Research Paper
Impact Factor: 3.996
Peer Reviewed & Indexed Journal

IJMSRR
E- ISSN - 2349-6746
ISSN -2349-6738

FACTORS INFLUENCING THE PASSENGER TRAIN TRAVEL IN INDIAN RAILWAYS WITH SPECIAL REFERENCE TO MADURAI CITY

Dr. K .Vanitheeswari * S. Nagaligam S. Nagapriya *** K.Mathan Kumar *****
**Assistance Professor , C.P.A. College Bodinayakanur.*
***Assistant Professor , Theni Kammavar college., Theni.,*
****Assistant Professor , C.P.A. College Bodinayakanur.*

Abstract
This paper reveals that out of twenty variables the six factors were extracted namely "Minimum Fare", "Comfort", "Safety", "Technological Development", "Passenger Amenities", "Better Infrastructure Facilities", All the attributes are formed under each factor had high associations. High value of Kaisar-Meyer-Olikin measure of sampling adequacy (0.681) indicates the correlation between the pairs at variables explained by other variables and thus factor analysis was considered to be appropriate in this model. Crobach's Alpha is more than 0.63 in all factors. The researcher interested to find out what are the factors influencing to passenger train travel.

Keyword: Indian Railways, Factor analysis, Rotated Matrix

Introduction

The East Indian Railway was 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 Railway provides the principle mode of transportation for freight and passengers. It has been a component of the social, political and economic life of the country. Indian Railway 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 Indian Railway network is a nation providing economic and reliable transport to Indians. While the freight traffic generates bulk of the revenue forth railways, passenger transport is the more visible face of the railways as it touches directly the lives of millions who avail of the passenger transport services. Accordingly, Indian Railways have been making efforts over the past few years to enhance the services being provided to their passengers. The provision of security on trains needs to be bolstered as most passengers feel that there is not enough security to prevent theft and crime on trains. This concern is mirrored in the rising rate of crime on trains. There is a need to set norms for escort parties, providing for the required number of personnel, ensuring that they were provided with needed equipment and ensuring coordination with the train staff, for providing effective security aboard trains. While the Indian Railways have begun to address the passenger services in a big way, there is a need to integrate passenger concerns with the operational concerns in planning and other processes that impact passenger services. This will help the railways address passenger concerns more effectively. At the same time there is a need to effectively monitor the creation and maintenance of services so that the gains can be consolidated and the position on ground can be improved.

Statement of the Problem

India is one of the largest countries in terms of its geographical size which requires efficient means for long-distance transportation. The public transport, being primary mode of transport remains as a powerful yardstick to measure the overall development of a nation. Among the various modes of transport, railway is one of the biggest modes of passenger transport in the world. The railway passenger services face long term competitive threats from airlines, luxury buses, personalised transport and improved public transports. Low cost airlines are giving stiff competition to upper class segments of the railway passenger service. Though there are competitions from various modes of transport, the railway has its own unique features and provides more services to the passengers. In order to compete with other modes of transport, it is inevitable for railways to accelerate the growth of passengers' origination. It is only when people are attracted to a destination that amenities and services. So, the researcher interested to find out what are the factors influencing to passenger train travel in Madurai city. Based on the above discussion the researcher has raised the following research question , What are the factors that influencing the passenger train travel in Madurai city?

Objective: To analyse the factors influencing to Passenger Train Travel in Madurai city.

Methodology

The present study is largely based on the primary data. Required primary data have been collected in the course of interview with the railway passengers through survey method with a pre-tested, well-structured and non-disguised Interview Schedule. This study is an empirical based on survey method. The present study is confined to Madurai Zone of Southern Railways. 300 samples were taken to analyses the data. Convenient sampling method was used to collect the data from the sample

respondents. This study has been undertaken mainly to analyses the passenger services in Indian Railway with the special references to Madurai City.

