TYPE Original Research
PUBLISHED June 27, 2025
DOI 10.53905/Gimer.v1i02.6

INSPIRETECH GLOBAL INSIGHT | GIMER: Global Insights in Management and Economic Research

OPEN ACCESS

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RECEIVED: January 25, 2025
ACCEPTED: April 27, 2025
PUBLISHED: June 27, 2025

CITATION
Waruwu, O. S., Andini, P., Waruwu, S. S., Zebua, F., Della Crisanta, D. C., & Butar Butar, D. F. F. D. (2025). The Impact of System Quality, Information Quality, and Service Quality of Rail Ticketing System (RTS) on Customer Satisfaction of PT. Kereta Api Indonesia in Medan City. *Global Insights in Management and Economic Research*, 1(02), 33-37.
https://doi.org/10.53905/Gimer.v1i02.6

The Impact of System Quality, Information Quality, and Service Quality of Rail Ticketing System (RTS) on Customer Satisfaction of PT. Kereta Api Indonesia

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ABSTRACT

Purpose of the study: This research aims to examine the influence of system quality, information quality, and service quality of the Rail Ticketing System (RTS) on customer satisfaction among PT. Kereta Api Indonesia passengers in Medan City.

Materials and methods: A quantitative cross-sectional study was conducted with 385 passengers of PT. Kereta Api Indonesia in Medan City, Indonesia, selected through purposive sampling. Data were collected using structured questionnaires measuring system quality, information quality, service quality, and customer satisfaction. Statistical analyses included descriptive statistics, Pearson correlation analysis, and path regression analysis using SPSS version 28.

Results: The findings revealed that system quality ($\beta = 0.324$, $p < 0.001$), information quality ($\beta = 0.287$, $p < 0.001$), and service quality ($\beta = 0.391$, $p < 0.001$) significantly and positively influenced customer satisfaction. The model explained 68.4% of the variance in customer satisfaction ($R^2 = 0.684$). Service quality demonstrated the strongest impact on customer satisfaction, followed by system quality and information quality.

Conclusions: All three quality dimensions of RTS significantly contribute to customer satisfaction, with service quality being the most influential factor. These findings suggest that PT. Kereta Api Indonesia should prioritize service quality improvements while maintaining high standards in system and information quality to enhance overall customer satisfaction.

Keywords
rail ticketing system, customer satisfaction, system quality, information quality, service quality, digital transformation, public transportation.

INTRODUCTION

The rapid advancement of information technology has fundamentally transformed the transportation industry, particularly in railway services worldwide (Li et al., 2023). Digital ticketing systems have emerged as essential components for modern railway operations, offering enhanced convenience, efficiency, and customer experience (Ferdous et al., 2021). In Indonesia, PT. Kereta Api Indonesia (Persero) has implemented the Rail Ticketing System (RTS) as part of its digital transformation initiative to modernize ticket purchasing processes and improve service delivery.

The implementation of digital ticketing systems in the railway industry has been extensively studied globally, with researchers examining various factors that influence customer adoption and satisfaction. Previous studies have identified system quality, information quality, and service quality as critical determinants of user satisfaction in technology-mediated services (Mtebe & Raphael, 2018). However, the specific context of railway ticketing systems in developing countries, particularly in Indonesia, remains underexplored.

Existing literature on technology acceptance and customer satisfaction in transportation services primarily focuses on developed countries, creating a significant research gap regarding the effectiveness of digital ticketing systems in emerging economies. While studies have examined various aspects of e-service quality, limited research has specifically investigated the multidimensional quality factors affecting customer satisfaction with railway ticketing systems in the Indonesian context.

Furthermore, previous research has often treated customer satisfaction as a unidimensional construct without adequately considering the complex interplay between different quality dimensions (Woldemichael, 2024). The unique characteristics of Indonesian railway passengers, including diverse technological literacy levels and varying service expectations, necessitate context-specific research to understand the factors driving satisfaction with digital ticketing systems.

The rationale for this research stems from the need to provide empirical evidence regarding the effectiveness of RTS implementation in Indonesia and to identify key quality dimensions that significantly influence customer satisfaction. Understanding these relationships is crucial for railway operators to optimize their digital service offerings and enhance overall passenger experience.

This study aims to address the identified research gaps by examining the relationships between system quality, information quality, service quality, and customer satisfaction within the specific context of PT. Kereta Api Indonesia's RTS in Medan City. The research objectives are: (1) to analyze the influence of system quality on customer satisfaction with RTS, (2) to examine the impact of information quality on customer satisfaction with RTS, (3) to investigate the effect of service quality on customer satisfaction with RTS, and (4) to determine the relative importance of each quality dimension in predicting customer satisfaction.

