



# FACTORS INFLUENCING THE ADOPTION OF BIKE TAXI SERVICES AMONG COMMUTERS IN TIRUCHIRAPPALLI CITY

Yugesh R

II MBA, Sakthi Institute of Information and Management Studies, Pollachi

Dr. A. Prasathkumar

Assistant Professor, Sakthi Institute of Information and Management Studies, Pollachi



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**Abstract:** The rapid growth of app-based mobility services has transformed urban transportation in Indian cities, with bike taxi services emerging as a popular and affordable commuting option. This study examines the factors influencing the adoption of bike taxi services among commuters in Tiruchirappalli city by integrating the Technology Acceptance Model (TAM), Theory of Planned Behaviour (TPB), and travel behaviour factors into a unified conceptual framework. Primary data were collected from 304 commuters through a structured questionnaire and analysed using simple percentage analysis, reliability analysis, correlation analysis, regression analysis, independent sample t-test, and one-way ANOVA. The results indicate that perceived usefulness, perceived ease of use, attitude, subjective norms, perceived behavioural control, travel cost, travel time, convenience, safety perception, and availability all significantly influence user adoption. Demographic variables including age, gender, monthly income, and occupation did not show any significant difference in adoption behaviour, suggesting that bike taxi services are widely accepted across all population groups. The study provides meaningful insights for service providers and policymakers in developing strategies to promote sustainable urban mobility and supports SDG 11 — Sustainable Cities and Communities.

**Keywords:** *Bike Taxi, Urban Mobility, Last-Mile Connectivity, Safety Perception, SDG 11*

## 1. INTRODUCTION

The transportation industry has undergone significant transformation due to rapid urbanization, increasing traffic congestion, and the growing adoption of digital technologies. In India, app-based mobility services have emerged as an important solution for providing affordable, convenient, and time-saving transportation options to urban commuters. Among these services, bike taxis have gained considerable popularity, especially in metropolitan and tier-two cities, because they offer quick and cost-effective travel for short-distance journeys and last-mile connectivity, thereby supporting sustainable urban mobility in line with SDG 11 — Sustainable Cities and Communities.

Bike taxi services operate through mobile applications that connect passengers with two-wheeler riders. Companies such as Rapido, Uber Moto, and Ola Bike have expanded their operations across several Indian cities, making urban mobility more accessible and flexible. These services are increasingly popular among students, office workers, and daily commuters due to their affordability, reduced travel time, and ability to navigate through congested roads efficiently.

In Tiruchirappalli (Trichy), transportation demand has increased rapidly due to population growth, educational institutions, commercial activities, and urban expansion. Traffic congestion and delays in public transportation have created growing demand for alternative mobility solutions. Bike taxi services have emerged as a practical option, particularly among students and working professionals who require fast and affordable transportation for daily travel. The India bike taxi market was valued at USD 385.4 million in 2025 and is projected to reach USD 1,802.89 million by 2035, growing at a CAGR of 18.7% (MarkWide Research, 2025).

### 1.1 Research Objectives

- To examine the influence of perceived usefulness, perceived ease of use, subjective norms, and perceived behavioural control on consumers' adoption and intention to use bike taxi services.
- To analyse the effect of cost effectiveness, travel time savings, convenience, and accessibility on consumers' preference towards bike taxi services.
- To evaluate the role of safety perception and service availability in determining customer satisfaction and continued usage intention.
- To study the relationship between demographic factors (age, gender, monthly income, occupation) with the usage behaviour of bike taxi services.

## 2. REVIEW OF LITERATURE

Acheampong (2020) used a structural equation model to study ride-hailing adoption in Ghana, finding that perceived benefits and socio-demographic factors are key determinants, and that ride-hailing primarily substitutes conventional taxis and public transport. Subriadi and Baturohmah (2022) examined the role of social media marketing in ride-hailing services, finding that loyalty, information quality, trust, and service quality strongly influence usage intentions. Etuk and James (2022) found that digital marketing, relational marketing, and competitive pricing strategies significantly improve passenger adoption in Nigeria.

