



"Navigating the Digital Payment Landscape: An Analysis of UPI App Usage and Security Perceptions"

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Abstract

The study investigates UPI (Unified Payments Interface) app usage among 513 respondents, revealing insights into demographic and transactional trends in digital payments. Predominantly from Ahmedabad and Gandhinagar, students emerge as the largest user group, indicating widespread adoption among the youth. UPI apps are popular alongside cash and mobile banking, showcasing evolving payment preferences.

Google Pay leads the UPI app market, fostering competition and innovation. Security perceptions vary, with overall confidence but persistent concerns, emphasizing the need for strengthened security measures. Many respondents faced fraudulent UPI transactions, emphasizing the importance of rapid resolutions and robust security protocols.

Despite digital trust, some respondents remain skeptical, highlighting the necessity for transparent policies, proactive security, and educational initiatives to bolster trust. In summary, the research provides a holistic view of UPI app usage, aiding stakeholders in enhancing security and user experiences in the dynamic digital payment landscape. Addressing the concerns outlined can foster industry growth with heightened user satisfaction and trust.



Introduction

The evolution of digital payments, notably through UPI apps, has transformed finance, presenting both opportunities and challenges. This analysis delves into a diverse dataset, exploring UPI app users' behaviors and responses to cybersecurity threats. Covering risk awareness, security perceptions, fraud detection speeds, and preventive measures, it also considers demographics. These insights are crucial for policymakers, UPI providers, and users, guiding collaborative efforts to enhance app security, increase awareness, and bolster user trust. The research contributes to creating a safer, informed, and user-centric financial ecosystem in the digital payment landscape.

Literature review

1. Digital Payment Landscape and UPI Technology

The advent of novel technologies such as UPI apps reflects the rapid transformation of the digital payment landscape. The National Payments Corporation of India (NPCI) developed the Unified Payments Interface (UPI), a real-time interbank payment system that has revolutionised financial transactions in India (National Payments Corporation of India, 2021). The study recognises UPI apps' revolutionary influence, which is consistent with earlier studies highlighting their significance in facilitating smooth and quick financial transactions (Sahoo et al., 2019). Understanding user behaviours and security risks is becoming increasingly important as UPI apps gain popularity.

2. UPI App Usage Patterns

The investigation of UPI app usage trends in the study is consistent with the larger research on digital payment adoption. Previous research has shown that digital payment methods, including mobile payment apps, are increasingly preferred over traditional options such as cash and credit cards (Venkatesh et al., 2012). Students are a large demographic category among UPI app users, which is consistent with research showing the appeal of digital payment solutions to younger generations (Mehrotra & Shrivastava, 2019). This demographic insight highlights the ever-changing nature of payment habits in the digital age.



3. Competition and Innovation in UPI App Market

This competitive climate has been a significant driver of sector innovation, resulting in the creation of user-friendly features and services (Das & De, 2020). According to research, such competition has aided the growth of digital payments and the multiplicity of options available to users.

4. Security Perceptions and Challenges

The research looks on user views of security and the issues posed by fraudulent UPI requests or transactions. The importance of security in digital payments has been repeatedly recognised in research (Ali & Ali, 2018; PricewaterhouseCoopers, 2020). Users' faith in the security of UPI transactions is consistent with earlier research emphasising the importance of trust in driving adoption (Luo et al., 2020). However, the presence of reported fraudulent instances highlights the importance of strong security measures and quick resolution procedures to protect users' financial interests.

Research Methodology

The research presented in this paper aims to provide a comprehensive analysis of various aspects related to UPI (Unified Payments Interface) app usage, cybersecurity awareness, and responses to fraudulent activities among a sample of 513 respondents. The following section outlines the research methodology employed to collect, analyze, and interpret the data.

Data Collection:

- **Survey Instrument:** A structured questionnaire was designed to collect data from respondents. The questionnaire comprised multiple-choice questions, Likert scale items, and open-ended questions.
- **Sampling:** The sample population consisted of individuals residing in a specific region, focusing on two cities: Ahmedabad and Gandhinagar. The selection of respondents was done using a stratified random sampling technique to ensure representation from both cities.



- **Data Collection Platform:** The survey was administered electronically, utilizing online survey platforms such as Google Forms or similar tools. Respondents were provided with a web link to access and complete the questionnaire.

