Atna – Journal of Tourism Studies
2026, Vol. 21, No. 1, 133-152
ISSN 0975-3281/https://doi.org/10.12727/ajts.35.8

Exploring the Influence of Demographics, Awareness, and Inducing Factors on Preference of Railway Services

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Abstract

The railway is the largest and cheapest transportation facility for Indian passengers. The primary objective of the study was to develop a model to estimate the influence of demographic, awareness, and inducing factors on the preference for non-suburban stations. Pollachi Station is an NSG–5 category Indian railway station in the Palakkad railway division of the Southern Railway zone. However, Pollachi station is not a primary transport hub among passengers due to its location, limited train services, and inadequate facilities. The study attempts to identify what kind of passengers are aware of and prefer the Pollachi railway services on the basis of demographic factors. The study is quantitative and empirical. Primary data were collected through a structured questionnaire from passengers who regularly use Pollachi railway station. The study found that factors such as education up to higher secondary, income levels up to ₹15,000 and above ₹50,001, awareness of intermodality and technological features, and inducing factors like perceived service value positively influence the railway service preference. The study provides insights to the Indian Railway Ministry about passenger preference towards the NSG-5 level railway stations and services to enhance them.

Keywords: NSG Railway Station, Pollachi, Demographics, Inducing factors, Awareness, Preference, Travel, Railway industry, Railway ministry

1. Introduction

Railways are the mass civic transportation mode with exceptional features like a large capacity, a high safety level, comparatively high comfort, a relatively high speed, a reasonable fare, and care for the environment (Da Silva and Mendes 2020). Railways have a history of morethan170 years in

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the Indian context. The first rail service in Madras was operated for the transport of granite in 1837. The first passenger train in India ran between Bori Bunder (now Mumbai) and Thane, a distance of 34 km, on April 16, 1853. In 1862, the first railway workshop was established at Jamalpur, Bihar. The Indian Railway network is the second-largest in Asia and the fourth-largest rail network globally, after the US, Russia, and China.

Railway stations are classified into three major categories: non-suburban (NSG), suburban (SG), and halts (HG) stations. There are 5976 NSG, 484 SG, and 2153 HG stations available in the Indian Railway. The study was conducted among passengers who arrive at the NSG 5 category station. The NSG 5 category means that the railway station earns more than 1 crore and less than or equal to 10 crores annually. At the same time, the railway station handled more than 01 million, less than or equal to 02 million passengers annually.

The Pollachi Station is an NSG 5 category Indian railway station in the Palakkad railway division of the Southern Railway zone. The Pollachi Station was first used as a train station for trade in the 1850s. After 1900, it was used as a station for passengers. Pollachi Station was opened when train services began on the Podanur-Pollachi section on October 15, 1915. It is one of the 73 stations in Tamil Nadu to be named for upgrading under the Amrit Bharat Station Scheme of Indian Railways. 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 stop at the station. Out of these, 10 trains ran every day. The station would have been an essential link between Pollachi and other regions of Tamil Nadu and beyond for the transportation of commerce, agricultural products, and people.

Awareness, inducing factors, and preferences play a crucial role in the understanding of the passenger. The regression model will be insightful for the railway ministry regarding passenger preference towards NSG–5 category stations. The policy decisions may be derived from a preference model, and identifies the factors that need more attention to increase passenger preference.

2. Review of literature

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

The development of the Indian railway was rooted in 1832, but it took several years to materialise. Railways have emerged from instruments of industrial enlargement into multifaceted, passenger-oriented mobility systems after the introduction of passenger rail services in 1857. Understanding of passenger awareness and behaviour has become indispensable for designing safe, efficient services to satisfy passengers.

2.1. Awareness of service, intermodal and technological factors

The preference and usage of the railway sector are principally determined by passengers' awareness of railway services. Research evidence indicates that awareness of railway passengers is uneven among various regions and demographic groups. For instance, Vishnuvarthani and Selvaraj (2013) identified that passengers from Salem show a low level of awareness about the services offered by Indian Railways, with variables such as annual expenditure, class of travel, and mode of ticket reservation being significantly associated with the awareness.

Earlier empirical studies provide an understanding of the importance of technological awareness. Shunmugaselvi and Darling Selvi (2023) observed that passengers are moderately aware of the technological features implemented by the railway, with gender and location being associated with the awareness levels. From Malaysia, Rahman et al. (2022) found that most of the passengers are not aware of technological evacuation information and tools, irrespective of their frequent usage. Older and male passengers showed a lower awareness than younger and female passengers. Further, demographic variables such as education, income, and occupation influence the ability to understand the railway infrastructure and service facilities (Stabak Roy et al., 2024). From professionals' perception, Awodele et al. (2024) reported that technologies such as IoT, Big Data, and cloud computing in the railway industry have a moderate level of awareness and low inclination in adoption. Inadequate technical expertise, resistance to change, infrastructure limitations, and uncertainty about benefits are the key barriers to adopting advanced technologies in the railway industry. Joint technological awareness of digital tools and ICT platforms certainly widens intermodal awareness, which enables seamless connections across multiple transport modes within an intermodal network.

