CHAPTER - VI

SUMMARY OF FINDINGS, SUGGESTIONS AND CONCLUSION

6.1. INTRODUCTION
6.2 SUMMARY OF FINDINGS
6.3 SUGGESTIONS
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CHAPTER I

INTRODUCTION AND DESIGN OF THE STUDY
1.1 INTRODUCTION

‘Indian Railways’ (IR) has a vast network, the second largest in the world under a single management, with 65,000 route kilometres of track and employing 1.39 million workforce as on 31.3.2010. It carried 887.79 million tonnes of freight and 7246 million passengers during the year 2010. Indian Railways is the largest transport system in Asia and the fourth largest transport system in the world. It runs 19,000 trains daily of which 10,000 are passengers trains, operates over 8000 stations, covering a distance of 12.5 lakh kms every day. More than 20.9 million passengers board the trains and about 18 lakh tonnes of freight are carried daily. It has a fleet of over 7800 Locomotives of which are diesel 4170, electric 2120 and wagons 3,13,000 and passenger coaches 36000. The total investment in the railways exceeds Rs.25,000 crores as on date. The Indian Railways has completed more than 150 years of useful service to the nation. Indian Railway’s products and expertise have world market, extending their overseas operations extensively to about 20 countries in Africa, Middle East, South Asia and Latin America. Before 1947, 42 Railway Companies operated in the country. ‘Indian Railways’ is now entirely owned and operated by Government of India throughout the country. The policy decisions are taken by the Railway Board comprising the Railway Minister, Government Officials, Railway Officials and the representatives of Labour Unions. The mega cities in India like Mumbai (Bombay), Chennai (Madras) and Calcutta have a large suburban network and it also forms part of the general railway operations of the respective zone. These suburban rails account for about 60 per cent of the total number of passengers on the railways. Very recently a separate corporation was formed to take care of the transportation needs of the Mumbai mega city. Mumbai
suburban rail is one of the biggest systems in the world carrying nearly 2 billion passengers and operating 47 billion passengers kms. annually. Mumbai suburban rail fares are, however, one of the lowest in the world and its yield per passenger kilometre fluctuates between 0.20 – 0.25 per cents only.\(^1\)

Railway plans today are financed through three main sources: (i) Internal resources, (ii) Market borrowings and (iii) Capital from the General Exchequer. During 1996-97 the composition of such financing was 54 per cent, 28 per cent and 18 per cent respectively. The capital receipts from the General Exchequer have declined from 51 per cent in 1986-87 to 18 per cent in 1996-97 while the level of market borrowings has gone up from zero to 28 per cent over the same period. This situation is likely to land Indian Railways in a debt-trap like most railway networks in developed world. The Japanese and the German railways had to be bailed-out of Yen 28 trillion and Dutch Mark 67 billion of debt through State intervention recently.

As in other developing countries in the world, Indian Railways discharge social obligations by carrying essential commodities at lower rates, concessional fare for certain category of passengers mainly in the suburban areas of larger cities, operating uneconomic branch lines, security patrolling and the like. The losses incurred under these heads amounted to Rs.11, 477.93 crore in 2008-09, that is, about 14.38 per cent of the total earnings of Indian Railways. No subsidy in any form is provided by the Exchequer as is done in countries like U.K., Switzerland, Germany and France where

the magnitude of the subsidy ranges between 30 per cent and 35 per cent of the total revenue earnings of the railways.²

1.2. HISTORY OF INDIAN RAILWAYS

The East India Railway was registered in the year 1848 and it opened the first line of Railway between Bombay and Thane in 1853. This early development was purely due to British influence and the various networks gradually extended and increased in size. The Indian Railways in India provides the principal mode of transportation for freight and passengers. It has been a component of the social, political and economic life of the country. Indian Railways transportation network has played a key role in weaving India into a nation. This network has not only integrated markets but also people across the length and breadth of the country. It has improved the economic life of the country and helped in accelerating the industry and agriculture.

The main objectives of railways have been to develop the transport infrastructure to carry the projected quantum of traffic and meet the developmental needs of the economy with efficient railway transport system since the inception of the planned era in 1950-51. Indian Railways has implemented ten five-year plans, apart from the annual plans in some years. Besides the general objectives each plan had a special objective as given below:

1) First Five Year Plan---Rehabilitation and replacement of over-aged assets due to Second World War and the partition of the country.

2) Second Five Pear Plan---Particular emphasis to prepare railways for carrying the traffic generated steam plants and the increased production of coal.

