Ghasemi, P. (2013). Service quality dimensions in technology-based banking: Impact on customer satisfaction and loyalty.
56. Natarajan, R., Sharma, A., & Gupta, S. (2013). Service quality in e-ticketing: An empirical study on passengers' perception.
57. Nelson, J. D., & Mulley, C. (2013). The impact of the application of new technology on public transport service provision and the passenger experience: A focus on implementation in Australia. *Research in Transportation Economics*, *39*(1), 300-308.
58. Nordin, N., & Norman, A. (2019). The Impact of Service Quality and Technology Adoption on Customer Satisfaction and Brand Image in Public Transport
59. Nunnally Jr, J. C. (1970). *Introduction to psychological measurement*.
60. Okazaki, S. (2008). Understanding mobile advertising adoption: a multi-country comparison.
61. Oliver, R. L. (1999). Whence consumer loyalty?. *Journal of Marketing*, *63*, 33-44.
62. Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1985). A conceptual model of service quality and its implications for future research.
63. Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1988). SERVQUAL: a multiple-item scale for measuring consumer perceptions of service quality
64. Parasuraman, A., Zeithaml, V. A., & Malhotra, A. (2005). E-S-QUAL a multiple-item scale for assessing electronic service quality.
65. Prioni, P., & Hensher, D. A. (2000). Measuring service quality in scheduled bus services. *Journal of Public transportation*, *3*(2), 51-74.
66. Rahi, S., Khan, M. S., & Ahmad, A. (2022). The influence of technology adoption on service quality and customer loyalty in the context of the Pakistan e-commerce.
67. Redman, L., Friman, M., Gärling, T., & Hartig, T. (2013). Quality attributes of public transport that attract car users: A research review.
68. Reichheld, F. F., & Teal, T. (1996). *The loyalty effect: The hidden force behind growth, profits, and lasting value*.
69. Reinders, M. J., Dabholkar, P. A., & Frambach, R. T. (2008). Consequences of forcing consumers to use technology-based self-service
70. Samat, N., Teo, T. S. H., & Lee, P. C. (2006). A Study of TQM in a University Environment.
71. Streiner, D. L. (2003). Starting at the beginning: An introduction to coefficient alpha and some common misconceptions. *Journal of Personality Assessment*, *80*(1), 99-103.
72. Tabachnick, B. G., & Fidell, L. S. (2019). *Using multivariate statistics*. Pearson Education.
73. Te Morsche, W., Puello, L. L. P., & Geurs, K. T. (2019). Potential uptake of adaptive transport services: An exploration of service attributes and attitudes.

74. Too, L., & Earl, G. (2010). Public transport service quality and sustainable development: a community stakeholder perspective.
75. Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view.
76. Watters, P. A., D'Este, G. M., & Taylor, M. A. (2013). Real-time information in urban public transport: a critical review. *Transport Reviews*, *33*(6), 666-689.