



Preference pattern of passengers towards public rail transport – evidence from Pollachi

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Abstract

The railway is one of the most widely used modes of transportation among Indian passengers. Understanding preference patterns can provide comprehensive insights to the Railway Ministry for framing policies and schemes for passenger welfare. The investigation measures the preference pattern of passengers towards the Indian Railway services and examines the association between demographic factors and preference patterns towards railway services over other transportation facilities. By focusing on passenger behaviour and service at the station level, the study aligns with the objectives of inclusive and sustainable transport infrastructure outlined in Sustainable Development Goal 9. The study is quantitative and empirical; primary data were collected from 102 passengers who travelled at Pollachi Railway station by employing a structured questionnaire through the snowball sampling technique. The findings and suggestions are proposed to strengthen the usage level of railway transport among passengers in a semi-urban context.

Keywords: Sustainable Development Goal 9, passenger behaviour, preference pattern, Indian Railway, semi-urban railway station, determinants, transportation

Introduction

Railway transportation emerged as a significant form of public transportation across the world for its large capacity, safety, comfort, low cost, and sustainable environment. Railways play a key role in the economic development of the world by empowering well-organised and large-scale passenger mobility. Railway transportation contributes to Sustainable Development Goal (SDG) 9 by enhancing affordable transport and accessible sustainable transport infrastructure in low and middle-income countries (Koks *et al.*, 2019)^[7].

Indian Railways has a 170-year history. Indian Railways maintains a constant connection with the world to provide state-of-the-art facilities in its system. Indian Railway becomes the third largest network under a single management, providing regional connectivity and passenger movement to growth centres. Railway transportation is divided into passenger transportation and freight transportation. In India, on April 16, 1853, the first passenger train ran between Bori Bunder and Thane, a distance of 34 km. The Indian Railway consists of 18 zones and 70 divisions to ensure operational efficiency. It is one of the largest employers in the world, with over 1.4 million employees.

The preference pattern is the observable choices made by passengers towards the travel frequency, class of travel, ticket booking mode, travel purpose, and service expectations on the Indian railway. Strategic issues in railway systems are correlated to the service level quality and infrastructure capacity to customers, which enhance passenger satisfaction and travel choices (Caprara *et al.*, 2007)^[4]. Understanding the preference pattern of passengers and measuring the association between the demographic profile of passengers and the preference pattern of railway passengers towards the Indian Railway are essential for

designing service-oriented railway policies and station facilities. Exploring the factors is essential for enhancing railway station services and ensuring the long-term sustainability of railway transport among passengers.

Review of literature

The following passage is a review of the literature related to the current study.

In 1825, the Stockton and Darlington Railway, which opened in England, was considered the world's first public railway for transporting both passengers and goods. World Railway has a 200-year history. Before the 20th century, psychological and sociological observation of railway passengers emerged in developed countries only. After technological advancements in the early 21st century, Indian research is making a huge impact on all domains, including the railway industry. Studies from the Pollachi region explored that passengers moderately prefer the Pollachi railway station and its services (Saravanan *et al.* 2026)^[9].

Concerning determinants of preference, travel time and Scheduling attributes become a leading determinant of passenger preference. Rubén Cordera *et al.* (2021)^[5] found that Infrastructure expansion, network coverage, and service reliability will enhance the long-distance train travel preference in Europe. Similarly, Yank *et al.* (2023), Dongsheng Gao *et al.* (2024)^[6], and Jian Bai *et al.* (2025)^[2] found that travel time, departure time period, and train frequency are the key influencing factors for heterogeneous Passengers. Grazyna Rosa (2021)^[8] supports that the journey period and unfavourable departure hours are the key factors of long trips, as well as the period is a factor for short distance travel in Poland.

Cost and price sensitivity factors are another critical theme for influencing passenger preference. Dongsheng Gao *et al.* (2024)^[6] found that in the case of the Nanning-Guangzhou

railway and Nanning-Beihai railway, train fare was a statistically significant factor affecting train preference. Research evidence in China by Jian Bai *et al.* (2025) ^[2] supports this by showing that HSR tickets are attractive to passengers, and the price will affect passengers' willingness to purchase a flexible ticket. Evidence from Poland confirms that travel charges are a factor for short distance travels. Comfort, Safety and Station Environment also significantly shape the passenger preference, and perception about the railway services. A study from Indonesia by Fadlilah *et al.* in 2024 revealed that comfort and safety are the top concerns for passengers in railway stations. Crowding and access factors affect railway attractions, particularly in emerging economies. In India, Debasis Basu and John Douglas Hunt (2023) revealed that movement time to the railway station and train trip time are associated with a particular crowding level in Mumbai. Prior studies explored the implications for real-time problems and determinants for preference in metropolitan regions, high-speed corridors, and developed rail networks. There is an empirical gap available in a particular domain. There are limited studies in semi-urban railway stations, particularly in the preference pattern of railway passengers in reference to the frequency of train travel, co-passengers, purpose of travel, time of travel, area of travel, reservation, mode of ticket booking, and travel classes. Limited empirical evidence exists to understand the association between these preferences and the demographic factors of passengers. The present study addresses this gap by analysing the preference patterns of passengers at Pollachi railway station and examining their association with demographic factors.

