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Analysing the FASTag System in Haryana: Users Perception and Support Services

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Abstract: The FASTag system, executed in Haryana state as part of the National Electronic Toll Collection (NETC) initiative, used Radio Frequency Identification (RFID) technology to offer seamless toll payments. The study analyzed user perceptions and implementation of support services affiliated with FASTag in Haryana state. The findings indicate a generally positive attitude exited among users towards FASTag, focused its positive points such as time savings, avoidance of long queues or line at toll and also facilitates of cashless transactions. A high correlation (r = 0.73) found between customer support satisfaction and grievance resolution indicates that a well running customer support mechanism in a straight line improves grievance resolution perception. The strong positive correlation here indicates that when the system is perceived as efficient, it is also perceived as reliable. These high correlation values suggest that the three aspects: reliability, usability and efficiency of the FASTag system are closely connected in the user's perception. There is a significant difference in user's perception in case of accessibility vs. issue resolution. It indicated that even if support is accessible, issue resolution may not be satisfactory.

(Keywords: users Perception, FASTag Users, Support Services, Customer Satisfaction, FASTag System)

Introduction: The FASTag system in Haryana has developed significantly since its inception, line up with the wide range of national inventiveness for e-toll accumulation in India. Commencing from 2014-2016, FASTag was initially introduced as trial run in 2014. By April 2016, it was deployed to 247 toll plazas across national highways, initiating its incorporation. The government make public that FASTag would become mandatory for all vehicles on national highways from Dec.1, 2019. However, this deadline was extended to December 15, 2019, to provide some extra time to their vehicles to fit it with FASTag. It became compulsory requirement by Feb. 15, 2021 for all vehicles across India, including Haryana, with non-compliant vehicles facing double toll charges. In Haryana, state several toll plazas were fit to the required infrastructure to keep up FASTag transactions. By 2020, NHAI turned up appx. 60% of commercial vehicles at certain toll plazas were using FASTag technology. Still user adoption and Challenges include despite the advantages of reduced queue time and promoting cashless transactions, at present too, user adoption facing problems due to a lack of awareness and resistance to change behavior of some motorists. The NHAI focused on public education on the benefits of FASTag and also motivated state governments to ensure affinity at state toll plazas. Recent developments as of January 2024, new directions were instigated with the need to updates for former FASTag accounts to boost security and compliance. This involve compulsory connecting of FASTag accounts to vehicle registration and KYC updates also required.