Intermodal awareness becomes a major element in the preference for rail transportation. Oostendorp, R., & Gebhardt, L. (2018) from Berlin emphasise that time efficiency is an essential characteristic for intermodal users, becoming a motive for performing intermodal trips. Limited awareness of facilities, transfer times, and updated information would decrease the usage of intermodal transportation facilities. Meyer-Hollatz et al. (2024) identified that the lack of clear and integrated information is a major barrier, and better information platforms can motivate intermodal transportation. Collectively, these studies indicate that awareness of intermodality, travel updates, and technological features is an essential factor in enhancing railway preference among all passenger categories.

2.2. Inducing factors and service attributes

Beyond awareness, inducing factors interrelated to service quality significantly influence the choice of railway transport. Hak Lee et al. (2021)

stated that passengers prefer the railway services which characterized by shorter vehicle travel and waiting time, and lower disruptions in the travel route. Station-level facilities also play a prime role in selecting railway service. Statistical evidence from Edakkotte Shaji (2020) shows that Kozhikode Railway Station passengers were well aware of the facilities, such as railway ATMs, IRCTC restaurants, and AC waiting rooms, which positively influence their travel experience and preference.

Fadlilah et al. (2024) highlighted that service attributes such as comfort and safety are the significant priorities for passengers in railway stations. Additionally, Grazyna Rosa (2021) states that inducing service factors assorted by trip length, with departure hours being critical for long trips, while price and time are the major issues for short distances.

From a service management policy framework perspective, Roberto Sañudo et al. (2019) intimated that the lack of quality rail transport, infrastructure, services, and pricing negatively influences the general passengers. Improving these dimensions is a crucial part of meeting passenger expectations and improving the service quality of the railway. Synthesising this literature, inducing factors such as safety, security, customer-friendly services, convenience, comfort, affordability, on-time arrival, departure, and proper maintenance are the prominent drivers that influence the preference.

2.3. Research gap and model development

There are many scientific and decision support models for instructing the application of railway track maintenance and scheduling proposals (Mahdieh Sedghi et al., 2021). The literature reveals that a contextual and evidence gap exists in the study area. Empirical evidence from a social science perspective, by integrating passenger behaviour, is limited particularly in preference outcomes. Railway stations are classified into non-suburban (NSG), suburban (SG), and halt (HG) stations. The prior studies did not clearly mention the sample unit of their studies. The government give a more attention to the SG station compared to others due to its passenger turnover. The facilities provided by the railway also differ for each category. The results of SG stations will not apply to other category stations. To address this gap, the preference model was formulated by collecting data from the NSG 5 category station. This approach provides category-specific, preference-based empirical evidence and a unified behavioural framework for the non-suburban railway stations context.

3. Theoretical and Conceptual Framework

The study is theoretically grounded in the Stimulus-Organism-Response (S-O-R) model. The model describes how external stimuli influence the mental state of an individual and subsequently determine their behavioural

responses. In the context of railway services, environmental factors such as service quality attributes, comfort, safety, affordability, on-time and waiting times, and the facilities within the station are experienced during the travel experience. These external stimuli influence the psychological condition of passengers, simulated through mental evaluations such as awareness of railway services, technological features, and intermodality features. These procedure outcomes a behavioural response of passengers' preference towards railway services. Socio-demographic variables are treated as background variables that outline how passengers observe and process the external environmental stimuli. The following conceptual framework is framed by employing the S-O-R model.

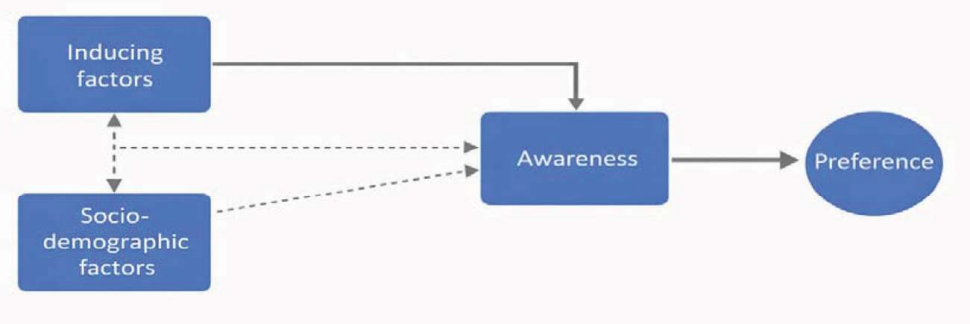

Figure 1: Theoretical framework
Source: Author's Contribution

The theoretical model is grounded in the S-O-R model, but the empirical statistical analysis adopts a multiple regression approach where independent factors, awareness, are treated as direct predictors of passenger preference, and demographic variables are considered as control factors.