Tirachini (2019) conducted an international review of ride-hailing impacts, finding that the service improves mobility, comfort, and accessibility but tends to increase motorised traffic while substituting public transport. Lesteven and Samadzad (2021) found that ride-hailing is primarily adopted by younger, highly educated individuals as an alternative to public transit due to flexibility, comfort, and time savings. Wang (2021) found that ride-hailing increases trip frequency and significantly shifts users from public transit, taxis, walking, and cycling.



Mao et al. (2020) examined crash risk among ride-hailing drivers, finding that passenger ratings, crash history, and long working shifts significantly influence driver crash risk — underscoring the primacy of safety in two-wheeled mobility. Nguyen-Phuoc et al. (2020) found that service quality, booking app benefits, and sales promotions significantly improve passenger satisfaction and loyalty. Chalermpong (2023) noted that in cities with weak public transport, ride-hailing becomes a primary mobility solution, though it raises unresolved concerns about driver safety and environmental impact.

Young and Farber (2019) found that ride-hailing is predominantly used by younger, higher-income individuals during evening hours. Ahmed and Hyland (2022) similarly identified younger, transit-frequent, high-income residents as more likely ride-hailing users. However, these metropolitan findings may not apply to tier-two Indian cities, where unique socioeconomic conditions shape adoption differently a gap this study addresses.

### 3. CONCEPTUAL FRAMEWORK

The conceptual framework integrates three theoretical foundations: the Technology Acceptance Model (TAM), the Theory of Planned Behaviour (TPB), and Travel Behaviour Factors, with demographic variables (age, gender, income, occupation) as moderators and user adoption of bike taxi services as the dependent variable.

#### 3.1 Technology Acceptance Model (TAM)

**Perceived Usefulness:** the degree to which a commuter believes bike taxi services improve travel efficiency and save time. Higher perceived usefulness leads to greater likelihood of adoption.

**Perceived Ease of Use:** the degree to which a commuter believes using the bike taxi app requires minimal effort. A simple, intuitive interface drives greater willingness to adopt.

#### 3.2 Theory of Planned Behaviour (TPB)

**Attitude:** a commuter's overall positive or negative evaluation of bike taxi services. Favourable attitudes toward bike taxis as practical and modern transport increase adoption.

**Subjective Norms:** social pressure perceived from friends, family, and peers. When peers actively use or recommend bike taxis, adoption intention increases.

**Perceived Behavioural Control:** a commuter's confidence in using the service. Access to a smartphone, internet, and digital payments drives higher adoption.

#### 3.3 Travel Behaviour Factors

**Travel Cost:** fare affordability compared to alternatives. **Travel Time:** journey speed relative to congested roads. **Convenience:** ease of booking and door-to-door access. **Safety Perception:** security features such as GPS tracking, helmets, and driver verification. **Availability:** geographic coverage and fleet density across Trichy city.

## 4. RESEARCH METHODOLOGY

### 4.1 Research Design

A descriptive research design was adopted to describe the characteristics, opinions, attitudes, preferences, and behaviour of bike taxi users in Trichy city. This design enables systematic analysis of commuter perceptions without manipulating variables.

### 4.2 Sampling and Data Collection

Non-probability convenience sampling was employed due to the absence of an official database of bike taxi users. A total of 304 respondents who had used Rapido, Uber Moto, or Ola Bike at least once were selected. Data were collected via a structured questionnaire distributed through Google Forms. The sample covers diverse age groups, genders, occupations, and income levels.

### 4.3 Research Instrument

The questionnaire comprised two sections: (1) demographic profile — age, gender, occupation, monthly income, frequency of use; and (2) construct measurement — 37 statements across 11 constructs measured on a 5-point Likert Scale (1 = Strongly Disagree to 5 = Strongly Agree). The overall Cronbach's Alpha was 0.926, confirming excellent internal consistency (threshold: 0.7).

