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EXPLORING THE EFFECT OF THE RAILWAY SERVICE QUALITY ON CUSTOMER SATISFACTION AND TRUST IN WESTERN SAUDI ARABIA

Mashaer Sheikhoon*[1], Khalid Husain[2]

[1,2]Department of Business Administration, Faculty of Economics and Administration, King Abdulaziz University, Jeddah, Saudi Arabia

Abstract
This study investigates impacts of railway services quality RSQ upon CS and T in the following industry of railway transportation. It also examines the issue of CS as a mediator in the connection between the RSQ and T.Design/methodology/approach: The data was collected with regards to a railway traveler, and the structural equation modeling (SEM) applied to estimate both the direct and indirect relationship, including the arbitrating impact on customer satisfaction. The findings reveal that the quality of railway services significantly influences customer satisfaction, which in turn increases customer trust. Furthermore, the importance of customer satisfaction as an intermediate mediating variable between the services quality and trust are proved causes increased satisfaction, which results in the idling of trust towards the provider of rail services. The research can be useful to the railway operators interested in enhancing their customers' satisfaction and truth. Rail services aim at providing customers with good quality, which makes them feel happy and safe, thus gaining trust, which is long-lasting and gives the rail company comparative advantage.This paper describes the principal drivers that influence customer trust within rail, and the relationship between RSQ, CS and T. It offers valuable guidance to the railway operators who would like to improve the level of delivery services as well as building customer relations towards an effective sustenance of competitiveness in the dynamic transport sector.

Keywords: Railway service quality, Customer satisfaction, Trust

1. Introduction

Transportation is the movement of people and goods from one place to another using air, sea, and land transport. Transportation systems are vital components of society, supporting economic growth by facilitating trade. Additionally, transportation fosters cultural exchange by connecting people and ideas across different regions. Their benefits range from a reduction in congestion, oil consumption, as well as carbon emissions, consequently creating safe and clean air (Rezapour & Ferraro, 2021). The road transportation sector is a major source of CO2 emissions, making up about 70% of the total because it heavily relies on fossil fuels. While the main contributor is cargo transport, vehicles like cars, buses, taxis, and intercity coaches also significantly add to the overall emissions (Aminzadegan et al., 2022). The most common mode of people travelling is through road. It generates several ills which include; adverse impact on the environment, health hazards, noise pollution, extreme accidents and the highest cause of death. In contrast, rail transport appears to be the most sustainable option for the future (Dahim, 2021).

The vision 2030 is the strategy that Saudi Arabia intends to diversify its over-reliance on oil and distribute economic activities to a variety of sectors. As part of this effort, the Kingdom places a strong emphasis on sustainable development, making it a core pillar of the Vision 2030 agenda. This strategy highlights the importance of adopting environmentally and economically sustainable practices for long-term growth.

Saudi Arabia will have to respond to the increased demand of people in transportation through the production of an effective, inexpensive, and safe mass transit system. This industry is so vital since it influences the entire economy to a great extent. It is deeply interconnected with various other industries, making it a vital component of nearly all economic activities in the

Kingdom. The importance of transportation is further emphasized by the annual influx of millions of travelers visiting for Umrah and Hajj, highlighting its central role in supporting both economic growth and the tourism sector (Brika et al., 2021)

Railways in Saudi Arabia began in 1900 with the Hejaz railway connecting Damascus to Madina, mainly for Hajj pilgrims. It was completed in 1908 but closed in 1920. In 1951, a new 16 km line linked the Gulf port to Dammam, later extended 450 km to Riyadh for passengers, with a parallel freight line added. After the early projects, Saudi Arabia had no major railway developments until the 21st century, when several large projects were launched under the national rail master plan. These include the North-South line, the Gulf countries line, the linkage line, and the Haramein line that connects Madina, Jeddah, and Mecca, among others (Dahim, 2021).

According to (Transport General Authority,2025) The Haramain, High-Speed Train boasts an advanced rail network connecting Makkah and Madinah, with severalmain destinations include Jeddah via King Abdulaziz International Airport and King Abdullah Economic City, both of which are important centers for transportation and economic activity in the region. Running on electric power, the train is designed for passenger comfort and convenience. It also incorporates high-tech security features, including surveillance cameras, fire safety systems, and onboard first aid facilities, to ensure a safe and secure travel experience. This system is the only one in the western regen. It offers significant economic and social benefits by reducing travel time, supporting Hajj and Umrah pilgrims, and alleviating traffic congestion. Additionally, it boosts economic growth and tourism by connecting key cities. Therefore, ensuring its efficiency is essential for maximizing its impact.