4. Statement of the problem

Analysing awareness about factors such as features, technologies, and intermodality helps the railway ministry identify information gaps, enthusiasm level, and reluctance to adopt the railway among passengers (Awodele, Imoleayo et al., 2024). Categorisation of passengers based on awareness of railway services will help railways take steps to popularise railway services among passengers. For this purpose, the following problem is formulated.

- What kind of passengers are aware of the railway services available in Pollachi railway station?

The identification of preferences will help frame the policies and schemes for particular clusters, which will increase the quality and demand for transport (Roberto Sañudo et al., 2019). However, it needs details regarding which kind of passengers prefer and do not prefer the Pollachi

railway station services. For this motive, the following research problem is formulated.

- What kind of passengers prefer Pollachi railway station and its services?

By integrating demographic factors (Syahreza Alvan et al., 2021; Stabak Roy et al., 2024) and awareness through technology, and intermodality (Izza Anwer et al., 2024), and addressing key inducing factors (Boqing Wang et al., 2024), the railway ministry can design attractive and more efficient, inclusive services for passengers. To assess the impact of these factors on preference behaviour, the following problem was framed.

- What are the effects of demographics, awareness, and influencing factors on the choice of railway services?

5. Objectives

The following are the objectives of the current study:

- To identify the significant difference between demographic variables and passengers' awareness towards facilities available in Pollachi railway services.
- To identify the significant difference between demographic variables and passengers' preferences towards the Pollachi railway services.
- To investigate the influence of demographic factors, awareness, and inducing factors on passenger preference towards the railway services

6. Research Methodology

The current study is quantitative and empirical. In the Kongu Region, Pollachi has a notable impact on the socio-economic status of individuals. Pollachi is a significant location for super-hit Tamil movies in Tamil Nadu. Pollachi serves as a transportation cluster by providing easy access to lush landscapes, tea plantations, the Western Ghats and Valparai Wildlife Sanctuary, making it an ideal gateway for nature enthusiasts and travellers. Irrespective of these facilities, Pollachi railway station is an NSG–5 category railway station in India. Residents of Pollachi prefer road transport compared to railway transport due to its location, limited train services, and facilities. There are no precise passenger count details at Pollachi railway station, but it serves as a major connecting point for Kerala and southern Tamil Nadu passengers. The study is mainly based on primary data collected from 102 respondents between April 2025 and May 2025. The data were collected in the field from passengers travelling from Pollachi, through issue of a structured questionnaire by adopting a convenience sampling technique. In total, 125 questionnaires were collected. After the examination, only 102 questionnaires were accepted for further data analysis, due to incomplete and inappropriate responses from passengers.

An awareness scale was constructed with the latent variables of awareness about intermodality and travel updates, and technological features provided by the Indian Railway. Intermodality refers to the use of two or more transportation modes, and travel updates include the train schedule and route of the train. Technological features include awareness about technological availability in the station, as well as features like apps provided by the Indian Railway.

Inducing factors are categorised as safety, security, customer-friendly services (user-centric assurance), convenience, comfort, lower cost and affordability (perceived service value), and on-time arrival, departure, and proper maintenance (service reliability) as three crucial inducing factors for railway preference. The preference scale was constructed with a focus on passengers' opinions to utilise the Pollachi station for their transportation in the upcoming periods.

The secondary data was collected from various articles, magazines, periodicals, books, and the internet. The data were analysed through simple percentage analysis, reliability tests, independent t-tests, ANOVA, and multiple linear regression. Independent t-test and ANOVA used as a filter tool for regression analysis. Only significant variables from the t-test and ANOVA are taken for regression analysis.

7. Analysis and Discussion

7.1. Measurement Quality Assessment

Cronbach's alpha values for the awareness, preference, and inducing factors are 0.820, 0.842, and 0.831, respectively. It is greater than the threshold limit of 0.700. This shows that the data is reliable. The Pearson correlation registered a positive correlation and significant association between the item variable and the total score obtained by each respondent. This indicates that three scales have a good internal consistency.

According to the central limit theorem, the large sample mean will be normal, irrespective of the original distribution. A sample size of greater than 30 is considered a large population for any research. If the conditions are met, the parametric procedures will follow even if the data are not normally distributed (Elliott and Woodward, 2007). To measure the homogeneity of the data, the Levene test was employed. The Levene test specifies that the assumption of homogeneity was not violated in scales.