Construct	Items	Source
Perceived Usefulness	4	Acheampong & Siiba (2020)
Perceived Ease of Use	4	Acheampong & Siiba (2020)
Attitude	3	Nguyen-Phuoc et al. (2020)
Subjective Norms	3	Subriadi & Baturahmah (2021)
Perceived Behavioural Control	3	Acheampong & Siiba (2020)
Travel Cost	3	Lesteven & Samadzad (2021)
Travel Time	4	Lesteven & Samadzad (2021)
Convenience	3	Nguyen-Phuoc et al. (2020)
Safety Perception	3	Mao et al. (2021)
Availability	4	Chalermpong et al. (2023)
User Adoption	3	Etuk & James (2022)

Table 1: Measurement Constructs and Sources

### 4.4 Statistical Tools

Data were analysed using SPSS software employing: (1) Simple percentage analysis for demographic profiling; (2) Cronbach's Alpha for reliability; (3) Pearson's correlation analysis for variable relationships; (4) Multiple linear regression for predictive influence; (5) Independent sample t-test for gender comparison; and (6) One-way ANOVA for multi-group demographic comparisons.

## 5. DATA ANALYSIS AND INTERPRETATION

### 5.1 Demographic Profile

Variable	Category	Frequency	Percentage (%)
Age	Below 20 Years	34	11.2
	21 – 30 Years	154	50.7
	31 – 40 Years	74	24.3
	41 – 50 Years	36	11.8
	Above 50 Years	6	2.0
Gender	Male	127	41.8
	Female	177	58.2
Monthly Income	Below ₹25,000	80	26.3
	₹25,000 – ₹50,000	115	37.8
	₹50,000 – ₹75,000	66	21.7
	Above ₹1 Lakh	43	14.1
Occupation	Student	79	26.0
	Private Employee	90	29.6
	Government Employee	58	19.1
	Self-Employed	47	15.5
	Business	22	7.2
	Others	8	2.6

Table 2: Demographic Profile of Respondents (N = 304)

The majority of respondents (50.7%) belong to the 21–30 years age group, confirming that bike taxis are predominantly used by young adults. Female respondents constitute 58.2% of the sample. The largest income group is ₹25,000–₹50,000 (37.8%), indicating that bike taxi services primarily serve middle-income commuters. Private employees (29.6%) and students (26.0%) are the most frequent users, reflecting the regular commuting needs of these occupational groups.

### 5.2 Correlation Analysis — TAM and TPB Constructs

H<sub>0</sub>: There is no significant relationship between perceived usefulness, perceived ease of use, subjective norms, and perceived behavioural control with user adoption.

Variable	Pearson r	Sig. (2-tailed)	Result
Perceived Usefulness	0.447**	0.000	H <sub>0</sub> Rejected
Perceived Ease of Use	0.388**	0.000	H <sub>0</sub> Rejected
Subjective Norms	0.238**	0.000	H <sub>0</sub> Rejected
Perceived Behavioural Control	0.373**	0.000	H <sub>0</sub> Rejected

Table 3: Correlation — TAM/TPB Constructs vs. User Adoption (\*\* p < 0.01)

All four constructs show statistically significant positive correlations with user adoption. Perceived usefulness ( $r = 0.447$ ) is the strongest predictor among TAM variables, indicating that commuters who find bike taxis useful for saving time and effort are most likely to adopt them. Perceived ease of use ( $r = 0.388$ ) confirms that an intuitive app interface drives adoption. Subjective norms ( $r = 0.238$ ) and perceived behavioural control ( $r = 0.373$ ) confirm that social influence and digital self-confidence both shape adoption behaviour. All null hypotheses are rejected ( $p = 0.000 < 0.05$ ).

