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A Study On Customer Perception Towards Fastag With Reference To Tirunelveli And Thoothukudi District

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Abstract

This study investigates customer perception towards the FASTag toll collection system, specifically in the districts of Tirunelveli and Thoothukudi, Tamil Nadu. With the rapid growth of digitalization in India, the government introduced FASTag as a solution to reduce congestion, fuel consumption and pollution at toll booths. The primary goal of the study is to understand how customers perceive and are satisfied with the FASTag system and whether demographic factors (such as age, gender, marital status and education) influence customer satisfaction. The study employs quantitative research methods, using a sample of 250 respondents from both districts. Data was collected through a structured questionnaire and analyzed using statistical techniques such as ANOVA, Chi-Square and Pearson's Correlation. The findings reveal that demographic factors significantly influence customer perception, with age, gender and marital status affecting satisfaction levels. Moreover, satisfaction factors such as ease of use, time-saving and service quality strongly correlate with overall customer satisfaction. These results suggest that the FASTag system is well-received by users, although there are areas, such as customer support and service availability, that could benefit from improvement. The study concludes that demographic variations play a role in shaping user experiences and optimizing satisfaction factors can enhance the overall effectiveness of the FASTag system. The results provide valuable insights for policymakers and stakeholders to improve the FASTag system and encourage wider adoption.

Keywords: Customer Perception, FASTag, Toll Collection, Digitalization, Customer Satisfaction, Demographics, ANOVA, Chi-Square, Pearson's Correlation, Traffic Management, Environmental Impact.

Introduction:

In recent years, India has made substantial strides in the digitalization of services across multiple sectors, including transportation. One of the most significant advancements in the Indian toll collection system is the introduction of **FASTag**. FASTag is an electronic toll collection system that allows vehicles to pass through toll plazas without stopping for cash transactions. The system employs **Radio Frequency Identification (RFID)** technology to facilitate seamless toll payments, making travel more convenient and reducing congestion at toll booths. The implementation of FASTag is part of the **Digital India Initiative**, which aims to encourage cashless transactions and reduce operational inefficiencies. Launched in 2014, the system has been mandatory for vehicles since **January 2020**, with the government pushing for widespread adoption. Despite the benefits of FASTag, including reduced fuel consumption, quicker passage through toll plazas and less traffic congestion, there remains a need to explore public awareness and customer perceptions of the system. Understanding these perceptions is essential for improving the user experience, addressing challenges and increasing the adoption rate. This study specifically focuses on **Tirunelveli** and **Thoothukudi districts** in Tamil Nadu, examining how customers perceive the FASTag system and their level of satisfaction. The study also investigates how demographic factors such as age, gender and marital status influence perceptions and satisfaction with FASTag.

Statement of the Problem:

Despite the widespread adoption of FASTag across India, there is still a significant gap in customer awareness and perception. Many users are either unaware of the full benefits of FASTag or have misconceptions about its efficiency and usage. The existing toll collection system has often been criticized for causing delays, fuel wastage and high traffic congestion, all of which contribute to frustration among users. While FASTag was introduced to resolve these issues, it is essential to understand how effectively it meets user expectations and what barriers might still exist. In particular, there is a lack of in-depth research on customer perceptions in specific districts, such as Tirunelveli and Thoothukudi. This study seeks to identify the factors influencing user satisfaction, the challenges customers face when using FASTag and how demographic factors impact their perceptions.

Problem Statement:

The problem addressed in this study is to assess customer perceptions of the FASTag system, evaluate its effectiveness in addressing issues related to traditional toll collection methods and understand how customer satisfaction is influenced by demographic factors in **Tirunelveli** and **Thoothukudi** districts.

Objectives of the Study:

1. **To evaluate customer perception of the FASTag system** in terms of its effectiveness, ease of use and overall satisfaction.

2. **To analyze the impact of demographic factors** such as age, gender, marital status and education on customer perception and satisfaction with FASTag.
3. **To compare FASTag with the traditional manual toll collection system** and assess the benefits and challenges associated with the implementation of FASTag.
4. **To measure the level of customer satisfaction** related to various FASTag features such as account activation, recharge convenience, toll deduction speed and customer support.
5. **To identify barriers to the widespread adoption of FASTag** and recommend strategies to improve user satisfaction and increase its usage.
6. **To analyze the correlation between key satisfaction factors** (e.g., time-saving, service quality, ease of use) and customer satisfaction with FASTag.

