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MEASURING SERVICE QUALITY IN MADURAI DIVISION OF SOUTHERN RAILWAY ZONE

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ABSTRACT

For several years, the Indian Railway (IR) keeps its passenger fare low and cross subsidises 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 "measuring service quality in Madurai division of Southern Railway Zone" has assumed greater significance than ever before.

KEYWORDS: ***Indian railway, Southern Railway, service Quality, passenger expectation, Madurai division.***

INTRODUCTION

[1]In 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 formed in April, 1951. Head quartered in Chennai, it has the following six railway divisions – Chennai Tiruchirapalli, Madurai, Palghat, Salem and Trivandrum. [2]Madurai railway division was formed in 1856; it spans over 1,356 kms making it the largest division of SR. At present, the Madurai division covers 11 districts of Tamilnadu and one in Kerala. [3]SR operates daily 1313 trains where more than 50 core 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 [4]Hemant Sharma and Sonali Yadav (2013), Rajeswari and Santa kumari (2014) and Singh and Vikas Kumar(2015); and [5]certain others were concerned about growth and development of IR – Arpita Mukherjee and Ruchika Sachdeva(2004). 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. The present study fills this gap.

RESEARCH PROBLEM

Concerning the service quality, IR 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.

A sordid state of affairs is the operating ratio of IR has consistently been higher than 90%; [6]while 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. 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.

Objectives of the study are

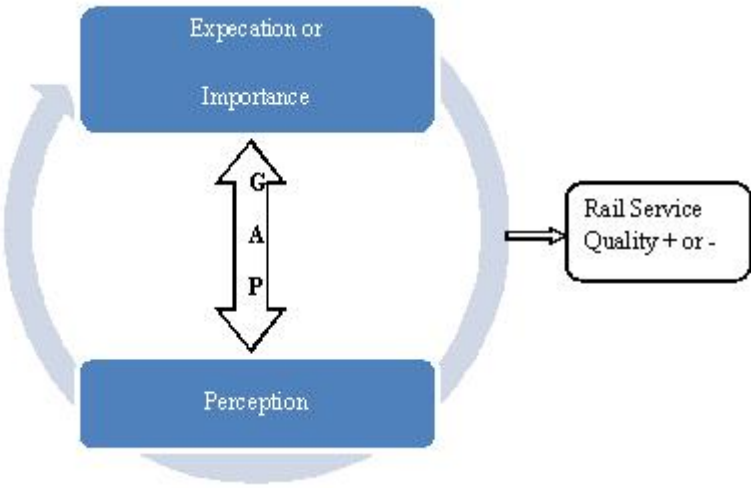
1. To study the gap between passengers' expected level and perceived level of service quality attributes of southern Railway.
2. To examine the avenues for raising the revenue of Madurai division of SR.

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 is portrayed in figure1.

Figure 1

Gap model for Service Quality Attributes of Southern Railway



HYPOTHESIS TESTED

H_o : 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

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

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

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

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. 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 11 districts of Madurai division in SR, 62 passengers were chosen (31 Male and 31 female passengers. Relevant statistical tools such as percentage calculation, weighted average, standard deviation, paired t test, confirmatory factor analysis and gap analysis were applied.

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 1 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	Dissatisfed	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 2.

Table 2 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 the present study, CFA was conducted to confirm/ validate four dimensions or constructs, i.e. to test construct validity 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, plat form shelters, foot overbridge 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.

Service quality denotes a gap between one's perceived and expected level of service. several 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.

Service quality in Indian railway, a mammoth public utility concern is totally different from any other product/ service environment. As a result, the present author has evolved –his own 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 dimension 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

Table 3 presents a summary of reliability statistics (Cronbach's alpha) runoff SPSS.

Table 3 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.

Gap Analysis - Mean Analysis

The author's rail service quality model namely, RSQUAL (Rail service Quality) 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. 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 table4.