Although service quality has been widely studied in many sectors, research on the transportation mainly railway model in KSA remains limited. As a newly introduced system, its efficiency, customer satisfaction, and trust are not well explored. Most studies focus on its economic and geographic impacts, leaving gaps in understanding its quality of service. Railway services must rectify vital gaps to serve passengers in a better way. This study considers the quality of train operations and the impact this has on customer satisfaction and confidence. It also confirms Saudi Vision 2030 that plans to develop a modern, efficient and sustainable transport system. The question that the study answers are the following:

RQ: How does the quality-of-service impact on customer satisfaction and trust in railway transportation?

The findings provide insights for service providers, policymakers, and academics to improve transportation services, regulations, and knowledge. Enhancing service quality will strengthen customer trust, increase ridership, and support long-term sustainability.

In this study, we will focus on a specific mode of transportation, the railway transportation in Western Region, which is the newest type in KSA. Its service quality is highly critical, as poor quality can result in economic consequences, low rates of customer satisfaction, and a loss of trust in its transportation system.

In upcoming sections of this paper, we will look at the theoretical underpinning literature review, results, discussion and implications with conclusion.

2. Theoretical Underpinning

2.1 SERVQUAL Model

One of the most well-known tools which help to define the question of the quality of the

products and services is the SERVQUAL model that has been provided by Parasuraman et al. (1985). It measures service excellence through the customer expectations on the service provided. The multidimensional nature of SERVQUAL is gauged in five dimensions namely Reliability, a dimension of being able to effectively deliver promised services with consistency and accuracy; Assurance is constructed on understandings and professionalism of employees and how they bring trust and reliance in the customers, Tangibles are physical components of a service: infrastructure, equipment and appearance and behavior of employees, Empathy refers to the level of individual care and attention that is accorded to customers; and Responsiveness, which is a dimension covering the readiness and willingness to help and assist (Parasuraman et al., 1988). All these dimensions present a most reliable totality of the dimensions to examine the quality of services offered and the implication to customer contentment and confidence. SERVQUAL is a solid model to measure the effects of RSQ to the customer emotions and actions. Customers may use these five dimensions to pass verdict over this general service they get. The higher the SERVQUAL ratings, the better the services. High ratings will make the customers more satisfied and trusting which will facilitate long-term success.
The literature available and hypothesis will be discussed in the upcoming section regarding all the construct.

3. Literature and Hypothesis

3.1 Service Quality in Railway and Customer Satisfaction

Service quality has been defined as a customer's impression of the comparative quality of a service provider and its services according to (Prakash & Mohanty, 2013).
It is how satisfied a customer is after having received a service and it is what shapes the thought of the customer. Reputable service quality holds merit on three grounds, in that it can be used to gauge the satisfaction of customers and accumulate loyalty. The effectiveness of service quality can be measured by the number of complaints received fewer complaints typically indicate a higher level of service quality (Yesitadewi&Widodo, 2024).

Customer satisfaction refers to a customer's personal observation or sentiments regarding the quality of a product or service they received compared to their expectations. The main goal is to meet customer needs, encouraging repeat business, boosting profitability, and ensuring long-term sustainability within the industry (Balinado et al., 2021). If the service meets expectations, the customer is satisfied. Exceeding expectations leads to greater happiness and delight, while falling short results in dissatisfaction (Hidayat&Idrus, 2023).

In the highly competitive service industry, customers are essential in evaluating the quality of service they receive. This service quality, commonly referred to as SERVQUAL, is a crucial factor in assessing customer satisfaction (Balinado et al., 2021). When executed effectively, service quality can yield significant benefits. Superior service quality enhances customer satisfaction, has positive impacts on customer loyalty and drives higher sales (Prakash & Mohanty, 2013).

Previous studies have explored the connection between service quality upon customer satisfaction across various industries (Ayinaddis et al., 2023; Balinado et al., 2021; Gonu et al., 2023; Yum & Yoo, 2023). The quality of public transportation services is widely regarded as a fundamental element of infrastructure development in numerous countries. Gaining insight into how satisfied users are with the services provided is essential. Previs study by (Ismael &Duleba, 2021) aims to identify the main factors influencing satisfaction with public transportation to help

shift users from private vehicles to public transit. It emphasizes that while improving service quality is essential, it doesn't always ensure higher satisfaction levels. The findings indicate that an improved sense of quality of the public transportation service results into a higher number of satisfied drivers of the private vehicles.

Other study in Brazil explores key factors affecting public transportation service quality and how these perceptions vary by gender (Freitas et al., 2023). In addition, study by Wang et al., (2020) measuring key extents of service quality and customer satisfaction on railway commuters' with reuse intention in China. The experiment revealed the fact that a higher quality of service drives customer satisfaction. There are numerous studies that connect the quality-of-service relative to customer's satisfaction but onlylimitednumber of them focus on the industry of rail travel through railway. Thus, the following hypothesis can be proposed as the result of this research:

H1: Service quality in railway related to customer satisfaction.

