

A STUDY ON MEASURING SERVICE QUALITY IN SOUTHERN RAILWAY ZONE.

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Abstract

For several years the Indian Railway (IR) keeps its passenger fare low and cross subsidized the loss-making passenger traffic with profit earning freight traffic. Under the modern consumerism, passengers of rail transport are craving for quality service from the IR. The Railway Board has to ponder over the features of service quality of IR where for mass movement of men and materials, rail transport is highly suitable; but this must be accompanied by quality train service with safety and convenience in travel. Considering the above aspects, the present study titled “A study on Measuring Service Quality in Southern Railway zone.” has assumed greater significance than ever before.

Keywords: Indian railway, Southern Railway one, Service Quality, Passenger expectation, Madurai division.

Introduction

¹In a year, 700 crore passengers travel in Indian railway; while 1.3 crore passengers travel in IR daily, 1.2 crore of them travel in the unreserved Coaches. Southern railway (SR) a key zone of Indian railway was ²formed in April, 1951. Head quartered in Chennai, it has the following six railway division – Chennai Tiruchirapalli, Madurai, Palghat, Salem and Trivandrum.

³Madurai railway divisions was formed in 1856; it spans over 1,356 kms making it the largest division of SR. At ⁴present, the Madurai division covers twelve districts of Tamilnadu and one in Kerala and these districts are Coimbatore, Dindigul, Karur, Madurai, Pudukottaai, Ramanathapuram, Sivagangai, Theni, Thoothukodi, Tiruchirapalli, Thirunelveli and Virudhunagar in Tamilnadu State and Kollam district till Kilikollur railway station in Kerala State. ⁵SR operates daily 1313 trains where more than 50 crore passengers travel in a year.

Literature review

A review of earlier studies reveals that previous studies focused on measuring service quality of Indian Railways in terms of Parasuraman's SERVQUAL model based on five dimensions Balakrishnan. K.P. (2012), Hemant Sharma and Sonali Yadav (2013), Rajeswari and Santa kumari (2014) and Singh and Vikas Kumar (2015), Raja Shekar and Devi Prasad. M (2011), and certain others were concerned about growth and development of IR – Arpita Mukherjee and Ruchika Sachdeva (2004) and Chopra Vikram (2009).

The present researcher's review of literature has brought to limelight that earlier studies were not concentrated on passengers' problems in online ticket booking, issue of women passengers' safety in travel, benefit of holding season ticket and the like. Importantly, feasible solutions are lacking in raising the revenue of IR/SR so that it could improve the service quality of IR/SR.

Further, performance of gap analysis, i.e., the gap existing between passengers' perceived and expected level of service quality of IR in terms of a scale that suits to unique nature of IR and expectation of millions of passengers on a host of basic amenities, low train fare with safety in travel and their preference for booking reservation. Also, hardly there was any study on service quality in southern end of South India, i.e., Madurai division in Southern railway zone of IR. The present study fills this gap.

Research problem

Concerning the service quality of IR, it is severely hampered by the funds crunch. To illustrate, as stated earlier, a large part of revenue of IR is obtained from freight traffic, and passenger fare is cross subsidized with profit earning freight traffic. To worsen the situation the IR is losing freight traffic to road transportation. Though the IR carried 93 million tones of goods in 1950-51, and it rose to 1010 million tones in 2012-13, yet its share in goods traffic is much lower than road traffic.

For instance, in 1951, the share of wagon goods was 65% as against the share of road of 35%; currently, the share of road has climbed upto 70%. Further delve into the matter reveals an alarming picture. Table 1 shows the net earning \Loss of SR zone of IR for the period 2010 – 11 to 2013-14.

TABLE 1 - Net earnings / Loss of Southern Railway Zone of IR

Year	Gross Earnings (Rs in 000')	Working Expenses (Rs.in 000')	Net loss (Rs.in 000')
2010-11	47,90,2725	64,93,08,68	17,02,8143
2011-12	56,08,0760	68,74,3258	12,66,2498
2012-13	60,28,7534	78,73,2046	18,44,4512
2013-14	68,45,5454	90,48,1296	22,02,5842

Source: www.indianrailways.gov.in

A sordid state of affairs is the operating ratio of IR has consistently been higher than 90%; ⁷while it was 91.3% in 2014-15, it was 90.5% in 2015-16, 96.5% in 2016-17, 96% in 2017-18 and 92.08% in 2018-19.

The foregoing discussion pinpoints lack of funds of IR/SR. As India is an emerging economic force, the Government of India cannot shut its eyes on improving the service quality of IR citing the case of financial crunch. The ministry of Indian Railway has to balance carefully both these aspects, namely augmenting its financial resources and enhancing the service quality in rail transport. Amid this back ground, the following research questions arise.

1. What are the passengers' perceived and expected level of service quality features in Madurai division of Southern railway?
2. How do the women passengers consider about safety in their rail journey?
3. How to cope with raising service quality of IR/SR in the context of its financial crunch?

The present study attempts to find answers to the above questions.

This paper is mostly based on the author's study under ICSSR's two-year senior fellowship (2016-18) (F.No. 2-16/2015-16/ s.fel. Dt.29.12.2015), as well as his continued subsequent study from March 2018 to 20th August 2019

Objectives of the study are:

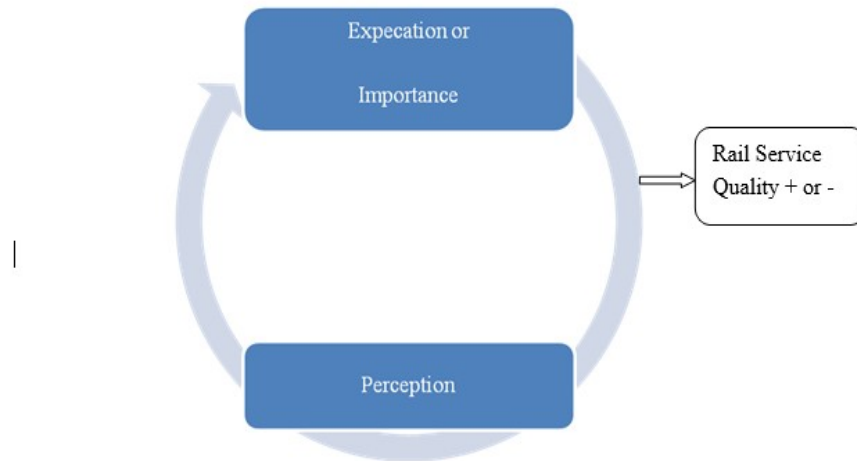
1. To study the gap between passengers' expected level and perceived level of service quality attributes of southern Railway.
2. To examine the avenues for raising the revenue of Madurai division of SR.

