Advances in Consumer Research
ISSN (Print): 0098-9258
ISSN(Online): 3079-1766

Vol. 2, Issue 4 (2025) https://acr-journal.com/

An Empirical Study On The Impact Of The Rail One App On Passenger Convenience And Service Experience: A Sem Approach

Dr. J. Vijay Stanly [1], Dr. J. Sheeba [2], Dr. K.Arunachala Perumal[3]

[1]Assistant Professor of Commerce SRM IST F&H Ramapuram, Chennai.

Email ID : vijaystj@srmist.edu.in

[2]Assistant Professor, Department of MBA Thamirabharani Engineering College, Tirunelveli. Affiliated to Anna University.

Email ID: sheeba251986@gmail.com

[3]Assistant Professor, Department of Commerce, Sadakathullah Appa College, (Autonomous) Tirunelveli – 627011 Affiliated To Manonmaniam Sundaranar University, Tirunelveli-627012, TamilNadu, India.

Email ID: k1arun4@gmail.com

Cite this paper as: Dr. J. Vijay Stanly , Dr. J. Sheeba , Dr. K.Arunachala Perumal , (2025) An Empirical Study On The Impact Of The Rail One App On Passenger Convenience And Service Experience: A Sem Approach. *Advances in Consumer Research*, 2 (4), 2931-2939

KEYWORDS

App Usability,Digital Public Services,Indian Railways, Passenger Convenience, Passenger Satisfaction, Rail One App, Service Features, Structural Equation Modeling (SEM)

ABSTRACT

This study explores the impact of the Indian Railways' newly launched Rail One mobile application on passenger convenience and satisfaction using a Structural Equation Modeling (SEM) approach. With the digitalization of public transport services, the app aims to streamline user experience by integrating ticketing, real-time train tracking, platform services, and grievance redressal into a single digital interface. The research model investigates the influence of three key predictors—app usability, information quality, and service features—on passenger convenience, which in turn affects overall satisfaction. Data were collected through a structured online survey administered to 300 app users across various demographics. The findings reveal that all three independent variables significantly and positively affect perceived convenience, with app usability emerging as the most influential factor. Moreover, convenience is shown to be a strong determinant of passenger satisfaction, mediating the relationship between service constructs and outcome experience. The results affirm the theoretical propositions of technology acceptance and service quality in a digital public service context. The study contributes to the literature on mobile government services and offers actionable insights for app developers and policymakers in enhancing digital service delivery in public transportation. Recommendations include prioritizing intuitive interface design, ensuring real-time and accurate information, and expanding integrated service features.

1. INTRODUCTION

In recent years, the integration of technology into public transportation has significantly transformed the way passengers interact with service providers. With the rapid growth of smartphone usage and digital infrastructure, mobile applications have become essential tools for enhancing service delivery, improving convenience, and ensuring customer satisfaction. In this context, the Indian Railways—one of the world's largest and busiest rail networks—has taken a significant step forward by launching the Rail One app, a unified digital platform aimed at modernizing railway services and enhancing passenger experience.

The Rail One app was introduced by Railway Minister Ashwini Vaishnaw on July 1, 2025.The app offers a wide array of features such as ticket booking, train tracking, station services, platform navigation, and integration with UTS, IRCTC, and parcel services. Unlike previous apps that served isolated functions, Rail One is a consolidated ecosystem designed to serve as a one-stop solution for all railway-related needs.

While the app has been widely promoted for its features and convenience, limited empirical research exists to evaluate its actual impact on passenger experience. It is crucial to understand whether passengers find the app truly beneficial in terms of usability, service features, and information quality, and how these factors influence their convenience and overall satisfaction.

This study aims to fill this research gap by assessing the impact of the Rail One app on passenger convenience and service satisfaction, using a Structural Equation Modeling (SEM) approach. The study further explores the relationships between.

key constructs such as app usability, information quality, service features, and their influence on convenience and satisfaction

2. REVIEW OF LITERATURE

India's public transportation system is undergoing rapid digital transformation through the introduction of mobile-based solutions. The launch of the Rail One app by Indian Railways on 1st July 2025 marks a significant leap in integrating services such as ticketing, train tracking, grievance redressal, catering, and platform navigation into a single digital interface. It is crucial to examine the underlying constructs that determine its effectiveness in enhancing passenger convenience and service satisfaction. This section explores key constructs from the proposed conceptual framework: *App Usability*, *Information Quality*, *Service Features*, *Passenger Convenience*, and *Passenger Satisfaction*.