3.2Customer Satisfaction and Customer Trust

Trust has been widely studied in marketing, psychology, management, and sociology (Islam et al., 2021). Trust is a fundamental part of human relationships and society as a whole. It tends to grow when people see good reasons to believe in one another, and it lasts when those beliefs turn out to be true. We often decide to trust based on our expectations, past experiences, or signals that someone is reliable. When those we trust prove themselves trustworthy, that trust is reinforced. Understanding what makes trust possible and sustainable is essential. In a world where people are generally trusting and their trust is well-placed, relationships are stronger, collaboration is easier, and communities thrive. But when trust is misunderstood or taken for granted, it can lead to broken relationships and dysfunctional systems. If we don't clearly grasp what builds and supports trust, we may unintentionally create environments that weaken it or cause it to disappear altogether (Pettit, 1995). We interpret trust as existing when one party has trusts and is reliable in an exchange partner's reliability and integrity (Morgan & Hunt, 1994).

One way to build customer trust is by consistently delivering on promises made to customers, ensuring reliable service and maintaining transparency (Hidayat&Idrus, 2023). One key factor company focus on is delivering high quality services to achieve customer satisfaction and, at the same time, build customer trust.

Past researches have explored the relationship between the two factors of customer satisfaction and customer trust in different industries like banks, education, and others (Albarq, 2023; Fawad et al., 2021; Hidayat&Idrus, 2023; Islam et al., 2021). the results showed there are positive effects between them, indicating that as customer satisfaction increases, customer trust also rises. Conversely, when satisfaction decreases, trust declines as well. Other research conducted an in-depth assessment of service quality on commuter satisfaction and trust in electronic form of transportation, with the Doha Metro serving as the case study. The findings highlighted the essential importance of empathy and reliability in building passenger trust and enhancing satisfaction (Flores et al., 2025). Although many studies have examined this relationship, to date, limited research appears to have explored this topic within the railway sector in Saudi Arabia. Therefore, this study will examine the following hypothesis.

H2: customer satisfaction related to customer trust

3.3 Service Quality and Customer Trust Direct Relationship

The quality of service is recognized as a key element of organizational growth, sustainability, and overall success (Yesitadewi&Widodo, 2024) .Customer trust clearly reflects the quality of a company's services, including its after-sales support and customer care. It is acknowledged as a fundamental component in establishing strong relationships between corporations and their customers (Islam et al., 2021). In railway passengers anticipate efficient, reliable, and comfortable service in exchange for their fare, as service quality significantly influences their trust and lasting commitment to using the system (Flores et al., 2025).

Trust influences all facets of business operations. When trust is perceived, it enables companies to reduce the time and costs associated with maintaining relationships with partners and customers, thereby enhancing operational convenience and efficiency (Tiep Le et al., 2023).

A previous study by Kalia et al., (2021) explored the relationship between service quality elements and trust. In the research it was discovered that all four RSQ dimensions lift the levels of trust except the reliability factor made no significant changes.

Another study by (Shie et al., 2022) investigates whether the quality of hospital services impacts patients' perceptions of healthcare encounters, along with their trust and loyalty toward the hospital. Additionally, this relationship was supported by another study focused on rail transportation in Doha (Flores et al., 2025).

While numerous studies have investigated this relationship, there is a lack of research specifically within the railway sector in Saudi Arabia; precipitating the need for this study aims to test the outlined hypothesis.