Analytical model

Based on the study objectives, an analytical model is presented as a diagram. The rail service quality gap model in a concise form in terms of passengers' expected level and perceived

level of various service quality attributes (for more details vide later pages of this paper) is portrayed in figure1.

Fig1. Gap model for service quality attributes of southern Railway



Hypothesis tested

H₀: There is no difference between passengers' expectation and perception of service quality in terms of the dimension basic amenities in Madurai division of Southern railway

H₀: There is no difference between passengers' expectation and perception of service quality in terms of factor modern amenities in SR.

H₀: There is no difference between passengers' importance and perception of service quality in terms of dimension ticket booking facilities in SR.

H₀: There is no difference between passengers' expectation and experience in service quality in terms of factor service performance activities of SR.

H₀: There is no hypothesized relationship between dimension namely, passenger basic amenities and its constituent 10 measured variables. Similar null hypotheses were formulated for the remaining three dimensions with their respective constituent measured variables.

Data and Methodology

The study has mainly depended on primary data which were collected by conducting a sample survey of rail passengers in Madurai division of SR zone of Indian Railway.

A well-conceived questionnaire was used for primary data collection. The survey was conducted during 2017. Statistical formula was used for determining the size of sample as 434 passengers.

In each of seven districts selected randomly out of 13 districts of Madurai division in SR, 62 passengers were chosen (31 Male and 31 female passengers). Importantly, the sample passengers had to have travelled in the train recently.

Relevant statistical tools such as percentage calculation, weighted average, standard deviation, paired t test, confirmatory factor analysis and gap analysis were applied for the analysis of survey data.

Results and discussion

There are problems in rail journey, i.e., theft and harassment, especially, women passengers may be scared of such problems. The survey measured respondents' level of satisfaction with women passengers' safety in the travel.

Table 2 Satisfaction with women passengers' safety

S.No	Satisfaction level	Frequency	% to total
1	Highly satisfied	78	18.0
2.	Satisfied	165	38.0
3.	Neither satisfied nor dissatisfied	108	24.9
4	Dissatisfied	53	12.2
5.	Highly dissatisfied	30	6.9
TOTAL		434	100.0

Source: Primary data

The analysis reveals that still a sizeable number of passengers (including undecided cases) are there who are not satisfied with women passengers' safety in the travel.

Further delve into the matter unfolds the measures suggested by the passengers for improving women passengers' safety in the travel. For this, the passengers were requested to rank their suggestive measures five in number and the result of the analysis is shown in the table 3.

Table 3 Ranking suggestions

S.No.	Suggestion	Weighted average	Rank
1.	Additional women compartments	4.13	1
2.	Women Security guards	3.97	4
3.	Installation of CCTV cameras inside ladies' compartments	3.97	4
4.	Provision of help line number	3.98	2
5.	Display of safety instructions in station & coaches	3.98	2

The investigation discloses the suggestive measure of additional women compartments (4.13) gets the top rank, followed by the other measures.

Performing confirmatory factor analysis (CFA)

In this study, the author tests the measurement model of structural equation modeling (SEM) through confirmatory factor analysis (CFA). Measurement model describes how well the observed or measured variable serve as a measurement instrument for the latent variable i.e., dimension/factor. In the present study, CFA was conducted to confirm/ validate four dimensions or constructs, i.e. to test construct validity.

Validity of the dimension/constructs

CFA was performed to validate or test the measurement model and for this the following null hypothesis was tested.

Ho; There is no hypothesized relationship between dimension1, namely passenger basic amenities and its 10 constituent variables (of drinking water facility, toilet facility, lighting & fans, cleanliness, seating facility, trolley path facility, platform shelters, foot over bridge facility, adequacy of parking space and availability of autos & buses).

Note: similar null hypotheses were formulated for the remaining three dimensions with their respective constituent measured variables.

Hypotheses:

H₀1: There is no difference between expected level and perceived level of rail passengers in terms of the dimension basic amenities in SR.

H₀2: There is no difference between expectation and perception of passengers in terms of dimension modern amenities in Madurai division of SR.

H₀3: There is no difference between expectation and perception of passengers for dimension ticket booking facilities of SR.

H₀4: There is no variation between expectation and perception of passengers for the dimension service operational activities of SR.

Result and discussion

Service quality denotes a gap between one's perceived and expected level of service. Most studies in the area of service quality have been based on the model developed by

Parasuraman et al. (1985,1988) which makes a comparison of customer expectation and perception of service delivery.

In 1988, they modified the previous ten dimensions into five dimensions of service quality, i.e., reliability, assurance, tangibles, empathy and responsiveness or RATER scale. Parasuraman, Zeithaml and Berry evolved a 22 items multiple attribute scale termed SERVQUAL to measure service quality in service and retail concerns; the SERVQUAL scale measured service quality along five distinct dimensions/factors, namely, Reliability, Assurance, Tangibility, Empathy, and Responsiveness (RATER) by performing gap analysis.

It is to be noted that several authors in their studies have used SERVQUAL scale with the above mentioned five dimensions to measure service quality in trading and financial concerns; at the same time, several others have objected to SERVQUAL instrument of measure service quality.

In his ICSSR's sponsored research, the present author has conceptualized rail passengers' perception of service quality as their level of experience with service quality attributes and their expectations and how these attributes are considered important by the passengers in Madurai division of SR.

In this context, it is apt to note that the renowned author Cross by (1979) defined service quality in this sense, namely, "Service quality is the conformance to requirements".

Service quality in India railway a mammoth public utility concern is totally different from any other product/service environment. The present author has evolved a 29 items multiple attribute scale compressed into two main dimensions as the base to measure service quality in Southern Railway. The two main dimensions are: 1. Passenger amenities and 2. Service operational activities.

To have realistic approach, the first main dimensions was subdivided into three sub dimensions, namely, (A) basic amenities; (B) modern (tech driven) amenities and (C) Ticket booking facilities.