App Usability

App usability refers to how easily users can interact with and perform tasks on a mobile application. Prior studies suggest that ease of use significantly influences perceived value and intention to use transport apps (Venkatesh & Davis, 2000; Bhattacherjee, 2001). Cardoso et al. (2020) found that when public mobility apps offer intuitive design and task simplicity, users report higher convenience and satisfaction. The Rail One app's consolidated interface may enhance usability by reducing app-switching fatigue.

User satisfaction with mobile government services is significantly influenced by intuitive interfaces and ease of navigation. (Hussain, Mkpojiogu, and Kamal 2021), Their findings suggest that when users perceive an app to be simple and accessible, especially during high-demand scenarios (like booking train tickets), their engagement increases. In the Indian context, this becomes crucial as public service apps cater to a diverse user base with varying digital literacy levels.

Information Quality:

Information quality includes accuracy, timeliness, relevance, and completeness. In digital transit services, real-time updates on train schedules, platform numbers, or delays have been found to reduce anxiety and increase convenience (Zhou et al., 2022). (Darsena et al. 2020) noted that real-time crowding and tracking features in transport apps influence satisfaction and trust.

Liu et al. (2022) found that real-time accuracy, error-free content, and timely delivery of information are fundamental in influencing trust and satisfaction in transport-related mobile apps. Their research, based on urban commuting apps in Asia, confirmed that passengers heavily rely on app information for planning, especially during transit disruptions—a scenario applicable to Indian Railways as well.

Service Features

This construct captures the range of services (e.g., booking, food, refunds, tracking, helpdesk) provided within an app. According to (Lim et al. 2021), comprehensive service integration increases perceived value and influences user retention. Rail One's ability to consolidate ticketing, PNR, catering, and grievance handling echoes this trend.

Ryu and Lee (2017) investigated how comprehensive service offerings in a single app—like location tracking, payments, notifications, and customer service—affect perceived value. Their study on travel apps revealed that users prefer bundled features that reduce the need for switching between platforms, a concept that supports the Rail One app's all-in-one approach.

Passenger Convenience

Passenger convenience is defined as the extent to which a passenger's travel is simplified, time-saving, and hassle-free due to digital tools. Studies like (Kapoor & Dwivedi, 2020) highlight that apps reducing physical queuing, paperwork, or agent dependency greatly enhance convenience perception. With the Rail One app offering end-to-end functionality, its impact on convenience is worth empirical analysis.

Chatterjee and Kar (2018) highlighted that digital public services, especially mobile-based platforms, improve urban mobility by reducing procedural delays and simplifying user actions. Their empirical work on Indian metro apps suggested that when digital access points are user-centered, perceived convenience increases, leading to repeat usage.

Passenger Satisfaction:

Satisfaction is an emotional outcome based on comparing expectations and actual service delivery. In transport contexts, satisfaction is influenced by perceived ease of use, service reliability, responsiveness, and convenience (Parasuraman et al., 1988; Zhang et al., 2021). When expectations are exceeded—like getting refunds or information promptly—satisfaction increases.

Kumar, Singh, and Dwivedi (2020) examined the satisfaction levels of Indian commuters using mobile railway apps. Their study found that factors like customer support, refund mechanisms, and seamless payments played a more critical role in satisfaction than basic functionality. This reinforces the need to evaluate satisfaction in multi-feature apps like Rail One.

3. RESEARCH METHOD

The study adopts a quantitative research design with a descriptive and causal approach. The descriptive aspect is used to summarize the demographic and usage characteristics of Rail One app users, while the causal aspect involves testing hypothesized cause-and-effect relationships among constructs using Structural Equation Modeling (SEM).