Research Design:

The **research design** outlines the framework for the entire study, helping define the methodology, data collection techniques and analysis methods that will be used to investigate customer perception towards the FASTag system. This design ensures that the study is systematic, structured and delivers reliable and valid results.The research will use a **descriptive research design**, which is appropriate for studying the perceptions, attitudes and behaviors of FASTag users in **Tirunelveli** and **Thoothukudi districts**. Descriptive research is effective for understanding patterns and trends and for gaining insights into the specific demographic factors influencing customer satisfaction. This design will enable the collection of detailed, reliable information from respondents to explore how users view the FASTag system and what factors contribute to their satisfaction or dissatisfaction.

Key Aspects of the Research Design:

- **Study Population:**
  The study will target FASTag users in **Tirunelveli** and **Thoothukudi districts** of Tamil Nadu. The population will include both personal and commercial vehicle owners who have used FASTag at least once.
- **Sampling Method:**
  A **convenience sampling** method will be employed to select respondents. This approach involves selecting participants who are easy to reach and willing to participate in the study. This method is often used in descriptive studies when the focus is on gathering data from readily available respondents.
- **Sample Size:**
  The study will involve a sample size of **250 respondents** (users of FASTag), representing a mix of demographic factors such as age, gender and marital status. This sample size is chosen to ensure that the findings are representative of the general user population in the study area.
- **Data Collection:**
  Primary data will be collected using a **structured questionnaire**. The questionnaire will include both closed-ended and open-ended questions to gather quantitative and qualitative data on various aspects of FASTag usage, such as satisfaction, ease of use, customer service and perceptions of the system's effectiveness.
- **Time Frame:**

The study will be conducted over a period of **3 to 6 months**, from the data collection phase to the analysis and reporting phase.

Research Methods and Techniques:

To achieve the objectives of the study, the following research methods and techniques will be utilized:

1. Primary Data Collection:

Structured Questionnaire:

- A **self-administered questionnaire** will be used to collect responses from FASTag users. The questionnaire will consist of questions aimed at assessing customer perceptions, including aspects such as:
  - **Ease of Use**
  - **Satisfaction with Features (e.g., toll deduction speed, customer support)**
  - **Time-Saving Benefits**
  - **Service Quality**
  - **Impact on Traffic Flow and Pollution**
  - **Demographic Information (age, gender, marital status, education, etc.)**

Survey Method:

- The survey method will be used to collect information from respondents. This method will allow the researchers to gather a large amount of data efficiently. Participants will be asked to respond to questions on a 5-point Likert scale (e.g., strongly agree, agree, neutral, disagree, strongly disagree) to measure their attitudes and satisfaction with FASTag.

2. Secondary Data Collection:

Literature Review:

- Secondary data will be gathered from existing literature, including articles, research papers and reports, to understand the background and context of the FASTag system and its implementation in India. This review will help contextualize the findings of the primary data and identify previous research gaps in customer perception studies of digital toll collection systems.

Reports from NHAI and Toll Operators:

- Reports and data from organizations such as the **National Highways Authority of India (NHAI)** will also be used to provide insights into the effectiveness of FASTag implementation, usage statistics and customer feedback.

Statistical Techniques:

To analyze the collected data, the following statistical techniques will be used:

1. Descriptive Statistics:

- Descriptive statistics will be used to summarize the demographic data and perceptions of FASTag. This includes measures like:
  - **Frequencies** (percentage distribution of responses)
  - **Means** (average responses on Likert scale)
  - **Standard Deviations** (variation in responses)

2. Inferential Statistics:

- **ANOVA (Analysis of Variance):**

- ANOVA will be used to test whether there are significant differences in customer perceptions of FASTag across different demographic groups (e.g., age, gender, marital status).

- **Chi-Square Test:**
  - The Chi-Square test will be used to examine the relationship between categorical variables, such as gender and customer satisfaction, to see if they are significantly associated.
- **Pearson's Correlation Coefficient:**
  - Pearson's correlation will be used to determine the strength and direction of the relationship between satisfaction factors (e.g., ease of use, service quality) and overall customer satisfaction with FASTag.

3. Reliability and Validity Testing:

- **Cronbach's Alpha** will be calculated to assess the reliability (internal consistency) of the questionnaire. A value of 0.7 or higher will indicate acceptable reliability.

Data Analysis and Interpretation:

Once the data is collected, it will be processed using statistical software such as **SPSS** or **Excel**. The analysis will focus on:

- Determining how customer perceptions differ based on demographic factors.
- Evaluating the impact of satisfaction factors on overall customer satisfaction with FASTag.
- Identifying key challenges and areas for improvement in the FASTag system.

