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Modeling Factors Influencing Passenger Decisions on Intercity and Regional Railway Train

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ABSTRACT

The dependence on private vehicles has grown significantly in the past decade, impacting travel experience quality. Transportation companies need to focus on enhancing the loyalty through exploring choice behavior. Existing research often focuses on typical service attributes, but the comparative impact with more complex variables factors remains underexplored. This study aims to identify factors influencing intercity and regional rail passenger travel decisions. This research explores sociodemographics, travel behavior, and factors affecting their mode of choice. Survey data using questionnaires were collected from 649 respondents across four intercity and five regional rail services. Logistic regression models were developed with variable selection validated using the Wald significance test and model evaluation conducted. The results indicate that intercity rail travel choices are significantly influenced by disposable income, trip purpose, and onboard comfort attributes such as air conditioning and cleanliness. In contrast, regional train choice is largely driven by factors such as occupancy rate, frequency of use, travel time reduction, and cost sensitivity. These findings confirm that intercity and regional passengers represent distinct market segments shaped by different behavioral priorities. The resulting models demonstrated strong performance, with the intercity model explaining 76.8% of the variance in choice and achieving a predictive accuracy of 82.1%, while the regional model explained 58.9% of the variance with an accuracy of 63.8%. The findings suggest that fare adjustment strategies and service development focused on air conditioning, cleanliness, and travel time can enhance ridership for both train types, thereby enhancing the overall attractiveness of the public transportation system.

1. Introduction

The significant 40.70% increase in private vehicles hurts travel quality, highlighting the urgent need for effective public transport [1], [2], [3]. While public transit quality is often

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subpar, focusing on the overall travel experience is crucial for gaining customer loyalty [4], [5] and encouraging repeat use and recommendations [6]. Transportation providers are now intensely analyzing the passenger experience to guide improvements in policies and vehicle design [2]. Indonesia's state railway (PT KAI) has seen substantial passenger growth across its services from 2015 to 2022 (e.g., 19% long-distance, 257% medium-haul), underscoring the rail network's importance [7]. This highlights the importance of understanding the complex factors that influence passenger mode choice, and underscores the need for urgent studies to ensure that service improvements are effective and sustainable.

Consumer behavior theory suggests that individuals select and use services based on a process influenced by a combination of cultural, social, personal, and psychological factors [8], [9], [10]. Applied to transportation, travel choices are similarly shaped by socioeconomic attributes, psychological elements (like perceived control), and perceptions of service quality [11], [12], [13], [14]. The distinction between rail services, such as Inter-City and regional trains, presents a key cost-versus-convenience trade-off in user decisions. Regional trains offer approximately 30% lower cost but often involve longer travel times and about 25% more transfers [15]. Furthermore, passenger preferences are segmented by journey length. Medium-haul passengers prioritize frequency and affordability, while long-haul travelers emphasize in-train comfort, hygiene, and the overall experience [8], [2]. This highlights how service characteristics and associated factors like ticket method and punctuality influence modal split models [16], [17].

In comparing specific rail alternatives, such as conventional and high-speed intercity trains, factors like demographics, ticketing methods, departure time, purpose, and distance are all significant determinants of choice [18], [19], [20]. To understand and model this complex behavior, research employs advanced statistical and computational methods, including discrete choice models (like the mixed-logit model) and machine learning algorithms (such as random forest), with parameter estimation often relying on the maximum likelihood method [21], [22], [23], [24]. Advanced techniques, such as the latent class model, are further utilized to categorize travelers and investigate how key variables, including travel expenses, access time, duration, and comfort, influence their decisions across intercity and regional options, providing a detailed, segmented understanding of choice behavior [25].

Existing research identifies various factors influencing rail passenger satisfaction, including service characteristics like punctuality and staff competence [26], [27], yet a research gap exists regarding the detailed impact of individual-level attributes on choice behavior

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between intercity and regional trains, especially in specific contexts like Indonesia, where physical amenity complaints are frequently reported [28], [29]. This study aims to identify factors influencing the travel decisions of intercity and regional rail passengers. This research explores sociodemographics, travel behavior, and factors affecting their mode of choice. The results of this study are expected to provide an empirical basis for service development and enhance the overall attractiveness of the public transportation system.