² Ibid., p.3
3) Third Five Year Plan---Building up additional capacity so as to be ahead of the traffic demand and to prevent bottlenecks.

4) Fourth Five Year Plan---Modernization of the system to improve efficiency of operations.

5) Fifth Five Year Plan---Improvement of existing capacity more than the extension of railway system and to maximize operational efficiency in the railways.

6) Sixth Five Year Plan---Better utilization of the existing assets, modernization of equipment and increase local production of critical items.

7) Seventh Five Year Plan---High priority to the development of freight terminals to facilitate the free and smooth movement of wagons; accelerate the conversion of steam locomotives to diesel and electric traction.

8) Eighth Five Year Plan---The thrust areas identified for this plan included replacement and renewal of over-aged assets; augmentation of terminal and rolling stock capacities; gauge conversion and electrification.

9) Ninth Five Year Plan---The main thrust was on capacity generation besides rehabilitation, manpower planning and human resources development, energy conservation safety, financial viability and consumer’s satisfaction through reliable and better quality of services.
10) Tenth Five Year Plan---The main thrust in the Tenth Plan was to strengthen the capacity of the railway system as the prime carrier of long distance bulk freight and passenger traffic.\(^3\)

To achieve this, the railways concentrated on electrification of dense corridors, improvement in reliability of operations, containerization and optimization of total system operations. By providing means of mobility to a large number of people and huge quantities of materials across the country, Indian Railways contributes substantially to the growth of the economy. The passengers carried are enormous and the quantities of goods moved are massive.

The nationalized railways of India are under the control of the Central Government under the Ministry of Railways. The operations are controlled and directed by the Railway Board under the overall supervision of the Minister for Railways. The Railway Board has a Chairman and six members including the Financial Commissioner. The Chairman is the ex-officio principal Secretary to the Government of India. The Board thus performs the dual functions of a secretariat to the Ministry of Railways and that of an executive body responsible for railway operations. The Railway Annual Budget is approved by the Parliament and accounts are audited by the Comptroller of Auditor General of India.

After Independence, the zonal grouping was made in order to ensure effective administration, operation and co-ordination of the Indian Railways. Zonal grouping was expected to achieve economy and improvement in operation and uniformity in administration and financial control. At present the Indian Railways network is divided into 16 zones, each headed by a General Manager. Zonal Divisions in Railways are given in Table 1.1 with their headquarters and date of inauguration.

TABLE 1.1

| INDIAN RAILWAY ZONES: HEADQUARTERS AND DATE OF INAUGURATION OF THE DIVISION |

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\(^3\) [www.irfca.org/faq/faq-history5.html](http://www.irfca.org/faq/faq-history5.html).
<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Railway Zone</th>
<th>Head Quarters</th>
<th>Date of Inauguration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Southern Railways</td>
<td>Chennai</td>
<td>April 14, 1951</td>
</tr>
<tr>
<td>2.</td>
<td>Central Railways</td>
<td>Mumbai CST</td>
<td>Nov 5, 1951</td>
</tr>
<tr>
<td>3.</td>
<td>Western Railways</td>
<td>Mumbai Church Gate</td>
<td>Nov 5, 1951</td>
</tr>
<tr>
<td>4.</td>
<td>Northern Railways</td>
<td>New Delhi</td>
<td>April 14, 1952</td>
</tr>
<tr>
<td>5.</td>
<td>North Eastern</td>
<td>Gorakhpur</td>
<td>April 14, 1952</td>
</tr>
<tr>
<td>6.</td>
<td>Eastern Railways</td>
<td>Kolkata</td>
<td>Aug 1, 1955</td>
</tr>
<tr>
<td>7.</td>
<td>South Eastern</td>
<td>Kolkata Garden Reach</td>
<td>Aug 1, 1955</td>
</tr>
<tr>
<td>8.</td>
<td>North Eastern Frontier Railways</td>
<td>Maligon (Guwahati)</td>
<td>Jan 15, 1958</td>
</tr>
<tr>
<td>9.</td>
<td>South Central</td>
<td>Secunderabad</td>
<td>Oct 2, 1966</td>
</tr>
<tr>
<td>10.</td>
<td>East Coast (ECR)</td>
<td>Bhubaneswar</td>
<td>Aug 8, 1996</td>
</tr>
<tr>
<td>12.</td>
<td>East Coast (ECR)</td>
<td>Hajipur</td>
<td>Sep 8, 1996</td>
</tr>
<tr>
<td>14.</td>
<td>South Western (SWR)</td>
<td>Hubli</td>
<td>Nov 1, 1996</td>
</tr>
<tr>
<td>15.</td>
<td>West Central (WCR)</td>
<td>Jabalpur</td>
<td>Dec 9, 1996</td>
</tr>
</tbody>
</table>