H3: Railway service quality has a positive impact on customer trust

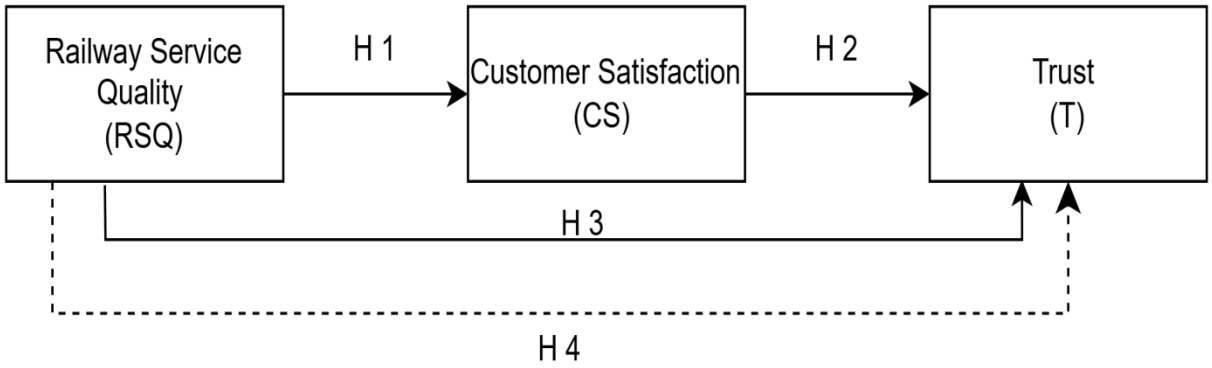
3.4 Customer Satisfaction as Mediator

Aspects linked to service quality are more appropriately viewed as precursors rather than components of it (Lin et al., 2023), with customer satisfaction serving as a key mediator between service quality and customer trust. CS has been examined as the midway connector services quality and customer feelings or action in various studies. The study by (Khan &Alhumoudi, 2022) aimed to examine the role of customer satisfaction as a mediator in the relationship between service quality dimensions and customer retention within the online banking sector. The results indicated a positive impact. In addition, Previous studies have demonstrated that customer satisfaction serves as a mediator in the relationship between service quality and customer loyalty across various digital contexts, with results showing a significant positive effect; for example, in mobile social media, CS mediates the impact of service quality on customer loyalty, and in e-service environments, it positively mediates the link between e-service quality and customer loyalty (Venkatakrishnan et al., 2023; Yum & Yoo, 2023). In the context of Islamic banks in Jordan, customer satisfaction significantly mediates the impact of service quality on customers' loyalty intentions (Dandis et al., 2021). In other study Customer satisfaction was found to be a significant and positive mediator in the relationship between logistics service quality and reuse intention (Lin et al., 2023). Service quality has been examined earlier, but the role of customer satisfaction as a mediator between railway service quality and trust within the Saudi railway sector has rarely been addressed in the existing literature. This research will therefore provide the following hypotheses to test that connection.

H4: customer satisfaction mediates relationship between service quality and trust.

The next sections will discuss the conceptual model then the research methodology.

4. The Conceptual Model



In this conceptual framework, railway service quality serves as an independent variable, while customer satisfaction (CS) functions as the mediating factor. The study investigates how these variables affect customer trust (T). Furthermore, the proposed hypotheses aim to clarify and strengthen the incidental effect of service quality upon customer trust. The next section will cover the methodology of this study

5. Research Method

5.1 Research Design and Method

Based on the research goal and objectives the philosophy of this study has been chosen to adopt positivism method, because it depends on scientific tactic by collecting data systematically and analyzing it objectively. The approach in this study is a deductive as it is based on theory and from the theory the hypothesis been generated. Using a deductive approach support in examining the relationship between both the dependent and independent factors which in turn will validate this relationship and enhance the practical and theoretical contributions of the study. The strategy that has been used to collect the data is via a questionnaire survey to gain greater insight into how these variables influence customer trust. Since the study will use single data collection technique which is questionnaire and it is quantitative study, the choice of the study is mono method. That may result in data being collected in a short amount of time, therefore, the time horizon for the study is cross -sectional (Saunders et al., 2009)

To fill the gap of this research, it has carried out in Saudi Arabia and it focused on Saudi railway transportation sector. Due to the lack of studies regarding the service quality on railway in this country. The population of the study is passengers who are used railway in Western Saudi Arabia. The reason to choose the passengers as a population for the study is because the study has examined their experience as user for the railway; and investigated how this experience may impact their satisfaction and trust in the service of the railway. Moreover, survey questionnaire was conducted to provide a comprehensive understanding of the phenomenon. Finally, this

research design is emphasizing the consistency and systematic way with the reliability and validity of the study (Saunders et al., 2009)

5.2 Measurement Model

To measure the study constructs, a set of scale items based on previous research was used to ensure reliability and validity, as recommended by Hair et al. (2021). This questionnaire contained two sections. The first one was that it requested information on the participants: gender, age, education, and other details that were important. Second, it had 31 questions that gauged the main ideas of the study. Service quality and its five key dimensions were assessed using 22 items from the SERVQUAL scale implemented by Parasuraman et al. (1988). Customer satisfaction was recorded using a 6-item scale adapted from Lin et al., (2023), while customer trust was measured using a scale established by (Morgan & Hunt, 1994). All the items in the scale were modified to suit this research. The adapted items were translated into Arabic by the authors. The questionnaire was filled in by respondents on a seven-point Likert scale ranging from strongly disagree to strongly agree. It is localized in the present research were derived out of study materially published earlier in the leading academic journals.