2. Research Method

2.1 Sample

This study will involve a selection of Intercity Trains and Regional Railway Trains as a representative sample of the broader population. The specific Intercity and Regional routes were selected to ensure the sample accurately represents the fundamental differences in distance, service type, and passenger priorities inherent to Indonesian rail travel, allowing for a robust comparative analysis of choice behavior between long-haul (Intercity) and medium-haul (Regional) segments. The selected routes connect major hubs (like Pasarsenen, Surabaya, and Ketapang) to capture the full spectrum of trade-offs passengers make regarding cost, speed, and comfort. The Intercity train objects include KA Kahuripan (Blitar – Kiaracondong), KA Bengawan (Purwosari – Pasarsenen), KA Sri Tanjung (Lempuyangan – Ketapang), and KA Airlangga (Surabaya Pasarturi – Pasarsenen). Meanwhile, the Regional Railway object consists of five services, namely Serayu operating on the Purwokerto – Kroya – Pasarsenen, Kutojaya Selatan operating on the Kutoarjo – Kiaracondong, Tawang Alun operating on the Malang Kotalama – Bangil – Ketapang, Probowangi operating on the Ketapang – Probolinggo – Surabaya Gubeng, and Cikuray operating on the Pasarsenen – Garut.

The survey administration took place on board trains and on platforms while passengers were waiting for departure. The survey's sampling technique is non-probability sampling, specifically quota sampling. The sample size decision was based on both the statistical basis and the practical feasibility of the estimated 96 full-board passengers per train. According to a statistical basis, the number of populations was determined by the desired level of statistical confidence and the margin of error. The number of samplings reflected the relative volume of passengers. It was allocating a larger proportion to the intercity because it represents the service with higher strategic importance. The sample size was distributed across trains as shown in **Table 1.**

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Table 1. Number of Samples

Intercity Train Name	Number of Samples	Regional Railway Train Name	Number of Samples
Kahuripan	114	Cikuray	45
Bengawan	109	Kutojaya Selatan	50
Sri Tanjung	116	Probowangi	51
Airlangga	101	Serayu	53
Total	**440**	Tawang alun	51
		Total	**250**

Source: Author Research Result (2025).

Before participation, all individuals were provided with detailed information regarding the study's objectives and procedures, and later provided with a voluntary agreement by signing informed consent documents. Questionnaires deemed invalid due to incomplete data or outlier values were removed from the analysis. This process yielded a final dataset of 649 valid responses, representing an effective response rate of 94.1%, which satisfied the predetermined sample size requirements.

2.2 Data Collection

The survey questions are structured to gather information about respondents' socio-demographic characteristics, daily commuting patterns, and factors influencing their mode choice. A pilot study involving 40 participants was conducted to validate the questionnaire and establish the reliability of its variable attributes. The questionnaire demonstrated content and construct validity and exhibited high internal consistency reliability, as shown in Cronbach's alpha ($\alpha > 0.7$) for all measured variable attributes.

The questionnaire related to sociodemographics includes age, gender, occupation, number of households, and monthly disposable income. To understand their typical commuting patterns and past travel experiences, the survey consists of questions about their travel behavior, such as the origin and destination of daily trips, frequency of using specific types of trains, trip purposes, and allocation of transportation fees for commuting. While the attributes related to factors affecting their mode of choice will include ticket fare, quantity of air conditioning, seat convenience by increasing fare by 10%, reducing travel time by reducing stop stations, and cleanliness inside the train.