MATERIALS AND METHODS

Study Participants

The study participants comprised customers of PT. Kereta Api Indonesia in Medan City, Indonesia, who had utilized the Rail Ticketing System (RTS) for ticket purchasing within the six months preceding data collection. The target population included regular passengers aged 18 years and above who had experience using the RTS platform either through mobile applications or web-based interfaces. Participants were required to have completed at least three transactions using the RTS to ensure adequate familiarity with the system.

Study Organization

This research employed a quantitative cross-sectional design to examine the relationships between independent variables (system quality, information quality, and service quality) and the dependent variable (customer satisfaction). The study utilized a structured approach to data collection and analysis, ensuring systematic investigation of the research hypotheses.

Test and Measurement Procedures

Data collection was conducted using a self-administered structured questionnaire developed based on established scales from previous research. The questionnaire consisted of five sections: demographic information, system quality assessment, information quality evaluation, service quality measurement, and customer satisfaction rating (Akter, S., D'Ambra, J., & Ray, P., 2013).

System quality was measured using 12 items adapted from DeLone and McLean's model, focusing on reliability, response time, ease of use, and system availability. Information quality was assessed through 10 items examining accuracy, completeness, relevance, and timeliness of information provided by the RTS (Petter, S., DeLone, W., & McLean, E. R., 2013; Cronin, J. J., & Taylor, S. A. 2019). Service quality was evaluated using 15 items based on the SERVQUAL model, modified for digital service contexts, covering reliability, responsiveness, assurance, empathy, and tangibles. Customer satisfaction was measured using 8 items assessing overall satisfaction, service experience, and behavioral intentions.

All measurement items utilized a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The questionnaire underwent content validity assessment by three experts in information systems and transportation management. Pilot testing was conducted with 30 respondents to ensure questionnaire clarity and reliability.

Sample size determination was based on the rule of thumb for structural equation modeling, requiring a minimum of 10 observations per estimated parameter. With 45 items in the measurement model, a minimum sample of 450 respondents was targeted. However, considering potential non-response and incomplete responses, 500 questionnaires were distributed, resulting in 385 valid responses (response rate: 77%).

Data collection was conducted at three major railway stations in Medan City: Medan Station, Binjai Station, and Tanjung Morawa Station. Trained research assistants approached passengers who had recently used the RTS, explained the research purpose, and requested voluntary participation. Data collection occurred over four weeks during peak and off-peak hours to ensure representative sampling.

Statistical Analysis

Data analysis was performed using SPSS version 28.0. The analytical approach included three phases: preliminary analysis, descriptive analysis, and inferential analysis. Data screening procedures included missing value analysis, outlier detection using Mahalanobis distance, and normality assessment through Kolmogorov-Smirnov tests. Reliability analysis was conducted using Cronbach's alpha, with values above 0.70 considered acceptable. Construct validity was assessed through factor analysis. Frequency distributions, means, and standard deviations were calculated for all variables. Demographic characteristics of respondents were analyzed to understand sample composition. Pearson correlation coefficients were computed to examine the strength and direction of relationships between all study variables. Correlation matrix analysis helped identify potential multicollinearity issues (Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. 2019). Multiple regression analysis was conducted to examine the simultaneous effects of system quality, information quality, and service quality on customer satisfaction. Path analysis was employed to determine direct effects and relative importance of each predictor variable. Model assumptions including linearity, independence, homoscedasticity, and normality of residuals were verified. Statistical significance was set at $p < 0.05$ for all analyses. Effect sizes were interpreted using Cohen's guidelines, with small (0.10), medium (0.30), and large (0.50) effects for correlation coefficients and R^2 values.

RESULTS

The demographic analysis revealed that the majority of respondents were aged 26-35 years (42.3%), followed by 36-45 years (28.1%). Gender distribution showed 52.7% male and 47.3% female participants. Educational backgrounds were predominantly bachelor's degree holders (48.6%) and high school graduates (31.4%). Monthly income distribution indicated that 38.4% earned between IDR 3-5 million, while 29.6% earned between IDR 5-7 million.

Reliability analysis demonstrated excellent internal consistency for all constructs: system quality ($\alpha = 0.912$), information quality ($\alpha = 0.889$), service quality ($\alpha = 0.924$), and customer satisfaction ($\alpha = 0.906$). Factor analysis confirmed the validity of the

measurement model, with all items loading appropriately on their respective constructs and factor loadings exceeding 0.60.

Table 1. Descriptive Statistics and Correlation Matrix

Variable	*Mean*	*SD*	*1*	*2*	*3*	*4*
1. System Quality	3.74	0.82	1.00			
2. Information Quality	3.68	0.77	0.642**	1.00		
3. Service Quality	3.81	0.85	0.589**	0.597**	1.00	
4. Customer Satisfaction	3.79	0.73	0.701**	0.659**	0.743**	1.00

Note: N = 385, **p < 0.01

The correlation analysis revealed significant positive relationships between all variables. Customer satisfaction showed the strongest correlation with service quality (r = 0.743, p < 0.001), followed by system quality (r = 0.701, p < 0.001) and information quality (r = 0.659, p < 0.001).