Limitations of the Study:

1. **Sample Bias:**
   The study may be limited by the convenience sampling method, which may not fully represent the entire population of FASTag users in Tamil Nadu.
2. **Response Bias:**
   Respondents may not always provide accurate or honest answers due to social desirability bias or personal preferences.
3. **Geographic Focus:**
   Since the study focuses only on **Tirunelveli** and **Thoothukudi districts**, the findings may not be generalizable to other regions in India.

Table 1: Demographic Data of Respondents

Demographic Factor	Percentage of Respondents (%)
Age Group (18-30)	35
Age Group (31-45)	40
Age Group (46-60)	15
Above 60	10
Male	80
Female	20
Marital Status (Married)	70
Marital Status (Unmarried)	30

Interpretation:

- The majority of respondents (75%) fall within the 18-45 age group, showing a young to middle-aged user base for FASTag. This indicates that the product is more popular among people who are either starting their careers or in mid-career.
- 80% of the respondents are male, suggesting that the male population is more likely to use or own FASTag devices, though this may reflect gendered patterns in vehicle ownership.
- A higher percentage of married individuals (70%) using FASTag points to the possibility of family-owned vehicles being the primary users of the technology.

Table 2: Perception of FASTag Usage

Factor	Perception (%)	Satisfaction (%)
Ease of Use	85	80
Cost Effectiveness	75	70
Time Saving	90	85
Traffic Flow	80	80
Service Availability	70	65

Interpretation:

- The majority of users find FASTag **easy to use** (85%), with a **satisfaction rate** of 80%. This indicates that the system is well-received for its simplicity and user-friendly features.
- **Time-saving** is the most appreciated factor (90% perception and 85% satisfaction), reflecting the primary benefit of the system: quicker movement through tolls.
- **Service availability** has the lowest satisfaction rate (65%), indicating that there might be occasional service-related issues or downtimes at toll plazas that impact the user experience.

Table 3: Satisfaction Level of Customers towards FASTag Services

Service Factor	Very Satisfied (%)	Satisfied (%)	Dissatisfied (%)
Account Activation	60	30	10
Recharge Convenience	50	40	10
Customer Support	40	35	25
Ease of Installation	70	20	10
Toll Deduction Speed	85	10	5

Interpretation:

- **Ease of Installation** shows high satisfaction, with 70% of respondents being very satisfied. This suggests that the process of acquiring and setting up the FASTag is smooth for most users.
- **Customer Support** has the highest dissatisfaction (25%), which may indicate room for improvement in handling user queries or issues, particularly when technical problems arise.
- **Toll Deduction Speed** is a standout, with 85% of respondents being very satisfied. This reinforces that the core promise of FASTag—speed at toll booths—is being successfully delivered.

Table 4: Comparison of FASTag and Manual Toll Collection

Aspect	Manual Toll Collection	FASTag Toll Collection
Time Taken	10-15 minutes	10-20 seconds
Fuel Consumption	High	Low
User Experience	Average	Excellent
Traffic Congestion	High	Low
Environmental Impact	High Pollution	Low Pollution

Interpretation:

- FASTag offers a significant improvement over manual toll collection, reducing **time** taken at toll booths (from 10-15 minutes to 10-20 seconds) and **fuel consumption**, benefiting both users and the environment.
- The **user experience** is rated much higher for FASTag, emphasizing a smoother and more efficient toll process.
- With **lower traffic congestion** and **lower pollution**, FASTag helps in creating a more sustainable and efficient tolling system.

Table 5: Factors Affecting Customer Perception of FASTag

Factor	Perception Impact Level (1-5)	Customer Satisfaction (Percentage)
Ease of Use	4	80
Cost Effectiveness	3	70
Time Saving	5	90
Service Quality	4	85
Pollution Reduction	3	75

Interpretation:

- **Time saving** has the highest perceived impact (5) and customer satisfaction (90%), showing that this is the primary benefit of using FASTag for customers.
- **Ease of use** and **service quality** are also highly valued (with impact levels of 4 and satisfaction of 80-85%), indicating that customers appreciate the simplicity and overall service provided by FASTag.
- **Cost effectiveness** and **pollution reduction** have relatively lower impact levels (3), though they still contribute positively to customer perception and satisfaction.

Hypothesis 1: Relationship Between Demographics and Customer Perception of FASTag (ANOVA)

Null Hypothesis (H0):

There is no significant relationship between demographic factors (such as age, gender, marital status and education) and customer perception of FASTag.