The other main dimension, i.e., service performance activities does not have any subdivision. Thus ultimately, the gap analysis - means analysis was used to measure the four dimensions of service quality in Madurai division of SR.

Reliability Test of service quality Dimension/Constructs

According to Bruce Thompson (2002) reliability refers to the extent to which a scale produces consistent result if repeated measurements are made. Cronbach's alpha is the most widely used measure of reliability, used as a lower bound estimate of the reliability of the constructs. George and Mallery (2003) provide the following rules of thumb: > 0.8 is Good; > 0.7 is acceptable; and > 0.6 are questionable.

There are four dimensions of service quality; Basic amenities have 10 attributes/variables such as drinking water facility in the station, toilet facility, lighting and fans, platform shelters, cleanliness in the station and coaches, seating facilities, foot over bridge facility, trolley path facility, adequacy of parking space, and availability of autos and public transport buses.

Modern amenities encompass six attributes such as touch screen facility, coach indication board, mobile phone charger facility, display of name chart in reserved coaches, escalator facility and wi-fi facility. Ticket booking facilities have five attributes such as online booking, booking facility in advance, seasonal ticket facility, ticket cancellation, and tatkal scheme facility.

Service operational activities include eight attributes such as passenger fare, safety in journey, service frequency, punctuality in service, connectivity of trans, announcements about train timings, running of semi high speed trains and cooperativeness of railway staff. Table 2 presents a summary of reliability statistics (Cronbach's alpha) run off SPSS.

Table 4 summary of Reliability statistics

S.No	Dimension	No of items in the dimension	Cronbach's alpha	
			Perception (Experience)	Expectation (Importance)
1	Basic amenities	10	0.823	0.847
2.	Modern amenities	6	0.814	0.758
3.	Ticket booking facilities	5	0.811	0.719
4.	Service operational activities	8	0.861	0.859

Source: Primary data, Results calculated by author

A notable feature is that all the four dimensions have a value more than 0.7 and most are above 0.8 in passengers' perception and expectations of service quality of Madurai division in

SR. It indicates that the scale items have good internal consistency. Further, the validity of the scale was tested by content validity by contacting the experts in the field.

The last but the most important step before performing gap analysis is testing the validity of the four dimensions. The construct validity was carried out with confirmatory factor analysis (CFA). Performance of CFA revealed that all the 29 attributes / items were highly aligned with their corresponding dimensions. As the validity of dimensions was confirmed, the researcher proceeded to perform gap analysis through mean analysis.

Gap Analysis - Mean Analysis

The Author's R-SQUAL model is the right choice to find the perception and expectation of passengers. This model would show the service quality gap in the service provided by the SR. Certainly, the gap may be positive or negative.

Gap analysis is the difference/ gap between passengers' (numbering 434) perceived mean and their expected mean for the 29 attributes/items under the four broad dimensions/constructs. A positive gap value would show that the passengers' actual experience / perception is more than expectation, indicating good service (that attribute doesn't require improvement).

A negative gap value denotes the passengers' experience is less than their expectation, indicating not a good/poor service (that attribute requires improvement by the Southern Railway). Both perceptions and expectations of passengers for the 29 service quality attributes subject to four dimensions were measured with a 5-point numerical scale to rate their level of perception/ expectation.

The expectation score one denotes very low level of expectation and 5 is very high level of expectation. For the perception, score1 is very low level of service quality experience and 5 denotes very high level of service quality experience.

Service quality gap values are the difference between the passengers' perception and expectation scores(P-E). The quality score measures the service quality gap or the extent to which expectations exceed perceptions.

The more positive the P-E Score, the higher level of service quality received by the rail passengers, and vice versa. The details of the result of service gaps in all the 29 attributes under the four dimensions are presented in table5.

Table 5 Gap Analysis with paired sample T-Test

S.No	Service Quality dimensions	Variables / Attributes	Expectation (E) (Importance)	Perception (P) (Experience)	Gap (P-E)	t-test	Sig
SQ1	Basic Amenities	Drinking water facility in the station	4.35	3.42	-0.93	13.06	0
		Toilet facility in the station	4.27	3.12	-1.15	14.92	0
		Lighting & fans in the station	4.26	3.2	-1.06	16.41	0
		Shelters in the platform	4.19	3.58	-0.61	9.836	0
		Cleanliness in station & coaches	4.28	3.04	-1.24	16.39	0
		Foot over bridge facility in the station	4.17	3.51	-0.66	10.32	0
		Trolley path facility in the station & coaches	4.08	2.93	-1.15	14.31	0
		Adequacy of parking space and parking charges	4.15	3.57	-0.58	10.62	0
		Availability of auto & public transport	4.11	3.49	-0.62	9.669	0
		Seating facility in the station & coaches	4.27	3.42	-0.85	12.47	0
		Grand mean	4.21	3.33			
SQ2	Modern amenities	Mobile phone charger facility in the station	4.16	3.35	-0.81	11.50	0
		Touch screen facility in the station	4.15	3.44	-0.71	10.08	0
		Display of name chart in reserved coaches	4.13	3.49	-0.64	9.00	0
		Escalator and lift facility	4.11	3.09	-1.02	13.00	0
		Coach indication board in the station	4.06	3.41	-0.65	9.15	0
		Wi-Fi facility	3.96	2.91	-1.05	13.47	0
		Grand mean	4.10	3.28			
SQ3	Booking facility	Booking ticket facility in advance	4.15	3.66	-0.49	7.58	0
		Ticket cancellation facility	4.14	3.42	-0.72	10.33	0
		Season ticket facility	4.13	3.59	-0.54	8.31	0
		Online booking facility	4.11	3.73	-0.38	5.87	0
		Tatkal & premium tatkal booking facility	4.03	3.32	-0.71	11.64	0
		Grand mean	4.11	3.54			

Table 5 Gap Analysis with paired sample T-Test (Continued...)							
SQ4	Service operational features	Safety in journey	4.3	3.23	-1.07	13.31	0
		Passengers’ fare	4.29	3.56	-0.73	12.06	0
		Punctuality of service	4.25	2.97	-1.28	12.89	0
		Announcements about train timing	4.25	3.51	-0.74	14.41	0
		Frequency of service	4.19	3.39	-0.8	16.55	0
		Running of semi high speed and high-speed trains	4.18	3.2	-0.98	12.62	0
		Existence of connectivity of trains	4.17	3.31	-0.86	17.05	0
		Cooperativeness of staff	4.16	3.27	-0.89	14.10	0
Grand mean		4.22	3.31				

p-value <0.05

A striking disclosure of the above gap analysis is that there is a negative gap (grey area) in all the 29 variables of the four service quality dimensions of Southern Railway. It means the passengers' level of experience/perception of service quality lags behind their expected level of the service quality for all the 29 attributes of service quality of Southern Railway.

