

An Impact of Recent Technological Reforms in Indian Railways on its Revenue and Its Influence on the Passenger Satisfaction in Terms of Service

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Abstract: An objective of this study is to find an impact of recent technological reforms in Indian Railways on its revenue and its influence on the passenger satisfaction in terms of service. Quality of customer service in Indian Railways has a significant role on the Passengers' Satisfaction. Railways could draw higher economic benefits from its operations by improving its service quality. Various studies have pronounced many dimensions concerning about the Passengers' satisfaction of Indian Railways. Below mentioned are the Five dimensions of Service Quality under SERVQUAL model which are taken in this research paper. Reliability, Responsiveness, Tangibility, Assurance and Empathy.

Keywords: Indian Railways, Rail Commuters, Technological Reforms, Revenue generation, Service quality.

I. INTRODUCTION

Indian Railway plays a vital role as being a lifeline of India. It was founded 165 years ago on April 16, 1853 with its Headquarters in New Delhi. It is a multi-gauge, multi-traction system covering 115,000 kilometers, with 8613 stations across the length and breadth of the country. It stretches its boundaries from Kanyakumari in South to Baramula in North and Okha in West to Dibrugarh in East. It is one of the largest employer in the organized sector in India, with a workforce of more than 13 lakhs. For simplifying its controlling, Indian Railways has been categorized into 17 zones and 68 Divisions. Each Zone is headed by General Manager (GM) and each Division is headed by the Divisional Railways Manager (DRM) who is further assisted by two Assistant Divisional Railways Managers (ADRM). Indian Railways has a network of 67,368 KMs. (Y.B. 2016-17). It runs 13,329 passenger services daily catering to 22.24 million passengers. Similarly, it runs 9,221 freight trains daily transporting 3.04 MT freight. Way back in 1960s, Railways started using computers in a small way and by 1985 we had passenger reservations system all computerized. I remember banking started using computers in 1990s. (Source: <http://www.indianrailways.gov.in/>)

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II. PROCEDURE FOR PAPER SUBMISSION

Different studies based on the service quality of the consumer satisfaction in recent years have been studied and are as described below:

Parasuraman et al. (1985) had identified important factors of passengers' service quality for customer satisfaction which are responsiveness and reliability. Apart from this, a study on Railway transport service quality evaluation was done by LIY Jun and Gao He (2001). It was found that there is a practical role to find effective ways to upgrade the service quality of urban rail transit service management. It used the model of service quality gap to understand the five kinds of gaps within urban rail transit service quality.

As per the "Study on Railway Transport Service Quality Evaluation" of LIU Jun Goo"* (2007) the Service quality is proved to be the major factor that service organizations can use to obtain competitive advantages.

Rida Khurshid et al. (2012) explored present problems that how service quality affects customer satisfaction.

A. Safety Reigns Supreme

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- Speedy execution in rail renewal from 2926 KMs in 2013-14 to 4505 KMs in 2017-18.
- Consequential train accidents have reduced by 62% from 118 in 2013-14 to 73 in 2017-18.
- Total switchover to production of safer LHB (**Linke Hofmann Busch**) coaches.
- Rashtriya Rail Sanraksha Kosh (**RRSK**) has been setup for the safety expenditure with a fund of Rs 1 Lakh Crore out of which Rs 16,000 Crores have already been spent.
- Foot Over Bridges (**FOB**) are now treated as safety items. There has been a 221% increase in FOBs constructed per year from 23 during 2009-14 to 74 during 2014-18
- IR worked hand in hand with the Army to construct 3 FOBs at Elphinstone Road-Parel, Curry Road and Ambivali in Mumbai.
- CCTVs & Video Surveillance systems are being installed in all the Stations & Trains.



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- There has been a highest ever construction of Road over Bridge, Road under Bridge and Subways with 3 times increase in average construction per year. It was 415 per year from 2004-14 whereas, now it is 1220 per year during 2014-18.