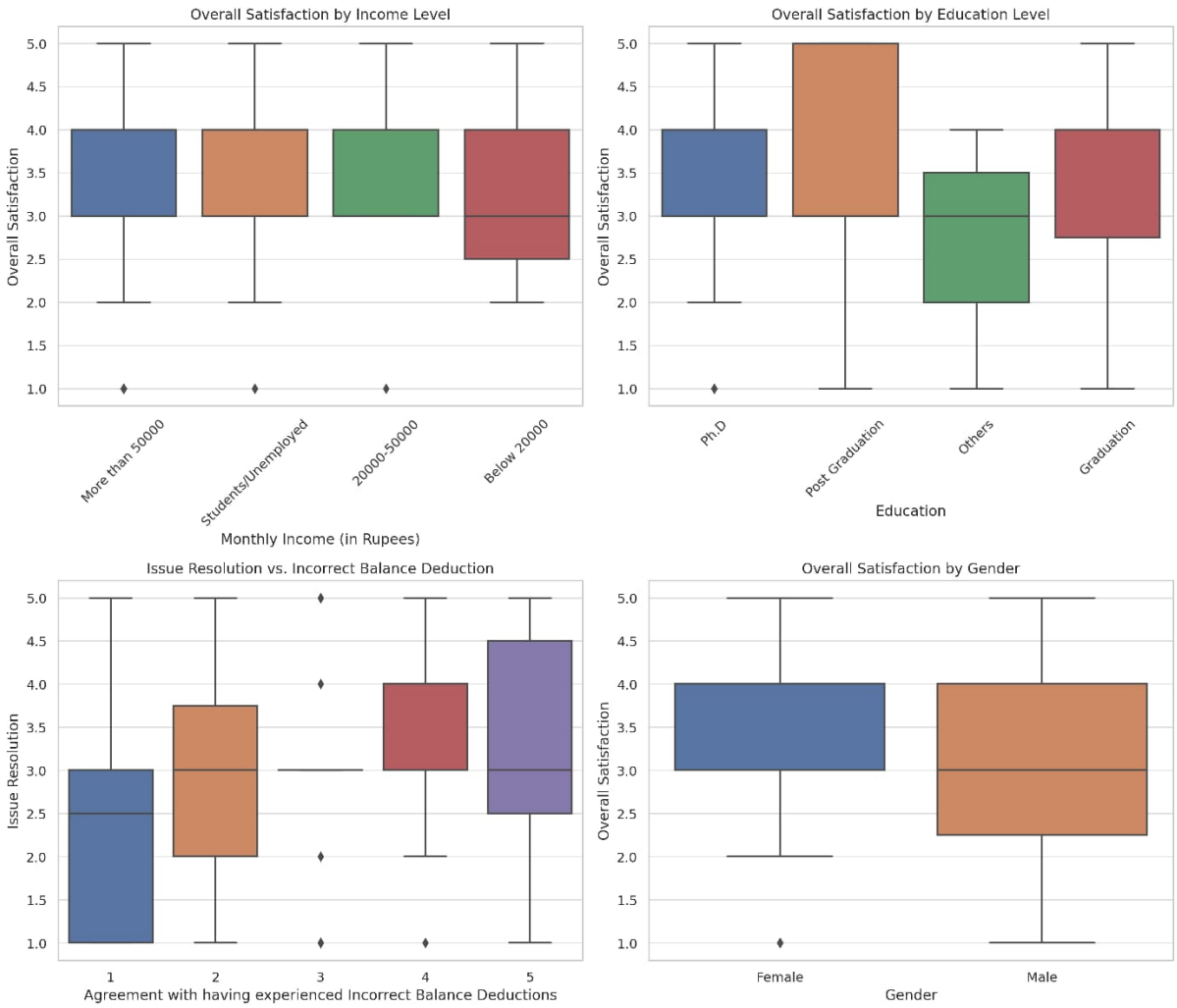
Review of Literature: Customer perception of FASTag is largely positive, emphasizing ease of payment, time savings, and convenience. However, issues like technical glitches and customer service dissatisfaction persist, affecting overall user experience and satisfaction levels. *Akshaya N, .R.Guna Sundari (2021).* The literature review in the paper emphasizes the rapid innovations occurring in the payments sector, particularly focusing on digital payment systems like the Unified Payment Interface (UPI) in India. It explores critical concepts such as financial inclusion, the rise of fintech, and electronic payment adoption. *Baj, M., Rane, Y., & Shinde, I. (2023).* The application of Robotic Process Automation (RPA) across various sectors, emphasizing its role in promoting operational efficiency and customer satisfaction. The studies indicated that RPA beneficially reduces manual efforts in tasks traditionally performed by humans, leading to increased productivity and improved accuracy, particularly in the context of toll collection systems. *Ahuja, S., & Tailor, R. K. (2021).* The integral role of Artificial Intelligence (AI) in transforming customer experiences across various industries. It discusses the emergence of AI technologies, such as big data analytics, recommendation systems, and conversational agents, as pivotal tools for achieving personalization and enhancing customer engagement. Despite their potential, the literature acknowledges significant challenges, including the complexity of system redesign, the personalization-privacy paradox, and issues pertaining to customer churn. Researchers emphasize the need for frameworks that address these challenges, proposing strategies like journey mapping analytics and solution matrices to balance customer personalization with privacy concerns. *Chaturvedi, R., & Verma, S. (2022).* The cashless transaction mode and their impact on the economy. It emphasizes that the transition to digital payment systems is influenced by many factors, such as technological advancements, user adoption rates, and challenges related to infrastructure and digital literacy. *Praiseye, T., & John, F. (2019)* The literature review on FASTag highlights its role in enhancing toll collection efficiency and minimizing congestion at toll plazas by leveraging RFID technology. Studies, such as those by Pontarelli et al. (2014) and M. Likhitha et al. (2017), emphasize the socio-economic and environmental benefits of FASTag, including reduced waiting times and decreased pollution. Various researchers, including Joshi (2017) and Dr. S. Sukumar (2020), have examined the implementation and operational aspects of FASTag, noting its capacity to automate toll payments and improve user experience. The transition from manual to electronic toll collection systems has also been analysed, showing a positive reception among urban drivers, though challenges persist in rural adoption. This body of work collectively underscores the potential of FASTag to transform toll operations and enhance user satisfaction while calling attention to the need for addressing existing barriers to its widespread use. *Samarthi, P., Goud, G. K., & Rithwik, P. (2025).*