Data Analysis:

- **Quantitative Data:** Responses to closed-ended questions were analyzed using descriptive statistics. This involved calculating counts, percentages, and frequencies to summarize the data.
- **Qualitative Data:** Responses to open-ended questions were subjected to thematic analysis. Common themes and patterns in respondents' qualitative answers were identified and categorized.
- **Cross-Tabulations:** Cross-tabulations were conducted to explore relationships and associations between variables, such as age and UPI app preferences.

Data Interpretation:

- Findings were interpreted based on the data analysis, and key insights and trends were identified.
- Data interpretation involved providing a comprehensive overview of the results, including percentages, counts, and thematic summaries.

Limitations:

The study has several limitations, including potential response bias, reliance on self-reported data, and a specific geographical focus on Ahmedabad and Gandhinagar. These limitations should be considered when generalizing the findings to a broader population.

In summary, the research methodology employed in this study aimed to collect, analyze, and interpret data from a diverse group of respondents to gain insights into various aspects of UPI app usage, cybersecurity awareness, and responses to fraudulent activities. The methodology ensured data quality, ethical considerations, and a structured approach to research.



Data analysis and interpretation

Demographic profile of the respondents

Place where you live

Table 1: Place of living of the respondents

City	Count	Percentage
Ahmedabad	372	72.66%
Gandhinagar	136	26.56%
No response	4	0.78%
Grand Total	512	100.00%

The table presents locations of respondents' residences. Ahmedabad has 72.66% (372 individuals), Gandhinagar 26.56% (136), and 0.78% (4) didn't specify. With 512 respondents, this data illustrates the prevalent residential cities within the surveyed population, indicating Ahmedabad as the primary residence for most respondents.

Gender

Table 2: Gender of the respondents

Gender	Number	Percentage
Female	204	39.77%
Male	308	60.04%
No response	1	0.19%
Grand Total	513	100.00%



The data, consisting of 513 respondents, reveals a male majority at 60.04%, with 39.77% identifying as female. Remarkably, only 0.19% didn't respond to the gender question. This breakdown provides insights into the surveyed population's gender distribution.

Age

Table 3: Age of the respondents

Age	Count	Percentage
Above 55	17	3.32%
more than > 25 and less than < 35	165	32.23%
more than >18 and less than <25	230	44.92%
more than >35 and less than <45	80	15.63%
more than >45 and less than <55	19	3.71%
No response	1	0.20%
Grand Total	512	100.00%

The data table illustrates age distribution within the dataset, revealing significant patterns. The largest group, 44.92%, comprises individuals aged 18 to 25, with 32.23% between 25 and 35. A smaller 15.63% falls between 35 and 45, and just 3.71% are aged 45 to 55. Those above 55 constitute 3.32%, while only 0.20% didn't respond. This breakdown offers a clear view of the dataset's demographic composition, emphasizing the prevalence of younger respondents, with notable representation in older age brackets.



Mode of payment

Table 4: Mode of payment used by the respondents.

Mode of payment	Count
UPI apps	31.19
Cash	22.61
Mobile banking	8.38
Cash & UPI apps	6.43
Mobile banking & UPI apps	3.70
Cash, Mobile banking, Internet banking, UPI apps	4.48
Internet banking	3.31
Cash & Cheque	1.56
Cheque	1.95
Other Combinations	
Cash, Cheque	4.48
Cheque, Mobile banking, Internet banking	0.58
Cash, Mobile banking	0.97
Cash, Cheque, Internet banking, UPI apps	1.36
Mobile banking, Internet banking, UPI apps	2.92
Cash, Cheque, UPI apps	0.58
Cash, Internet banking, UPI apps	0.58
Cheque, Mobile banking, Internet banking, UPI apps	0.39



The above table represents the modes of payment used by customers, along with their respective counts and percentages.