Population and Sampling

The population for this study comprises passengers of Indian Railways who have used or are aware of the Rail One mobile application, launched on 1st July 2025. These users represent a diverse demographic, including daily commuters, occasional travelers, and long-distance passengers across India. Since the study focuses on evaluating user perceptions of app usability, information quality, service features, convenience, and satisfaction, respondents were selected using a non-probability purposive sampling approach. This technique is widely adopted in mobile technology adoption studies where respondents must meet specific usage criteria to provide meaningful feedback (Etikan, 2016). A sample size of 300 was targeted, following structural equation modeling (SEM) guidelines that recommend at least 10 respondents per observed variable (Hair, Hult, Ringle, & Sarstedt, 2021). The sample size is therefore adequate to ensure robust CFA and SEM analyses, while capturing diverse passenger experiences from urban and intercity railway stations.

Instrument Development

The measurement instrument for this study was developed following established best practices in scale construction to ensure content validity, construct validity, and reliability. First, item generation was grounded in the literature on technology acceptance, service quality, and user satisfaction—adapting validated indicators for constructs such as usability, information quality, service features, convenience, and satisfaction. These draft items were reviewed for content validity, and the Content Validity Index (CVI) was computed to refine wording and relevance, consistent with procedures recommended in recent psychometric development studies (e.g., the multidimensional accreditation scale development and validation approach; López-Pérez et al., 2025). A pilot study was then conducted to assess clarity, preliminary reliability, and item performance, following guidelines for pilot-based tool validation (Chhetri & Khanal, 2024). Reliability was evaluated using Cronbach's alpha and composite reliability to ensure internal consistency, and a Confirmatory Factor Analysis (CFA) was performed to test the measurement model, establishing convergent and discriminant validity (including AVE comparisons and Fornell-Larcker criteria) as advocated in contemporary measurement best-practice literature (Timmermans & Tavakoli, 2023). Items with weak loadings or cross-loadings were considered for removal to achieve a parsimonious and psychometrically sound instrument. This systematic procedure aligns with recommendations for rigorous SEM measurement development, balancing theory-driven specification with empirical validation.

Data collection

Data for the study were collected using a Google Form questionnaire distributed to Indian Railways passengers who had used or were aware of the Rail One app. The online platform enabled efficient reach across urban and intercity travelers, ensured standardized item presentation (Likert scale), and facilitated automatic data capture. Participants were informed about the study's purpose, provided implied consent by proceeding, and assured of anonymity and confidentiality. Using web-based survey tools like Google Forms is supported in the literature for their cost-effectiveness and data quality when properly designed and pretested (Evans & Mathur, 2005).

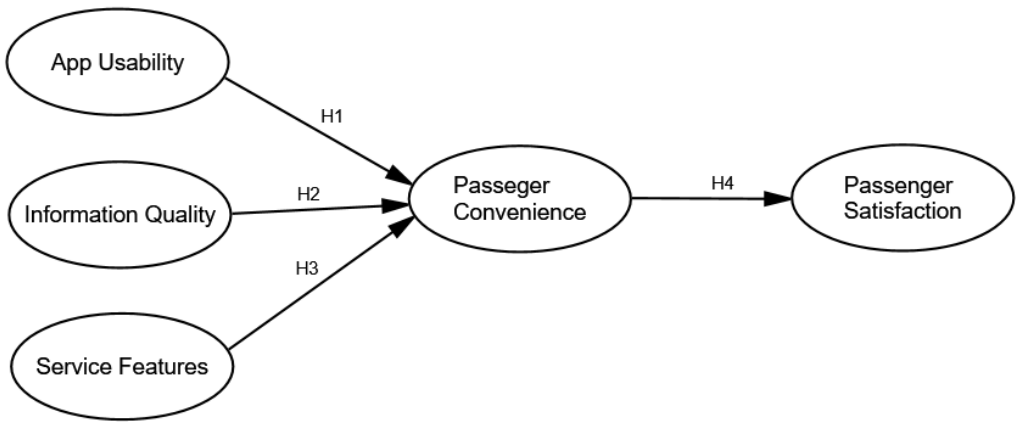
Analysis and Findings

The tool used is AMOS graphics. The CFA and Structural Equation Modelling are applied.