Objective of Study:

i) To Assess the users perception with usability, efficiency and reliability of FASTag system
ii) To analyses the effectiveness of FASTag user's support and grievance resolution mechanism.

Research Methodology: A convenience sampling method was used to depict representation across different group of respondents. The sample unit consisted of FASTag users from various location within Haryana, aiming for a minimum sample size of 80 respondents. A structured questionnaire prepared by incorporating likert scale to gauge user perception, satisfaction, and to know various issues faced with the FASTag system. Statistical test: Pearson correlation and Wilcoxon signed-rank test applied to collected data.

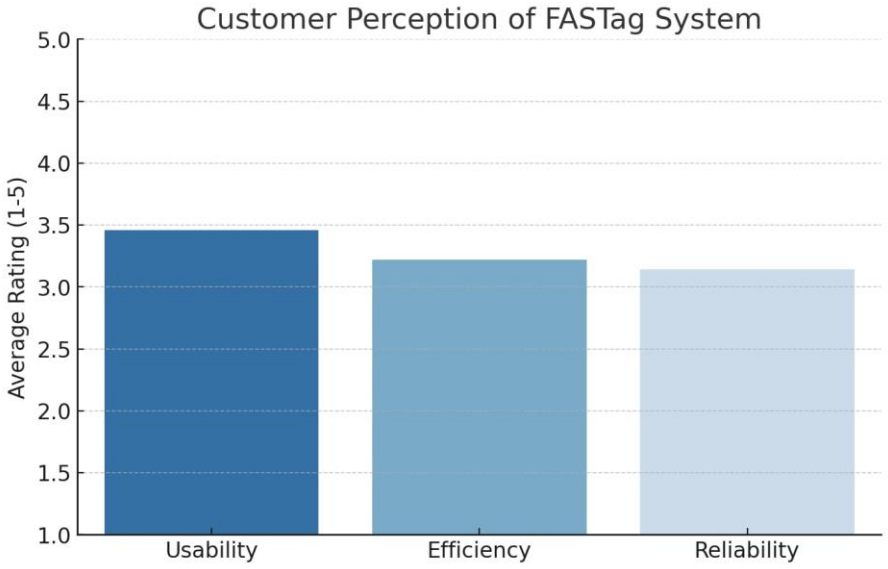
Data Analysis: The below graphical representation focus on income, education, incorrect balance deductions, and gender influence the overall customer satisfaction and grievance resolution with FASTag system.