7.2. Demographic Analysis

To analyse the demographic details of respondents, a simple percentage analysis is 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 exhibits the demographic details of the Pollachi railway passengers. It is found that the majority of the passengers (n=53, 51.96%) are aged between 21 and 40 years old, followed by age groups such as 41-60 years (n=23, 22.55%), above 61 years (n=15, 14.71%), and up to 20 years (n=11, 10.78%). Most of the passengers (n=65, 63.73%) are female, while other passengers are male (n=37, 36.27%). Regarding the location of residence, the majority of the respondents' residences are located in a village (n=64, 62.75%), and some passengers from towns (n=38, 37.25%) indicate that mostly the Pollachi station is utilised by rural passengers.

The marital status of passengers showed a balanced distribution between married (n=54, 52.94%) and unmarried (n=48, 47.06%) passengers. With respect to educational qualification, undergraduate and postgraduate account for a majority (n=39, 38.24%), and higher secondary class and professional passengers each represented an 11.76% (n=12) portion of the sample size. The majority of the respondents come from a nuclear family (n=69, 67.65%),

whereas 32.35% (n=33) of passengers come from a joint family.

Monthly income distribution showed that 45.10% (n=46) of passengers earned between ₹15,001 and ₹ 30,000, followed by 20.59% (n=21) earning up to ₹15,000, 19.61% (n=20) earning between ₹30,001 and ₹50,000, and 14.71% (n=15) earning above ₹50,001. This distribution suggested that the majority of the respondents are from the lower-middle and middle-income groups.

7.3. Mean difference between demographic variables and awareness towards the railway services

The awareness level of passengers is computed with the help of the awareness index. The awareness index shows that most passengers are moderately aware (61.80%) of the railway services. The following table shows the mean difference between demographic variables and the awareness index. Parametric tools such as the independent t-test and the ANOVA are employed to find the mean difference among variables.

Table 2: Demographic Variables with Awareness of intermodality and travel updates

S. No.	Independent Variables	Dependent Variable	T value/ F value	p value	Status
			Independent t-test		
1.	Gender	Awareness	-1.103	.272	Not Significant
2.	Location	Awareness	-.069	.945	Not Significant
3.	Marital Status	Awareness	1.121	.265	Not Significant
4.	**Family Type**	**Awareness**	**-2.108**	**.037***	**Significant**
			ANOVA		
5.	Age	Awareness	.646	.587	Not Significant
6.	**Education**	**Awareness**	**4.739**	**.004****	**Significant**
7.	Income	Awareness	1.695	.173	Not Significant
	*5% Significant			** 1% significant	

Source: Primary data

7.4. Independent t-test

The independent t-test is employed to assess the significant mean difference between the two groups of demographic variables and awareness.

There is no statistically significant mean difference between awareness and gender (t (100,102) =-1.103, p=. 272). In comparison, female passengers (M=78.41, S.D=10.79) have more awareness than male passengers (M=76.04, S.D=9.81). Passengers residing in the village (M=77.60, S.D=10.89) have more awareness than town passengers (M=77.46, S.D=9.82), with no statistically significant mean difference between awareness and location (t (100,102) =-.069, p=.945).

Concerning marital status, there is no significant effect on awareness (t (100,102) = 1.121, p=.265), where passengers who are unmarried (M=78.64, S.D=9.89) have more understanding than married passengers (M=76.32, S.D=11.03). Furthermore, the study revealed a significant mean difference between family type (t (100,102) = -2.108, p=.037) and awareness. It suggests that family structure influences awareness of railway services. Passengers who are from nuclear families (M=79.03, S.D=10.54) are more aware of railway services, followed by those from joint families (M=74.45, S.D=9.71). The nuclear families provide autonomy to individuals to make travel decisions, which gives an opportunity to learn the technological and intermodal facilities available in the sector. It indicates that a nuclear family settings have a stronger influence and chances for understanding the technological and intermodal awareness than joint families.

7.5. ANOVA

The ANOVA is used to measure the significant mean difference between three or more demographic groups and awareness.

The test revealed that age (F (3,98) = .646, p = .587) shows no significant difference, with a mean score of 80.22 (S.D=10.80) for passengers aged above 61, 78.70 (S.D=8.02) for passengers aged 41-60, 77.27 (S.D=14.36) for passengers up to 20 years old, and 76.35 (S.D=10.49) for passengers aged 21-40. The small effect size (η^2 = 0.02) indicates that age explains only two per cent of the variation in awareness. It reveals that the differences are not practically meaningful.