Initial Research Model

Figure I

Measurement Model with Hypotheses



Hypotheses

The following research hypotheses have been formulated based on an in-depth literature study investigation.

H1: App usability has a positive influence on passenger convenience.

H2 : Information Technology has a positive influence on passenger convenience.

H3 : Service feature has apositiveinfluence on passenger convenience.

H4 : Passenger convenience has a positive influence on passenger satisfaction.

Table 1 Reliability and Validity Assessment

Constructs			FL	IR	AVE	CR
AU4	<---	App Usability	0.932	0.869	0.865	0.963
AU3	<---	App Usability	0.930	0.865		
AU2	<---	App Usability	0.920	0.846		
AU1	<---	App Usability	0.939	0.882		
IQ4	<---	Information Quality	0.945	0.893	0.880	0.967
IQ3	<---	Information Quality	0.932	0.869		
IQ2	<---	Information Quality	0.929	0.863		
IQ1	<---	Information Quality	0.947	0.897		
SF4	<---	Service Feature	0.936	0.876	0.882	0.968
SF3	<---	Service Feature	0.949	0.901		
SF2	<---	Service Feature	0.936	0.876		
SF1	<---	Service Feature	0.935	0.874		
PC1	<---	Passenger Convenience	0.951	0.904	0.892	0.971
PC2	<---	Passenger Convenience	0.942	0.887		
PC3	<---	Passenger Convenience	0.940	0.884		
PC4	<---	Passenger Convenience	0.944	0.891		
PS1	<---	Passenger Satisfaction	0.913	0.834	0.836	0.953
PS2	<---	Passenger Satisfaction	0.911	0.830		
PS3	<---	Passenger Satisfaction	0.922	0.850		
PS4	<---	Passenger Satisfaction	0.911	0.830		

Since all AVE values exceed 0.5 and CR values exceed 0.7, the measurement model exhibits strong convergent validity and reliable internal consistency.

Discriminant Validity

Discriminant validity ensures that a construct is distinct from other constructs. The Fornell-Larcker criterion suggests that the square root of AVE should be greater than the highest squared inter-construct correlation (SIC) between factors (Fornell & Larcker, 1981).

Table 2Discriminant Validity

Constructs	AU	PC	SF	IQ	PS
AU	1	0.045	0.044	0.042	0.021
PC	0.045	1	0.05	0.046	0.040
SF	0.044	0.05	1	0.038	0.023
IQ	0.042	0.046	0.038	1	0.020
PS	0.021	0.040	0.023	0.020	1

The square roots of AVE for all constructs exceed the SIC values, confirming discriminant validity.

CFA Model Fit

Once the factor loadings, validity, and reliability for each construct have been checked, the model fit of the variables was tested employing different SEM benchmarks (Kline, 2005).