2.3 Data Analysis

Logistic regression is a part of regression analysis used when the outcome variable is binary, indicating the presence or absence of a specific event [30]. This statistical technique models the dependent variable as a linear combination of independent variables. This linear function, often referred to as a utility function, is then transformed into a probability estimate using the logit function. To predict the likelihood of a particular alternative being chosen based

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on the model, its utility function value is compared against other available choices and converted into a probability score ranging from 0 to 1. This framework is ideal for rail travel mode choice because passengers are forced to select only one discrete option (Intercity or Regional), making the outcome inherently categorical. The fundamental assumption of this model states that respondents will select to use a certain travel mode yielding the highest utility under a given set of conditions [31], [32]. The utility function for each mode is conceptualized as comprising a deterministic component and a stochastic component. The corresponding mathematical expressions are shown in Equations 1 and 2.

$$Uin = V_{in} + \varepsilon_{in} \quad (1)$$

$$Vin = \beta 0 + \sum_{k=1}^{k} \beta k \, Xink \quad (2)$$

The utility function, denoted as U_{in}, represents the perceived value of the i-th usage of travel mode, either using Intercity train or Regional Railway Train (Yes (i=1), No (i=0)) for the n-th respondent. This utility U_{in} is composed of a deterministic component, V_{in}, and a random error term, ϵ_{in}. Here, K signifies the total number of attributes (also termed characteristic variables) that influence the respondents' mode choice. The term β_k represents the undetermined coefficients associated with each attribute, and X_{ink} denotes the value of the k-th factor for the i-th travel mode as perceived by the n-th respondent. Assuming the random component ϵ_{in} adheres to a Gumbel distribution, and all variables exhibit mutual independence, the probability P_{in} of the n-th respondent selecting the i-th travel mode is given by Equations 3 and 4.

$$Pin = \frac{\exp(\text{Vin})}{\sum_{i=1}^{2} \exp(Vin)} \quad (3)$$

$$\ln\left(\frac{Pin}{1 - Pin}\right) = \beta 0 + \sum_{k=1}^{k} \beta k \, Xink \quad (4)$$

The Logit model's strength is its ability to directly estimate the implicit value (or "weight") that passengers place on various quantitative and qualitative attributes—such as fare, travel time, and comfort—to rigorously quantify the trade-offs passengers make when deciding between the distinct service levels of Intercity versus Regional trains.

The logit model was then generated after defining and analyzing the factors that affected choice behavior for both intercity and regional trains. The factors that influenced the choice behavior were determined by coding the number. The socio-demographic attributes consist of gender, coded as male given the value 1 and female given the value 0. Age is classified into five groups with values assigned as 0 for ages 18 to 24, 1 for ages 25 to 30, 2 for ages 31 to 36, 3 for ages 37 to 45, and 4 for ages above 45. Occupation is coded as 0 for students,

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1 for full-time workers, 2 for self-employed individuals, and 3 for other employment categories. Disposable income is coded as 0 for monthly income below 1,000,000 IDR, 1 for income between 1,000,000 and 2,500,000 IDR, 2 for income between 2,500,000 and 4,000,000 IDR, 3 for income between 4,000,000 and 5,500,000 IDR, and 4 for income above 5,500,000 IDR. Household size is coded as 0 for one person, 1 for two persons, 2 for three persons, 3 for four persons, and 4 for households with more than four persons. Travel-pattern variables cover several components. Origin–destination characteristics are coded as 0 for travel between DAOP areas, 1 for travel within the same region with up to three stops, and 2 for travel within the region with more than three stops. Frequency of train usage is coded as 0 for one to two trips per year, 1 for three to four trips per year, 2 for five to eight trips per year, 3 for eight to ten trips per year, and 4 for more than ten trips per year. Trip purpose is coded as 0 for business travel, 1 for work-related travel, 2 for leisure travel, and 3 for school travel. Monthly transportation expenditure for commuting is coded as 0 for spending below 250,000 IDR, 1 for spending between 250,000 and 500,000 IDR, and 2 for spending between 500,000 and 1,000,000 IDR. Allocation for train fares per trip is coded as 0 for amounts below 100,000 IDR, 1 for amounts between 100,000 and 150,000 IDR, 2 for amounts between 150,000 and 200,000 IDR, and 3 for amounts above 200,000 IDR. Factors related to train-choice attributes include several service-quality components. Ticket-fare preference is coded as 0 when paying a full fare in a single purchase, 1 when selecting a fifteen-percent discount fare through booking, and 2 when using an annual subscription fare with a twenty-percent discount. Availability of air-conditioning units is coded as 0 for one unit per coach, 1 for two units per coach, 2 for three units per coach, and 3 for more than three units per coach. Seat convenience preference is coded as 0 for upright-facing seats, 1 for new image seat models, and 2 for premium seating. Reduced travel time is coded as 0 when the reduction is one hour or less per trip and 1 when the reduction exceeds one hour. The cleanliness level inside the train is coded as 0 when cleaning occurs every half hour, 1 when cleaning occurs every hour, and 2 when cleaning occurs every 1.5 hours.