Table 4 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	Drink water facility in the station	4.35	3.42	-0.93	13.055	.000
		Toilet facility in the station	4.27	3.12	-1.15	14.922	.000
		Lighting and fans in the stations	4.26	3.20	-1.06	16.405	.000
		Shelters in the platforms	4.19	3.58	-0.61	9.836	.000
		Cleanliness in station and coaches	4.28	3.04	-1.24	16.388	.000
		Foot over bridge facility in the station	4.27	3.42	-0.85	12.466	.000
		Trolley path facility in the station	4.17	3.51	-0.66	10.318	.000
		Adequacy of parking space and parking charges	4.08	2.93	-1.15	14.308	.000
		Availability of auto & public transport buses	4.15	3.57	-0.58	10.621	.000
			4.11	3.49	-0.62	9.669	.000
Grand mean			4.213	3.328			
SQ2	Modern amenities	Touch screen facility in the station	4.15	3.44	-0.71	10.083	0.000
		Coach indication board in the station	4.06	3.41	-0.65	9.154	0.000
		Mobile phone charger facility in the station	4.16	3.35	-0.81	11.501	0.000
		Display of name chart in reserved coaches	4.13	3.49	-0.64	9.000	0.000
		Escalator and lift facility	4.11	3.09	-1.02	12.997	0.000
		Wifi facility	3.96	2.91	-1.05	13.473	0.000
Grand mean			4.095	3.280			
SQ3	Booking facility	Online booking facility	4.11	3.73	-0.38	5.871	0.000
		Booking ticket facility in advance	4.15	3.66	-0.49	7.581	0.000
		Season ticket facility	4.13	3.59	-0.54	8.306	0.000
		Ticket cancellation facility	4.14	3.42	-0.72	10.331	0.000
		Tatkal & premium tatkal schemes booking facility	4.03	3.32	-0.71	11.644	0.000
Grand mean			4.112	3.544			
SQ4	Service operational features	Passengers' fare	4.29	3.56	-0.73	12.056	0.000
		Safety in journey	4.30	3.23	-0.8	16.548	0.000
		Frequency of service	4.19	3.39	-1.28	12.890	0.000
		Punctuality of service	4.25	2.97	-0.86	17.054	0.000
		Existence of connectivity of trains	4.17	3.31	-0.74	14.414	0.000
		Announcements about train timing	4.25	3.51	-0.98	12.615	0.000
		Running of semi high speed and high speed trains	4.18	3.20	-0.89	14.101	0.000
		Cooperativeness of staff	4.16	3.27		13.306	0.000
Grand mean			4.224	3.305			

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. 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.

From the observance of probability in the last column of the above table 4 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 5) Ho: There is no difference between expectation and perception of passengers in terms of the dimension basic amenities in Madurai division of Southern Railway zone(of IR). Similar null hypothesis was formulated for the other three broad dimensions of service quality.

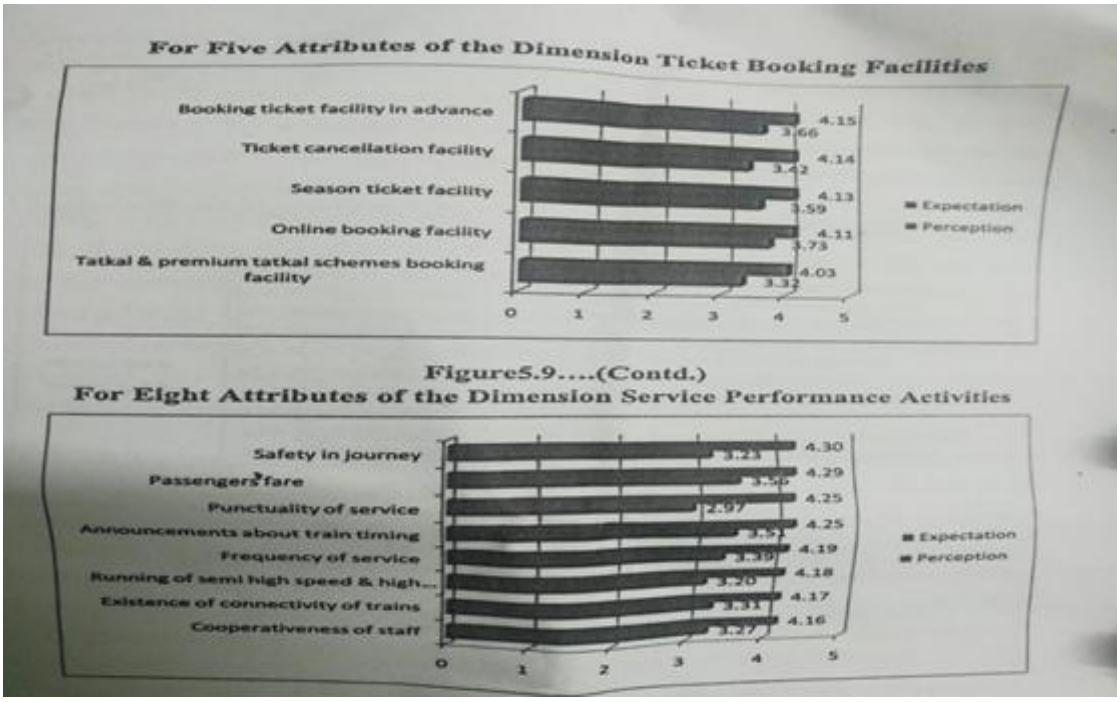
Table 5 pair differences between perception and expectation inSq Dimensions of Southern Railway