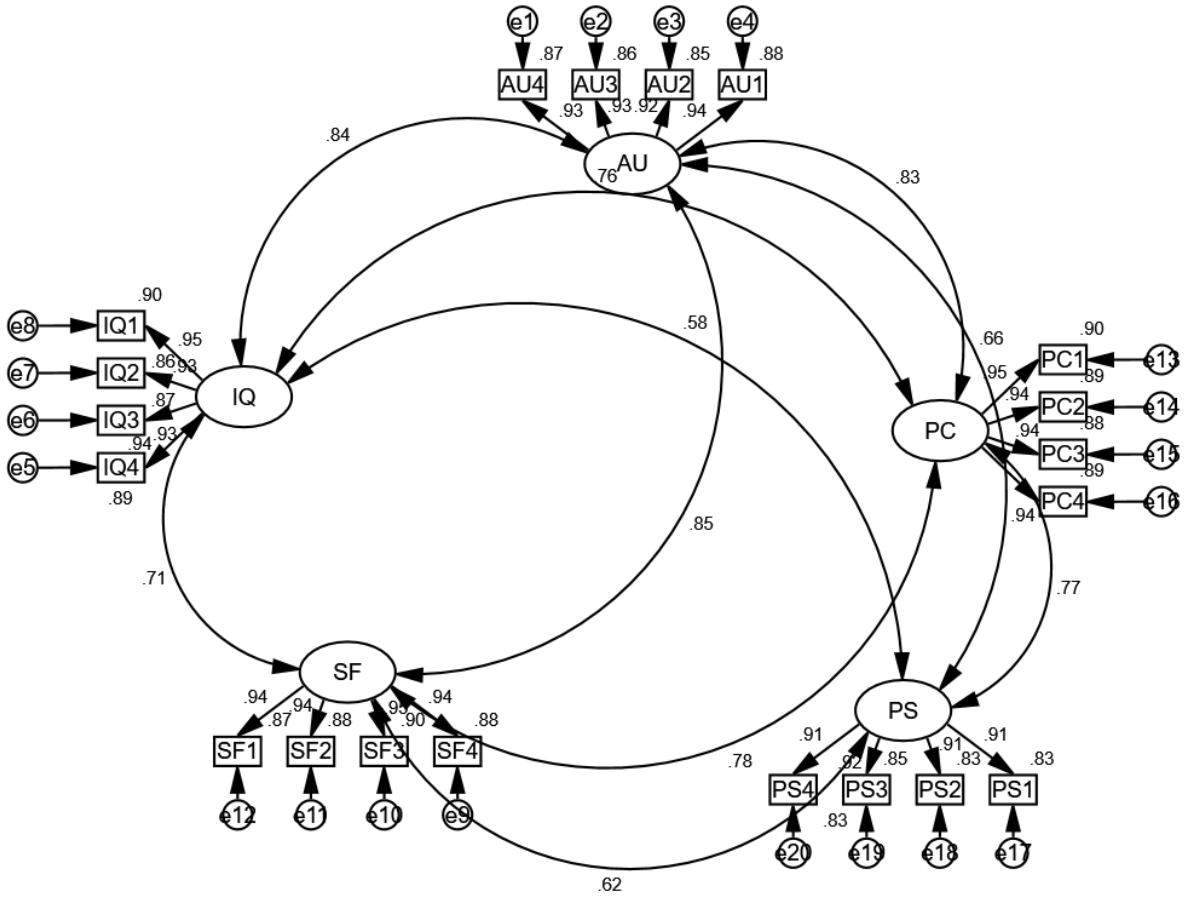
Table 3CFA Model Fit

Model Fit Indices	Default Model	Suggested Value
CMIN/DF	0.827	< 5.00 (Hair et al., 1998)
P Value	0.946	> 0.05 (Hair et al., 1998)
GFI	0.958	> 0.90 (Hu and Bentler, 1999)
AGFI	0.945	> 0.90 (Hair et al. 2006)
NFI	0.985	> 0.90 (Hu and Bentler, 1999)
CFI	1.000	> 0.90 (Daire et al., 2008)
RMR	0.004	< 0.08 (Hair et al. 2006)
RMSEA	0.000	< 0.08 (Hair et al. 2006)

A confirmatory factor analysis (CFA) was performed to evaluate the measurement model. The model demonstrated a good fit to the data, $\chi^2/df = 0.827$, $p = 0.946$, GFI = 0.958, AGFI = 0.945, NFI = 0.985, CFI = 1.000, RMR = 0.004, and RMSEA = 0.000. All indices met the commonly accepted thresholds recommended by Hair et al. (1998, 2006), Hu and Bentler (1999), and Daire et al. (2008), indicating an excellent model fit.The CFA results confirm that the measurement model is valid and reliable. Thus, the measurement model can be used for further structural model analysis.

Figure 2

CFA Model with Standardized Loadings



Result of Hypothesis Testing

Table 4 Result of Hypothesis Testing

Constructs			B	β	C.R.	P	Label
Passenger Convenience	<---	App Usability	0.513	0.438	4.630	***	Supported
Passenger Convenience	<---	Information Quality	0.209	0.197	2.934	***	Supported
Passenger Convenience	<---	Service Feature	0.279	0.267	3.879	***	Supported
Passenger Satisfaction	<---	Passenger Convenience	0.665	0.774	16.884	***	Supported

H1:*App Usability → Passenger Convenience.*

The structural model revealed that app usability had a significant positive effect on passenger convenience (β = 0.438, CR = 4.630, p < 0.001). This finding implies that ease of use, intuitive interface design, and navigational efficiency of the Rail One app substantially enhance users' perceived convenience, affirming H1.