Tool

Mathematically, factor analysis is somewhat similar to multiple regression analysis. Each variable is expressed as a linear combination of underlying factors. The amount of variables have included in the analysis referred to communality. The Co-variations 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 over observed. If the variables are standardised, the factor model may be represented as:

$X_i=A_{ij}\ F_i+A_i\ 2F_2+A_i\ 3F_3+\ldots\ldots\ldots\ldots\ldots\ldots\ldots + A_{im}\ F_m + V_i\ U_i$

Where

X_i = i^{th} standardized variable

A_{ij} = standardized multiple regression coefficient of variable I on common Factor

F = Common factor

V_i = Standardized regression coefficient of variable I on unique

U_i = The unique factor for variable i

m= Number of common factor,

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

$$F_1 = W_{1\,1}\,X_1 + W_{12}X_2+W_{13}X_3+\ldots\ldots\ldots\ldots+W_{1K}+X_K$$

Where

F_1 = Estimate of i^{th} factor

W_1 = Weight or factor score coefficient

K = Number of variables

It is possible to select weights factor score coefficient, so that the first factor explain the largest portion of the total variance. Then a second set of weight can be selected, so that the second factor accounts for most of the residual variance, subject to be uncorrelated with the first factor. This some principle could be applied for selecting additional weight for the additional factors. Thus, the factors can be estimated so that their factor score, unlike the value of the original variables, are not correlated. Furthermore, the first factor accounts for the highest variance in the data, the second factor is the second highest and so on.

Results and Discussion

There are twenty variable exacted into six factors. The rotated component matrix is given in table 1

Table 1, Rotated Factor Martrix For Motivation to Passengr Train Travel

S.No	Variables	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
1	low cost	0.829	-0.081	-0.095	-0.040	0.083	0.069
2	Easy to get back of 90% of money	0.822	0.163	0.066	0.230	-0.016	-0.076
3	It is boom for middle-class family	0.709	0.085	-0.277	0.023	0.122	0.0188
4	It is useful to students	0.654	-0.240	-0.073	0.145	-0.400	0.222
5	Comfort to travel	-0.108	-0.830	0.081	0.039	0.120	-0.017
6	Convenient to eat foods	-0.306	0.738	0.145	0.224	0.019	0.080
7	Comfort to ill-healthier	0.063	0.690	-0.203	0.274	0.215	0.246
8	Suitable for long travel	0.420	0.506	0.418	-0.292	-0.165	0.058
9	Hardly get accidents	-0.138	0.180	0.837	0.060	0.060	0.195
10	Safe for Senior Citizen	-0.142	-0.226	0.722	-0.014	-0.055	0.010
11	Special care of traveler	0.086	0.356	0.709	0.357	0.216	-0.032
12	Helping hand to passenger	0.063	0.158	-0.605	0.279	0.028	0.155
13	Internet Ticket Booking	0.216	-0.068	0.155	0.841	-0.134	0.158
14	Audio-visual system	0.080	0.195	-0.327	0.767	0.062	-0.019
15	E-Map of Train time	-0.112	0.158	0.162	0.655	0.558	0.046
16.	Toilet Facilities	-0.113	-0.041	-0.151	-0.018	0.844	-0.048
17	Successful Travel	0.350	-0.072	0.268	0.073	0.765	-0.158

18	Using New design of sleeper coaches	0.168	0.246	-0.070	0.032	-0.123	0.849
19	Modification the engines	-0.021	-0.460	0.006	0.237	0.175	0.694
20	Joyful for children's	0.149	0.343	0.204	-0.030	-0.356	0.692

Source: Computed Data

The above table 1 exhibits the rotated factor loading for the twenty statements (Attributes) of passenger travelling. It is clear from the table that all twenty statements have been extracted into factors. The Rotated Factor Matrix, for the Passenger Train Travelling is given below:

Factor 1, The variables responsible for 'Minimum Fare' are presented in TABLE 2.

TABLE 2: Minimum Fare

S.No	Variables	Factor Loading	Communality	Crobach's Alpha
1	low cost	0.829	0.716	0.731
2	Easy to get back of 90% of money	0.822	0.766	
3	It is boom for middle-class family	0.709	0.638	
4	It is useful to students	0.654	0.720	

Source: Computed Data

The attribute such as "Low Cost, Return of Money, Boom for Middle-Class family and Students useful" with high factor loading constituted Factor 1. The above said attributes with high loading on Factor 1 is characterized as "Minimum Fare". The higher factor loading on its identifying attributes associate with Factor 1. All the attributes have high communality, indicating that the variables within Factor 1 have high association. The crobach's alpha value of the attributes indicates that the attributes within the Factor 4 have very high association among them.