The socio-demographic characteristics of the survey respondents, travel attributes, and the factors that affected the choice of mode are analyzed to estimate the mode choice model. To ensure valid input data, a test of significance is performed to identify the attributes that influence choice preferences. These influential factors are determined through the Wald test for each variable. The null hypothesis posits that $\beta i=0$ (indicating no significant effect), while the alternative hypothesis states that $\beta i=0$ (indicating a significant effect). If a variable is found to

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significantly affect mode choice, its effect is then incorporated as a variable within the utility function of the mode choice model. The Wald test conducted with a significance level (α) of 0.05 yields a critical t-value of 1.96 [32]. Complementary to the Wald test, the p-value serves as an indicator of a variable's statistical significance, as previously described. A p-value below the designated α threshold signifies a statistically significant variable, and a p-value exceeding α indicates non-significance. Consequently, the conclusions derived from the Wald test and the p-value comparison, when employing an identical α value, will invariably be consistent.

After the mode choice model was constructed, several standard logistic regression diagnostics were applied to evaluate model fit. The overall significance of each model was examined using the Omnibus Test and the Hosmer–Lemeshow test. Model adequacy was further evaluated using the -2 Log Likelihood statistic compared to the chi-square critical value.

3. Results and Discussion

3.1 Socio-Demographic

Table 2 presents a summary of the respondents' socio-demographic characteristics. Across both types of train, the dominant demographic was male individuals aged 25 to 36 years, primarily identifying as full-time workers. While disposable monthly income exhibited some variation, the average reported income aligned with full-time workers' levels in its region.

Table 2. Attributes of Socio-Demographic

Attributes	Intercity	Regional	Attributes	Intercity	Regional
Gender			Disposable income (Indonesian Rp)		
Female	47.5%	36.7%	<1,000,000	9%	14%
Male	52.5%	63.3%	1,000,000 - 2,500,000	12%	18%
Age			2,500,000 - 4,000,000	20%	23%
18-24	12%	21%	4,000,000 - 5,500,000	37%	24%
25-30	35%	23%	>5,500,000	22%	21%
31-36	28%	35%	Number of households		
37-45	10%	11%	1	7%	5%
>45	5%	10%	2	18%	21%
Occupation			3	32%	25%
student	11%	18%	4	26%	35%
full-time worker	67%	53%	>4	17%	14%
self-employed	14%	16%			
others	8%	13%			

Source: Author Research Result (2025).

3.2 Travel Patterns

In **Table 3,** the analysis of passenger origin and destination reveals a clear distinction between Intercity and Regional train usage. In correlation with socio-demographic attributes, Intercity passengers are predominantly full-time workers (67%) with higher income (37% earn IDR 4M-5.5M), traveling long-haul (68% between regions) mainly for leisure (58%), and paying high fares (>200,000 per trip for 54%). Conversely, Regional users are strongly male

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(63.3%) and frequently travel (45%) using it (>10 times/year) for work/business (77% combined) on short, local routes (66% are 1-3 stations), reflected by their lower per-trip fare allocation (90% spend <150,000).