5.3 Data Collection and Sampling

To achieve the purpose of the research, as it described by Saunders et al., (2009) data should be collected from a representative sampling of the population. The sampling technique is non-probability based on the characteristics of the target population of the study which is railway passengers in Western Saudi Arabia. Using this technique supports in answering the research question. The non- probability technique has been used convenience and snowball sampling which means the sample is from railway passengers who are have used and have experienced Al Haramain High-Speed Railway, connecting the major cities such as Makkah, Madinah, Jeddah, and King Abdullah Economic City. that are nearby, available, and willing to participate in filling out the questionnaire. Using this technique is supports in collecting the data easily and in short amount of time from representative sample and emphasize the reliability and validity of the sampling. Snowball sampling increases sample size by utilizing existing networks, enabling data collection from a more diverse population. It is especially useful when traditional random sampling methods are impractical or result in inadequate sample sizes. The questionnaire was randomly distributed using social media tools like Whats app, as this method is efficient for collecting data in a short amount of time. After data collection, statistical techniques such as Smart PLS 4 wereapplying and SPSS 23 to analyze data. The sample size was determined using established guidelines (Soper, 2023). With an expected average effect size of 0.3, a desired statistical power of 0.8, member of latent constructs, and 31 observable variables, with the minimum sample size needed to detect the effect at a 0.01 significance level was calculated to be 212. In this study, the final sample size was n = 245, which exceeds the minimum requirement. To ensure ethical considerations, partakers were duly briefed on the purpose of the study. Regarding privacy, no unnecessary personal information was collected; only essential questions were asked. To respect participants, the questionnaire was culturally sensitive and aligned with Saudi cultural norms. Additionally, the questions were translated into Arabic to ensure clarity and accessibility. The next section will present the data, results, and analysis.

6. Data Analysis & Results

6.1 Descriptive Analysis

This part offers a comprehensive summary of the data regarding the participants demographic information.

6.1.1 Profile of Participants

Table 1: Participants' Demographic information (n = 245)

Participant' details (n=245)	Classification	Frequency	Percent
Statues	Citizen	219	89.4
	Resident	25	10.2
	Visitor	1	.4
	Total	245	100.0
Gender	Male	42	17.1
	Female	203	82.9
	Total	245	100.0
Age	Under 18	3	1.2
	18–24	12	4.9
	25–34	41	16.7
	35–44	70	28.6
	45–54	73	29.8
	55 and above	46	18.8
	Total	245	100.0
Education Level	below high school	12	4.9
	Secondary school	37	15.1
	Diploma	16	6.5
	Bachelor's degree	145	59.2
	Postgraduate	35	14.3
	Total	245	100.0
Frequency of Using High-Speed Train	Once	48	19.6
	2–3 times	66	26.9
	4–5 times	32	13.1
	More than 5 times	99	40.4
	Total	245	100.0
Main Reason of Travel by High-Speed Train	Work	21	8.6
	Study	4	1.6
	Family visit	65	26.5
	Tourism	30	12.2
	Performing Hajj or Umrah	73	29.8
	Visiting Al-Madinah Al-Munawwarah	42	17.1
	Other	10	4.1
	Total	245	100.0
The station you	Jeddah – King	104	42.4

usually depart from	Abdulaziz Airport Station		
	Jeddah – Sulaymaniyah Station	39	15.9
	King Abdullah Economic City (KAEC)	4	1.6
	Makkah	22	9.0
	Madinah	76	31.0
	Total	245	100.0
Do You Have Any Special Travel Needs	YES	37	15.1
	NO	195	79.6
	Prefer not to say	13	5.3
	Total	245	100.0

The sample population comprises a diverse group of participants representing various statuses, genders, age groups, and educational backgrounds. The majority of respondents were citizens, comprising 89.4% of the sample. Data collection took place after the Umrah season and before the Hajj season, which likely explains the high proportion of citizens and the relatively low number of visitors among the participants. In addition, the majority of respondents were female, accounting for approximately 83% of the sample. This may be attributed to two key factors: first, the female population slightly exceeds the male population in some regions; and second, although women in Saudi Arabia have recently gained the right to drive, long-distance travel between cities by car remains culturally uncommon or less acceptable in many Saudi families. As a result, women are prone to depend on public transportation, such as railways, for intercity travel. The age distribution of respondents shows that the majority were between 35 and 54 years old (58.4%), followed by those aged 55 and above (18.8%), indicating that the sample primarily consisted of middle-aged and older adults. The highest educational level was bachelor degree with 59%. This diversity ensures a comprehensive understanding of railway usage patterns across different segments of society. Additionally, this section includes questions relevant to the study, such as the frequency of railway use, with 40.4% of respondents reporting usage more than five times. The primary purpose of travel was for Umrah (30%), followed by family visits (27%). Regarding departure points, 42.4% of passengers departed from King Abdulaziz Airport station. The section also inquires whether passengers have special needs. Collecting this information is crucial for understanding user behavior, identifying accessibility requirements, and analyzing regional usage patterns, all of which support the development of a more inclusive and efficient transportation system.