Source: [www.indianrailway.org.in](http://www.indianrailway.org.in)
Besides the above mentioned 16 Zonal divisions, the Railways has several production units. Locomotives are built in Chittaranjan Locomotive Works, Chittaranjan; Diesel Locomotive Works at Varanasi; Integral Coach Factory at Perambalur (Chennai); and Rail Coach Factory at Kapurtala. In addition, two more units in Public Sector, M/s Jessops, Kolkata and Bharat Earth Movers Limited, Bangalore also manufacture coaches and electrical multiple units. Wheel and Axle Plant, Yelahanka at Bangalore went into production in 1983.

The Ministry of Railways has five undertakings under its administrative control. They are (i) Rail India Technical and Economic Services Limited; (ii) Indian Railway Construction Limited; (iii) Indian Railway Finance Corporation Limited; (iv) Container Corporation of India Limited; and (v) Konkan Railway Corporation Ltd. Centre for Railway Information System was set up as a registered Society to design and implement various computerization projects.

There is also a Research, Design and Standards Organization at Lucknow which is an attached office of the Railway Board and is headed by a Director General. The Rolling Stock Fleet of Indian Railways in service as on 31st March 2001 comprised of 54 steam, 4702 diesel and 2810 electric locomotives.

1.4 STATEMENT OF THE PROBLEM

The people regularly travel from one place to another for personal, educational and business purposes. For this they make use of Rail and Road transports. In between
these two, Rail transport is considered to be offering better facilities to passengers than Road transport. Right from entering the Railway station to reaching the destination the railway passengers are provided with facilities both at the stations and in the train. In India Railway has become important mode of transport as it carries 2.2 crore passengers daily. But, over the period of time the Railways is losing its share in the public transport system. Its share in public transport system has shrunk to 10 per cent in recent times. This situation arises because the railways could not increase its carrying capacity in proportion to passengers demand. It is slow in laying down new lines and doubling its existing rail lines.

But the railways being energy efficient and only suitable mode for long distance travel, the railways should not suffer from financial and operational deficiencies. The efficient Railways is must, for achieving higher ‘Gross Domestic Product’ growth which in turn develops the overall economy of the country. A study on the railway passenger services at micro level shall help the decision makers to formulate the policies at macro level for improving the financial and operational efficiency of Indian Railways. Hence the present study, “A study of Indian Railways in Public Passenger Transport”.
1.5 REVIEW OF LITERATURE

The present study has considered the views of the previous literature related to the research topic. In this respect, a few notable past studies relating to Indian Railways are focused on as they throw light on the initiatives to be introduced in the future.

Allen and DiCesare (1976) in their study “Transit Service Evaluation: Preliminary Identification Variables Characterizing Level of Service” have considered that quality of service for the Public transport industry contained two categories: user and non-user. The user category consists of speed, reliability, comfort, convenience, safety, special services and innovations. The non-user category is composed of system efficiency, pollution and demand.4

Silcock D.T (1981) in his study “Measures of Operational performance for Urban Bus Services” has conceptualized service quality for public transport industry as the measures of accessibility, reliability, comfort, convenience and safety.5


T.R. Shanmugam (1987) in his study titled, “Marketing of Railway Services-A study of Passenger and Goods Traffic in Madurai” has highlighted some aspects relating to the marketing of railway services in Madurai and the behaviour of passengers and users of goods traffic toward rail transport.\(^6\)

Parasuraman.A, V.A. Zeithamal and L.L. Berry (1988) in their study, “SERVQUAL: A Multiple-item Scale for Measuring Customer Perception of Service Quality” have identified five determinants: reliability, assurance, tangible, empathy and responsiveness (RATER).\(^7\)

Promila Sharma and Harpreet Duggal (1989), in their article titled “Grievance Redressal in Indian Railways” have reported that most of the passengers were dissatisfied with the railway service on different fronts namely catering, cleanliness and enquiry services. Most of the complainants did not use the redressal service provided by the Railway department because they did not expect any concrete action from Railways.\(^8\)


\(^8\)Promila Sharma and Harpreet - “Grievance Redressal in Indian Railways”, Consumer Confrontation, CERC, November 1989, pp. 5-7.
Hedvall and Palatschik (1989) in their study, “An Investigation in and Generation of Service Quality Concepts” have described willingness and ability to serve and the physical and psychological access to the service.⁹