The clear distinction between Intercity and Regional train passengers is consistent with findings from previous literature. Studies generally confirm that passenger selection is heavily influenced by a combination of socio-demographic attributes and trip characteristics, creating a persistent segmentation between long-haul and commuter services. Higher income and business/leisure passengers prioritize service attributes like comfort, convenience, and speed—often being less sensitive to higher fares [15], [17]. The choice of intercity rail is influenced by factors such as monthly income and the priority given to convenience and comfort over minimal travel costs, particularly when competing with other modes [15], [33]. Conversely, the Regional segment's frequent use for work/business and strong sensitivity to lower fares reflect that cost and travel time are the most significant factors for routine, short-distance, or daily commuting trips [16], [33]. This is often associated with travelers for whom economic factors are paramount, and who may be more likely to use season or prepaid tickets for a stable, low-cost travel option [34].

Table 3. Attributes of Travel Pattern

Attributes	Intercity	Regional	Attributes	Intercity	Regional
Origin and destination			**Monthly transportation fee allocating for commuting (Indonesian Rp)**		
In between DAOP (regional area)	68%	0%	<250,000	12%	17%
Inside the region area (1 -3 stations)	21%	34%	250,000 - 500,000	40%	50%
Inside the region area (> 3 stations)	11%	66%	500,000 - 1,000,000	48%	33%
Frequency of using type of trains			**Allocating fee for train's fare/trip**		
1-2 times/year	11%	8%	<100,000	13%	42%
3-4 times/year	18%	10%	100,000 - 150,000	11%	48%
5-8 times/year	33%	15%	150,000 - 200,000	23%	3%
8-10 times/year	20%	22%	>200,000	54%	7%
>10 times/year	18%	45%			
Aims of trips					
Business	5%	35%			
Work	17%	42%			
Leisure	58%	16%			
School	7%	7%			

Source: Author Research Result (2025).

3.3 Factors Affecting Mode Choice

Table 4 presents a comparative analysis of passenger preferences for various attributes of Intercity and Regional train services. The analysis highlights distinct preferences between Intercity and Regional rail users. Intercity passengers prioritize flexible pricing, heavily favoring discounted advance tickets (61%) and full-fare (34%) options, and demand superior

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comfort, with 82% choosing premium seating and a strong preference for multiple A/C units. They also value significant time reductions (over one hour preferred by 68%). In contrast, regional passengers are driven by frequency and value, overwhelmingly preferring the abonement subscription fare (78%) and opting for standard upright facing seats (42%). While Regional riders also value speed, their preference is concentrated on time savings up to one hour (83%).

This clear segmentation demands distinct operational and commercial strategies, where for Intercity services, the focus must be on a yield management fare design that strategically prices advance tickets to capture early demand while maintaining a high full-fare option for last-minute flexibility, simultaneously justifying this premium with enhanced service standards like guaranteed premium seating and adding more AC units. Conversely, the regional network requires optimizing for throughput and predictable revenue through expanded subscription schemes and high-frequency schedules, where infrastructure investments should prioritize delivering the essential time savings of up to one hour that directly improves daily commuter quality of life, rather than luxury amenities.

The observed differences in passenger choice behavior between Intercity and Regional rail users are consistent with established findings in transportation research, primarily reflecting variations in trip purpose, travel distance, and associated willingness-to-pay (WTP) for service attributes. Intercity passengers, often traveling longer distances with potential business motives, demonstrate a strong preference for discounted fares booked in advance but also commonly utilize full fare bookings, indicating a high value placed on flexibility and the ability to secure deals. This aligns with revenue management principles in long-haul services aimed at maximizing yield and securing early commitments [16]. Conversely, Regional passengers, typically comprising commuters, show a clear preference for abonement fares (subscription passes), which prior studies find effective in fostering high-frequency use of public transport [16]. Furthermore, Intercity passengers exhibit a greater WTP for superior on-board service quality, prioritizing premium seating and a higher density of air conditioning units, reflecting a lower tolerance for discomfort during longer journeys [33]. While both segments value reduced travel time via stop elimination, the stronger preference for greater reductions (over one hour) among Intercity users underscores that time is a critical competitive factor for long-distance rail against alternatives like air travel [16].