6.2 Measurement Model

Table 2. Descriptive analysis of measurement scales and (VIF) – Outer model – Lis

Items	Mean	Std. Deviation	Outer loading	VIF
TN 3	6.31	.802	0.618	2.080
TN 4	6.21	.893	0.645	2.174
RE 1	6.27	.946	0.765	3.293
RE 2	5.97	1.036	0.767	2.689

RE 3	5.96	1.049	0.719	2.731
RE 4	6.18	.935	0.755	3.149
RE 5	6.29	1.016	0.808	2.951
RS 1	6.17	1.017	0.730	2.433
RS2	6.14	.986	0.737	2.498
RS3	6.27	1.016	0.833	3.510
RS4	5.99	1.090	0.827	3.751
AS1	6.20	.918	0.837	4.003
AS2	6.31	.893	0.684	2.445
AS3	6.48	.733	0.803	3.208
AS4	6.15	.961	0.775	2.962
EM1	6.12	1.033	0.754	3.006
EM2	5.70	1.220	0.809	3.788
EM3	6.02	1.097	0.775	2.520
EM4	6.06	1.035	0.618	4.148
CS1	6.21	.960	0.901	4.444
CS2	6.07	1.034	0.905	4.126
CS3	6.20	.918	0.906	5.429
CS4	6.20	.940	0.928	4.846
CS5	6.29	.916	0.920	2.960
CS6	6.27	.849	0.873	1.654
T2	6.27	.849	0.925	1.654
T3	5.87	1.200	0.878	2.080

Table 2 shows the descriptive analysis shows high mean scores ranging from 5.70 to 6.48, indicating positive respondent perceptions. Standard deviations reflect consistent responses across items. Most outer loadings exceed 0.70, confirming good convergent validity, while a few items (TN3 at 0.618 and EM4 at 0.645) remain acceptable for exploratory studies. VIF values range from 1.654 to 5.429,indicating no multicollinearity issues. Overall, the measurement model demonstrates strong reliability and validity, providing a solid basis for structural model analysis (Hair et al., 2019, 2021).

Table 3. Construct validity and reliability overview

Constructs	**Cronbach's alpha**	**Composite reliability (rho_a)**	**Composite reliability (rho_c)**	**Average variance extracted (AVE)**
CS	0.956	0.957	0.965	0.820
RSQ	0.956	0.959	0.961	0.578
T	0.772	0.800	0.897	0.813

CS = Customer satisfaction, RSQ = Railway Service Quality T = Trust

The table above shows that measurement model demonstrates strong reliability and validity across all constructs. Customer Satisfaction and Railway Service Quality show exceptional internal reliability, with high Cronbach’s alpha and composite reliability values. Both these also

meet the threshold for convergent validity, with AVE values exceeding 0.50. Trust also meets reliability standards and demonstrates strong convergent validity, as indicated by a high AVE (0.813). Overall, these results confirm the robustness of the measurement model for further structural analysis (Hair et al., 2021).

Table 4. Fornelllarcker criterion & Discriminant validity Heterotrait-monotrait ratio (HTMT)

Constructs	**CS**	**RSQ**	**T**
CS	**0.906**	0.895 h	0.989 h
RSQ	0.859	**0.760**	0.955 h
T	0.865	0.831	**0.901**

CS = Customer satisfaction, RSQ = Railway Service Quality T = Trust

The table above presents the Fornell-Larcker criterion and the Heterotrait-Monotrait Ratio (HTMT), of which both techniques are utilized to evaluate discriminant validity, ensuring that the constructs within the model are conceptually and statistically dissimilar from one another.

The results demonstrate that the model maintains a suitable level of discriminant validity. The square roots of the AVE for Customer Satisfaction (0.906), Railway Service Quality (0.760), and Trust (0.901) are all higher than their inter-construct correlations, satisfying the Fornell-Larcker criterion (Fornell & Larcker, 1981).

Regarding HTMT values, most fall within acceptable limits, such as Customer Satisfaction–Railway Service Quality (0.895) and Customer Satisfaction–Trust (0.989). Although the HTMT values for Railway Service Quality–Trust (0.955) and Customer Satisfaction–Trust (0.989) slightly exceed the conservative threshold of 0.90, they remain justifiable given the theoretical relationship between the constructs (Franke and Sarstedt, 2019; Rasoolimanesh, 2022).

Overall, these values confirm that the constructs are adequality diverse and support the validity of the measurement model.

6.3 Structural model

The tables below display the outcomes of the structural model analysis conducted in this study. Following guidelines of Hair et al. (2019), a bootstrapping procedure with 10,000 iterations was employed to produce the reported results. The subsequent table provides a detailed summary of these structural model findings.

Table 5. R-Square Analysis Report

Constructs	**R-square**	**R-square adjusted**
Customer Satisfaction	0.739	0.737
Trust	0.778	0.776

The results in table 5 demonstrate a high level of explanatory power within the structural model. An R-square value of 0.739 for Customer Satisfaction indicates that nearly 74% of its variance is accounted for by the model's predictors, reflecting a strong and meaningful relationship. Similarly, the R-square value of 0.778 for Trust indicates that the model successfully explains over 77% of the variance in this construct. The close alignment between the adjusted R-square values (0.737 and 0.776, respectively) and their corresponding R-square values further reinforces the model's reliability and suggests minimal risk of overfitting. These results verify the

model's robustness and its effectiveness in determining the key determinants of Customer Satisfaction and Trust (Henseler et al., 2009).