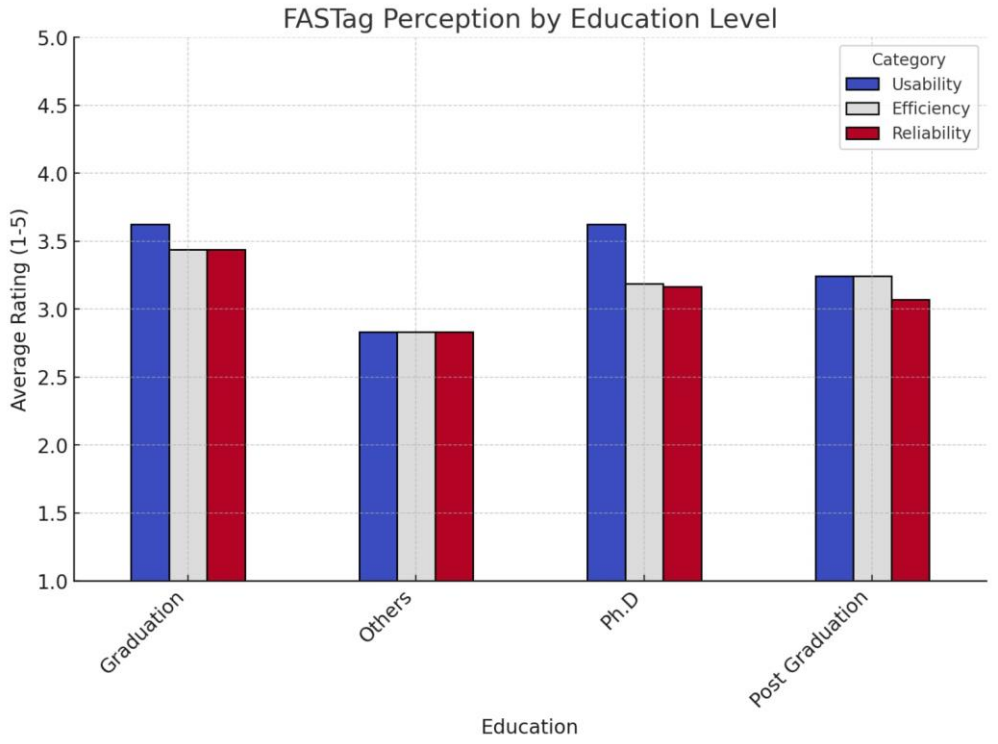
(Graph): Observations in case of overall satisfaction of users:

- It is found that the user of higher-income groups depicted higher overall satisfaction levels whereas lower-income group users reported dissatisfaction. On the other hand, median satisfaction score is relatively high across all income groups. The user with higher incomes may find the FASTag system convenient as well as cost-effective, as they use toll roads more frequently. The responses of lower-income respondents were more sensitive towards service issues.
- In case of overall satisfaction on the basis of education qualification, it is found that users with higher education including Ph.D., and Postgraduate generally showed higher satisfaction. The satisfaction levels are more diversified among users with lower education levels. Higher-educated users may better acknowledge the system and its advantages, results to more positive responses. Users with lower education levels might face with technical issues of FASTag Issue resolution vs. incorrect balance deduction, Observation: Customers who reported frequent incorrect balance deductions gave lower ratings for issue resolution. Those who rarely experienced incorrect deductions tend to rate issue resolution positively. It was interpreted that the grievance resolution mechanism is very important in building customer satisfaction. If users frequently face incorrect deductions and do not receive timely resolutions, they tend to lose trust in the system. A more effective resolution mechanism could improve user perception and retention.
- It was observed that satisfaction levels are a little higher among female respondents than male users. Male respondents reported dissatisfaction. Hence it is interpreted on the basis of data that female had more interactions in context to toll operations, it result to more positive perception. On the other hand male respondents were more frequently experienced problems of incorrect balance deductions that also affected their level of satisfaction.

- It was observed that lower income and less educated users have a need of well customer support and awareness. Grievance resolution is crucial for solving the problem of frequent incorrect deductions.



The above bar chart showing the average customer perception of the FASTag system based on three aspects 1) usability, 2) efficiency, and 3) reliability. Each one is rated on a scale from 1 (strongly disagree) to 5 (strongly agree). The average rating of usability aspects depicted higher than efficiency and reliability.