### 5.3 Correlation Analysis — Travel Behaviour Factors

Variable	Pearson r	Sig. (2-tailed)	Result
Travel Cost	0.425**	< 0.001	H <sub>0</sub> Rejected
Travel Time	0.511**	< 0.001	H <sub>0</sub> Rejected
Convenience	0.473**	< 0.001	H <sub>0</sub> Rejected
Availability	0.509**	< 0.001	H <sub>0</sub> Rejected

Table 4: Correlation — Travel Behaviour Factors vs. User Adoption (\*\*  $p < 0.001$ )

Travel time ( $r = 0.511$ ) and availability ( $r = 0.509$ ) emerge as the strongest travel behaviour predictors, reflecting commuters' prioritisation of time efficiency and service reach. Convenience ( $r = 0.473$ ) confirms that door-to-door access and easy booking significantly influence adoption. Travel cost ( $r = 0.425$ ) confirms affordability as a key driver, particularly for the middle-income majority. All null hypotheses are rejected ( $p < 0.001 < 0.05$ ).

### 5.4 Regression Analysis — Safety Perception and Availability

Predictor	Beta ( $\beta$ )	t Value	Sig.	Result
Safety Perception	0.274	4.581	0.001	Significant
Availability	0.346	5.793	0.001	Significant

Table 5: Regression Coefficients ( $R = 0.555$ ,  $R^2 = 0.308$ ,  $F = 66.888$ ,  $p = 0.001$ )

Safety perception and availability together explain 30.8% of the variance in user adoption ( $R^2 = 0.308$ ). The model is statistically significant ( $F = 66.888$ ,  $p = 0.001$ ). Availability is the stronger predictor ( $\beta = 0.346$ ), indicating that geographic coverage and fleet density are the most powerful operational levers for driving continued usage. Safety perception ( $\beta = 0.274$ ) confirms that commuters who feel secure — through GPS tracking, helmets, and driver verification — are significantly more likely to adopt and recommend bike taxi services. Both null hypotheses are rejected ( $p = 0.001 < 0.05$ ).

## 5.5 Independent Sample T-Test and One-Way ANOVA

Demographic Variable	Test	Statistic	p-Value	Decision
Gender	Independent t-test	t = 1.874	0.062	H <sub>0</sub> Accepted
Age	One-Way ANOVA	F = 1.470	0.211	H <sub>0</sub> Accepted
Monthly Income	One-Way ANOVA	F = 1.732	0.160	H <sub>0</sub> Accepted
Occupation	One-Way ANOVA	F = 1.291	0.268	H <sub>0</sub> Accepted

Table 6: Demographic Analysis Results

None of the demographic variables show statistically significant differences in user adoption (all  $p > 0.05$ ). Gender, age, income, and occupation do not significantly differentiate adoption behaviour, confirming that bike taxi services in Trichy are universally adopted across all demographic segments. This finding contrasts with metropolitan-focused literature and suggests that the service's affordability and accessibility transcend demographic boundaries in the tier-two city context.

## 6. FINDINGS, SUGGESTIONS AND CONCLUSION

### 6.1 Key Findings

#### Demographic Profile

- The majority of respondents (50.7%) are aged 21–30 years, indicating predominant use by young adults.
- Female commuters constitute 58.2% of users, showing relatively higher inclination toward bike taxi services.
- Middle-income earners (₹25,000–₹50,000, 37.8%) are the largest user group, reflecting the service's affordability appeal.
- Private employees (29.6%) and students (26.0%) are the most frequent users due to regular commuting needs.

#### Objective 1 — TAM and TPB Constructs

- Perceived usefulness ( $r = 0.447$ ) is the strongest TAM predictor — commuters who find bike taxis useful for saving time adopt them more readily.
- Perceived ease of use ( $r = 0.388$ ) confirms that a user-friendly app interface drives adoption.
- Subjective norms ( $r = 0.238$ ) and perceived behavioural control ( $r = 0.373$ ) confirm social influence and digital confidence as significant adoption drivers.