Factor 2, The variables responsible for 'Comfort' are presented in TABLE 3.

Table 3: Comfort

S.No	Variables	Factor Loading	Communality	Crobach's Alpha
1	Comfort to travel	-0.830	0.724	0.692
2	Convenient to eat foods	0.738	0.716	
3	Comfort to ill-healthier	0.690	0.704	
4	Suitable for long travel	0.506	0.723	

Source: Computed Data

It is observed from the above table that the attributes of passenger travel such as "Comfort to travel, Convenient to eat foods, Comfort to ill-healthier and Suitable for long travel" constituted Factor 2 with higher factor loading. The above said four attributes with high factor loading on Factor 2 is characterized as "COMFORT". The higher factor loading of the attributes indicate that the Factor 2 underlies that variable. The higher amount of variation is explained by the extracted factors. The crobach's alpha value of the attributes indicates that the attributes within the Factor 4 have very high association among them.

FACTOR 3, The variables responsible for 'Safety' are presented in TABLE 4.

TABLE 4: Safety

S.NO	VARIABLES	FACTOR LOADING	COMMUNALITY	CROBACH'S ALPHA
1	Hardly get accidents	0.837	0.797	0.827
2	Safe for Senior Citizen	0.722	0.595	
3	Special care of traveler	0.709	0.813	
4	Helping hand to passenger	-0.605	0.498	

Source: Computed Data

Among the attributes of passenger travel, the attributes, "Hardly get accidents, Safe for Senior Citizen, Special care of Traveller and Helping hand to passenger" constituted Factor 3 with higher factor loading. The above said four attributes with higher factor loading on Factor 3 is characterized as "SAFETY". The higher factor loading of the attributes indicate that the Factor 3 underlies the above four variables. The higher communality value of the attributes indicates that the attributes within the Factor 3 have very high association among them. The crobach's alpha value of the attributes within Factor 3 has very high association among them.

Factor 4, The variables responsible for 'Technological Development' are presented in TABLE 5.

TABLE 5: Technological Development

S.No	Variables	Factor Loading	Communality	Crobach's Alpha
1	Internet Ticket Booking	0.841	0.826	0.655
2	Audio-visual system	0.767	0.743	
3	E-Map of Train time	0.655	0.806	

Source: Computed Data

The attribute "Internet Ticket Booking, Audio-Visual system and E-Map of Train Time" is characterized as "TECHNOLOGICAL DEVELOPMENT", is constituted as Factor 4 with higher factor loading of 0.841, 0.767 and 0.655. The communality value for this attributes are 0.826, 0.743 and 0.806. The crobach's alpha value of the attributes indicates that the attributes within the Factor 4 has very high association among them.

Factor 5, The variables responsible for 'Passenger Amenities' are presented in TABLE 6.

TABLE 6: Passenger Amenities

S.No	Variables	Factor Loading	Communality	Crobach'sAlpha
1	Toilet Facilities	0.844	0.822	0.713
2	Successful Travel	0.765	0.814	

Source: Computed Data

The attributes, "Toilet Facilities and Successful Travel" characterized as "PASSENGER AMENITIES", is constituted as Factor 5 with higher factor loading of 0.844 and 0.765. It is important because service provided by the passengers of the Train Travel plays a vital role in Passenger Train Travel. The communality value is 0.822 and 0.814. The crobach's alpha value is 0.713.

Factor 6, The variables responsible for 'Better Infrastructure Facilities' are presented in TABLE 7.

TABLE 7: Better Infrastructure Facilities

S.No	Variables	Factor Loading	Communality	Crobach's Alpha
1	Using New design of sleeper coaches	0.849	0.813	0.638
2	Modification the engines	0.694	0.781	
3	Joyful for children's	0.692	0.787	

Source: Computed Data

Among the attributes of Railway Passengers, the attributes such as "New design of Sleeper coaches, Modification the engines and Joyful of children's" constituted the Factor 6 with higher factor loading. The above said the passenger travel with higher factor loading on Factor 6 is characterized as "BETTER INFRASTRUCTURE FACILITIES". Both of the three attributes have high communality indicating that the attributes within the Factor 6, have very high association among them.