Statement of the problem

Railways play a dominant role in the mobility of passengers from various socio-economic backgrounds in semi-urban places. The service planning and passenger facility decisions are taken based on models derived from metropolitan passenger travel behaviour. This model didn't reflect the actual preferences of semi-urban passengers, which may result a mismatched services in semi-urban stations.

Pollachi railway station comprise a heterogeneous population with different levels of age, income, education, etc. The absence of station-specific empirical data limits the railway authorities from addressing the problems and form specific services, for improving station infrastructure and

passenger satisfaction. Therefore, the following research questions were framed.

1. What are the facilities provided by the Indian Railway that are mostly preferred by railway passengers?
2. What is the significant association between demographic variables and the preference pattern of railway passengers towards the Indian Railway?
3. What are the main determinants for choosing railway services over other transportation?

Objectives

The following are the objectives of the current study:

- To analyse the demographic position and passengers' preference pattern towards services provided by the Indian Railway.
- To investigate the significant association between demographics and preference patterns of railway passengers towards the Indian Railway
- To measure the determinants of choosing railway transportation by passengers.

Research Methodology

The current study is quantitative and empirical. The sampling unit was passengers travelling through Pollachi railway station during the study period. Pollachi Station is in the Palakkad railway division of the Southern Railway zone. In Pollachi, 16 trains arrive at the station, which consist of 12 mail/express trains, 2 passenger trains, and 2 superfast trains. Among them, 14 trains are stopped at the station. Out of these, 10 trains ran every day. This indicates the activity level of pollachi railway station. The study is based on primary and secondary data. The primary data was collected from 102 respondents through a structured questionnaire by employing snowball sampling due to access and time limitations at the station sites. In total, 150 questionnaires were distributed, and 123 were collected. 102 questionnaires were accepted for further data analysis after screening excluded responses with inconsistencies. The data was analysed through simple percentage analysis, chi-square test, and the Garrett ranking technique. The secondary data was collected from various articles, magazines, periodicals, books, and databases through the internet.

Analysis and Discussion

Demographic Analysis

To analyse the demographic details of respondents, a simple percentage analysis was employed.

Table 1: Demographic Profile

Demographic Variables	Groups	No. of Passengers (102)	Percentage
Age	Up to 20 years	11	10.78
	21-40 years	53	51.96
	41-60 years	23	22.55
	Above 60 years	15	14.71
Gender	Male	37	36.27
	Female	65	63.73
Area of resident	Town	38	37.25
	Village	64	62.75
Marital Status	Married	54	52.94
	Unmarried	48	47.06
Education Qualification	Up to HSC	12	11.76
	Undergraduate	39	38.24
	Postgraduate	39	38.24
	Professionals	12	11.76

Type Of Family	Joint	33	32.35
	Nuclear	69	67.65
Monthly Income	Up to ₹15000	21	20.59
	₹15,001- ₹30,000	46	45.10
	₹30,001- ₹50,000	20	19.61
	Above ₹50,001	15	14.71

(Source: Primary data)

Table 1 displays the demographic facts of the Pollachi railway passengers. The table shows that 51.96 per cent of the passengers (n=53) are aged between 21 and 40 years old, followed by 41-60 years (n=23, 22.55%), above 61 years (n=15, 14.71%), and up to 20 years (n=11, 10.78%). Approximately 64 per cent of the passengers (n=65, 63.73%) are female, while male travellers were (n=37, 36.27%). Concerning the location, village passengers (n=64, 62.75%) utilised Pollachi railway station compared to town passengers (n=38, 37.25%).

The marital status of passengers exhibited a balanced distribution among married (n=54, 52.94%) and unmarried (n=48, 47.06%) passengers. Regarding educational qualification, undergraduate and postgraduate students have a majority mark (n=39, 38.24%), and higher secondary and professional passengers

Accounted an 11.76% (n=12) each of the sample size. Out of 102 passengers, 69 passengers were from a nuclear family (67.65%), whereas 33 passengers (32.35%) were from a joint family.

Monthly income distribution showed that out of 102 passengers, 45.10% (n=46) earned between ₹15,001 and ₹30,000, trailed by 20.59% (n=21) receiving up to ₹15,000, 19.61% (n=20) getting between ₹30,001 and ₹50,000, and 14.71% (n=15) earning above ₹50,001. This distribution indicates that the majority of the passengers are from the lower and middle-income clusters.