Furthermore, the study revealed that there is a significant mean difference between education (F (3,98) = 4.739, p = .004) and awareness, with the Anova eta squared value of 12.7 per cent. It indicates that education groups have a medium to large effect (η^2 =0.127) on awareness. Passengers who studied higher secondary (M=82.14, S. D=9.69) are more aware of railway services, followed by those who studied undergraduate degrees (M=76.67, S.D=7.65), professionals (M=74.53, S. D=10.58), and postgraduate degrees (M=73.33, S.D=10.35). This suggests that the highest awareness of railway stations occurs with a specific education level, due to exposure and frequent engagement with railway services. These indicate that the education level collectively influences the awareness of the railway station and its services.

The study found that income (F (3,98) = 1.695, p = .173) is statistically insignificant with awareness. However, the effect size (η^2 =0.049) is small to moderate. It suggests that the income collectively measures 4.9 per cent of the variation in awareness. The mean scores disclosed that passengers who earn income between ₹30,001 and ₹50,000 (M= 79.50, S.D=11.86), attaining higher awareness scores than those with passenger income of ₹15,001 to ₹30,000 (M= 79.06, S.D=10.08), up to 15,000 (M= 75.40, S.D=8.33), and above

₹50,001 (M= 73.33, S.D=11.55). It depicts that the income level didn't play a role in awareness of railway services.

7.6. Mean difference between demographics and preference towards Pollachi railway services

The preference level of Pollachi passengers towards railway service is computed with the preference index. The preference index found that most passengers moderately preferred (66.70%) the Pollachi railway station and its services. The following table shows the mean difference between demographic variables and preference. As the data are not normally distributed, the independent t-test and the ANOVA are employed to find the mean difference among variables.

Table 3: Demographic Variables with Preference

S. No.	Independent Variables	Dependent Variable	T value/ F value	P value	Status
		Independent Sample t-test			
1.	Gender	Preference	-.792	.430	Not Significant
2.	Location	Preference	.907	.367	Not Significant
3.	Marital Status	Preference	1.524	.131	Not Significant
4.	Family Type	Preference	-.536	.593	Not Significant
		ANOVA			
5.	Age	Preference	1.215	.308	Not Significant
6.	Education	Preference	2.292	.083	Not Significant
7.	**Income**	**Preference**	6.701	**.000****	**Significant**
		*5% Significant		** 1% significant	

Source: Primary data

7.7. Independent t-test

The independent t-test is employed to assess the significant mean difference between the level of preference of Pollachi passengers and the two groups of demographic variables.

The independent t test indicates that there is no statistically significant mean difference between the two groups in demographic variables such as gender (t (100,102) =-.792, p=.430), location (t (100,102) = .907, p=.367), marital status (t (100,102) = 1.524, p=.131), family type (t (100,102) = -.536, p=.593), and preference.

This suggests that the distributions of preference index in gender, location, marital status, and family type are parallel. The study found that female (M= 78.67, S.D=9.31), town (M= 79.21, S.D=8.03), unmarried (M= 79.44, S.D=8.49), and nuclear family (M= 78.45, S.D=9.80) passengers prefer Pollachi station services compared to male (M= 77.12, S.D=9.82), village (M

= 77.45, S.D=10.25), married (M= 76.60, S.D=10.37), and joint family (M = 77.37, S.D=8.89) passengers, respectively.

7.8. ANOVA

The ANOVA is executed to measure the significant mean difference between three or more demographic groups and awareness.

The test revealed that age (F (3,98) = 1.215, p = .308) shows no significant mean difference with preference, with a mean score of 80.58 (S.D= 7.29) for passengers aged up to 20 years, 80.00 (S.D=7.29) for passengers aged 41-60 years, 78.66 (S.D=7.95) for passengers aged above 61 years, and 76.48 (S.D= 9.77) for passengers aged 21-40 years. The eta squared valued at 0.036. It indicates that age groups measured the 3.6 per cent variation in preference.

Furthermore, the study revealed no significant mean difference between education (F (3,98) = 2.292, p = .083) and preference, with the eta squared value of 0.066. Mostly, Pollachi station is preferred by passengers who studied undergraduate degrees (M=80.94, S.D=7.64), followed by those who studied higher secondary (M=78.61, S.D=10.29), professionals (M=76.67, S.D=10.15), and those with postgraduate degrees (M=75.56, S.D=10.21). The education group collectively measures the medium effect of 6.6 per cent in preference. It revealed that education groups have a potential practical relevance, but lack of statistical evidence.