Table 6. Collinearity Statistics (VIF)- Inner model- List and Pathe coefficients

Relationships	**Hypothesis**	**Path coefficients**	**T statistics**	**P values**	**VIF**	**Results**
RSQ -> CS	H1	0.859	8.160	0.000	1.000	Supported
CS-> T	H2	0.579	37.609	0.000	3.824	Supported
RSQ -> T	H3	0.333	4.529	0.000	3.824	Supported
Mediating Effect						
RSQ -> CS -> T	H4	0.497	8.081	0.000	Supported	

The results that were obtained in this investigation confirm the fact that there were substantive relationships between RSQ and CS as well as T. The hypothesis H1 proves to have been positive with the path coefficient measuring to 0.859, a t-statistic of 8.160 and a p-value of 0.000 hence indicating that the RSQ affects the CS. As is the case with hypothesis H2, the hypothesis has a similar finding that indicates a coefficient path of 0.579, a t-statistic of 37.609 and a p-value of 0.000 that CS was indeed a cause of T. The interdependent relationship between RSQ and T is also proved by the fact that the direct path coefficient (0.333) in hypothesis H3 is significant by a t-statistic (4.529) and p-value (0.000) indicating a significant and independent relation between services quality and trust. Lastly, the hypothesis H4 tests the possible mediator effects of customer satisfaction by revealing the path coefficient of 0.497, t-statistics of 8.081 and p-value of 0.000. Overall, the above results reveal that high levels of RSQ were accompanied by a better CS and higher T, CS acts as substantive mediator between RSQ and T, and the RSQ plays an indirect, nonetheless, significant role of the impact on T with the help of CS.

7. Discussion

This paper provides clear evidence to the interaction between RSQ, CS and T. Hypothesized relationships were proved. The path coefficients with the p-values explain the strength and statistical significance of these connections and the details of the same will be reviewed in the discussion below.

In H1, the hypothesis was based on RSQ and CS. The hypothesis is supported, and the path coefficient stands at 0.859, and p-value 0.000. Thereby, the RSQ provides a major positive contribution to CS. These results are congruent with other past studies in most industries that indicate that high quality of service directly increases satisfaction among the customer. As an illustration, Ayinaddis et al. (2023) Balinado et al. (2021), Gonu et al. (2023), and Yum & Yoo (2023) have all confirmed that high service quality enhances customer satisfaction, which indicates a vital role of service quality in determining customer experiences.

This constructive relationship between service quality and customer satisfaction on rail transit was also confirmed by Wang et al. (2020) in China, proving that the service quality does not only raise satisfaction but also affects the desire of passengers to reuse this service. Due to such findings, the policy makers and the managers are in a position to identify the fact that by direct response to the quality of the services one can enhance a high level of meeting customers' expectations and trust. These studies concurrently support the findings of the current research, emphasizing the importance of RSQ in fostering CS and CL. Therefore, it is crucial for railway operators to prioritize the enhancement of RSQ to improve CS, and strengthen T in the industry. Thus, improving service quality should remain a priority for railway operators seeking to enhance customer satisfaction.

Regarding H2 the findings of this study confirm it, which suggests that customer satisfaction (CS) significantly influences trust (T) in the railway service provider. With a 0.579 path coefficient and a 0.000 p-value, the results reveal that higher levels of CS lead to greater trust in the provider. This outcome aligns with existing studies that have demonstrated a positive relationship between customer satisfaction added with trust across various industries, including banking, education, and transportation (Albarq, 2023; Fawad et al., 2021; Hidayat&Idrus, 2023; Islam et al., 2021). These studies consistently show that as satisfaction increases, trust follows suit, and when satisfaction declines, trust diminishes accordingly.

Moreover, similar results have been observed in the public transportation sector. For instance, Flores et al. (2025) examined service quality, passenger satisfaction, and trust in sustainable electronic public transportation, with the Doha Metro as their case study. Their findings highlighted the critical role of empathy and reliability in cultivating passenger trust thus improving satisfaction. This research demonstrates that prioritizing customer satisfaction does not only make a positive impact in the short term when the customers are using a service but also generates and maintains trust in the long-term. The outcomes of the present and similar studies indicate that customer satisfaction can be viewed as a significant driving power that promotes trust in numerous spheres of activity.