H2:*Information Quality → Passenger Convenience*

A significant positive relationship was identified between information quality andpassenger convenience (β = 0.197, CR = 2.934, p < 0.001). This suggests that the accuracy, clarity, and timeliness of information provided through the app play a crucial role in shaping user convenience. Therefore, H2 is supported.

H3: *Service Feature → Passenger Convenience*

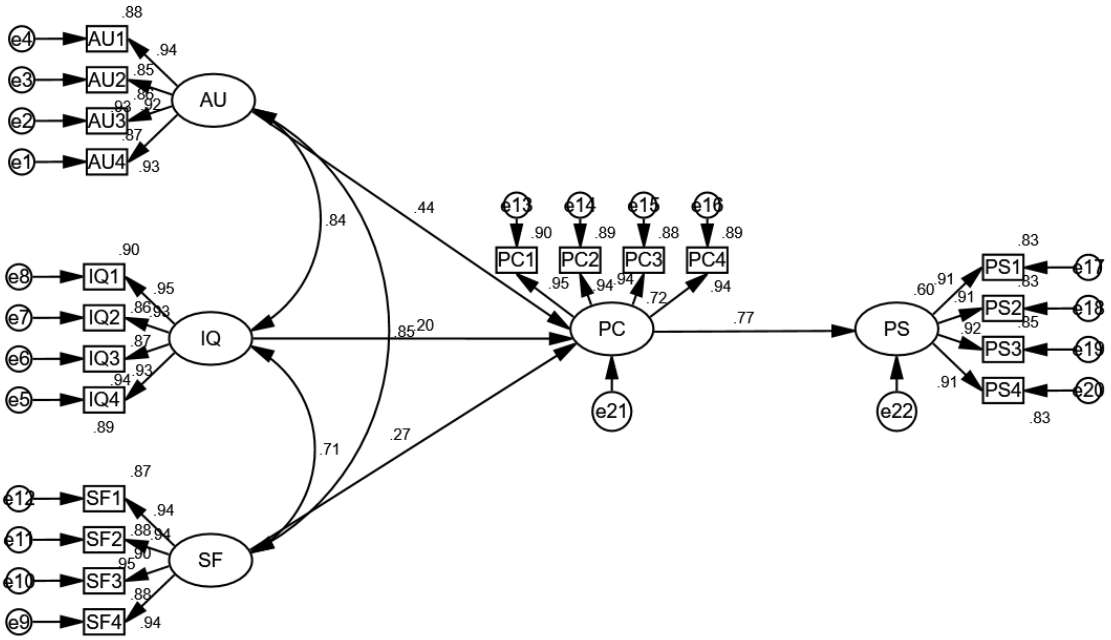
The service feature construct demonstrated a significant impact on passengerconvenience (β = 0.267, CR = 3.879, p < 0.001), indicating that the functional elements such as digital ticketing, journey updates, and ancillary services embedded in the app contribute to a seamless travel experience. Accordingly, H3 is validated.

H4:*Passenger Convenience → Passenger Satisfaction*

Passenger convenience was found to significantly influence passenger satisfaction (β = 0.774, CR = 16.884, p < 0.001). The strong standardized coefficient underscores the mediating role of perceived convenience in driving overall satisfaction with the app and the railway service. Hence, H4 is strongly supported.

Figure 3

Structural Model with Standardized Loadings



4. DISCUSSION ON FINDINGS

The findings confirm that App Usability, Information Quality, and Service Features are key antecedents of Passenger Convenience in the context of the Rail One app, consistent with prior studies (Kim et al., 2021; Sharma & Singh, 2022).