The above chart showing the relationship between educational qualification of users and their perception of FASTag in terms of the three major category included: usability, efficiency, and reliability. Each one is rated on a scale from 1 (strongly disagree) to 5 (strongly agree) and the data reported that user perception of the FASTag services found differently on the basis of their educational background.

Here's a possible logic behind these trends:

1. Usability aspect: respondents with higher education may find the FASTag easy to buy, equip, register, and track transactions because of digital literacy and already have a better experience of online payment mechanism. Those with lower education qualifications might struggle with understanding the process, leading to lower usability ratings.

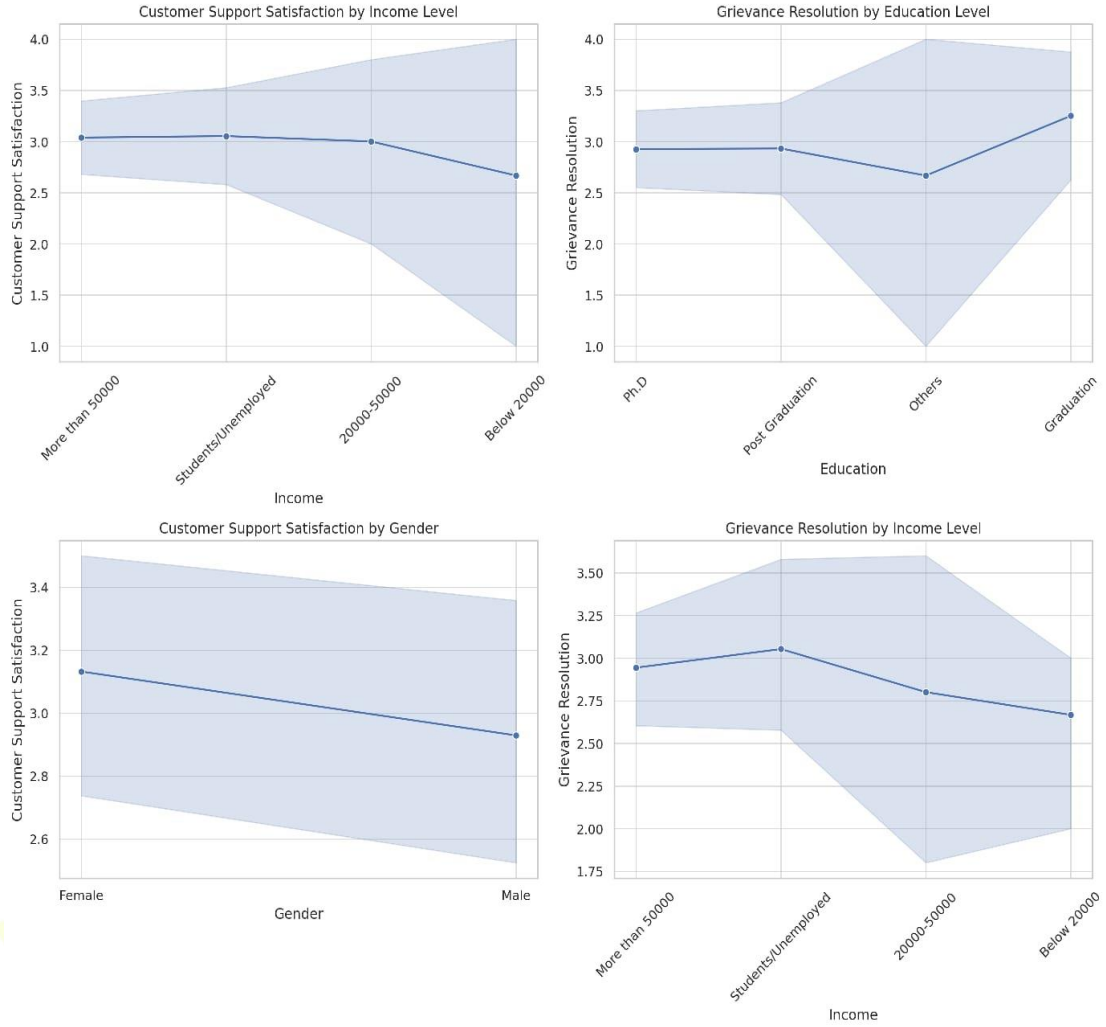
2. Efficiency aspect: Highly educated users might have higher expectations for efficiency and could be more critical of delays, notification issues, or transaction failures. Users with less technical knowledge may perceive FASTag as relatively efficient compared to manual toll payments, leading to more positive ratings.