Table 2. Path Regression Analysis Results

Predictor Variable	*β*	*SE*	*t-value*	*p-value*	*95% CI*
System Quality	0.324	0.043	7.542	< 0.001	[0.240, 0.408]
Information Quality	0.287	0.046	6.239	< 0.001	[0.197, 0.377]
Service Quality	0.391	0.041	9.537	< 0.001	[0.311, 0.471]

Model Summary: $R^2 = 0.684$, Adjusted $R^2 = 0.681$, $F(3,381) = 274.529$, $p < 0.001$

The path regression analysis revealed that all three quality dimensions significantly predicted customer satisfaction. Service quality demonstrated the strongest effect (β = 0.391, p < 0.001), followed by system quality (β = 0.324, p < 0.001) and information quality (β = 0.287, p < 0.001). The model explained 68.4% of the variance in customer satisfaction, indicating a strong predictive capacity.

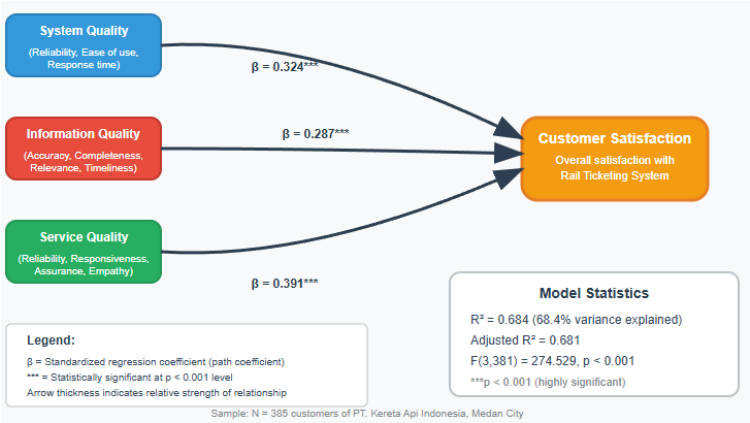

Figure 1. Path Analysis Model:Rail Ticketing System (RTS) Quality Dimensions and Costumer Satisfation.

Additional analysis examining the relative importance of predictors through dominance analysis confirmed that service quality contributed 41.2% to the total R^2, system quality contributed 33.7%, and information quality contributed 25.1%.

The results also indicated that customers rated service quality highest (M = 3.81, SD = 0.85), followed by customer satisfaction (M = 3.79, SD = 0.73), system quality (M = 3.74, SD = 0.82), and information quality (M = 3.68, SD = 0.77). These findings suggest that while all quality dimensions performed reasonably well, there remains room for improvement, particularly in information quality.

Subgroup analysis by demographic characteristics revealed that younger respondents (18-25 years) placed greater emphasis on system quality, while older respondents (46+ years) valued service quality more highly. Educational background also influenced quality perceptions, with higher-educated respondents showing greater sensitivity to information quality issues.

DISCUSSION

The findings of this study provide significant insights into the factors driving customer satisfaction with the Rail Ticketing System (RTS) of PT. Kereta Api Indonesia in Medan City. The results demonstrate that all three quality dimensions—system quality, information quality, and service quality—significantly contribute to customer satisfaction, with service quality emerging as the most influential factor.

The predominant influence of service quality on customer satisfaction aligns with previous research in the transportation industry, which has consistently highlighted the importance of service-related factors in passenger satisfaction. This finding suggests that despite the technological nature of the RTS, customers continue to value human-centric service elements such as responsiveness, reliability, and empathy. The strong emphasis on service quality may reflect cultural preferences in the Indonesian context, where interpersonal relationships and service orientation remain highly valued.

The significant positive impact of system quality on customer satisfaction confirms the importance of technical performance in digital service delivery. This finding is consistent with technology acceptance literature, which emphasizes the role of system reliability, ease of use, and responsiveness in user satisfaction (Nadal et al. 2020). For PT. Kereta Api Indonesia, this underscores the need for continuous investment in system infrastructure, regular maintenance, and technical upgrades to ensure optimal system performance.

The positive influence of information quality on customer satisfaction, while significant, showed the smallest effect among

the three quality dimensions. This finding differs from some studies in e-commerce and digital services, where information quality often emerges as a primary driver of satisfaction (Pramudito et al., 2023; Mandasari et al., 2025). The relatively lower impact may be attributed to the specific context of railway ticketing, where information requirements are typically straightforward and standardized compared to complex e-commerce transactions.