- UPI apps dominate payments at 31.19%, showcasing widespread digital adoption.
- Cash remains strong at 22.61%, favored by some despite digital rise.
- Mobile banking at 8.38% highlights its transactional ease.
- 6.43% prefer hybrid payments: cash and UPI apps.
- Mobile banking + UPI apps at 3.70% signify popular integration.
- 4.48% use varied modes: cash, mobile, internet banking, and UPI.
- Internet banking stands at 3.31%, emphasizing its significance.
- Cash + Cheque transactions: 1.56%, reflecting traditional reliance.
- Cheque transactions alone: 1.95%, showing steady but low usage.
- 4.48% involve diverse combos, reflecting unique preferences.

Frequency of the UPI app used for financial transactions

Table 5: Frequency of the UPI app used for financial transactions by the respondents

UPI App and Combinations	Count	Percentage
Google Pay	146	28.46%
Paytm	45	8.77%
Never	66	12.87%
PhonePe	36	7.02%
Bank Application	7	1.36%
BHIM	15	2.92%
Amazon Pay	4	0.78%



The data presents UPI app usage patterns among 513 respondents. Google Pay leads with 28.46% users, followed by PhonePe (7.02%) and Paytm (8.77%). Notably, 12.87% have never used any UPI app. The study underscores Google Pay's dominance but highlights a significant portion of non-users, indicating diverse preferences in UPI app adoption.

Factors that influence the choice of UPI

Table 6: Factors that influence the choice of UPI

Reason	Count	Percentage
Security features	195	38.01%
User interface	119	23.20%
Customer service	86	16.76%
Offers and rewards	66	12.87%
No response	28	5.46%
None	4	0.78%
Easy Pay	2	0.39%
Others	16	3.12%

The table illustrates the factors influencing the choice of using UPI (Unified Payments Interface) for financial transactions, with counts and percentages. Here's a concise interpretation:

- Customer Service:** 86 respondents (16.76%) value good customer service.
- Security Features:** The top influencer, with 195 respondents (38.01%) prioritizing security.
- User Interface:** 119 respondents (23.20%) appreciate a user-friendly interface.



4. **Offers and Rewards:** 66 respondents (12.87%) are motivated by promotional incentives.
5. **No Response:** 28 respondents (5.46%) did not specify influencing factors.
6. **Others:** A range of factors mentioned by smaller groups.

In summary, security, user interface, customer service, and offers/rewards significantly influence UPI usage. However, a portion of respondents did not provide specific reasons or prefer alternative methods like internet banking.

Security and confidence in using UPI apps for financial transactions

Table 7: Security and confidence in using UPI apps

How secure and confident are you in using UPI apps for financial transactions?		
Item	Count of 13. How secure and confident are you in using UPI apps for financial transactions?	Percentage
Insecure and not confident	10	1.95%
Neutral	151	29.43%
Secure and confident	181	35.28%
Very insecure and not confident at all	23	4.48%
Very secure and confident	140	27.29%
No response	8	1.56%
Grand Total	513	100.00%



The table presents respondents' perceptions of security and confidence while using UPI apps for financial transactions. A detailed breakdown of their sentiments reveals that 1.95% felt insecure and lacking confidence, while 29.43% remained neutral, indicating ambivalence. Notably, 35.28% expressed feeling secure and confident, underscoring trust in UPI app security. However, 4.48% were very insecure, demonstrating significant concerns. Conversely, 27.29% were very secure and confident, reflecting a substantial level of trust. Additionally, 1.56% offered no response, suggesting potential disengagement or indifference. This data underscores the varied spectrum of users' confidence levels, emphasizing the need for UPI app providers to address concerns, enhance security measures, and raise awareness to foster a more secure user experience.

Table 8: Speed of detection and resolution of fraudulent activity

Row Labels	Count of 18. How quickly were you able to detect and resolve the fraudulent activity on your UPI app account?	Count of 18. How quickly were you able to detect and resolve the fraudulent activity on your UPI app account? 2
Immediately and within a day	150	29.24%
More than a week and more than a month	31	6.04%
Never detected and issue not resolved.	94	18.32%
No response	126	24.56%
Within a day and within a week	72	14.04%



Within a week and within a month	40	7.80%
(blank)		0.00%
Grand Total	513	100.00%

The dataset examines respondents' response times to fraudulent activities on their UPI app accounts. 29.24% (150 individuals) swiftly resolved issues within a day, and 14.04% (72) within a week. A 7.80% (40) group took 1-4 weeks, while 6.04% (31) took over a month. Worryingly, 18.32% (94) didn't detect or resolve the problem, raising concerns about detection and communication. 24.56% (126) didn't respond, clouding their response times. This data emphasizes varied user responses, urging UPI platforms to enhance security and awareness, ensuring prompt resolution of fraudulent activities.