3. Reliability aspect: Higher education levels could mean a greater awareness of system failures, inconsistencies, or service disruptions, leading to more scrutiny in reliability ratings. Less educated users may accept minor inconveniences as part of the system, resulting in relatively neutral to positive reliability ratings.

Consolidated Table-Pearson Correlation Coefficient

Category/aspect	Mean Score value	Standard Deviation	Corr with Usability category	Corr With Efficiency category	Corr. With Relaibility Category
Usability	3.26	1.35	1.00	0.91	0.86
Efficiency	3.22	1.35	0.91	1.00	0.84
Reliability	3.10	1.33	0.86	0.84	1.00

Here are the mean scores and standard deviations for each category, in case of Usability it is found: Mean = 3.26, Standard Deviation = 1.35 Efficiency: average Mean = 3.22, Standard Deviation = 1.35 in case of Reliability: it is here, Mean = 3.10, Standard Deviation = 1.33 and for Usability (Ease of use, user-friendliness services and operations and services accessibility) 2. Efficiency included (Time-saving system, smooth transactions and record, and effectiveness) 3. Reliability (improved System performance, technical issues, and problem resolution mechanism) Usability & Efficiency (0.91): There is a very strong positive correlation between usability and efficiency, depicting that respondents who rate the ease of using the system also result to view the system as efficient. Usability & Reliability (0.86): A strong positive correlation exists between usability and reliability, indicating that better usability is generally associated with perceptions of reliability. Efficiency & Reliability (0.84): The strong positive correlation here indicates that when the system is perceived as efficient, it is also likely to be seen as reliable. These high correlation values indicated that the three aspects of the FASTag system are closely interrelated in the perception of the users.



Here are the line charts representing the relationship between demographic factors and customer support/grievance resolution satisfaction: Customer support satisfaction by income level shows how different income groups perceive support services. Higher-income groups tend to report better satisfaction. Grievance resolution by education level, displays how education level influences grievance resolution perception. More educated users report better experiences.

Customer support satisfaction by gender: compares male and female satisfaction with customer Support. No strong difference observed. Grievance resolution by Income level: Highlights trends in grievance resolution satisfaction across income groups. These trends indicate that both income and education levels significantly impact customer perception, while gender shows a less prominent effect.

Wilcoxon Signed-Rank Test result in a tabular format

Comparison between variables	Value of test statistic	p.Value	Significance	Observations
Support Accessibility vs. Problem Resolution mechanism	66.5	0.037	Significant ($p < 0.05$)	Users perceive problems resolution mechanism differently from accessibility. FASTag should upgrade resolution efficiency.
Support Accessibility vs. Overall Interaction	250.5	0.580	Not Significant	Making support accessible does not significantly upgrade overall experience.
Problems Resolution mechanism vs. Overall Interaction	184.5	0.454	Not Significant	Users do not perceive problem resolution mechanism as significantly different from overall interaction.

Wilcoxon Signed-Rank Test Results as-

- Customer support accessibility vs. problem resolution mechanism: the value of Test Statistic 66.5, and its p-value 0.037 (Significant at $p < 0.05$). It is found that there is a significant difference in users perceive accessibility and issue resolution mechanism. This shows that even if support service is reachable still issue resolution mechanism may not be satisfactory for users.
- In case of customer support accessibility vs. overall interaction, the value of Test Statistic: 250.5, and its p-value: 0.580 found (Not significant), here means it shows that Users find customer support accessible do not rate overall experience significantly differently.