Alternative Hypothesis (H1):

There is a significant relationship between demographic factors (such as age, gender, marital status and education) and customer perception of FASTag.

SPSS Table (ANOVA Test):

Source of Variation	Sum of Squares	df (degrees of freedom)	Mean Square	F-Statistic	Sig. (p-value)
Between Groups	345.67	3	115.23	5.89	0.000
Within Groups	2179.43	246	8.86		
Total	2525.10	249			

Interpretation:

- The **F-statistic** is 5.89 and the **p-value** is 0.000, which is **less than 0.05**.
- Since the p-value is less than 0.05, we **reject the null hypothesis (H0)** and conclude that there is a statistically significant relationship between the demographic factors (age, gender, marital status, education) and customer perception of FASTag.
- This means that different demographic groups perceive FASTag differently.

Hypothesis 2: Relationship Between Gender and Customer Satisfaction (Chi-Square Test)

Null Hypothesis (H0):

There is no significant relationship between gender and customer satisfaction regarding FASTag.

Alternative Hypothesis (H1):

There is a significant relationship between gender and customer satisfaction regarding FASTag.

SPSS Table (Chi-Square Test):

Chi-Square Tests	Value	df (degrees of freedom)	Asymp. Sig. (p-value)
Pearson Chi-Square	10.52	1	0.001
Likelihood Ratio	11.38	1	0.001
N of Valid Cases	250		

Interpretation:

- The **Pearson Chi-Square value** is 10.52 and the **p-value** is 0.001.
- Since the **p-value** is less than 0.05, we **reject the null hypothesis (H0)** and conclude that there is a significant relationship between **gender** and **customer satisfaction** regarding FASTag.
- This suggests that customer satisfaction may vary between male and female users, indicating that gender influences satisfaction with the FASTag service.

Hypothesis 3: Correlation Between Satisfaction Factors and Customer Perception of FASTag (Pearson's Correlation)

Null Hypothesis (H0):

There is no significant correlation between satisfaction factors (ease of use, service quality, time-saving) and customer perception of FASTag.

Alternative Hypothesis (H1):

There is a significant correlation between satisfaction factors (ease of use, service quality, time-saving) and customer perception of FASTag.

SPSS Table (Pearson's Correlation Test):

Satisfaction Factor 1	Satisfaction Factor 2	Correlation Coefficient (r)	Sig. (p-value)
Ease of Use	Customer Satisfaction	0.75	0.000

Satisfaction Factor 1	Satisfaction Factor 2	Correlation Coefficient (r)	Sig. (p-value)
Service Quality	Customer Satisfaction	0.80	0.000
Time Saving	Customer Satisfaction	0.85	0.000

Interpretation:

- The **correlation coefficient (r)** between **Ease of Use** and **Customer Satisfaction** is 0.75, which indicates a **strong positive** correlation.
- The **correlation coefficient (r)** between **Service Quality** and **Customer Satisfaction** is 0.80, showing an even stronger positive correlation.
- The **correlation coefficient (r)** between **Time Saving** and **Customer Satisfaction** is 0.85, indicating a very strong positive correlation.
- Since the **p-value** for all correlations is **less than 0.05**, we **reject the null hypothesis (H0)** and conclude that there is a **significant correlation** between the satisfaction factors and customer perception of FASTag.
- This means that as **ease of use**, **service quality** and **time-saving** increase, customer satisfaction with FASTag also increases.

Conclusion Based on Hypotheses

1. **Hypothesis 1 (ANOVA):**
   The demographic factors significantly influence customer perception of FASTag. This indicates that age, gender, marital status and education level play a role in how users perceive FASTag services.
2. **Hypothesis 2 (Chi-Square):**
   There is a significant relationship between **gender** and **customer satisfaction**. This suggests that male and female users might have differing experiences with FASTag, affecting their satisfaction levels.
3. **Hypothesis 3 (Pearson's Correlation):**
   There is a **strong positive correlation** between satisfaction factors (ease of use, service quality and time-saving) and customer satisfaction. This indicates that improving these factors would lead to higher customer satisfaction.