What steps did you take to prevent further fraudulent activity on your UPI app account?

Table 9: Steps taken by the respondents to prevent further fraudulent activity on their UPI.

Row Labels	Count	Percentage
Any other	10	1.95%
Changed UPI PIN or password	177	34.57%
I've done nothing. I just ignore them	1	0.20%
No action required	1	0.20%
No response	126	24.61%



Not applicable	1	0.20%
Not faced any fraudulent activity	8	1.56%
option, but they paid no help	1	0.20%
Reported of cyber police	76	14.84%
Reported to bank	46	8.98%
Reported to UPI app company	43	8.40%
Unlinked bank account	22	4.30%
Grand Total	512	100.00%

The analysis of responses to UPI app account fraud reveals key trends:

- Changed UPI PIN or password (34.57%): 177 individuals secured accounts promptly.
- Reported to cyber police (14.84%): 76 took legal action for potential criminal investigation.
- Reported to bank (8.98%): 46 relied on banks to investigate and resolve the issue.
- Reported to UPI app company (8.40%): 43 expressed confidence in the app provider's security measures.
- Unlinked bank account (4.30%): 22 disconnected accounts to limit damage.
- No action required (0.20%): One respondent found the issue minor.
- No specific response (24.61%): Many remained indifferent or unaware.
- Other actions (1.95%): 10 respondents took unspecified alternative measures. This data highlights the need for swift action in response to UPI app fraud.
- I am also aware of the risks associated with opening email attachments from unknown sources and clicking on suspicious links for financial transactions.



Table 10: Awareness of the risks associated with opening email attachments from unknown sources

Statement	Count	Percentage
Agree	208	40.55%
Disagree	33	6.43%
Neutral	87	16.96%
No response	13	2.53%
Strongly Agree	123	23.98%
Strongly Disagree	40	7.80%
Highly Agree	9	1.75%
Grand Total	513	100.00%

The analysis explores respondents' awareness of email attachment and suspicious link risks in financial transactions. Notably, 40.55% agreed, and 23.98% strongly agreed, indicating a substantial concern. However, 6.43% disagreed, 16.96% remained neutral, and 7.80% strongly disagreed, suggesting knowledge gaps. A small group highly agreed (1.75%), while 2.53% provided no response. This highlights the need for enhanced education efforts, as while many are aware, disparities exist, emphasizing the importance of raising awareness uniformly to mitigate risks effectively.

Summary of findings

In a study involving 513 respondents, significant insights into UPI app usage, cybersecurity awareness, and responses to fraud emerged. Google Pay and PhonePe were popular, but a concerning portion never used UPI apps. Security, user-friendly interfaces, and customer service influenced app choices. Users varied in security perceptions, with some feeling



confident and others insecure. Responses to fraud included changing PINs and reporting to authorities, but a substantial group never detected or resolved issues. The study highlighted the dynamic nature of UPI app use, emphasizing the need for continuous cybersecurity education and robust digital payment security measures.

Conclusion

In this analysis of 513 respondents, several crucial aspects of UPI app usage and cybersecurity were unveiled. Young adults aged 18 to 25 dominate UPI app usage, emphasizing the need for tailored services and robust security for this demographic. Google Pay's dominance highlights its user-friendly interface. However, a concerning percentage of respondents never used UPI apps, indicating a digital divide that requires comprehensive financial literacy initiatives. Security features significantly influence payment method choices, underscoring the pivotal role of cybersecurity in building user trust. Responses to fraud varied widely, highlighting the necessity of educating users on recognizing and responding to fraudulent activities. While a significant portion demonstrated awareness of cybersecurity risks, continuous efforts are needed to enhance awareness and promote best practices. The multifaceted UPI ecosystem demands collaborative efforts from providers, regulatory bodies, and financial institutions to bolster security, enhance user education, and tailor solutions for different demographics. This data-driven analysis serves as a valuable resource for stakeholders aiming to fortify UPI app security and resilience in an increasingly digital world.



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