Pullen (1993) in his study “Definition and measurement of Quality of Service for Local Public Transport management” has defined quality of service for local public transport industry as Concept that involves ‘those attributes of the service which affect its fitness for purpose’ and the attributes, and indeed fitness for purpose, required detailed definition in relation to local objectives and circumstances. Traditionally, the performance indicators for the public transport industry are divided into two categories: efficiency and effectiveness. Under the efficiency category, the measures are concerned with the processes that produce the services while the measures in the effectiveness category are used to determine how well the services provided perform in respect to the objectives that are set for them. Quality of service is one of the performance indicators under the effectiveness category. It is composed of accessibility, reliability, comfort, convenience and safety.¹⁰


¹⁰Pullen (1993)“ Definition and measurement of Quality of Service for Local Public Transport management”. Transport Reviews, 13(3): 247-64.
Corinne Bret in her article entitled (1994) “Japanese Trains”, has outlined the services provided by the Japan Railway inside the train. The information about the next station, connecting buses, the express trains, reminding of personal belongings and the like is made through public announcements inside the train.\(^{11}\)

Vivekanandhan in his study (1996) “A Study of Goods Traffic Services Provided by Southern Railways –with Special Reference to Virudhunagar Goods Shed” has pointed that the services provided by the Virudhunagar Goods shed satisfy its customers.\(^{12}\)

Kotnana Rama Rao (1996) in his article “Rural bus Transport Operations of the Andrapardesh State Road Transport Corporation (A Study of their Impact on the Socio Economic Development of Rural Households in Visakha Patnam District)” has pointed out that the introduction of bus service in the villages has played a complimentary role in moulding and changing the habits of people such as the food they eat, the vessels they use, the dress they wear and the cosmetics they apply. This is due to the


interaction with others particularly with the people in towns. Most of the sections of the people in the Villages expressed their satisfaction with the bus facility provided.\(^\text{13}\)

Zhang Ning in his article titled (1996), “A Railway Service Close to People’s Lives” has pointed out that Railway service in Japan is very close to people’s lives. In addition to providing safe, timely and speedy transportation, railways offer communities quick accessibility to shopping, entertainment, information, cultural activities and community services. This undoubtedly increase these competitiveness of rail to roads.\(^\text{14}\)

Ralph Buehler and John Pucher (1998) in their study “Making Public Transport Financially Sustainable” have found that public transport system reduced costs through organisational restructuring and outsourcing to newly subsidiaries, cutting employee benefits and freezing salaries, increasing work hours, using part time employees, cutting underutilized routes and services. Revenues were increased


\(^\text{14}\)Zhang Ning, “A Railway Service Close to People’s Lives”, \textit{Japan Railway and Transport Review}, April, 1996.
through fare hikes, raising passengers volumes by improved quality of service and full regional coordination of timetables, fares and services.\(^\text{15}\)

Cuomo, M.T. (2000) in his study “La Customer Satisfaction” has highlighted the techniques of customer satisfaction analysis that allow the critical aspects of the supplied service to be identified and customer satisfaction to be increased.\(^\text{16}\)

Drea and Hanna (2000) in their study “Niche Marketing in Intrastate Passenger Rail Transportation” have studied quality of service in a part of the Amtrak passenger rail system in the US. Their research focus was on the attributes of service quality that influenced the transport choice of the respondents of the survey, for example rail vs. automobile. The attributes used in the first paper were: comfort, cost, timing (ability to travel when I want), location (ability to travel where I want) and in-transit productivity (ability to work while traveling). In the latter paper cost, convenience in getting to the station, parking availability, Amtrak comfort, seat comfort, ride, seating


area cleanliness and courtesy of on-board staff were the service quality attributes tested.$^{17}$

Mudit Kulsnreshtha and Barnalinag (2000) in their article titled, “Structure and dynamics of non-sub urban passenger travel demand in Indian Railways” have reported that growing demand for passenger transport is directly related to growth in the economy. The demand system is found to be stable for all classes in the long-run and coverage to equilibrium in a period of around 2-4 years. Any disequilibrium in the short-run is corrected in the long-run with adjustments in passenger transport demand and the price variable. High price elasticity in long-run and short-run impulse responses indicate that passenger fare could lead to substantial decline in travel demand leading decline in revenue earnings of the railways.$^{18}$

R. Thirumoorthy (2001), in his study, “Consumer Images of Indian Railways-A Study in Madurai Railway Station”, has found that the image of the Indian Railways is dependent on its performance.$^{19}$


Koichi Goto (2001) in his article, “Passenger Service Technologies” has described the trends in seat reservation systems, automatic ticket machines in stations, automatic fare collection systems, automatic ticket checking machines, revolutionizing ticket systems using contact less IC cards and a guide system for visually impaired people currently being developed. With this system IC chips programmed with location information are embedded in tactile used to mark paths for visually impaired people; this is read by a cane with an embedded antenna, and verbal directions are given by a pocket-sized portable machine. The machine will guide him or her to the right platform by voice machines.  