The study found that income (F (3,98) = 6.701, p = .000) is statistically significant with large effect size (η^2 =0.17) on preference, with those whose income is ₹30,001 to ₹50,000 (M= 81.17, S.D=7.60) preferring a Pollachi station to passenger income of ₹15,001 to ₹30,000 (M= 80.87, S.D=8.73), up to ₹15,000 (M= 73.49, S.D=9.91), and above ₹50,001 (M = 72.00, S.D=8.62). It revealed that income jointly measured the 17 per cent variation in preference. Prior empirical studies suggest that travel preference is influenced by willingness to pay and selection of transportation **(**Alvinyah & Mulyono, 2024), and fee structures and income level influence the travel choices and preferences **(**Ninghai Li et al., 2025). High-income passengers have a stronger purchasing power than others, with their different preferences and demand elasticities. So, they prefer the Pollachi railway station to others. Additionally, Pollachi station provides an affordable and basic level of comfort to passengers, which leads middle-income passengers to prefer Pollachi railway station.

7.9. Preliminary observation

The independent t-test and ANOVA unveiled that demographic variables such as family type and education show a significant mean difference with awareness as well as income, demonstrating a significant mean difference with preference towards Pollachi railway station and its services. Eta-

squared value also revealed that education groups have a potential practical relevance on preference. Demographic variables like family type, education, and income were taken into account for the multiple regression analysis. The preliminary investigation found that family type inflates the VIF of other variables; therefore, family type will not be included in the final assessment.

7.10. Impact of Socio-demographic Factors, Awareness, and Inducing Factors on Preference of Pollachi Railway Services

To identify the influence of demographic factors, awareness, and inducing factors on preference for Pollachi railway services, the linear regression was employed. The analysis describes the relationship between independent awareness, inducing factors, and dependent preference. Dummy variables like postgraduate education and income between ₹15,001 and ₹30,000 are taken as reference variables.

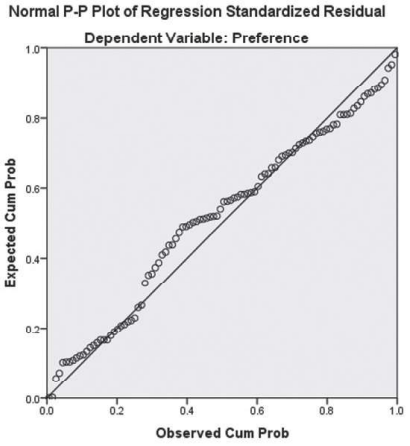

Figure 2: Normal P-P Plot and Scatter Plot
Source: Primary data

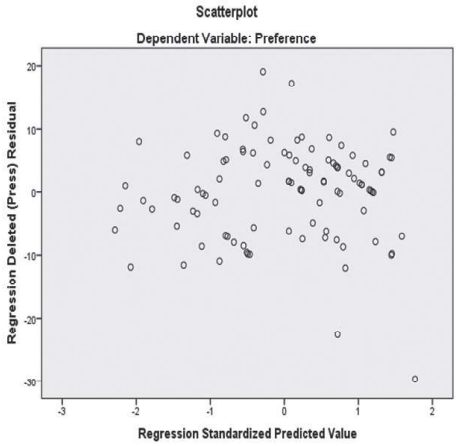

Figure 3: Scatter plot
Source: Primary data

The Normal Probability-Probability plot (Normal P-P Plot) of regression standardised residuals revealed that the data are closely associated with a diagonal line at roughly a 45-degree angle. This suggests that the data were normally distributed. The scatter plot for regression standardised predicted value and deleted residuals exhibited that the assumption of linearity and homoscedasticity is satisfied, as there is no similar pattern or funnelling effect (no increase, decrease, or constant variation). This suggests that the assumption of homoscedasticity is satisfied.

Residual diagnostics standardised (max=2.52) and studentized residual (max=2.58) are within an acceptable limit of the ±3 range. Centred Leverage Value (Max=.0.21) is below the threshold limit of 0.5, Cook Distance (Max=.163) is below the limit of 1, and Mahalanobis Distance ranged between 3.96 and 21.20, which meets the 31.26 (11 predictors) threshold limit. These

results indicate that the data shows no severe outliers, and multivariate outliers exist in the dataset. To determine a correlation between errors, the Durbin-Watson test was employed. The Durbin-Watson (1.966) was in the acceptable range of 1.5 to 2.5. It suggests that there is no autocorrelation between residuals.

The independent predictors such as education up to HSC (Tol=.719, VIF=1.391), education - UG (Tol=.519, VIF=1.692), education - professional (Tol=.803, VIF=1.245), income up to 15000 (Tol=.697, VIF=1.436), income - 30001-50000 (Tol=.768, VIF=1.302), income - above 50001 (Tol=.773, VIF=1.294), intermodality (Tol=.807, VIF=1.239), travel updates (Tol=.862, VIF=1.161), technological Features (Tol=.966, VIF=1.035), user-centric assurance (Tol=.966, VIF=1.035), perceived service value (Tol=.936, VIF=1.069), and service reliability (Tol=.924, VIF=1.082) are within the threshold limit of tolerance below 0.1, and VIF above 5; it suggests that the assumption of multicollinearity is not violated. The following hypothesis and equation were formulated to assess the relationship between variables.