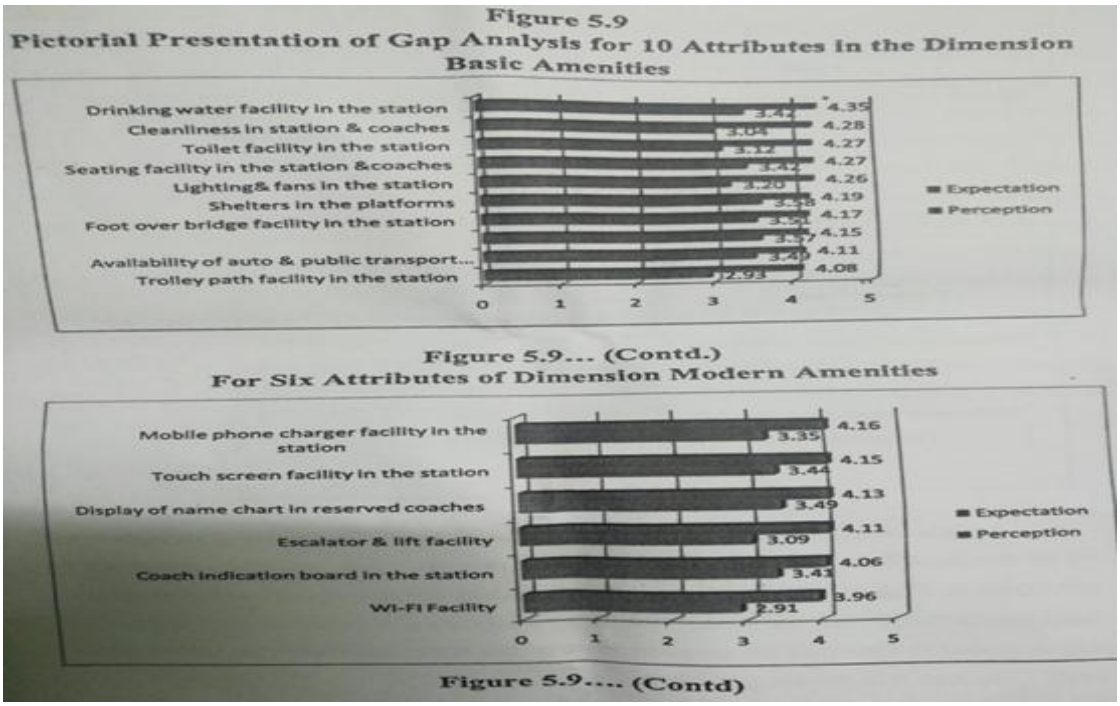
Pair	Dimensions	Grand mean value		Gap Score (P-E)	Statistic	Sig.
		(P)	(E)			
Pair 1	Basic amenities perceived basic amenities expected	3.328	4.213	-0.885	-54.328	.000
Pair 2	Modern Amenities Perceived Modern amenities expected	3.280	4.095	-0.815	-26.323	.000
Pair 3	Booking facilities perceive – booking 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.

Focusing attention on what matters most – diagrammatic presentation





The above gap analysis chart pinpoints if the perception bar is shorter than the expectation one, the Southern railway has a problem / grey area. The chart shows that the IR | SR has to close the gap between expectations and perceptions in all the 29 variables especially in grave grey areas where the gap is wider namely, punctuality in service, safety in travel, cleanliness and toilet facility. This significant revelation strongly suggests for raising passenger revenue of SR instantly

SUGGESTIONS

The present author contacted present and past railway employees and issued 50 data sheets – seeking their suggestions for augmenting passenger revenue of IR. From 42 data sheets, 71 responses were received.

Table 6 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 capacityof engines. Some of the express/passenger trains may be permanently augmented with 3 coaches, for examples; 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 introducing high hauling capacity of LOCO engine with 6500 CC, which would augment the number of coaches per train and hence the revenue.	10	14.28
3.	Ticketless travel should he cheked; to curb this , more ticket cheking 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.	The 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 withdrawn; instead, normal special train may be run. There maybe an increase in frequency of train service on important routes. Running of special train may be announced inadvance (late announcement to be avoided). Second class sitting reserved coaches in nigh 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 vacation 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 charges of IR	4	5.71
8	II class ordinary fare is heavily subsidized; the fare may be raised and the raised shall be 2% 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 fair and season ticket fare which remain unrevised for 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 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.	4	5.71
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 54 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 – Kanniyakumari stretch. The single lane Madurai – Kanniyakumari 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 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- Kanniyakumari stretch into a double lane".

CONCLUSION

The Ministry of Indian Railway should ponder over the issues brought to light by the present study. The 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[8].

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