Another important revelation is that individual attribute wise, the negative gap is wider in the attributes cleanliness in station and coaches (-1.24), followed by toilet facility (-1.15), trolley path facility (-1.15), and lighting and fans (-1.06) under the dimension basic facilities. Similarly, the negative gap is wider in the attributes Wi-Fi facility (-1.05), and escalator facility (-1.02), in the dimension modern amenities.

One could also observe the negative gap is bigger in the attributes punctuality of train service (-1.28), followed by safety in journey (-1.07) under the dimension service operational activities of SR, Thus, the study has pinpointed the deep grey areas in the individual attributes under the broad dimensions of service quality indicating priorities for improvement by the IR/SR.

Significance Testing

Test of significance is made for each of the pairs of attributes of service quality under the four dimensions. The null hypothesis of no difference / gap between each pair of attributes is

verified by paired t-test at 0.05 significance level. If there is no difference between the means, it shows that the passengers' experiences or perceptions are exactly as expected, and so the null hypothesis is accepted; otherwise, the alternative hypothesis is accepted.

From the observance of probability in the last column of the above table 5 one can conclude that there is difference (negative gap) in the mean of the pairs of all the 29 attributes of service quality dimension: it means all the null hypotheses are rejected.

Similarly, the null hypothesis of grand mean for each pair of all the four dimensions is verified by paired t-test (vide Table 6) Ho: There is no difference between expectation and perception of passengers in terms of the dimension basic amenities in Madurai division Southern Railway zone (of IR). Similar null hypothesis was formulated for the other three broad dimensions of service quality.

Table 6: Pair differences between perception and expectation in Sq Dimensions of Southern Railway

Pair	Dimensions	Grand mean value		Gap Score (P-E)	Statistic	Sig.
		(P)	(E)			
Pair 1	Basic amenities perceived basic amenities expected	3.328	4.213	-0.885	-54.328	.000
Pair 2	Modern Amenities Perceived Modern amenities expected	3.280	4.095	-0.815	-26.323	.000
Pair 3	Booking facilities perceive – booking facilities expected	3.544	4.112	-0.568	-19.61	.002
Pair 4	Service operational features perceive – service operational features expected	3.305	4.224	-0.919	-41.263	.000

Source: Primary Data

As the p-value 0.000 is far less than the significance 0.05, null hypothesis in terms of all the four broad dimensions are rejected. It means there are negative gaps in all the four pairs of dimensions of service quality of SR.

Service quality can be described as a result from customers' comparisons between their expectations about the service they used earlier and their perceptions about the service company.

Gap analysis is the difference in values between perceived mean and expected mean (Tonge and Moore, 2007). If a rail passenger's perception exceeds expectation, i.e., positive gap value then the service is considered good; if the value is zero, it indicates that his /her expectations equal the perceptions. and if the expectations are not met, then the service is considered poor (negative gap value).

The grand mean value for the passengers' of service quality dimension (SQ1) i.e., basic amenities, 3.328 indicates only just average level of perception (experience). Further delve into the matter reveals that individual variables/items in the dimension of basic amenities, namely, cleanliness, toilet facility and trolley path facility are even below the average level of perception of passengers.

These three attributes in the dimension basic amenities are the priority areas for improvement (PFI) by the Ministry of Railways. A notable feature is that all the 10 items in the dimension basic amenities have the mean value of expectation above 4.00, thereby denoting passengers' high level of expectation(importance) in these variables/attributes.

The grand mean for the rail passengers' perception of the second service quality dimension (SQ2), i.e., modern amenities indicates also just only average level of experience/perception (experience). Further probe into the matter unveils that individual variables/items in this dimension, namely, WI-FI facility (2.91) and lift and escalator facility (3.09) remain the priority areas for improvement by the Southern Railway.

An outstanding characteristic is that all the six attributes / excepting WI-FI facility in the dimension modern amenities register the mean value of above 4.00 there by indicating passengers' high level of expectation (importance) in these attributes.

A striking disclosure of the study is the grand mean of ticket booking amenities with 3.544 has registered passengers' above average level of perception. Further, three of its constituent variables out of five, namely, online booking, ticket booking in advance and season ticket facility are recorded above average level of perception (3.50).

A deep review also reveals that none of the attributes of this third dimension has recorded the mark of below the average level of perception. As in the case of the above mentioned two

dimensions/factors, here in this third dimension also, all its five constituent variables have the mean value of expectation above 4.00 thereby denoting passengers' high level of expectation in these variables.

A remarkable finding is that the fourth and last dimension., service operational activities has registered the highest grand mean value of 4.224 in the passengers' expectation of service quality. Further all its eight constituent variables, have also recorded "above average level of expectation, i.e., above 4.00) denoting rail passengers' high level of expectation of these attributes.

Further investigation unfolds that the attribute punctuality of train service falls below the average level of perception, i.e., 2.97. Also, among the total eight attributes of this last dimension, excepting one, attributes have not crossed the average perception level of passengers' i.e., mean value of above 3.50.

Focusing attention on what matters most – diagrammatic presentation

The gap analysis (bar) chart furnishes with one very useful outcome when both the passengers' expectations (importance) and their perception (experience) scores/mean values are presented together and ask a basic question is the Southern Railway Indian Railway performing best what matters most to rail passengers? the answer to this question is exhibited in the following figure.

By comparing the passengers' expectation and perception scores, one can do gap analysis to ascertain priorities for improvement (PFI) by the Southern Railway. Gap analysis pinpoints if the perception bar is shorter than the expectation one, the Southern Railway has a problem/grey area.