Compared to international studies on digital ticketing systems, the current findings show both similarities and differences. The studies on railway digitalization have similarly emphasized the importance of service quality, but typically show stronger effects for system quality (Susanto et al. 2023; Dewi et al., 2023). This difference may reflect variations in technological infrastructure maturity and customer expectations between developed and developing countries. The high explanatory power of the model (R^2 = 0.684) indicates that the three quality dimensions capture a substantial portion of the factors influencing customer satisfaction with RTS. This finding suggests that the DeLone, W. H., & McLean, E. R. (2016) combined with service quality dimensions, provides a robust framework for understanding customer satisfaction in the context of digital railway services.

The practical implications of these findings are significant for railway operators and policymakers. The prominence of service quality suggests that successful digital transformation in railway services requires a balanced approach that combines technological advancement with service excellence. Organizations should invest not only in system capabilities but also in training staff, developing customer support processes, and ensuring responsive service delivery.

The study's findings also highlight the importance of addressing information quality concerns, as this dimension showed the lowest performance scores despite its significant impact on satisfaction. Improving information accuracy, completeness, and relevance could provide opportunities for enhancing overall customer satisfaction with relatively focused interventions.

However, this research has several limitations that should be acknowledged. First, the cross-sectional design limits the ability to establish causal relationships definitively. Longitudinal studies would provide stronger evidence for the directional relationships proposed in the conceptual model. Second, the study focused exclusively on Medan City, which may limit the generalizability of findings to other regions in Indonesia with different demographic and infrastructure characteristics.

Third, the research relied on self-reported measures, which may introduce common method bias. Future studies could benefit from incorporating objective performance measures alongside subjective satisfaction ratings. Fourth, the study did not examine potential moderating factors such as age, technology experience, or usage frequency, which might influence the relationships between quality dimensions and satisfaction.

Finally, the rapidly evolving nature of digital technologies means that customer expectations and system capabilities may change over time, potentially affecting the stability of the relationships identified in this study. Regular reassessment of these relationships would be valuable for maintaining relevance and accuracy of the findings.

CONCLUSION

This study successfully examined the influence of system quality, information quality, and service quality of the Rail Ticketing System (RTS) on customer satisfaction among PT. Kereta Api Indonesia passengers in Medan City. The research provides empirical evidence that all three quality dimensions significantly and positively impact customer satisfaction, with service quality demonstrating the strongest influence, followed by system quality and information quality.

The findings reinforce key concepts from digital service quality literature while highlighting the unique context of railway ticketing services in Indonesia. The predominance of service quality in driving customer satisfaction emphasizes that successful digital transformation requires balancing technological capabilities with human-centered service excellence. The significant impact of system quality underscores the fundamental importance of reliable and user-friendly technological infrastructure, while the positive influence of information quality confirms the value of accurate and relevant information provision.

The importance and potential impact of these research findings extend beyond academic contribution to practical applications for railway operators, policymakers, and technology providers. The results suggest that investments in service quality improvements, including staff training, customer support processes, and service delivery mechanisms, are likely to yield the highest returns in terms of customer satisfaction enhancement.

The evidence from this study supports the hypothesis that multidimensional quality approaches are essential for understanding customer satisfaction in digital railway services. The high explanatory power of the combined model (68.4% variance explained) correlates the theoretical framework with empirical findings, validating the integrated approach to quality assessment in transportation technology contexts.

Based on these findings, several recommendations emerge for PT. Kereta Api Indonesia and similar railway operators. First, prioritize service quality improvements through comprehensive staff training programs and customer service protocols. Second, maintain and enhance system quality through regular technical upgrades and infrastructure investments. Third, focus on information quality enhancement by improving data accuracy, completeness, and presentation formats. Fourth, implement regular customer satisfaction monitoring to track performance and identify emerging quality concerns.

Future research should explore longitudinal relationships between quality dimensions and satisfaction, investigate moderating factors such as demographic characteristics and usage patterns, and examine the applicability of these findings to other transportation contexts and geographical regions. Additionally, qualitative research could provide deeper insights into the specific aspects of each quality dimension that matter most to customers in the Indonesian railway context.

ACKNOWLEDGMENTS

The authors express sincere gratitude to PT. Kereta Api Indonesia for providing access to their customers and supporting this research endeavor. Special thanks are extended to the management and staff at Medan Station, Binjai Station, and Tanjung Morawa Station for their cooperation during data collection. We also acknowledge the valuable contributions of the research

assistants who facilitated the data collection process and the study participants who generously shared their time and experiences.

CONFLICT OF INTERESTS

The authors declare no conflict of interests regarding the publication of this research. This study was conducted independently without any financial or personal relationships that could inappropriately influence the research outcomes or interpretation of results.

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