As far as the Indian scenario is concerned, only a few studies are forthcoming related to Indian railways. Prominent among these is the CAG Audit Report No.9A of 2002 entitled ‘Passenger Amenities on Indian Railways’. The report acknowledges that the provision of passenger amenities is an important objective for the Indian Railways, both as a business ethic and a social obligation. It evaluates the performance of services provided in terms of complaints against certain services. While under-reporting is certain, analysis reveals that there are more complaints against departmental catering units than against contractor-operated units and that the gap is widening.

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21 “Passenger Amenities on Indian Railways”. 2002. CAG Audit Report No.9A.
G. Jeganthan (2002) in his study “Commuters of Railways – An Attitude Study with Special Reference to Thirunelveli-Nagercoil Section” has found that if season ticket fares are reduced for long distance travel, it is an added attraction to the commuters.\textsuperscript{22}

Pollitt and Smith (2002) in their study “The Restructuring and Privatization of British Rail: Was it Really that bad?” have reported that more recently, output quality measures that have been used for the rail system in Britain include train performance (delays per passenger train), train overcrowding, asset condition (broken rails per train mile), and safety or accident risk (signals passed at danger per train mile).\textsuperscript{23}

M.V. Rama Prasad (2002) in his article entitled, “A Study on Passenger Amenities in Railways” has found that more general compartments will be required for short distance travellers and it has been found that most of the passengers are not happy

\textsuperscript{22}G. Jeganthan, “Commuters of Railways – An Attitude Study with Special Reference to Thirunelveli-Nagercoil Section”, Ph.D. Thesis submitted to Manomanian Sundaranar University, January, 2002.

particularly with the quality of food according to him. Quality of food should be improved and variety of items should be introduced.²⁴

Tripp and Drea (2002) in their study “Selecting and promoting Service Encounter Elements in Passenger Rail Transport” have conducted a survey of Amtrak passengers to assess the ‘direct and indirect relationship between pre-core/peripheral and core service performance components and their impact on the likelihood of repeat purchase’. They found that the core experiences on-board determined the customers’ attitude to the service provider and subsequently their intention to use the train again. These attributes included announcements, seat comfort, and ride, cleanliness of the seating area, courtesy of on-board staff, rest rooms and café car conditions.²⁵

R. Kavitha (2004) in her study “A Study on Passenger Amenities at Madurai Railway Junction,” has pointed out that majority of the pay and use toilets are well maintained and kept clean.²⁶


Vijay Durga Prasad (2005) in his article, “A Study of Passenger Amenities in Indian Railways with Reference to Vijayawada Division” has found that the number of unreserved compartments should be increased to 30 per cent of the total number of the compartments of a train and Public address system can be provided in all express trains.\(^{27}\)

Reeti Agarwal (2006) in his article titled “Public Transportation and Customer Satisfaction the Case of Indian railways” has reported that out of the various factors considered, employee behaviour has the maximum effect on satisfaction level of customers with Indian Railways as a whole. The organizations today should aim not only at satisfying the customer but should also focus on delighting him. Thus it has become imperative for organizations to identify parameters that cause customer satisfaction or dissatisfaction and consciously measure them so as to try and bring about the necessary changes on the basis of customer perceptions.\(^{28}\)


Sharma, C.P. (2006) in his study “Customer Care – Indian Railways” asserts that railway enquiry counters play a pivotal role in customer satisfaction, but railway enquiry service is far from satisfactory in India.  

Tandon, R.K. (2006) in his study “The Art and Science of Customer Care” has observed that improvements have been effected by Indian Railways to minimize ticket dispensing time through modernized passenger reservation systems using computers and the Internet at a large number of stations. He further highlights that the passengers also want efficiency, effectiveness and politeness in service.  

Eboli and Mazzulla (2007) in their study “Service Quality Attributes Affecting Customer Satisfaction for Bus Transit” have measured customer satisfaction in the context of bus service on various factors including availability of shelter and benches at bus stops, cleanliness, overcrowding, in formation system, safety, personnel security, helpfulness of personnel and physical condition of bus stops. 