Figure 2.1

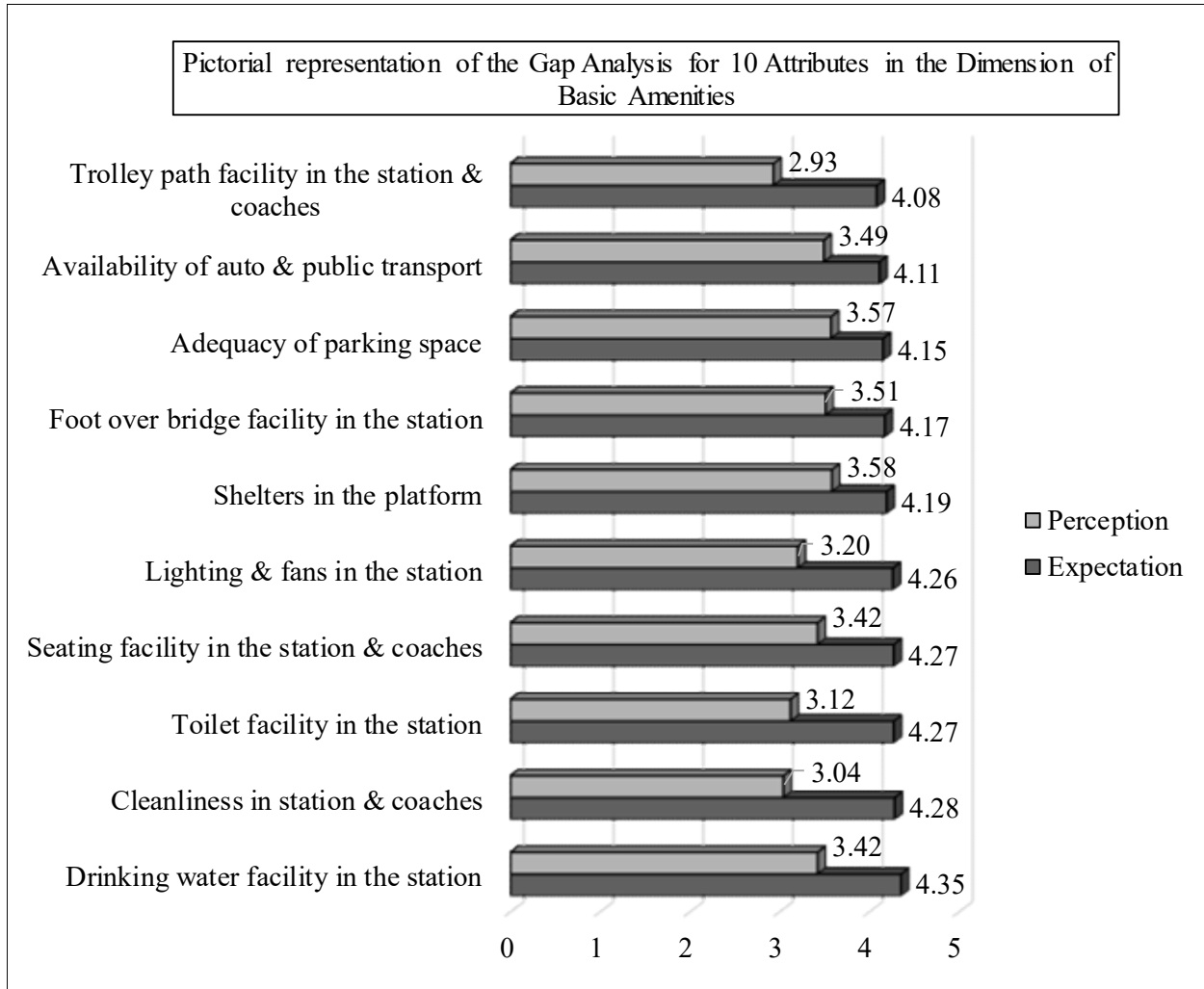


Figure 2.2

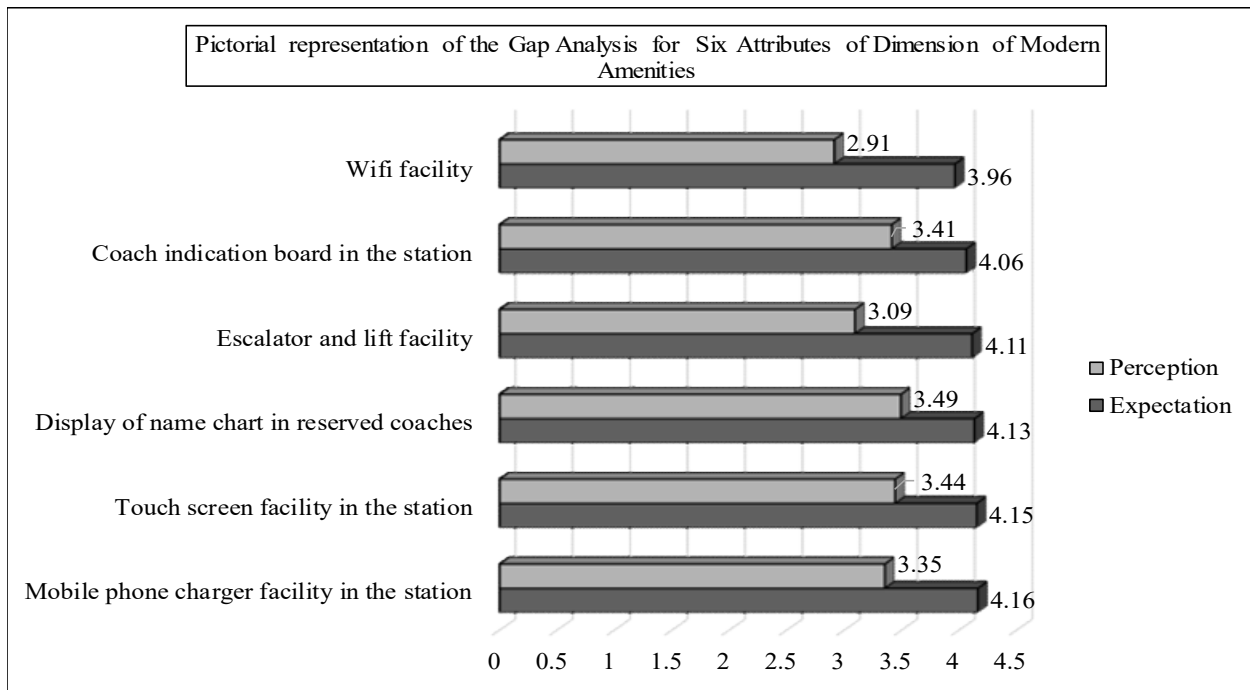