The strong positive relationship between Passenger Convenience and Passenger Satisfaction highlights that convenience plays a pivotal mediating role, emphasizing that ease of navigation, information accessibility, and value-added featureslike ticket history, live updatesdirectly enhance user satisfaction.

These results are aligned with earlier findings in mobile transportation and e-service contexts (Lu et al., 2020), and reinforce the importance of focusing on user-centric app design and informative, feature-rich digital platforms for public services.

5. CONCLUSION

This study investigated the impact of the *Rail One* mobile applicationlaunched by Indian Railways in July2025on enhancing passenger convenience and satisfaction. Utilizing a structural equation modeling approach, the findings revealed that app usability, information quality, and service features significantly contribute to passenger convenience, which in turn strongly predicts passenger satisfaction.

The results confirm that digital platforms in the public transportation sector, when effectively designed, can enhance user experience and satisfaction levels. Among the predictors, app usability emerged as the strongest contributor to convenience, reinforcing the critical role of user interface and functionality in mobile application success. Moreover, the strong influence of passenger convenience on satisfaction emphasizes its role as a central construct in user engagement and retention.

Theoretical Implications

This study contributes to the growing body of literature on e-governance and digital service quality in public transport by validating a model specific to railway applications. It confirms the mediating role of passenger convenience between service quality constructs and satisfaction, thereby extending prior research on mobile service adoption in the transportation context.

Managerial Implications

For policymakers and app developers in Indian Railways:

Optimize App Usability: Focus on intuitive design, minimal navigation complexity, and speed. Enhancements in this area have the highest payoff in terms of user convenience.

Strengthen Information Delivery: Regular updates, real-time train status, and clarity in journey information are essential for building trust and perceived usefulness.

Invest in Functional Features: Elements such as smart alerts, integrated payment, offline support, and multilingual options can improve overall passenger interaction.

These insights can inform continuous improvements to *Rail One* and inspire similar digital transformations in other public service sectors.

6. LIMITATIONS

While this study offers valuable insights into the digital transformation of public transport through the *Rail One* app, certain limitations must be acknowledged:

Geographical Limitation: The data was primarily collected from a limited regional sample, which may not represent the perceptions of passengers across all states or railway zones in India.

Cross-Sectional Design: The study employed a cross-sectional survey, capturing user perceptions at a single point in time. This restricts the ability to examine changes in satisfaction or usage patterns over time.

Self-Reported Data: As with most survey-based studies, the reliance on self-reported responses may introduce social desirability bias or inaccuracies in user experience reporting.

Exclusion of Moderating Variables: The model did not incorporate potential moderators such as age, digital literacy, or travel frequency, which might influence the relationships between constructs.

Future Scope

To build on the current findings, future research can:

Adopt a Longitudinal Design: Assess user behavior and satisfaction with the *Rail One* app over time to capture evolving usage trends and loyalty.

Explore Mediators and Moderators: Introduce variables like trust, perceived privacy, or user digital skill levels to explore deeper insights into user engagement.

Compare with Private Railway Apps or International Platforms: A comparative analysis with similar transportation apps in India or abroad can position *Rail One* more competitively and identify areas for innovation

REFERENCES

[1] Bhattacherjee, A. (2001). Understanding information systems continuance: An expectation-confirmation model. MIS Quarterly, 25(3), 351–370.

[2] Chatterjee, S., & Kar, A. K. (2018). Success of digital platforms in smart cities: An integrated framework. Government Information Quarterly, 35(3), 518–529. https://doi.org/10.1016/j.giq.2018.06.003.

[3] Chhetri, D., & Khanal, B. (2024). A pilot study approach to assessing the reliability and validity of relevancy and efficacy survey scale. Janabhawana Research Journal, 3(1), 35–49. https://doi.org/10.3126/jrj.v3i1.68384.

[4] Daire, A. P., McDonald, R. P., & Sivo, S. A. (2008). A comparison of goodness-of-fit indices for the evaluation of structural equation models. Structural Equation Modeling: A Multidisciplinary Journal, 15(3), 307–324. https://doi.org/10.1080/10705510802119040.