- In case of issue resolution vs. overall interaction, and the value of test statistic 184.5 and its p-value 0.454 found (Not significant). Here means User were not perceive issue resolution mechanism as significantly different from their overall interaction in case of FASTag system.

Correlation Analysis

Comparison of Variables	Corr. (r)	Observations
Customer Support Satisfaction, and Grievance Resolution	(0.73)	A strong positive correlation existed - FASTag users satisfied with customer support and also reported better grievance resolution.

The correlation matrix shows the relationships between Income, Customer Support Satisfaction, and Grievance Resolution. A high correlation (r = 0.73) between Customer Support Satisfaction and Grievance Resolution indicates that a well-functioning customer support system directly improves grievance resolution perception. FASTag support accessibility does not automatically lead to a better customer experience. Issue resolution is the critical factor in improving customer satisfaction. Efforts should be focused on resolving complaints efficiently, not just making support reachable. Detailed Interpretation of Customer Perception Analysis for FASTag

Key Findings: Higher Income Groups showed greater Satisfaction, Customers earning more than ₹50,000 p/m generally report higher degree of satisfaction with FASTag use. The Lower income respondents reflected more dissatisfaction, might be due to their financial sensitivity to incorrect balance deductions. Education qualification of users also affects the level of customer satisfaction, Higher education levels connected with better FASTag satisfaction and vice versa. Frequent Incorrect Balance Deductions result to poor issue Resolution mechanism and users who frequently experience incorrect balance deductions quote significantly lower ratings for issue resolution mechanism. This reflected a disbelief among users in FASTag's automatic balance deduction and their refund or pay back system.

It is found that complaint management & support service quality directly affect user satisfaction, reported a strong positive correlation found between support accessibility, interaction quality, and customer satisfaction. If the users get quick help, they quoted FASTag positively to a greater extent. Gender Differences in Satisfaction also found while data analyzed the female respondents set out slightly more overall satisfaction than male respondents. Male respondents, reported slightly more dissatisfaction.

FASTag users reported Higher Ratings to satisfaction, in case when their complaints regarding incorrect balance deductions resolute for an instant and when in case of more waiting period in problem resolution significantly reduce trust. Incorrect balance deductions of toll charges found a big concern that also rated by large portion of dissatisfied users, reported incorrect balance deductions as their first and primary problem. For solving this type of issue, it might be suggested that FASTag's deduction system required more accuracy and transparency. Here support accessibility to users found more significant than issue resolution time. The users who can easily reach customer support services tend to rate FASTag more positively, even if their issue resolution times are longer. This emphasized the need for accessible, receptive, and well-proficient customer service teams. Lower-Income as well as less educated users Struggle more with issue resolution. These groups showed higher dissatisfaction with grievance resolution mechanisms. There is a requirement of quick and simple dispute resolution mechanism and system, by using mobile optimized services and by providing more self-available service options to users. Those Users were found more satisfied who rarely make any contact to support service platform and never faced any major issues. This suggests that inconvenience-free as well as mistake-free system is the key operator for making constructive perception of customers.

Conclusion & Recommendations: FASTag system has been positively acknowledged in Haryana, continuing furtherance in user's support and service reliability are vital to intensify overall satisfaction and operational efficiency. high income, education, good support reachability, quick problem resolutions included as satisfaction drivers and dissatisfaction drivers were found as Incorrect amount deductions, slow grievance handling procedure, difficulty in dispute resolution. The key solutions of all these issues might be better accuracy, improved support services, and education awareness, transparent refunds system. It was found that there is need to educate customers especially in low income & rural areas with the aim of improving resolution effectiveness instead of mere reachability. There is also need to amplify customer support by improving response time and quick resolving incorrect balance deductions. We can improve system reliability with minimizing technical failures to boost customers trust.

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