- There has been a 79% drop in UMLC (Unmanned Level Crossings) accidents which were 47 in 2013-14 and 10 in 2017-18

- 5,479 UMLC have been eliminated in the last 4 years (2014-18)

- All UMLCs on Broad Gauge routes from its 4 Zones out of 17 have been eliminated. West Central Railway, Central Railway, Eastern Railway and South East Central Railway aggregating 11,545 route KMs have now become UMLC free.

B. Quantum Leap in Capital Expenditure

- Average Annual capital expenditure in 2014-19 is more than double of average during 2009-14. It was 2.30 Lakh Crores in 2009-14 whereas, it is 5.29 Lakh Crore in 2014-19

C. Capacity Enhancement

- There has been a faster commissioning of Railways lines. Average pace of commissioning of New Line / Doubling / 3rd and 4th Line Projects increased by 59% from 4.1 KMs (2009-14 to 6.53 KMs per day (2014-18).

D. Act East Policy

- Entire network in North East has been converted to Broad Gauge.

- One of the world's highest bridge is being built on Jiribam-Imphal New Line Project

- Rail connectivity has been established with Meghalaya (Dudhnoi-Mendipathar), Tripura

- (Kumarghat-Agartala) and Mizoram (Kathakal-Bhairabi). Apart from this, 1397 KMs of New Lines Projects costing Rs 51,428 Crores is in progress.

E. Sub- Urban Systems

- Development of Bengaluru Sub-Urban system is in progress worth Rs 17,000 Crores as per the Budget of 2018-19 which will benefit about 15 Lakh commuters.

- Modern system with air-conditioned coaches, state of the art signaling and modern stations are being placed.

- Upgradation of Mumbai sub-urban system worth Rs 54,777 Crores as per the Budget of 2018-19 is being done which includes new Corridors, additional lines/extensions and improved signaling which will increase passengers' comfort due to air-conditioned coaches and developed stations

F. Bullet Train in India

- Shinkansen technology will be implemented with zero fatalities in 50 years and train delay record of less than a minute.

- Will reduce travel time from approx 12 Hours to 8 Hours.

- Japan International Cooperation Agency (JICA) signed an agreement with the Government of India to provide Official Development Assistance (ODA) Loan of 10,453 million Japanese yen (approximately INR 600 crore)

for the development of a first-of-its-kind Training Institute at Vadodara, Gujarat, for Mumbai-Ahmedabad High Speed Rail Project. The ODA loan conditions are very concessional, i.e. 0.1% interest rate for both project activities and consulting services, and 50 years of repayment period (including 15 years of grace period). The institute will assist smooth set-up and safe operations of the MAHSR in India. The institute is being developed to generate efficient workforce, equipped with high level knowledge of the technology and operations of high speed Railways. It will provide huge direct and indirect employment opportunities.

G. Make in India

- Electric Locomotive Factory has been setup in Madhepura (Bihar) which has recently produced 12000 Horse Power electric locomotive.

- Depots in Nagpur (Maharashtra) and Saharanpur (Uttar Pradesh) are also being setup that will be used for preventive and corrective maintenance of the locomotives.

- Factory of manufacturing Diesel Electric Multiple Unit (DEMU) rakes has been setup at Haldia.

- Coach manufacturing for sub-urban and Metro trains will be setup in Latur, Marathwada.

- Factory for refurbishment of LHB coaches has been sanctioned at Lumding, Assam

- Coach refurbishment facilities is planned at Jhansi, Bundelkhand and Sonapat, Haryana.

H. Railways Electrification

- There has been a highest ever electrification in single year which is 4087 RKM (2017-18) as compared to 610 RKM (2013-14) which is more than 6 times increase.

I. Signaling new Railways

- Rs 1,299 Crores investment for improving signaling systems during 2017-18 which is 31% higher than the previous year.

- State of the art Electronic Interlocking Systems have been provided at 208 stations in 2017-18 which is 26% higher than the previous year.