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Geetika and Shefali Nandan (2010) in their study “Determinants of Customer Satisfaction on Service Quality: A Study of Railway Platforms in India” have identified availability and quality of refreshments, effectiveness of information systems, behaviour of railway staff, basic amenities provided on platforms, safety and security. Refreshments and behavior factors are considered most important by passengers.\(^{32}\)

Matthieu Glachant (2011) in his article titled “Distributional Effects of Public Transport Policies in the Paris Region” has found that reducing public transport fares, increasing the speed of the public transport, low-income individuals benefit more from fare reduction.\(^{33}\)

Daniel van Vuuren in his study “Optimal Pricing in Railway Passenger Transport: Theory and Practice in The Netherlands” has described the link between the well-developed economic theory of optimal pricing, and recent empirical results concerning price elasticity’s of demand and marginal cost estimates for The Netherlands Railways.\(^{34}\)


1.6 OBJECTIVES OF THE STUDY

The objectives set forth by the researcher for the present research work are listed below:

1. To trace the history, origin and development of Indian Railways during pre and post independence period.

2. To analyse the physical performance in terms of network route, rolling stocks-wagon and passenger kilometres of Indian Railways.

3. To study the financial performance in terms of receipts and expenditure of Indian Railways.

4. To study the profile of sample respondents and to analyse their level of satisfaction on amenities provided by Indian Railway passengers and to examine the variables affecting the level of opinion of the respondents.
5. To identify the factors which are related to services provided by railways.

6. To analyse the problems faced by the Railway passengers.

7. To give constructive suggestions to improve the passenger services in Indian Railways.

1.7 HYPOTHESES OF THE STUDY

In order to achieve the objectives of the study, an analysis is made to understand the opinions of passengers on various amenities. The following hypotheses have been formulated and tested for this purpose.

*The socio-economic factors like sex, age, marital status, educational qualification, income and occupation have not influenced the opinion of the passenger on amenities provided by Indian Railways.*

1.8 METHODOLOGY

Primary Data

The present study is an empirical work mainly based on survey method. A well-structured interview schedule was developed on services
offered by Railways. The interview schedule was personally administered to the passengers who were travelling to various destinations and data were collected about the following items.

1. The nature of travel undertaken by passengers in terms of purpose, distance, class of travel and the like.
2. What attributes are relevant to passengers in their choice of mode of transport?
3. How passengers are satisfied with various aspects of train travel?
4. What kind of problems do passengers encounter in travelling by Indian railways?

Secondary Data

The primary data were supplemented by a spate of secondary sources of data. The secondary data relevant to the study were gathered by holding personal discussions with officers and staff in various departments of the Indian Railways and the official records, circulars, annual reports, railway budgets, year books, leading journals like Indian Journal of Marketing, Indian Journal of Industrial Relations which constituted a supportive literature for the purpose of making analysis and suggestions. The data from internet also was used for the study.

1.8.1 Construction of Interview Schedule
The key aspects of the present research were identified through the preliminary interviews with some selected respondents. The schedule so drafted was circulated among some resource persons for a critical view with regard to wording, format, sequence, and the like. These interview schedules were re-drafted in the light of their expert comments.

1.8.2 Pre-Test

The interview schedule meant for the study was pre-tested with 50 passengers. After that the opinion of the passengers thus interviewed, was also incorporated. Thus the interview schedule was finalized.

1.8.3 Sampling Design

As the population is too heterogeneous in character, the researcher himself has adopted the convenience sampling method for the study. For the purpose of primary data collection, a total of 600 railway passengers, 100 each from 6 important railway stations namely, Chennai Central, Chennai Egmore, Coimbatore, Madurai, Tiruchirappalli and Tirunelveli was selected. The care has been taken that the sample includes the passengers of
different type such as Business man, Professionals, Employees, Farmers, Labours, students, Senior citizens and House wives.

1.8.4 Data Processing

After gathering the required data through the interview schedule they were thoroughly checked to ensure their adequacy. Later, the data were tabulated and taken into consideration for the purpose of the study. The calculations and analysis were made with help of the computer.

1.8.5 Tools of Analysis

The following tools have been applied in the present study:

To analyse the average and stability (fluctuations) over a period under study of the physical performance variables, the arithmetic mean and coefficient of variation were computed by using the following formulae.\(^{35}\)

\[
\text{Arithmetic Mean ( } \bar{X} \text{) } = \frac{\sum}{n}
\]

Where,

\[X = \text{Value of the variable}\]

\[
\text{n} = \text{Number of observations.}
\]

\[
\text{S.D.}
\]

\[
\text{Coefficient of Variation} = \frac{\text{S.D.}}{\bar{X}} \times 100
\]

Where,

\[
\text{S.D.} = \text{Standard Deviation}
\]

\[
\bar{X} = \text{Arithmetic mean.}
\]

In order to analyse the trend and growth of financial variables, the following semi-log trend equation was fitted.\(^\text{36}\)

\[
\text{Log } Y = a + bt
\]

Where,

\[
Y = \text{Value of variable},
\]

\[
t = \text{Time variable.}
\]

The above model was computed by the method of least squares.