#### Objective 2 — Travel Behaviour Factors

- Travel time ( $r = 0.511$ ) is the strongest travel behaviour predictor — time-saving capability is the primary practical motivator.
- Availability ( $r = 0.509$ ) and convenience ( $r = 0.473$ ) are closely behind, underscoring the importance of service reach and booking ease.

- Travel cost ( $r = 0.425$ ) confirms affordability as a key driver for price-sensitive middle-income commuters.

### ***Objective 3 — Safety Perception and Availability***

- Availability is the stronger predictor of continued usage ( $\beta = 0.346$ ), suggesting that geographic coverage matters more than any other single factor.
- Safety perception ( $\beta = 0.274$ ) significantly influences continued usage — commuters who feel secure are more likely to recommend the service.
- Together, these two variables explain 30.8% of variance in user adoption ( $R^2 = 0.308$ ).

### ***Objective 4 — Demographic Factors***

- No significant differences in user adoption are found across gender ( $p = 0.062$ ), age ( $p = 0.211$ ), income ( $p = 0.160$ ), or occupation ( $p = 0.268$ ).
- Bike taxi services are universally adopted across all demographic segments, confirming their inclusive and affordable nature.

## **6.2 Suggestions**

### ***To Bike Taxi Service Providers***

- Strengthen safety features — real-time GPS tracking, SOS buttons, mandatory helmets, and driver verification — and communicate them prominently to build user confidence.
- Expand service availability across all areas of Trichy city, including residential zones and outskirts, to ensure accessibility at all times.
- Simplify the app interface with Tamil language support and minimal steps to improve ease of use for first-time and less digitally literate users.
- Maintain competitive and transparent pricing, minimising surge pricing during peak hours to retain middle-income users.
- Conduct regular rider training, performance evaluation, and safety briefings to maintain service quality.

### ***To Government and Policymakers***

- Establish a clear regulatory framework covering licensing, safety standards, insurance requirements, and fare regulations for bike taxi services in Tamil Nadu.
- Formally integrate bike taxi services into urban transport planning as a last-mile connectivity solution to reduce congestion in tier-two cities.
- Introduce passenger-specific insurance policies to provide financial protection and encourage wider adoption.
- Promote digital literacy programmes to enable broader participation in app-based transportation services among all demographic groups.



### **To Users**

- Familiarise with safety features — live tracking and emergency contact options — available on bike taxi platforms.
- Provide honest ratings and feedback after every ride to help maintain service quality and improve the overall experience.
- Always wear helmets provided by the rider and explore available offers and loyalty programmes for more affordable commuting.

### **6.3 Limitations**

The study is limited to commuters in Trichy city and may not be generalisable to other regions. Convenience sampling may have introduced selection bias toward younger, more digitally literate respondents. Factors such as road conditions, weather, and local transport policies were not examined. The study addresses only the user perspective and excludes driver and operator viewpoints.

### **6.4 Conclusion**

This study examined the factors influencing user adoption of bike taxi services among 304 commuters in Tiruchirappalli city, integrating the Technology Acceptance Model, Theory of Planned Behaviour, and travel behaviour factors into a unified conceptual framework. The findings confirm that perceived usefulness, perceived ease of use, subjective norms, perceived behavioural control, travel cost, travel time, convenience, safety perception, and availability all significantly and positively influence user adoption. Demographic factors — age, gender, monthly income, and occupation — do not significantly differentiate adoption behaviour, establishing the demographic universality and inclusive nature of bike taxi services in Trichy city.

Availability and safety perception emerge as the most critical strategic priorities: operators must ensure broad geographic coverage while continuously strengthening safety infrastructure. The study supports SDG 11 — Sustainable Cities and Communities — by demonstrating that bike taxi services effectively promote affordable, accessible, and efficient transportation for all segments of the urban population in tier-two Indian cities, providing a strong foundation for sustainable urban mobility policy and practice.

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