Ho: Demographic factors such as income and education show no significant effect on preference for the Pollachi railway station and its services.

Ho: Awareness factors like intermodality, travel updates and technological features show no significant influence on preference for the Pollachi railway station and its services.

Ho: Inducing factors such as user-centric assurance, perceived service value, and service reliability did not show a significant impact on the preference of Pollachi railway station.

$$PR = \alpha + \beta_1 EH + \beta_2 EU + \beta_3 EP + \beta_4 IL + \beta_5 IM + \beta 6\ IH + \beta 7\ IT + \beta 8\ TF + \beta 9\ UC + \beta 10\ PS + \beta 11\ SR + E$$

Where,

PR – Service preference
α - Intercept
$\beta_{1...}\beta 11$- Regression Coefficient
EH – Education (Higher Secondary level)
EU – Education (Undergraduate level)
EP – Education (Professional level)
IL – Income (Up to 15000)
IM – Income (30001-50000)
IH – Income (Above 50001)
IT – Intermodality and travel updates awareness
TF – Technological feature awareness

UC – User-centric assurance
PS – Perceived service value
SR – Service reliability
E – Error term

7.11. Model Summary

Number of Observations: 102	Correlation: .744	R-squared: 0.554
Adjusted R-squared: 0.500	F-Statistic: 10.169	p-value = 0.000

Table 7 exhibits that there is a significant relationship (F (11,90) = 10.169, p = .000) among awareness, preference, and selected demographic variables, which concludes that the independent variable's awareness reliably predicts the dependent variable, like preference and other demographic variables. There is a positive correlation (r=.744) between awareness and dependent variables. The R^2 value (0.554) indicates that 55% of preference towards Pollachi railway services is influenced by awareness and other demographic variables. Demographic factors such as postgraduate education and Income between ₹15,001 and ₹30,000 are taken as a reference group in regression analysis.

Table 4: Regression Analysis

Variables	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Constant	**79.488**	**1.266**		**62.799**	**.000****
Education - Up to HSC	**5.839**	**2.431**	**.199**	**2.402**	**.018***
Education – UG	.215	1.778	.011	.121	.904
Education – Professional	1.410	2.299	.048	.613	.541
Income - Up to 15000	**-6.756**	**1.968**	**-.290**	**-3.433**	**.001****
Income - 30001-50000	.280	1.908	.012	.147	.884
Income - Above 50001	**-6.679**	**2.133**	**-.251**	**-3.131**	**.002****
Intermodality and travel updates	**5.028**	**.743**	**.530**	**6.768**	**.000****
Technological feature	**2.406**	**.719**	**.254**	**3.346**	**.001****
User-centric Assurance	.629	.679	.066	.927	.357
Perceived service value	**1.482**	**.690**	**.156**	**2.149**	**.034***
Service reliability	-.143	.694	-.015	-.207	.837

Source: Primary data

Predictor education up to higher secondary has a significant relationship (β = 5.839, t (100) = 2.402, p = .018) with the preference for the Pollachi railway station and its services. The coefficient is 5.839, indicating that passengers who studied up to HSC show a 5.839-unit higher preference than

postgraduate passengers. Undergraduates (β = 0.215, t (100) = .121, p = .904) and professionals (β = 1.410, t (100) = .613, p = .541) have a 0.215 and 1.410-unit higher preference than postgraduate passengers, but not significantly. The education level influences the preference through its impact on travel behaviour and decision-making. Education shaped the attitude of highly educated passengers towards sustainable and modern transport. Highly educated passengers consider a wide range of factors when choosing their mode of transport **(**Hajriyanti Yatmar et al., 2021).

Concerning income as a predictor, income up to ₹15000 (β = -6.756, *t* (100) = -3.433, *p* = .001) and above ₹50,001 (β = -6.679, *t* (100) = -3.131, *p* = .002) have a significantly negative effect of 6.756 and 6.679 units on preference compared to passengers earning between ₹30,001 and ₹50,000 passengers. In contrast, passengers' income between ₹30,001 and ₹50,000 (β = .280, *t* (100) = .147, *p* = .884) has an insignificant positive preference over income between ₹30,001 and ₹50,000. Income is correlated with the choice of transportation, depending on factors such as comfort, speed, hygiene, and other amenities (Yuzhao Zhang et al., 2019; Hajriyanti Yatmar et al., 2021).

Regarding awareness about the railway industry, awareness of intermodality and travel updates (β = 5.028, *t* (100) = 6.738, *p* = .000), such as integration of various transportation facilities and updating train schedules frequently, has a positive influence of 5.028 units on preferring Pollachi railway station. Awareness of technological features (β = 2.406, *t* (100) = 3.346, *p* = .001), such as digital ticket booking and train tracking, has a significant influence on preferring the Pollachi railway station and services.