Factor Motivation to Passenger Train Travel

Factor analysis of twenty relating to the Passenger Travel of Train identified six Train Travel factor and the results are presented in Table 8

Table 8: Factor Motivation to Passenger Train Travel

Sl.No	Factors	Eigen Value	Percentage of variance	Cumulative percentage of variance
1	Minimum Fare	3.653	18.26	18.26
2	Comfort	3.077	15.38	33.65
3	Safety	2.678	13.39	47.04
4	Technological Development	2.311	11.55	58.59
5	Passenger Amenities	1.875	9.37	67.96
6	Better Infrastructure Facilities	1.227	6.31	74.10

Source: Computed Data

* Kaisar-Meyer-Olikin measure of sampling adequacy = 0.681
* Bartlett's Test of Sphericity: Chi-Square x^2 =4041.586
Degree of Freedom df = 190
Signification = 0.000

It is observed the from Table 8 that the six factors such as Minimum Fare, Comfort, Safety, Technological Development, Passenger Amenities, and Better Infrastructure Facilities. This factor account for about 74.10 per cent of variance in the data Eigen Value for the factor "Minimum Cost" is 3.653. Which indicate that the factor contains very high information than the other factors. The first factor, "Maximum Fare" provides the maximum insights of Passenger Train Travel in the study area. It is a very important factor, because the respondents prefer to the Train Travel of fuel Fare and Minimum Fare of maintenance expenses. To improve this situation, manufactures in the Train Travel shall give more importance on the attributes concerning "Minimum Fare" of the Passenger Traveled in Train. The second important factor called "Comfort" account for 15.38 per cent variance. The Eigen value of this factor is 3.077. It explained that people choose to buy passengers if they possess the attributes of manufactures' reputation (Comfort). The third and the fourth Factors, "Safety" and "Technological Development" account for 13.34 per cent and 11.55 per cent variance with the Eigen value of 2.678 and 2.311 respectively. It shows that passengers are encouraged to Travel Train. The fifth and sixth factors "Passenger Amenities" and "Better Infrastructure Facilities" account for 9.37 per cent and 6.31 per cent variance with the Eigen values of 1.875 and 1.227 respectively. These factors are also important in making a Passenger Train Travel. High value of Kaiser-Mayer-Olkin (KMO) test of sampling adequacy (0.681) indicate the correlation between the pairs of variables explained by other variables and thus factor analysis is considered to be appropriated in this model.

Conclusion

Indian Railways is the largest Public Sector industry in the world. There is a case for early finalization of all procedural formalities, including lodging on the reservation system for holiday and festival specials on nearly 45 per cent of cases the special seasonal and festival trains introduced by Indian Railways were being lodged in the computerized Passenger Reservation System only about a fortnight in advance (and on isolated instances not at all), which limits their availability to larger number of passengers. It is concluded that the railway is considered to be an important transport system in India. It carries lake number of passenger at a time and that too for longest distance. In renders numerable services to the Passenger's in Madurai Zone. The six factor namely "Minimum Fare", "Comfort", "Safety", "Technological Development", "Passenger Amenities", "Better Infrastructure Facilities", Twenty attributes with help of factors analysis technique . Each factor had more than other variable. Each variable was expressed as a line combination of the underlying factors. The amount of variance a variable share with all other variable included in the analysis was referred to as communality. All the attributed That are formed under each factor had high associations.

Reference

1. DR.S.L.Gupta, and Hitesh Gupta, Research Methodology, International Book House , Pvt.Ltd 2011, P320.
2. THURSTONE, L. Multiple Factor Analysis, University of Chicago Press, Chicago, 1959, p-508 to 509.
3. Lauren J. Thomas, Daniel J.A. Rhind and Katie J. Robinson, (2006), "Rail passenger perceptions of risk and safety and priorities for improvement", Cognition, Technology and Work, Vol.8, No.1, January, pp.67-75.
4. Rama Prasad, M.V., (2002), "A study on passenger amenities in railways", Indian Journal of Marketing, Vol.XXXII, No.11, November, pp.14-19.
5. Bhandari R.R. Southern Railway, Chennai – 2003.
6. Corinne Bret, "Japanese Trains", Japan Railway and Transport Review, March 1994.
7. www.indianrailways.gov.in.
8. www.indianrailways.org.in.