The following formula\(^\text{37}\) was used to calculate the compound growth rate (CGR).

\[
\text{CGR} = [(\text{anti log } b - 1) \times 100]
\]


The various problems faced by the respondents were tested with Garrett’s Ranking Techniques. Garrett suggested this method for converting the ranks into scores when the number of items ranked differed from respondent to respondent.

The per cent position for each rank was found using the following formula:

\[
\text{Per cent position} = \frac{100(R_{ij} - 0.5)}{N_j}
\]

Where,

\[R_{ij} = \text{Rank given to } i^{th} \text{ factor by } j^{th} \text{ individual.}\]

\[N_j = \text{number of factors ranked by } j^{th} \text{ individual.}\]

By referring to the table given by Garrett the percent positions estimated were converted into scores. Then, for each factor the scores of various respondents were added and divided by the number of respondents to arrive at the mean score. The mean scores, thus obtained for each factor, were arranged in descending order. The factor with the highest mean score was given the first rank, followed by second, third and so on. It is to be noted that, under each problem, the respondents were asked to give only one rank to a factor.

A five point rating scale was used to convert the response items into quantitative structure suitable for further statistical manipulations.
Chi-square test is used extensively to test the hypotheses developed for the purpose of establishing the validity of the factors identified as ones exerting influence on the opinion of the passengers.

\[
\chi^2 = \sum \frac{(O-E)^2}{E} \text{ with } (r-1)(c-1) \text{ degree of freedom.}
\]

Where,

- \(O\) = Observed frequency
- \(E\) = Expected frequency
- \(N\) = Number of Respondents

Factor Analysis

In order to test the factors, which influence the opinion of the passengers, the rotated factor matrix was applied. Each variable is expressed as a linear combination of underlying factors. The amount of variance of variable shares with all other variables included in the analysis is referred to as communality. The co-variance among the variables is described in terms of a small number of common factors plus a unique factor for each variable. These factors are not observed. If the variables are standardized, the factor model may be represented as:

\[
X_i = A_{i1}F_1 + A_{i2}F_2 + A_{i3}F_3 + \ldots + A_{im}F_m + V_i U_i
\]
Where,

\( X_i \) = ith standardized variable.

\( A_{ij} \) = standardized multiple regression co-efficient of variable I on common factor j

\( F \) = common factor

\( V_i \) = standardized regression Co-efficient of variable i on unique factor

\( U_i \) = The Unique factor for variable i

\( m \) = Number of common factor

The unique factors are uncorrelated with each other and the common factors themselves can be expressed as linear combinations of the observed variables.

\[ F_i = W_{i1} X_1 + W_{i2} X_2 + W_{i3} X_3 + \ldots + W_{ik} F_m + X_k \]

Where,

\( F_i \) = Estimate of i\(^{th}\) factor score co-efficient

\( W_i \) = Weight or factor score co-efficient

\( K \) = Number of variables
It is possible to select a weight or factor score Co-efficient, so that the first factor explains the largest portion of the total variance. Then a second set of weights can be selected so that the second factor accounts for most of the residual variance, subject to bring uncorrelated with the first factor. The same principle could be applied for selecting additional weights for the additional factors. Thus the factors can be estimated so that their factor scores, unlike the value of the original value, are not correlated. Further more, the first factor accounts for the highest variance in the data, the second highest, and so on.

1.8.6 Period of Study

The secondary data collected from the records kept in the Commercial Traffic Trend, Booking Office, Southern Railway, Rail museum and Railway Websites in the study area related to a period of 10 years, that is from 1999-2000 to 2008-2009. The survey for collecting primary data was carried out from July 2009 to March 2010. The reference period was 2009-10.

1.9 OPERATIONAL DEFINITIONS

1.9.1 Accounts

1.9.1.1 Capital-at-Charge

Book value of the capital assets of Railways.

