



Innovations and Challenges of Financial Technology: A Study on Digital Wallets and Mobile Payments in India

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Abstract. With the advent of mobile phone services, penetrated even in remote villages, followed by demonetization, people have moved to digital transfers, making a gateway to digital and mobile payments, which is a revolution in the country like India. The usage of the secondary data and analyzing the banker's potentiality in the transactions using digital wallets and mobile payments was not focused much by the earlier researchers. We found a gap in research in understanding the behavior of the financial transactions using digital wallets and mobile payments in India. Even though, the Government of India is trying to be vigilant on the digital payments, but, a few Local Governments are not positive on these payments due to the GST problems. The objective of the research study is focused on difficulties in the introduction and usage of financial technology through digital wallets and mobile payments in India. The methodology adopted in this research study was basically descriptive research using secondary data on digital wallet payments and mobile payment transactions in terms of both volume and value of transactions done in five years. Through this research study, the authors were able to understand the transactional size of the payments happening through digital wallets and mobile payments in terms of both volume and value and also able to understand the issues and challenges that the bankers may be facing in several aspects.

Keywords: Financial Technology, Digital Wallets, Mobile Payments.

1 INTRODUCTION

India, as a country, has changed its position in comparison with the other countries at an exponential pace, and as on 2025, India is in the 4th position in terms of the largest economy by GDP, overtaking Japan, and in the 1st position in terms of population, overtaking China. In 2025, India is also showcasing its specialty as a dual demographic structure—possessing the world's largest youngest population, more tilted in the north, and a rapidly growing elderly population, tilted towards the south, which has some greatness in terms of consumerism and has made the country the largest global marketplace.

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India, as a developing country, has quickly adapted its payment systems from traditional barter to cash using wallets, cash to plastic cards, and now cards to mobile phones and digital wallets, thanks to the people and their acceptance levels and also the policies and mechanisms adopted for such quick penetration. One should appreciate the demonetization that pushed the pace of digitization as a byproduct. Also, a revolution that took place in mobile phone penetration supported the banking system through communication systems from e-banking to M-banking, a total shift from bank cash counters and tellers, net banking to ATM cards, ATM cards to swiping machines, cash wallets to digital wallets.

2 LITERATURE SURVEY

Demonetization was not a new concept to the country like India. In general, it will be announced, and time will be given with a long window period for exchange with the new currency in place of the older ones, except in 2016, which was like a financial emergency. It was a challenge to both the bankers and customers on the timely closures (Mohd, M. S.; 2016).

The advantage of its communication network through 4G and 5G services and improved its mobile phone services, which indirectly supported Digital India in terms of online payment transactions, thanks to demonetization. This, in turn, enhanced the transparency in transactions and empowered the country's economy. UPI and BHIM apps are given a competition to Google Pay and PhonePe. This in turn enhanced the efficiency of the payment banks, as the technology usage gave almost all real-time data (Kavitha, M. and Kumar, K. S.; 2018). India also entered digital mode of its financial operations, thanks to demonetization, which influenced digitization. This promoted the country to a cashless society, as every vendor was open for different digital modes of payment transactions (R. Kalaivani; 2018).

Demonetization had its own objective when it was introduced, as it was pointed out on Black Money, but later it was very much used to shift the mindsets as well as the payment systems from cash transactions to digital transactions. In fact, for a short time, temporary derailment, but later it enhanced the economy levels, which made the acceptance of the country's travel towards a cashless economy. Data was analyzed, tested with statistical tools, and conclusions were drawn (Kavita Chavali, Chowdari Prasad, and KS Srinivasa Rao, 2019).

One has to understand the behavior on fintech adoption of Gen Y in India by including factors like Information Quality (IQ) and Readiness to Pay for Privileges (RPP). A sample study on 349 analyzed using judgmental sampling from different academic institutions. Through the research, it was noticed that Information Quality (IQ) is a prime factor in adoption of FinTech. The research outcome will be very useful to the policy makers and vendors on developing strategies to launch user-friendly FinTech products and services (Aggarwal, M., Nayak, K. M., & Bhatt, V.; 2023). India, a

country with a rapidly growing economy, has the advantage of its tech-savvy population with a digital adoption mindset due to the various government policies adopted for financial inclusion. Interestingly, new business creation models along with systematic operations that result in high-level customer satisfaction are happening due to fintech, or financial technology solutions, by involving banking and non-banking services, IT and ITES companies, and start-ups of this industry (Ramkumar, G.; 2023). One has to understand the UPI transactions with a special focus on women customers aged under 40 years and their daily cash transactions (J. Thakkar and P. Thakkar, 2023). In spite of better logistics, technology in place, and Gen Z domination in India, still it's the normal socio-economic network estimations continued (Ozili, P. K., & Syed, A. A.; 2024). The World Bank cautioned in 2020 to appreciate the FinTech market growth business, even an exponential increase in the fraud cases. Research carried on to understand the loopholes of the FinTech industry by developing a model known as "Identity Theft" was analyzed qualitatively and suggested preventive techniques for frauds in the FinTech industry (Saluja, S., 2024).

Luckily, India is supporting the sustainable economic growth through FinTech and digital economies by understanding data of 28 states during 2010-22, and it was concluded that regional financial regulatory resources influence FinTech and digital economies (Sreenu, N.; 2025). The banking fintech industry is rapidly increasing by portfolio diversification along with customer satisfaction. This association is becoming competitive and influences innovations of product and catches more diversified target customers. This, in turn, enhances better offerings with optimized efficiency through scaling up the business activities (Roy, D., et al., 2025). Indian consumers are using their learning curves and using Unified Payments Interface (UPI) payments for normal financial transactions and buying any FMCG goods through or Equated Monthly Instalment (EMI). These changing patterns are identified through Business Analytics, giving a chance for better business and economic performance. This study period was of 20-month duration, from Jan. 2023 to Aug. 2024 and the short-term and long-term behavior of the consumers was analyzed using cross-sectional time-series analysis with a focus on average ticket size strategies to cater their services to the target customers (Invali, S.; 2025).