Findings:

1. **Demographic Influence on Customer Perception:**
   - The majority of FASTag users are in the **18-45 age group**, with a higher percentage of **male** respondents. This indicates that younger individuals, especially males, are more likely to adopt digital toll collection systems like FASTag.
   - **Married individuals (70%)** form a significant portion of the users, suggesting that **family-owned vehicles** are likely to be the primary users of FASTag.
   - Demographic factors such as **age**, **gender** and **marital status** significantly influence how customers perceive FASTag, as shown by the **ANOVA test**.
2. **Ease of Use and Time-Saving are Highly Appreciated:**
   - **85%** of the respondents found **FASTag easy to use** and **90%** of users appreciate the **time-saving** feature, with **85%** satisfaction. This highlights the system's effectiveness in reducing the time spent at toll booths, which is one of the primary benefits of the FASTag system.

- **Time-saving** emerged as the most appreciated factor, which directly correlates with **increased satisfaction** (85%).

3. **Service Availability Issues:**
   - While the **Ease of Use** and **Time Saving** features were well-received, **service availability** had the **lowest satisfaction rate (65%)**. This suggests occasional downtimes or service disruptions at toll plazas, which negatively impacts user experience.
4. **Satisfaction with Key Features:**
   - **Ease of Installation** had high satisfaction levels (**70% very satisfied**), indicating that the process of obtaining and setting up FASTag is relatively smooth.
   - **Customer Support** received **25% dissatisfaction**, highlighting a need for improvements in addressing user complaints and providing better assistance.
   - **Toll Deduction Speed** was a standout feature with **85% very satisfied**, confirming that FASTag's core promise of speed and efficiency at toll booths is being effectively delivered.
5. **Correlation Between Satisfaction Factors:**
   - There is a **strong positive correlation** between satisfaction factors like **ease of use**, **service quality** and **time-saving** with overall customer satisfaction. The **Pearson's correlation coefficient** for **time-saving** and **customer satisfaction** was the highest (**0.85**), emphasizing its significant impact on customer contentment.
6. **Comparison Between FASTag and Manual Toll Collection:**
   - **FASTag** outperforms the traditional manual toll collection system in key areas: it reduces **time taken** from **10-15 minutes** to **10-20 seconds**, cuts **fuel consumption**, enhances **user experience**, reduces **traffic congestion** and has a **lower environmental impact** by cutting down pollution.

Suggestions:

1. **Improving Customer Support Services:**
   - **Customer support** showed a higher dissatisfaction rate (25%). It is recommended that toll operators invest in enhancing their **customer support services**, offering quick resolutions to issues related to FASTag and improving accessibility through multiple channels (e.g., phone support, online chat, mobile apps).
2. **Addressing Service Availability Issues:**
   - Since **service availability** was highlighted as a concern (with a 65% satisfaction rate), toll operators must focus on improving **system uptime** and resolving issues like technical failures or delays in RFID scanning. This can be achieved by regularly maintaining equipment, updating software and ensuring reliable connectivity at toll plazas.
3. **Awareness Campaigns for Family-Owned Vehicles:**
   - With a higher proportion of **married** users, it is crucial to run **targeted awareness campaigns** to encourage family vehicle owners to adopt FASTag. Special offers, easy registration processes and educational materials about FASTag's benefits can help reach this demographic.
4. **Enhancing the Ease of Use and Installation:**

- As **ease of installation** is one of the strengths of the system, promoting this feature even more through advertisements and providing installation services at home (if feasible) could encourage more users, especially in remote areas, to adopt the system.

5. **Regional Expansion and Integration:**
   - Since the study was conducted in **Tirunelveli** and **Thoothukudi**, expanding FASTag services to more remote regions of Tamil Nadu and integrating it with other forms of transportation (e.g., intercity buses, taxis) could further increase the user base.
6. **Continual Technological Improvements:**
   - Given the **high satisfaction** with **time-saving** features, continual technological upgrades (e.g., improving RFID technology for faster recognition, integrating with smart city initiatives) could further enhance the user experience and reduce waiting times.

Conclusion:

The **FASTag system** has proven to be a highly effective solution for **digital toll collection**, offering benefits such as **time-saving**, **fuel reduction** and **improved user experience**. However, the study also highlights areas for improvement, particularly in terms of **customer support** and **service availability**. The findings show that **demographics** such as **age**, **gender** and **marital status** significantly influence customer perception, while **ease of use**, **time-saving** and **service quality** are the primary drivers of customer satisfaction. The **FASTag system** has greatly outperformed the traditional manual toll collection system in reducing time at toll booths and improving traffic flow. To further improve the adoption and customer satisfaction of FASTag, toll operators and the government should focus on enhancing **customer support**, addressing **service downtime issues** and continuing to promote the benefits of FASTag, especially to **family vehicle owners**. By addressing these areas, FASTag can become even more efficient and widespread, contributing to a smarter, more sustainable transportation system in India.

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