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Table 4. Factors Affecting Choice Behavior

Attributes	Intercity	Regional	Attributes	Intercity	Regional
Ticket Fare			**Seat convinience by increasing fare to 10%**		
Full fare (1 time booking)	34%	7%	upright facing seats	6%	42%
Discount Booking days in advance (by 15%)	61%	15%	new image	12%	35%
Abonement fare (by 20%)	5%	78%	premium	82%	23%
Quantity of air conditioning			**Travel time by reducing stop stations**		
1 unit/coach	5%	6%	faster by 1 hour or less	32%	83%
2 units/coach	12%	28%	faster by >1hour	68%	17%
3 units/coach	34%	29%	**Cleanliness inside train**		
>3 units/coach	49%	37%	Cleaning staff clean every half hour	10%	22%
			Cleaning staff clean every hour	55%	47%
			Cleaning staff clean every 1,5 hour	35%	31%

Source: Author Research Result (2025).

3.4 Significance Test

Table 5. Estimated Model for Intercity Train

Attributes	Intercity train		
	Coefficient	Wald	P-value
Sex	-1.987	2.751	0.128
Age	0.987	0.873	0.259
Occ	-1.153	0.485	0.521
Dispinc	0.534*	12.698	0.003
Household	-0.653	6.329	0.078
OD	1.812	0.578	0.656
FreqUsage	-0.956	4.856	0.089
TripAims	-0.721*	5.634	0.021
MonthSpend	0.672*	28.928	0.000
AllocateFee	0.028	3.565	0.095
Fare	5.612*	19.813	0.000
AC	0.213*	8.549	0.021
Seat	-0.985	0.635	0.484
TT	-0.435	2.530	0.176
Cleanliness	0.472*	4.731	0.035
Constant	2.336	23.842	0.000

Source: Author Research Result (2025).

Based on **Table 5**, the utility function equation in logistic regression model as it performs the most suitable predicted model shown in Equation 5.

$$\ln\left(\frac{p_{intercity}}{1-p_{intercity}}\right) = -1.987\text{Sex} + 0.987\text{Age} - 1.153\text{Occ} + 0.534Disp_{inc} - 0.653\text{Household} + 1.812\text{OD} - 0.956\text{FreqUsage} - 0.721\text{TripAims} + 0.672\text{MonthSpend} + 0.028\text{AllocateFee} + 6.612\text{Fare} + 0.213\text{AC} - 0.985\text{Seat} - 0.435\text{TT} + 0.472\text{Cleanliness} + 2.336 \quad (5)$$

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Table 6. Estimated Model for Regional Railway Train

Attributes	Regional Railway train		
	Coefficient	Wald	P-value
Sex	-2.851	0.881	0.245
Age	0.653	0.459	0.568
Occupation	0.379*	11.028	0.002
Disposable income	5.226	0.368	0.721
Number of Household	0.881	8.221	0.079
Origin and destination	2.721	9.169	0.087
Frequency of using type of trains	0.951*	21.589	0.000
Aims of trips	1.952	2.743	0.485
Monthly transportation fee allocating for commuting (Indonesian Rp)	-0.221*	10.114	0.003
Allocating fee for train's fare/trip	-0.861*	31.553	0.000
Ticket Fare	0.433*	10.442	0.001
Quality of air conditioning	3.298	9.284	0.097
Seat convinience	0.219	0.923	0.417
Travel time	-0.273*	8.988	0.001
Cleanliness inside train	3.381	0.622	0.391
Constant	1.749	9.945	0.002

Source: Author Research Result (2025).