Figure 2.3

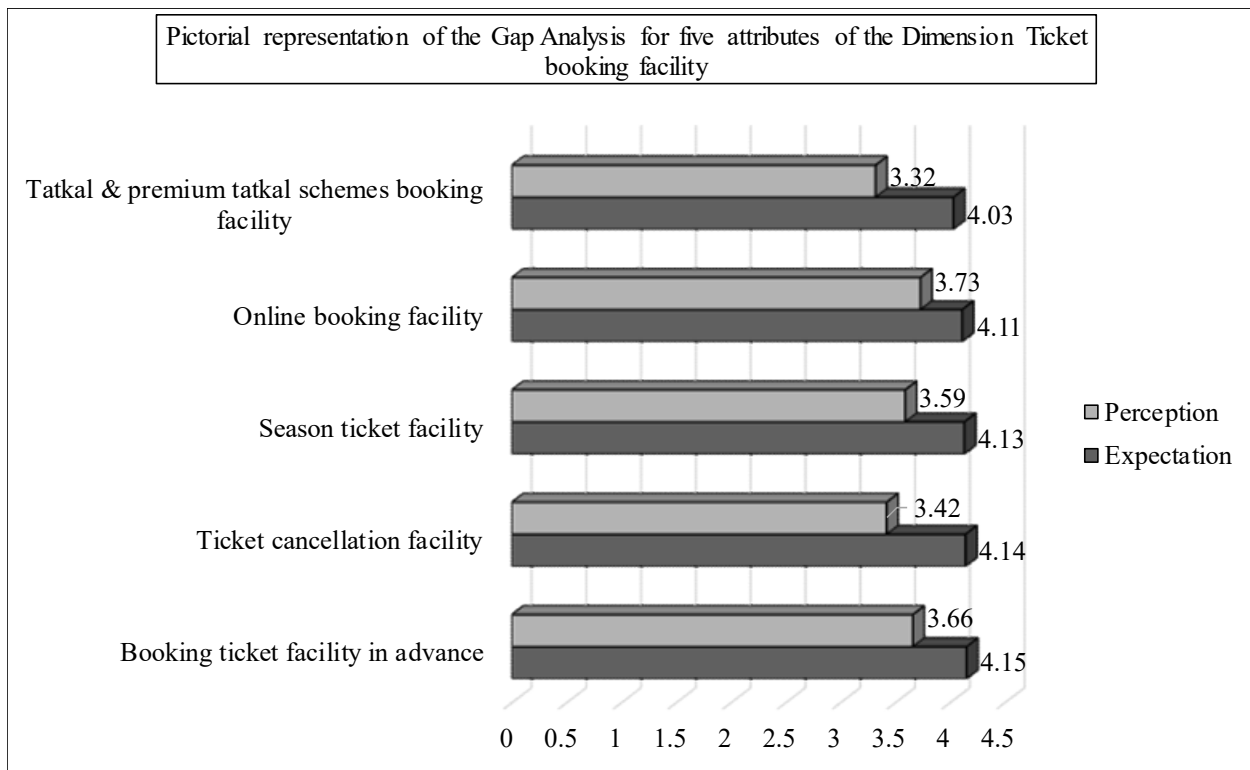
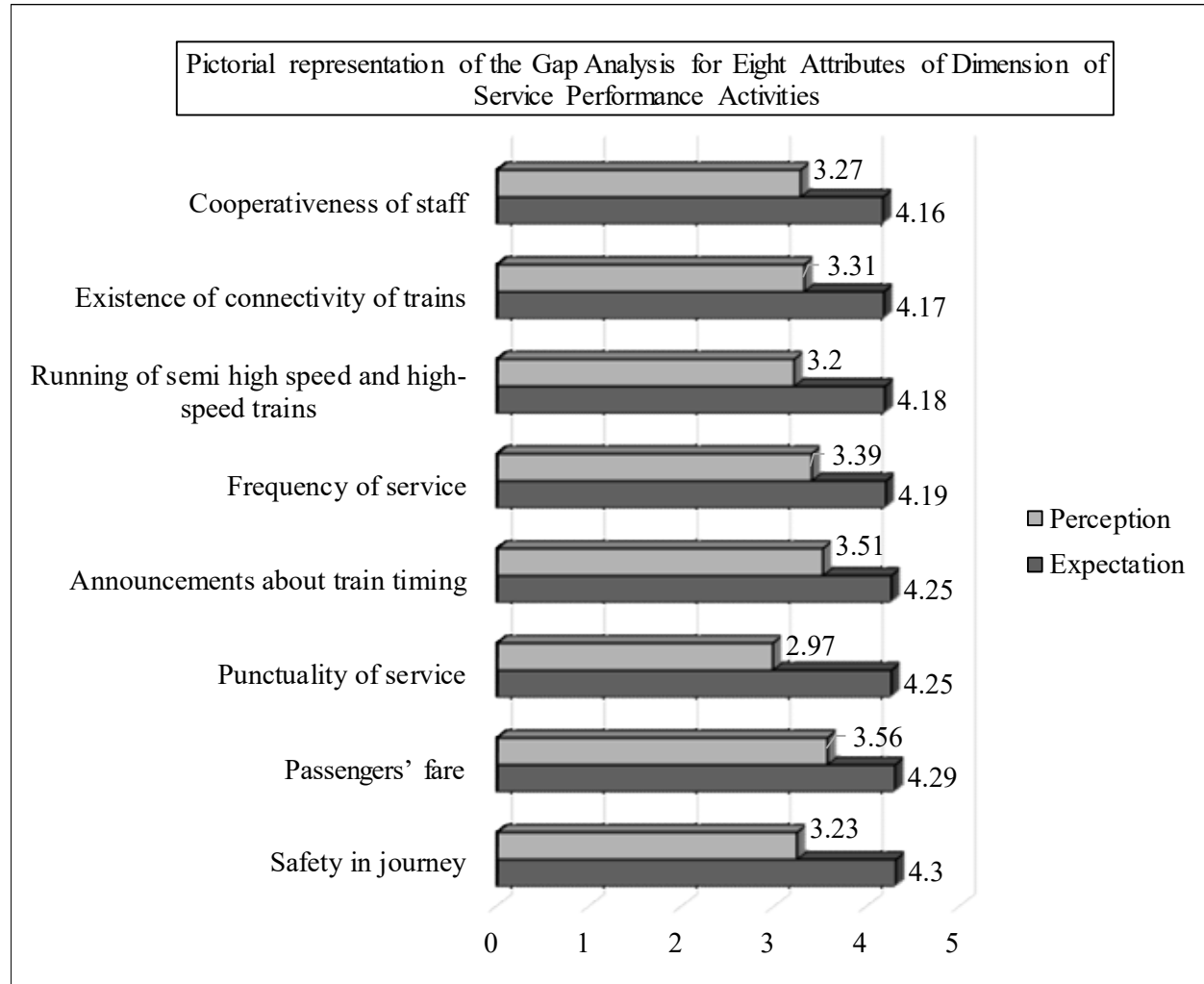