J. Freight

- Goal for 2022 is to increase the market share of Freight transport from 33% to 45%

- Encouraging private participation in infrastructure and operations of freight traffic for which already 58 Private Freight Terminal (PFT) policies have already been notified.

- Highest ever freight loading of 1162 MT vs 1052 MT in 2013-14, an increase of 10.5%

- Highest ever freight earnings, expected to be over Rs 1.17 Lakh Crores in 2017-18 which is 12% above the previous year.

- Commissioned of Western and Eastern DFCs (2822 KMs) in phases by 2019-20

- Contracts worth Rs 39,157 Crores have been awarded during the last 4 years as compared to Contracts worth Rs 12,749 Crores awarded up to Mar 2014 which is more than 200% increase.



K. Station Development

- 68 stations to be improved by Mar 2019
- Beautification of 60 stations already completed using the local art.
- Redevelopment of Habibganj station, Madhya Pradesh and Gandhinagar station, Gujarat by Dec 2018 has been planned
- All railway stations have been fitted with 100% LED lights
- Matunga became the first all-women railway station

L. Upgradation of Passenger Coaches

- Interiors of 5,000 coaches including mail/passenger trains to be improved by Mar 2019.
- 1st ever indigenous train-set to be commissioned this year
- Tejas, Antyodaya and Humsafar trains have already been launched
- Double decker UDAY (Utkrisht Double Decker Air Conditioned Yatri) rake service is already being used.
- Deen Dayalu and Anubhuti Coaches have been launched with modern features.
- Glass top 'Vistadome' coaches on select routes have been launched so that tourists can view beautiful scenic routes.

M. Enhancing Passenger Services

- 407 new trains have been launched in the last 4 years
- 22 new trains and 44 extensions through better utilization of rolling stock, sweating of assets and use of lie period
- SMS services have been started on 1,373 trains to inform passengers about train delays
- There were 97 Lifts and 199 Escalators till 2014. Now their count has increased to 261 Lifts and 292 Escalators within 4 years (2014-18)

N. Digital India – Digital Rail

- High speed Wi-Fi service at more than 675 stations and the plan is to have Wi-Fi at all the stations
- 9,100 POS machines have been installed at about 4,000 locations
- Capacity of E-Ticketing has been increased from 2,000 tickets per minute in 2014 to estimated 20,000 tickets per minute in 2018
- Service charge on credit and debit cards for purchasing tickets at booking counters has been removed.
- Passengers' grievances are being resolved in real time via Social media.

O. Catering

- 16 base kitchens have already been upgraded in 2017-18.
- Use of Artificial Intelligence to monitor food production in base kitchens for improving quality and hygiene
- E-Catering has been started at 314 stations and 100 more planned. More than 7,000 meals per day
- Optional catering has been introduced on 32 Rajdhani, Shatabdi, Duronto and Gatiman Trains.
- 1,689 water vending machines have been installed at 600 stations

P. Catering

- Integrated Mechanised Cleaning has already been provided to 488 stations
- All suburban and major stations to have mechanised cleaning by Mar 2019
- Mechanised Laundries for improving quality of washed linen: 33 setups in 2014-18 versus 26 in 2009-14
- 100% Mechanised Laundries for improving quality of washed linen by Dec 2019
- Bio-Toilets installed: 1,17,164 in 2014-18 versus 9,587 in 2004-14
- All Trains to have Bio-Toilets by Mar 2019.
- Vacuum Bio-Toilets like Airlines are under testing.
- Affordable Sanitary Pads dispensing machines at major stations by Dec 2018.
- Automatic Rail-mounted machine to clear muck started in Delhi. Also, planned across India.
- Payments to contractors also based on ratings given by passengers

Q. Transparency

- E-Reverse Auction policy has been issued
- It'll help us to save Rs 20,000 Crores annually.
- 100% E-Procurement through single web portal
- 4 times increase in total number of vendors registered on IREPS (Indian Railways E-Procurement System) portal from 19,867 in 2014 to 81,127 in 2018
- Mandatory procurement of common use goods/services through GeM (Government E-Marketplace)
- Simpler approval processes in RDSO (Research Designs and Standards Organization) in which the process timeline has been reduced from 30 months to 6 months.