1.9.1.2 Gross Earnings
The true earnings in an accounting period whether actually realized or not.

1.9.1.3 Gross Receipts

**Earnings actually realized in an accounting period.**

1.9.1.4 Working Expenses

**It includes expenditure on administration, operation, maintenance and repairs, contribution to depreciation reserve and pension funds.**

1.9.1.5 Suspense

**Unrealised earnings, liabilities not discharged in an account period.**

1.9.1.6 Net Revenue

**Gross traffic receipts minus total working expenses.**

1.9.1.7 Operating Ratio

**It refers the percentage of working expenses to gross earnings.**

1.9.2 Statistical

1.9.2.1 Passenger Kilometre

**A passenger transported over one km.**

1.9.2.2 Net Tonne Kilometre

**Payload of one tonne carried over one km.**

1.9.2.3 Gross Tonne Kilometre

**A tonne, including payload, tare and weight of engine, carried over one km.**

1.9.2.4 Revenue-earning traffic
Traffic which is paid for by the consignor or the consignee.

1.9.2.5 Non-Revenue traffic

Traffic conveyed free for working the railways.

1.9.2.6 Lead

Average haul of a passenger or a tonne of freight.

1.9.2.7 Net Load or Net Tonnage

Payload of passengers, luggage or goods carried by a vehicle or a train.

1.9.2.8 Wagon Turn-round

Interval of time between two successive loadings of a wagon.

1.9.2.9 Train Kilometre

Movement of a train over one km.

1.9.2.10 Engine Kilometre

Movement of an engine under its own power over one km.

1.9.2.11 Vehicle/Wagon Kilometre

Movement of a vehicle / wagon over one km.

1.9.2.12 Loaded Wagon Kilometre

Movement of a wagon, including departmental, loaded with goods over one km.

1.9.2.13 Smalls

Goods consignments whose weight and dimensions do not require the exclusive use of a wagon.

1.9.2.14 Route Kilometre
The distance between two points on a Railway system treating all lines (double, treble, etc.) as a single line.

1.9.2.15 Running Track Kilometre

The distance of multiple tracks (excluding track in sidings, yards and crossings at stations) i.e., double, treble etc., taken as two, three or more, as the case may be.

1.9.2.16 Track Kilometre

The distance of running track and tracks in sidings, yards and crossings at stations.

1.9.2.17 Density

The volume of traffic is moving between any two points on the Railway system. It is expressed in terms of passenger kilometers (PKms) or net tonne kilometers (NTKms) or train kilometers per running track kilometre or route kilometre.

1.9.3 Traffic

1.9.3.1 Freight Forwarder

The freight forwarder collects “smalls” as well as piecemeal wagon-load consignments from the premises of individual traders, consolidates and offers them as wagon-load/train-load traffic for carriage by rail.

1.9.4 Others

1.9.4.1 Number of Staff
All employees paid directly by the Railway administration.

1.9.4.2 Store

Supplies of materials or parts purchased externally or manufactured in Railway workshops for working the Railways.

1.9.4.3 Traffic Effort

Load-hauling capacity of a locomotive expressed in terms of the tractive force exerted by the locomotive at wheel.

1.10 LIMITATIONS OF THE STUDY

The present study is subject to the following constraints.

1. The study is confined to the Railway passengers only.

2. The data collected from the sampled respondents were the first hand information. In the course of field survey, a few respondents were hesitant to give response.

3. Secondary data gathered from standard books, leading journals and other records from railway offices might possess inherent limitations in respect of statistics.

4. Freight users, foreign tourists and travel agents were not included in this study.
5. The translation of the questions in vernacular language could have created response errors especially ambiguity in understanding questions as well as answer.

1.11 CHAPTER SCHEME

The first chapter ‘Introduction and Design of the Study’ gives a brief introduction to the history of Indian Railways, restructure of Indian Railways, statement of the problem, review of literature, objectives, hypotheses, methodology, limitations and chapter scheme.

The second chapter ‘Indian Railways – An Overview’ gives an outlook on the historical background of Indian Railway in pre and post Independence, functions of Indian Railways, review of Five Year plans and passenger amenities of Indian Railways.

The third chapter ‘Physical Performance of Indian Railways’ evaluates the physical performance of Indian railways in terms of network-route, running tracks, rolling stocks and the like.

The fourth chapter ‘Financial Performance of Indian Railways’ analyses the financial performance of Indian railways.

The fifth chapter ‘Opinion of Passengers Towards Services Provided by Indian Railways’ exposes the personal information of the respondents details about the travel of the respondents, the general opinion and specific opinion of passengers on the Indian Railways.

The last chapter ‘Summary of Findings, Suggestions and Conclusion’ gives the summary of the current research and brings it to a logical conclusion.

CHAPTER II