Figure 2.4



A look into the above gap analysis chart shows that among an aggregate of 29 service quality attributes, passengers' requirements are almost met for two attributes in dimension, i.e., ticket booking facilities; they are one online booking facility, and two ticket booking in advance. Similarly, passengers' requirement is also met for one attribute in the dimension service operational activities, and it is passengers fare.

Most importantly, there are some attributes where the Southern Railway / Indian Railway has failed to meet the rail passengers' requirements, and these are the one it needs to focus on if it wants to improve service quality and thereby reducing / closing the gap between passengers' perception and expectation of service quality variables. These attributes are the priorities for improvement (PFI). The bigger the gap, the bigger the problem.

One can well see that biggest PFI, the attribute or the area with the greatest need for improvement / action is not the attribute with the lowest perception mean score, but the one with the largest gap, for example punctuality of train service (-1.28), followed by cleanliness (-1.24), safety in travel (-1.07), Lighting and fans (1.06), wi-fi facility (-1.05) and escalator facility (-1.02).

A notable feature is that in none of the variables, there has been at least equality between expectation scores and perception scores. This clearly shows the Southern Railway has to gird up its loins to close/reduce the gap between expectations and perceptions in all the 29 variables especially in grave grey areas where the gap is larger, namely, punctuality of service, cleanliness, toilet facility, safety in travel, and trolley path facility in platforms. This significant revelation strongly suggests for augmenting passenger revenue of Southern Railway instantaneously.

Suggestions and Conclusion

A remarkable revelation is that grand mean difference is bigger in two dimensions, namely, service operational activities and basic amenities with the larger negative (grand mean value of -0.919 and -0.885 respectively).

At this juncture it is noticeable that individual pairs of attributes in the dimension basic amenities, namely, cleanliness and toilet facility have registered a bigger negative gap; similarly, the individual pairs of attributes in the broad dimension service operational activities, namely, punctuality in service and safety in rail journey have shown a larger negative gap. The Ministry of Indian railway should ponder over these negative gaps.

The crux of the problem is how to close the negative gaps in the service quality of IR/SR? Now the Indian Railway/Southern Railway are at cross roads. It is caught in between Scylla and Charybdis. That is to say, amid dire financial straits, the IR/SR has to overcome the lacunae in its service quality.

The real situation is there is fierce competition in surface transportation; Now the rail passengers are craving for improved rail service. Being so, the pragmatic solution lies in augmenting the revenue of SR/IR from passenger traffic, so that the rail passengers' expectations of robust service would be fulfilled.

How to close the negative gaps in service quality attributes - Suggestions for augmenting revenue:

As seen earlier, the shortage of funds of IR/SR precluded it from improving its service quality. To increase revenue from passenger traffic of SR, the present author got suggestions from knowledgeable persons, namely, present & past railway officials, office bearers of rail passengers' welfare Association and frequent travelers in the train. For this out of 50 data sheets issued to them in January 2017; 41 completed data sheets were obtained.

The data sheet had only one open end question, i.e., what are your practical suggestions for increasing the revenue of SR from passenger traffic so as to enable it to improve its service³. As some of them offered more than one suggestion, the number of responses (numbering 70) exceeded the number of respondents (41). A portrait of frequency distribution of suggestions offered by them is laid underneath.

Table 7 Frequency distribution of suggestions from Knowledgeable persons for Augmenting Revenue of IR/SR

S. No	Suggestion	Frequency of responses	% to total
1.	Doubling and electrification of high revenue yielding routes like Chennai –Egmore - Nagarcoil should be completed without delay.	11	15.71
2.	Streamlining the existing service and increasing the hauling capacity of engines. Some of the express/passenger trains may be permanently augmented with 3 coaches, for example; one sleeper class coach, one AC 2 tire coach and one AC three tire coach- for example, in Harzrat Nizamuddin and Kacheguda – Nagercoil section. Similarly, crowded passenger trains may get permanently additional II class 2 or 3 coaches, for example; Tiruchendure – Palanai passenger train, Tirunelveli - Tiruchendur Passenger train and Palakkad – Palani special passenger train and Palakkad to Kollam train. Now in IR, the maximum capacity of attachment of coaches per passenger train is 24 coaches. It is suggested to increase the number of coaches to be attached per train by	10	14.28

	introducing high hauling capacity of LOCO engine with 6500 CC, which would augment the number of coaches per train and hence the revenue.		
3.	Ticketless travel should be checked; to curb this, more ticket checking staff may be appointed	8	11.43
4.	Punctuality in train service should be maintained in order to retain/increase the number of passengers.	6	8.57
5.	There may be public private partnership (for a specified period) in the areas where heavy investment is needed	8	11.43
6.	Premium tatkal and premium special trains may be withdrawn; instead, normal special train may be run. There may be an increase in frequency of train service on important routes. Running of special train may be announced in advance (late announcement to be avoided). Second class sitting reserved coaches in night express trains should be converted into general coaches; this would accommodate more passengers, revenue would increase	5	7.14
7.	There may be commercial utilization of vacant lands of Southern railway. Earning revenue from advertisement on railway coaches. Also, for the use of vacant lands at both sides of track used by railway engineering staff, they may pay nominal charge to IR	4	5.71
8	II class ordinary fare is heavily subsidized; the fare may be raised and the raised shall be 20% less than road transport fare; similarly, sleeper class fare may be raised and it shall be 30% less than omnibus fare. Railways should revise II class fare and season ticket fare which remain unrevised for a long time.	3	4.28
9	Introduce new measures. Check in and checkout times in retiring rooms of SR may be streamlined; for e.g. a passenger who enters between 6.00 a.m. and 10.00a.m. will be charged for 1 day till the next day 6.00 a.m. and 10.00a.m. Railways pricing policy for VRR and NVRR may be decentralized. Neatness keeping work (garbage free) in the stations	4	5.71