Railways faced the biggest challenge in creating a hygienic environment (Mohit Kumar Ojha, 2020). These suggest there is a need to identify which factors upset the preference of NSG–5 category railway services among low and high-income passengers. Considering the inducing factors of Pollachi railway station, user-centric assurance (β = .629, *t* (100) = .927, *p* = .357), including factors such as safety, security, customer-friendly services, and perceived service value (β = 1.482, *t* (100) = 2.149, *p* = .034), together with convenience, comfort, lower cost, and affordability, has a positive influence on preference of Pollachi railway station. Among these positive predictors, perceived service only has a significant impact on preference. Service reliability (β = -.143, *t* (100) = -.207, *p* = .837), including on-time arrival, departure, and proper maintenance, has a negative influence on choosing the Pollachi railway services.

It indicates that among all inducing factors, on-time arrival, departure, and proper maintenance have minor complications to induce passengers to select Pollachi railway station. These results confirm that Pollachi station has some hygienic issues, but not at a significant level. But it still causes the

low and high-income, and highly educated passengers to prefer the railway station service. The results of these studies apply to all 100 NSG 5 class stations in Southern Railway.

8. Suggestions

The study suggests the following to the railway ministry.

- Palakkad division may concentrate on targeted awareness campaigns and quality services, such as hygienic waiting halls, digital information systems, and punctual train timing, which stimulate more post-graduate and high-income level passengers to Pollachi railway station.
- The study revealed that high-income passengers show a low preference compared to middle-income passengers. It provides a need for the formulation of an income-based sensitive pricing policy. By providing a first-class amenity with fare pricing in the NSG 5 category station will attract more passengers.
- The study proved that awareness significantly influences preferences for railway service. Therefore, the researcher suggests that a simplified and unified mobile application (Where is my train+ Rail one + UTS) will decrease the operational difficulty, increase technological awareness, and provide travel updates, which leads to a greater preference for railway service.
- Regression revealed that service reliability, including on-time arrival, departure, and proper maintenance in Pollachi station, damages the preference for Pollachi railway services. It suggests that the railway ministry may take efforts to improve operational consistency and proper maintenance to reconstruct the trust among passengers at Pollachi station.
- Some passengers suggest that the Pollachi Station will improve if it joins with the Madurai division. Therefore, the researcher suggests that rather than restructuring, the Southern Railway may consider increasing trains and other facilities by improving the interdivisional coordination among the Madurai, Salem, and Palakkad divisions.

9. Conclusion

The current study highlights the influence of demographics, awareness dimensions, and inducing factors on the preference of Pollachi NSG 5 railway station. With a behavioural perspective, the study contributes to the comprehensive approach of how the cognitive awareness and service-related inducing factors jointly influence the preference for the non-suburban railway context.

The findings specify that intermodality and travel updates awareness, Technological feature awareness play a critical role in the preference for railway stations. Inducing factors associated with service attributes also influence preference, but their impact fluctuates across the passenger clusters. Particular socio-demographic variables didn't show a significant influence on the preference. It suggests that the preference for a railway station is highly influenced by awareness and travel experience rather than by socio-demographic factors.

From a practical perspective, this study discloses the need to improve awareness of the passengers through targeted information sharing, online platforms, and intermodal connectivity initiatives. Strengthening the technological communication, real-time travel updates, and passenger-focused service can develop the preference for railway services, especially in NSG-5 cluster stations. Besides, the results show that the service quality attributes, such as safety, hygiene, and reliability, play an important role in nurturing a passenger's trust and continued preference in the long term.

The study has some limitations. The data is only gathered on one railway station classified under one of the NSG-5 categories out of 100 stations available in southern railway, and this could limit the applicability of the findings and suggestions to other groups of railway stations and regions. Additionally, the study adopts a cross-sectional research design, which only takes a snapshot of perceptions of the passengers at one point in time, thus limiting the ability to conclude the change in preference behaviour over time.

Future research may extend this study by examining multiple NSG-5 category railway stations in various railway divisions to increase the generalizability of the study. Longitudinal studies will uncover the views on the changes in awareness and preference with the growth of service developments and policy interventions. The comparative studies may be conducted by examining the awareness, preference, and satisfaction differences among non-suburban (NSG), suburban (SG), and halts (HG) station passengers. The study suggests the railway ministry and other research forums may conduct research for high-income groups and professionals to further popularise the railway among them.

Finally, this study presents empirical evidence that increasing passenger preference for railway services in the non-suburban areas is based on increasing awareness and service-related inducement factors. NSG-5 category stations will become a potential and trusted transportation for regional movement if railway authorities improve passenger information systems and service quality.

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