Passengers' Preference towards Indian Railway

To analyse the preference pattern of Pollachi railway passengers towards services offered by the railway, a simple percentage analysis is deployed.

Table 2: Passengers' preference pattern towards the Indian railway

Preference	Groups	No. of passengers (102)	Percentage
Frequency of Train Travel	Daily	17	16.67
	Weekly	28	27.45
	Monthly	20	19.61
	Occasionally	37	36.27
Co-Passenger	Alone	19	18.63
	With family	48	47.06
	With friends	19	18.63
	With relatives	09	8.82
	With colleagues	05	4.90
	With business partners	02	1.96
Purpose of Travel	Business/official	14	13.73
	Education	24	23.53
	Tour/pilgrim	41	40.20
	Sports	09	8.82
	Others	14	13.73
Time of Travel	Day	38	37.25
	Night	24	23.53
	Both day/night	40	39.22
Area of Travel	Within the district	32	31.37
	Within the state	39	38.24
	Other states	21	20.59
	All over India	10	9.80
Travel Classes	First-class A/C	30	29.41
	Second class A/C	22	21.57
	Third class A/C	16	15.69
	AC chair car	07	6.86
	Non-AC chair car	01	0.98
	Sleeper	16	15.69
	General coach	10	9.80
Reservation	Reserved	60	58.82
	Unreserved	15	14.71
	Both	27	26.47
Ticket Booking	At the Station counter	31	30.39
	Through agent	16	15.69
	Online	55	53.92

(Source: Primary data)

The above table illustrates that the majority of the passengers preferred to travel occasionally (n=37, 36.27%), followed by others. Most of the respondents prefer to travel with family members (n=48, 47.06%). The majority of the respondents prefer railway services for tour/pilgrimage (n=41, 40.20%) visits. Most of the respondents prefer both day and night (n=40, 39.22%) trains to travel. The majority of the respondents prefer train travel within the state (n=39, 38.24%). Most of the passengers chose first-class A/C

coaches (n=30, 29.41%) to travel on the train. The majority of Pollachi passengers prefer reserved tickets (n=60, 58.82%), which are booked online (n=55, 53.92%).

Association between Demographics and Passengers' Preference towards Indian Railway

The chi-square test is employed to find out the association between demographic variables and the travel preferences of passengers towards the Indian railway facilities.

Table 4: Chi-Square Analysis Table

S. No.	Independent Variable	Dependent Variable	X ² Value	p value	Status
1.	Age	Co – Passenger	30.929	.009**	Significant
2.	Age	Purpose	23.132	.027*	Significant
3.	Gender	Purpose	9.625	.047*	Significant
4.	Gender	Area Travel	9.371	.025*	Significant
5.	Education	Co – passenger	31.638	.007**	Significant
6.	Education	Travel class	37.100	.005**	Significant
7.	Education	Ticket Booking	23.029	.001**	Significant
8.	Education	Travel time	12.830	.046*	Significant
9.	Area of residence	Frequency of travel	7.821	.05*	Significant
11.	Income	Ticket Booking	12.675	.049*	Significant
12.	Income	Frequency of Travel	20.802	.014*	Significant
13.	Income	Area Travel	27.901	.001**	Significant
* 5% level			** 1% level		

(Source: Primary data)

Age

The above table shows that demographic variable age is associated with the preferences of co-passengers ($\chi^2(15,102) = 30.929$, $p = .009$) and travel purposes ($\chi^2(12,102) = 23.132$, $p = .027$). The study found that a passenger whose age is between 21 and 40 prefers to travel with family members (52.38%) to pilgrimage (38.17%). A passenger whose age is between 41 and 60 prefers to travel pilgrimage (47.80%), with family members (34.80%). Senior citizens also prefer pilgrimage (66.70%) with family (60.00%) passengers. In contrast, young passengers prefer to travel alone (45.50%) for sports events (36.40%).

Gender

The above table shows that the gender is associated with preferences for travel purposes ($\chi^2(4,102) = 9.625$, $p = .047$) and travel area ($\chi^2(3,102) = 9.371$, $p = .025$). The study found that the majority of the female passengers prefer to travel to pilgrimages (40.00%) located within the district (41.50%). In contrast, male passengers prefer pilgrimages (40.50%) situated within the state (32.40%).