	may be entrusted to NCC, NSS and such other school/college voluntary groups; this would not only reduce expenses but also promote civic responsibility and patriotism of students. Maintenance of bathrooms and toilets may be entrusted to local chambers of commerce and local service organizations, and thus railways expenditure will be reduced.		
10	Quality food may be served; for this, the railways itself can undertake catering service instead of given it to private contractors. Or, public private partnership may be thought of.	3	4.28
11.	Introducing/running semi high speed/ high speed trains.	3	4.28
12.	Populist schemes should be pruned. Populist projects which are economically unviable should not be announced/ undertaken expect in N.E. region. Similarly, unwanted concessions from the existing list of 50 concessions may be pruned in a phased manner.	2	2.86
13	Existing reservation system needs improvement to quicken the transactions of reservation system	2	2.86
14	Online ticket booking service charge may be increased up to 2 to 3 % and, e-ticket booking authorized agencies may be appointed	2	2.86

Source: Field survey

Analysis of suggestive measures meant for augmenting the revenue of SR reveals that responses constituting 15.72 percent suggest for doubling and electrification of high revenue yielding route, namely, Madurai – Kanyakumari stretch. The single lane Madurai – Kanyakumari stretch is in dire need of conversion in to double lane.

This would considerably improve service quality attributes safety in travel and punctuality in service in terms of the dimension service operational activities. In this context, it is worth to note the following statement: 7““The main demand of south Tamil Nadu citizens is for a swift conversion of the single lane Madurai- Kanyakumari stretch into a double lane””.

Responses forming 14.28 percent pinpoint the second important suggestive measure, namely, increasing the hauling capacity of engines, and some of the crowded express/passenger trains permanently augmented with three coaches.

Now in IR, the maximum capacity of attachment of coaches per passenger train is 24 coaches. It is suggested to raise the number of coaches to be attached per train by introducing high hauling capacity of LOCO engine with 6500cc, and hence the revenue rise.

Whereas 8.57 percent responses indicate maintenance of punctuality in train service, 7.14 percent pinpoint an increase in frequency of train service but these two things are possible only in case of completion of double line in Madurai – Kanyakumari stretch.

Responses forming 4.28 indicate a revision in second class fare. Respondents report as second-class ordinary fare is heavily subsidized, the fare may be raised and the raise may be 25 percent less than road transport fare. The railways may revise II class ordinary fare, and season ticket fare which remain unrevised for a long time.

Responses constituting 5.71 percent indicate keeping neatness (garbage free) in the railway stations; Respondents perceive cleanliness is a basic amenity in service quality of SR. As India has a mammoth population, maintenance of cleanliness poses a problem.

It is the suggestion of the respondents that the work of keeping neatness may be entrusted to NCC, NSS and such other School/College voluntary groups; this would not only reduce expenses but also promote civic responsibility and patriotism of students.

Maintenance of bathrooms / toilets maybe entrusted to local chambers of commerce and local service organizations, and thus the expenditure of Railways could be reduced.

Seeking Suggestions again in 2019 to raise revenue of SR:

The present author after two years, again, issues a data sheet as did in the year 2017 to knowledgeable persons of IR seeking their practical Suggestions for raising revenue from passenger segment of SR.

For this out of 50 data sheets issued, 34 completed sheets were obtained in August,2019. As some of the respondents offered more than one suggestion, the number of responses obtained was 56. The analysis of their responses for raising the revenue of SR is shown in the following table.

Table 8 Frequency Distribution of suggestions from knowledgeable persons for augmenting revenue of IR/SR

S. No	Suggestion	Frequency of responses	% to Total
1.	Of the 50 categories of railway concessions, excepting for health, education, farmers, persons of bravery awards, war widowers & military personnel, the other categories of the concessions may be withdrawn.	12	21.43
2.	Senior citizen concessions in I class, II A/C and I A/c may be withdrawn	10	17.86
3.	To mitigate overcrowding in long distance trains, minimum fare in general coaches up to 200kms may be raised. This Would prevent the occupation of short distance passengers and permit more number of long distance passengers occupation; this may vary according to the type of train.	9	16.10
4	The number of trips in much demanded routes (eg. Coimbatore to nagarcovil and Madurai to Rameswaram) Should be increased.	11	19.64
5.	For season tickets, the distance slab in Kms. to 200/250kms	8	14.29
6.	Catering may be flexibility that is regional food may be served: for e.g. for train service in Tamilnadu, South Indian food / Tamilian food may be served	6	7.14
7.	Seat reservation charge for II sitting coaches may be increased from 15 to 30 rupees	2	3.57
8.	Parcel booking and delivery may make round the clock service	-	-
9.	The circuitous trains may (e.g Guruvaur to Chennai and Anathadayatrain from Tirunelveli to tambaram) correctly short routed	-	-
10.	All trains ended at Chennai central station (coming from Northern states) may be extended to Tirunelveli/Nagarcoil so as to cater to the needs of all people of tamilnadu	-	-

It is clear from the above table that responses constituting 21.43 percent suggest for cessation of unwanted concession, and followed by 17.86 percent increase in the frequency of service in much demanded routes.

Conclusion

The ministry of Indian Railway should ponder over the issues brought to light by the present study. The present study has brought to sharp focus two things one is identifying service quality attributes requiring priorities for improvement (PFI); the other is exploring avenues for raising revenue in passenger traffic in Madurai division of Southern Railway so as to enable it to upgrade its service quality. Such exploration of augmentation of revenue or reduction in working expense becomes imperative in the context of Indian Railway's incurrence of Rs.34,000 crore operational loss per year.

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