The study also confirms Hypothesis H3 which is that trust, (T), is strongly and positively influenced by railway service quality (RSQ) the 0.333 path coefficient with 0.000 P- value. The relationship influence is not as high as the influence of service quality on CS, but it demonstrates that services that are high in quality are relevant in developing customer trust. The outcome aligns with the prior studies, such as Kalia et al. (2021) who stated that most of the service quality dimensions increase trust, Shie et al. (2022) who found that service quality in hospitals increases patient trust, and Flores et al. (2025) who connected service quality to increased trust in the sphere of rail transportation. All these studies emphasize that service quality not only is an issue of CS, but also a driver of building trust, the critical success factor of railway industry.

Hypothesis H4, which is CS mediates the relationship between RSQ and T, is also tenable according to the findings with a 0.497 path coefficient and 0.000 p-value. What this implies is that the chief mode through which service quality affects trust is customer satisfaction. Same pattern is observed in other fields of study- Khan &Alhumoudi (2022) in online banking, Venkatakrishnan et al. (2023) and Yum & Yoo (2023) in the context of digital services, Dandis et al. (2021) on the case of Islamic banking. A similar nexus between reuse intention and logistics service quality was established by Lin et al. (2023). All these studies are correct in proving that CS mediates the relationship between T and RSQ affirming again its relevance to long-term success of railway industries. The following section is devoted to the contributions of the study, its limitations,

possible directions of future studies, and a short conclusion.

8. Contribution & Limitations and Conclusion

8.1 Theoretical Contribution

This paper provides a conceptual model of a concept, which elucidates the association between RSQ and T, where CS is applied as a central intermediary. The findings show that a high-quality service delivery of the railway will enhance customer satisfaction that will develop trust in the provider. Customer satisfaction also turns up not just service quality is a ratio of what the customer takes and quality into which it is provided by a service provider. It offers a good basis for further research on how to investigate these relations in other areas of transportation or regions. It would help railway companies to apply more focused strategies to achieve customer satisfaction and trust, to achieve growth and sustainability in the business in the long run.

8.2 Practical Implications

RSQ is important to CS and T in the rail industry. Customer satisfaction depends largely on RSQ and CS is a key to gain trust. Due to that fact, railway operators should also strive to increase the RSQ they provide in order to be able to positively contribute to CS. Since trust is meditated by customer satisfaction, operators should ensure that they support high levels of service quality to exceed the expectations of customers. Other components of the quality of service need to remain on a high level since they are directly associated with customer satisfaction.

With the mechanism of continuous improvement of the CS as one of the main issues of focus, railway operators are more likely to build the trust of the customers in the service. Moreover, it is in line with the Saudi Arabia Vision 2030, where the mission is to develop and modernize all infrastructure of the country as it is aimed to stimulate economic diversification and increase the quality of public services. Improvement of railway services and customer satisfaction become important in this vision of creating the world-class transport system which will benefit the wider economy of the country.

8.3 Limitation and Future Study

The study can provide some essential data on RSQ and T, and CS in the railway industry; nevertheless, a number of limitations appear to be potential subjects of future research studies. Firstly, this research was conducted within the specific context of Western Saudi Arabia, where the railway infrastructure is relatively limited. The region relies on two major rail systems: the Al Haramain High-Speed Railway, that runs year-round, and the Al Mashaaer Railway, which is only used during the Hajj season. This is unlike in most other rail systems. The trains in this one operate on a weekday basis. Additionally, the data collection occurred after the Umrah season and before the Hajj season, meaning the sample was predominantly composed of local residents (citizens). This temporal aspect of the data collection process may have led to a sampling bias, as international passengers, who may have different perceptions and experiences, were underrepresented. Future studies could replicate this research in regions with broader and more diverse railway systems, and during different times of the year, to capture a more varied customer base and allow for comparisons across different cultural, economic, and infrastructural contexts.

The research employed a cross-sectional design, hence not demonstrating causation. The long-term (longitudinal) studies would prove the evolution of the RSQ, T, and CS produced by time and how the enhancement of service benefits affects the success of the sector. The research

only addressed the saturation of what the customer thinks. It failed to consider the perception of workers or managers on the same issues, yet their feelings can influence service quality and customer expectations. Lastly, the research failed to put factors like economic changes, market competitions or government policies into consideration. These processes are also capable of shaping the impressions that the population has of the industry, which also ought to have been researched. Future research would examine how these external factors affect the correlations among RSQ, CS, and T, as means of yielding a more complex view of the dynamics governing customer loyalty in the railway industry.

8.4 Conclusion

This research examined the relations that exist between good RSQ, T, and CS in Western Saudi Arabia. It proved that customer satisfaction lies between service quality aspect and trust aspect that allows its customers to trust the service. The findings indicated that CS is a strong mediator of T relationship, establishing the notion that service quality must be maintained at high level to ensure customer satisfaction and trust. The research has limitations in that it sampled only one region, gathered data after the Umrah and Hajj periods and it relied on the customer perceptions, which may not represent all aspects of railway operation.

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