Meanwhile, as for the regional railway train (**Table 6**), within the same influenced variable, the utility function equation in the logistic regression model produces the most suitable prediction model shown in Equation 6.

$$\ln\left(\frac{p_{intercity}}{1-p_{intercity}}\right) = -2.851\text{Sex} + 0.653\text{Age} + 0.379\text{Occ} + 5.226Disp_{inc} + 0.881\text{Household} + 2.721\text{OD} + 0.951\text{FreqUsage} + 1.952\text{TripAims} - 0.221\text{MonthSpend} - 0.861\text{AllocateFee} + 0.433\text{Fare} + 3.298\text{AC} + 0.219\text{Seat} - 0.273\text{TT} + 3.381\text{Cleanliness} + 2.336 \quad (6)$$

This study achieved significant model fit for both mode choice models, as confirmed by a significant Omnibus test ($p < 0.05$) and the satisfactory non-significant Hosmer-Lemeshow test ($p > 0.05$), demonstrating that the chosen model structure is appropriate for the data. The goodness-of-fit was notably higher for the Intercity model, which explained 76.8% of the variance in respondent choices, significantly exceeding the regional model's explanatory power of 58.9%. However, when assessing overall predictive success against the null hypothesis, both models performed strongly, with the Intercity model achieving 82.1% correct predictions and the regional model achieving 63.8%. Furthermore, the -2 Log Likelihood (-2LL) values (798.531 for Intercity; 291.732 for Regional) significantly exceeded the Chi-square critical values. This outcome confirms that the complex models have significantly better predictive ability than the simple models that only use a constant value like socio-demograph and travel

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pattern only, thus it is important to incorporate the specific factors affecting the passenger's choices.

Based on the analysis reveals that choosing an Intercity train is most strongly predicted by higher ticket fares (+5.612 coefficient), followed by socio-economic status (higher disposable income, +0.534; and a larger monthly transport budget, +0.672). This suggests Intercity riders prioritize premium options. Furthermore, demand for better service quality, specifically cleanliness (+0.472) and demand for more air conditioning (+0.213), significantly increases this choice probability. Conversely, specific trip aims (-0.721 coefficient) negatively correlate with the Intercity option. Attributes like age, sex, and travel time were not significant predictors.

According to **Table 6**, the analysis of Regional Railway train choice shows that passenger decisions are overwhelmingly driven by frequency of use and price sensitivity. The strongest predictor is a positive correlation with the Frequency of using trains (+0.951), confirming that frequent travelers strongly favor this option. In contrast, the strongest negative correlation is with the Allocating fee for the train's fare/trip (-0.861), indicating that highly price-sensitive passengers who allocate less money per trip are more likely to choose the regional rail. Other significant factors include positive correlations with Occupation (+0.379) and the Ticket Fare attribute itself (+0.433), while there are negative correlations with the total Monthly transportation fee allocated for commuting (-0.221) and travel time (-0.273), suggesting a preference for shorter trips.

These findings confirm that for Intercity trains, decisions are primarily economic and comfort-driven, showing significant effects from disposable income, ticket fare, air conditioning quantity, and cleanliness. This is in line with previous studies emphasizing the value of quality and amenities for longer-distance travel [9], [10]. In contrast, the choice for Regional Railway trains is more strongly rooted in commuter and routine-based constraints, being heavily influenced by occupation, usage frequency, monthly transportation fees, and travel time options. This is in line with previous studies that highlight the importance of reliability, affordability, and practical factors for regular, medium-haul commuters [8], [20]. This comparison significantly contributes to the literature by quantifying how socioeconomic factors and trip characteristics are *differentially* weighed by passengers when choosing between two distinct rail service tiers.

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4. Conclusions

The research findings indicate that Intercity and Regional rail passengers represent two fundamentally different markets requiring distinct management strategies. The Intercity choice is significantly driven by disposable income, trip purpose, and on-board amenities (A/C and cleanliness), emphasizing a pursuit of perceived value. In contrast, regional rail selection is more influenced by factors such as occupation, usage frequency, and travel time reduction, reflecting limited stringent time and budget constraints. Mode choice models for both rail services have been developed with reasonable accuracy. These findings suggest that operators should implement a dynamic pricing strategy and invest in premium comfort (A/C and hygiene) for Intercity services to attract higher-spending segments, while simultaneously prioritizing travel time reduction and expanding the subscription-based ticketing system for Regional rail. These results highlight the importance of treating these services as distinct passenger markets with different behavioral sensitivities. This can provide an empirical basis for service development and enhance the overall attractiveness of public transport systems.

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