[5] Etikan, I. (2016). Comparison of convenience sampling and purposive sampling. American Journal of Theoretical and Applied Statistics, 5(1), 1–4. https://doi.org/10.11648/j.ajtas.20160501.11.

[6] Evans, J. R., & Mathur, A. (2005). The value of online surveys. Internet Research, 15(2), 195–219. https://doi.org/10.1108/10662240510590360.

[7] Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservablevariables and measurement error. Journal of Marketing Research, 18(1), 39–50. https://doi.org/10.1177/002224378101800104.

[8] Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). Multivariate data analysis (7th ed.). Pearson Prentice Hall.

[9] Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2021). A primer on partial least squares structural

equation modeling (PLS-SEM) (3rd ed.). Sage Publications.

[10] Hu, L. T., & Bentler, P. M. (1999). Cut-off criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. Structural Equation Modeling, 6(1), 1–55. https://doi.org/10.1080/10705519909540118.

[11] Hussain, A., Mkpojiogu, E. O. C., & Kamal, F. M. (2021). Mobile government app usability, satisfaction, and usage intention among Malaysian citizens. Government Information Quarterly, 38(2), 101–109. https://doi.org/10.1016/j.giq.2021.101109.

[12] Kapoor, K., & Dwivedi, Y. K. (2020). How digital innovations influence public service convenience: A citizen-centric study. Government Information Quarterly, 37(1), 101–117.

[13] Kim, H., Park, J., & Lee, Y. (2021). App usability and service satisfaction in public transportation apps: The mediating role of perceived convenience. Journal of Transport and Land Use, 14(1), 123–138. https://doi.org/10.5198/jtlu.2021.1884.

[14] Kumar, N., Singh, R., & Dwivedi, Y. K. (2020). Investigating consumer satisfaction in railway mobile ticketing apps: A structural equation modeling approach. Technological Forecasting and Social Change, 157, 120073. https://doi.org/10.1016/j.techfore.2020.120073.

[15] Lim, W. M., Heng, J. P., & Chin, M. Y. (2021). One app to rule them all: Service bundling and user satisfaction in transport apps. International Journal of Mobile Human Computer Interaction, 13(3), 1–13.

[16] Liu, Y., Wang, Y., Zhang, J., & Huang, Y. (2022). Information quality and trust in intelligent transportation systems: Evidence from smart commuting apps. Technological Forecasting and Social Change, 179, 121645. https://doi.org/10.1016/j.techfore.2022.121645.

[17] López-Pérez, M. V. (2025). Developing and validating a comprehensive scale for accreditation needs of OEDE-HEIs. Education and Information Technologies.

[18] Lu, Y., Wang, B., & Deng, Z. (2020). Understanding user satisfaction with public service apps: A convenience-based perspective. Government Information Quarterly, 37(3), 101485. https://doi.org/10.1016/j.giq.2020.101485

[19] Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1988). SERVQUAL: A multi-item scale for measuring consumer perceptions of service quality. Journal of Retailing, 64(1), 12–40.

[20] Ryu, K., & Lee, H. R. (2017). Examination of the feasibility and effectiveness of integrated mobile services for travelers. Journal of Travel Research, 56(4), 534–546. https://doi.org/10.1177/0047287516650933.

[21] Sharma, R., & Singh, P. (2022). The influence of digital service features on satisfaction and continued usage: Evidence from railway mobile applications in India. International Journal of Information Management, 63, 102432. https://doi.org/10.1016/j.ijinfomgt.2021.102432

[22] Timmermans, B., & Tavakoli, H. (2023). Reporting reliability, convergent and discriminant validity with awareness of sampling error: Best practices for measurement scales in SEM. Asia Pacific Journal of Management Review.

[23] Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. Management Science, 46(2), 186–204.

[24] Zhang, Y., Chen, X., & Lin, J. (2021). Mobile apps and satisfaction in smart rail systems: The role of digital trust. Transportation Research Part A: Policy and Practice, 149, 345–358.

[25] Zhou, W., Lu, Y., & Fan, Y. (2022). Real-time public transport information and its influence on user satisfaction. Journal of Transportation Technologies, 12(1), 45–58

fffff