Education

The above table shows that there is an association of education among preference of co-passengers ($\chi^2(15,102) = 31.638$, $p = .007$), travel time ($\chi^2(6,102) = 12.830$, $p = .046$), ticketing booking ($\chi^2(6,102) = 23.029$, $p = .001$), and travel class ($\chi^2(18,102) = 37.100$, $p = .005$). The passengers who are educated up to HSC prefer to book a ticket through an agent (58.30%) and travel with family members (41.70%) at daytime (58.30%) in first-class coaches (41.67%). Concerning Undergraduates, most of the passengers prefer to book an online ticket (66.70%) and travel with family members (51.30%) at both day and night (46.20%) in first-class coaches (33.33%). Postgraduates prefer to book an online ticket (53.80%) and travel with family members (53.80%) at both day and night (43.60%) in first-class coaches (48.40%). Professionals prefer to book an

online ticket (41.70%) and prefer to travel alone (33.30%) at both day and night (41.70%) in first-class coaches (50.00%). This indicates that a person who studied HSC has a low level of preference for online booking due to a lack of awareness.

Area of residence

There is an association between the area of residence and the frequency of travel preferred ($\chi^2(3,102) = 7.821$, $p = .050$). The study found that a person whose residence is located in town travels the train at least once a month (31.60%).

Income

There is a significant association of income with preference for ticket booking ($\chi^2(6,102) = 12.675$, $p = .049$), frequency of travel ($\chi^2(9,102) = 20.802$, $p = .014$), and preferred travel area ($\chi^2(9,102) = 27.901$, $p = .001$).

The study found that the majority of the passengers whose income is up to ₹15,000 prefer to book an online ticket (52.40%) and travel daily (42.90%) within the district (42.90%). Passengers who earn between ₹15,001 and ₹30,000 prefer to book an online ticket (45.70%) within the district (37.00%) as well as the state (37.00%) weekly once (37.00%). Concerning earners between ₹30,001 and ₹50,000, they prefer to book an online ticket (65.00%) to other states (65.00%) weekly once (40.00%). Most of the passengers whose income is above ₹50,001 prefer to book an online ticket (65.00%) and travel occasionally (53.30%) all over India (40.0%) through railway services.

Key Determinants to Prefer Indian railway transportation facility over others

To discover the key determinants in the choice of Indian railway service over other transportation, the Garrett ranking was deployed.

Table 6: Factors leading to the preference for the Pollachi railway station and its services

Factors	1	2	3	4	5	6	Total	Score	Rank
Convenient and comfortable	1309	1701	1026	765	396	253	54500	54.50	2
Lower cost and affordable	2156	756	1026	990	432	207	5567	55.67	1
Safe and Secured	1848	693	864	1080	504	299	5288	52.88	3
Customer-friendly services	847	1197	1026	585	684	483	4822	48.22	4
On-time arrival and departure	847	1134	972	360	756	598	4667	46.67	6
Proper maintenance	847	945	594	810	900	506	4602	46.02	5

(Source- Primary data)

The low cost is the major influencing factor in choosing railway services (Ashkan Razmfarsa *et al.*, 2022)^[1]. Table 6 also confirms that the most influential factor in preferring a railway service was lower cost and affordability (55.67), followed by other variables such as convenience and comfort (54.50), safety and security (52.88), customer-friendly services (48.22), on-time arrival and departure time (46.67), and proper maintenance (46.02). The study found that improper time management and improper maintenance are the causes of the low preference of passengers towards the railway station.

Suggestions

The study suggests the following to the Ministry of Railways.

- A chi-square test showed that a person who studied up to higher secondary prefers an agent for their ticket booking; in contrast, other groups prefer online booking. Lack of awareness plays a crucial role among those who studied up to the higher secondary level in digital ticket booking. The ministry may try to promote the UTS and Railone applications to these group passengers through newspapers and media in regional languages.
- The chi-square test indicates that a passenger whose income is above ₹50,001 prefers an all-India trip. This indicates the Palakkad division may operate more trains to satisfy high-income group passengers.
- Garrett's ranking techniques exhibited that improper time management and improper maintenance are the least influential factors in preferring railway transportation. Hence, the railway ministry may take an extra effort to maintain proper time and hygienic management.
- While collecting responses, the majority of the passengers suggest that the Pollachi Station will improve if it joins with the Madurai division. The Southern Railway may consider it.

Conclusion

The findings of the study revealed that railway passenger prefers the railway transport due to its factors such as affordability, accessibility, comfort, and perceived safety features. The study revealed that the preference pattern of passengers shows differences across the demographic groups, including age, education, income, and area of residence, in terms of preferences related to travel frequency, travel class, ticket booking mode, purpose of travel, and area of travel. The paper emphasises the need for specific campaigns to address the awareness gap in digital

applications introduced by the Indian Railway among passengers. The dynamic change of economic position in these areas induces a demand for connectivity trains to travel all over India. The study advises that time management and service management can encourage passengers to use railway transport in these areas. The study provides practical insights into passenger behaviour at the station level and advocates the need for demand-based service planning and passenger-focused railway management in a semi-urban context.

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