III. OBJECTIVES

1. To explore the benefits of recent technological reforms in Indian Railways – wrt revenue generation passengers' satisfaction.
2. To analyze the gap between Passengers' Expectation and Perception of Service Quality.
3. To suggest the areas of improvement in the services of trains with the help of technology.

Methods of Data Collection

This study is based on the primary data collected from close to 500 participants who've recently travelled in Indian Railways. Out of which 326 have been correctly selected.

Research Methodology

Five-point Likert scale has been used to analyze the various factors of Passengers' Satisfaction on Service Quality.

Analysis

The detailed research was done to explore an impact of the recent technological reforms in Indian Railways on its revenue and its influence on the passenger satisfaction in terms of Service as per the five dimensions of SERVQUAL scale.



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The primary data was collected for this research. SERVQUAL, (Parasuraman et al, 1985) with modified attributes to suit Railway Services was used in this research. The total selected sample size was of 326 respondents.

SQ – Score of service quality
 Pi - Scores of Perception
 Ei - Scores of Expectation

Average score of service quality

$$AVSWQ = \frac{\sum_{i=1}^n (P_i - E_i)}{N}$$

In the expression AVSQ - average score of service quality
 N --- Total numbers in sample.

Selection and definition of variables

This study explores the railway passengers’ service quality upon the SERVQUAL model. It’s a worldwide renowned model. After having multiple interviews with some passengers, we were able to establish 25 variables based on the five SERVQUAL factors (i.e. assurance, empathy, reliability, responsiveness, and tangibles). Railways punctuality and staff behavior in general.

Table -1 Gap Analysis and Tangibility

S. No	Factors	Expectation Mean Score	Perception Mean Score	Gap
1	Bio-Toilets	5.26	3.29	1.97
2	E-Catering service in the train	4.94	3.02	1.93
3	E-Medical facility in the train Coaches	4.73	2.41	2.33
4	E-Time Table	5.07	3.29	1.78
5	Clarity of announcements E-display boards in station & within coaches	5.17	3.62	1.55
6	Availability of booking counters and Refreshment stalls in station	5.10	3.27	1.82
7	Arrangements of cloak room and lift facilities in platform	4.88	2.93	1.96
8	Anubhuti and Deen Dayalu coaches	4.94	2.71	2.23
Total Gap				15.57

Interpretation of Table #1: The above table shows that, a huge gap on the tangibility dimensions, particularly in the “E-medical facility in the train coaches” a gap mean score of 2.33 and the low gap on the tangibility dimensions “clarity of announcements and display boards in station & within coaches” the gap value of 1.55. Indian Railways should make necessary actions to avoid these problems.

Table 2 - Gap Analysis of Reliability

S. No	Factors	Expectation Mean Score	Perception Mean Score	Gap
9	Frequency of Train schedule, Arrival and departure of train are on Time	5.04	3.22	1.82
10	Trains’ running update during the journey	5.01	3.15	1.86
11	The attitude and helpfulness of the railway staff in handling your service problems	4.90	2.86	2.04
12	Timely provision, Complaints handling & Staff sincerity in service	4.79	2.78	2.01
Total Gap				7.73

Interpretation of Table #2: From the above table, the gap on reliability dimensions in “the attitude and helpfulness of the railway staff in handling service problems” a gap mean score of 2.04 and the minimum gap of this dimension in “frequency of train schedule, arrival and departure”. Indian Railways should make necessary actions to evade these kinds of issues.

Table 3 - Gap Analysis of Responsiveness

S. No	Factors	Expectation Mean Score	Perception Mean Score	Gap
13	Railway staff easily understanding your needs & willing to help when you make inquiries.	5.04	2.98	2.06
14	Promptness in satisfying the request	4.79	2.97	1.83
15	Railway staff are too busy to respond	4.77	2.87	1.90
16	Availability of railway staff on train & ticket counter	4.93	3.00	1.93
Total Gap				7.72

Interpretation of Table #3: The above table shows that, the information about the gap on responsiveness dimension, the maximum gap on this dimension “Railway staff is willing to help when you make inquiries” and the minimum gap on the responsiveness dimensions “promptness in satisfying the request”. Indian Railways should make necessary actions to avoid these problems.



Table 4 – Gap Analysis of Assurance

S. No	Factors	Expectation Mean Score	Perception Mean Score	Gap
17	Ease of Courtesy & Communication with Railway staff	4.94	3.00	1.94
18	The railway is trust worthy & Personal safety during journey	5.13	3.19	1.94
19	Knowledgeable staff to answer your questions	4.98	3.19	1.79
20	Providing information about the delays & changes in the itinerary	4.94	3.11	1.83
Total Gap				7.5

Interpretation of Table #4: The above table reveals that, the gap on assurance dimensions, the high gap of this dimension two attributes like “Courtesy and communication with railway staff, Railway trust worthy and personal safety during journey” it’s got more gap between customer expectation and satisfaction and the low gap of this dimension is “knowledgeable staff to answer your questions”. Indian Railways should make necessary actions to evade these kinds of issues.

Table 5 - Gap Analysis of Empathy

S. No	Factors	Expectation Mean Score	Perception Mean Score	Gap
21	Prompt service to the passengers	5.04	2.99	2.04
22	Paying individual attention & Customers’ best interest	4.96	2.70	2.26
23	Coach Attendants’ availability in the Coach	4.87	2.59	2.27
24	Understanding the needs of the passengers	4.88	2.61	2.26
25	Railway operations are convenient to all passengers.	5.01	2.96	2.06
Total Gap				10.89

Interpretation of Table #5: Above table reveals that, gap on empathy the lowest gap for this dimension is “prompt service to the passengers” and highest gap on the empathy dimensions is “Availability of coach attendant or helper in the train”.

IV. CONCLUSION

Based on the score calculated for individual dimensions, it is found that the Tangibility dimension in Indian Railways lacks the most. All the 25 attributes indicated that quality of

service fell short of the passengers’ expectations and passengers were generally not satisfied with the few services of Indian Railways. Generally, the customers expect more services from service providers therefore, the rail passengers are also expecting more as well as quality service from the Indian Railways.

To enhance the competition of the Railway service quality business, improving the quality of customer satisfaction is one way. All the 68 Divisions and 17 Zones could optimally use the SERVQUAL model to record the scores of services’ quality. This model will help to bridge the gaps of passengers’ perception and expectations.

Reservation systems including the infrastructure facilities in both trains and railway stations must be improved. The railway staffs and attendant or helper can be appointed for each coach which can help to improve the security system towards the passengers’ expectations. Therefore, the human touch is indispensable and inevitable as compared to the airlines services which is missed in Indian railway passenger services. In this aspect, further improving the performance in the satisfaction level of the passengers could help us to occupy a leading position among the customers’ mind everlastingly. The results of the Table III indicate that Social Responsibility, Responsiveness, assurance get higher importance. It clearly indicates that passengers’ perception on Social Responsibility, responsiveness, and assurance is much higher than other aspects. Service Delivery, Reliability and Empathy gets the lowest score which clearly indicated that passengers are not happy with Railways punctuality and staff behavior in general. Therefore, its required to be taken care by Railways.

V. LIMITATIONS OF THE STUDY

Due to the paucity of time, scope of this study could only touch up the New Delhi Railway Station of Delhi Division under Northern Zone. Apart from this, the respondents’ reluctance to give the responses might have also added to the biasness as per the primary data is concerned. The sample size has been small (326) which might not reflect the true picture.

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