3 RESEARCH GAP

The study found a gap in research in understanding the behavior of the financial transactions using digital wallets and mobile payments in India. Even though, the Government of India is trying to be vigilant on the digital payments, but, a few Local Governments are not positive on these payments due to the GST problems. The research gap is in terms of the transactions by the earlier researchers to understand the financial behavior of transactions using digital wallets and mobile payments.

4 RESEARCH OBJECTIVES

The following are the objectives of the research study:

- i. To understand the business in terms of transactions of both volume and value through digital payments of the fintech industry
- ii. To analyze the issues and challenges in the digital payments of the FinTech industry

5 RESEARCH METHODOLOGY

As per the banking digital money transfer:

- i. NEFT (National Electronic Fund Transfer)—Transferring is considered as popular type of money transfer in India
- ii. RTGS (Real Time Gross Settlement)—This money transfer process is almost similar to NEFT, but the difference lies in the minimum amount and how much time NEFT takes to credit the amount in the receiver's account
- iii. IMPS (Immediate Payment Service)—IMPS provides the benefits of instant transfer to users
- iv. UPI (Unified Payments Interface) has convenient types of money transfer methods from bank to bank with the support of a smartphone and internet connection to carry out any the transaction using Virtual Payment Address (VPA)
- v. E-Cheque (Digital or Electronic Cheque) transfers funds by digitally encoding cheque details and securely transmitting them through electronic channels, which are processed by banks similarly to paper cheques, but at a faster rate. E-checks are a form of Electronic Fund Transfer (EFT) and can be used for direct deposits, bill payments, and P2P transfers through online banking or dedicated apps. The recipient's bank verifies the transaction and, once cleared, credits the funds to the recipient's account

It was considered the following as the UPI Transactions as per the banking sources:

- Peer-to-Peer (P2P) transfers: Sending money directly from one individual to another using their UPI ID
- Merchant payments: Paying for goods and services at businesses by scanning static or dynamic QR codes
- Bill payments: Paying utility bills (electricity, water, gas), loan EMIs, and insurance premiums
- Mobile and DTH recharges: Recharging mobile phones and DTH services
- Online shopping: Making payments for purchases on e-commerce sites that support UPI
- Recurring payments: Setting up recurring payments for subscriptions or regular bills using the AutoPay

The research was exploratory and descriptive in nature while understanding the financial behavior of the digital transactions in terms of volume and value. Data collection methods are from secondary sources using the websites of NPCI for 2016-2025 banks operating UPI transactions, whereas from RBI for 2022-2025 on a monthly basis of volume (in Rs. Lakhs) and value (in Rs. Crores) of the UPI transactions on the issues and challenges in digital payments in the fintech industry. In addition to various issues and challenges that both the bankers and the customers are facing, the main issues are the scams and fraudulence, both from references cited in the review of literature as well as from the RBI website.

6 DATA ANALYSIS

The data was analyzed and the following are the figures that give details of the analysis:

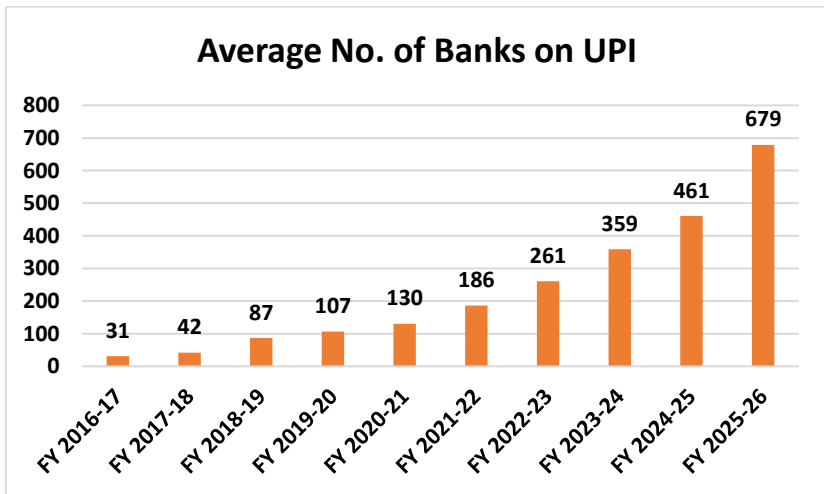


Fig.1. Average No. of Banks on UPI payments

Source: NPCI

Table 1. Descriptive Statistics of No. of Banks live on UPI, Volume (in Mn.) and Value (in Cr.) of Transactions

<i>Descriptive Statistics</i>	<i>No. of Banks live on UPI</i>	<i>Volume (In Mn.)</i>	<i>Value (In Cr.)</i>
Mean	283.06	5423.10	814560.69
Standard Error	19.94	579.90	79868.09
Median	213	2302.73	431181.89
Minimum	21	0.09	0.38
Maximum	688	20008.31	2514297.01
Count	111	111	111

Source: NPCI

Table 2. Correlation between No. of Banks live on UPI, Volume of Transactions (in Mn.) and Value of Transactions (in Cr.)

<i>Correlation Matrix</i>	<i>No. of Banks live on UPI</i>	<i>Volume (In Mn.)</i>	<i>Value (In Cr.)</i>
No. of Banks live on UPI	1		
Volume (In Mn.)	0.985	1	
Value (In Cr.)	0.994	0.994	1

Source: NPCI

Table 3. Regression Analysis of Volume of Transaction (in Mn.) on No. Banks live on UPI

<i>Regression of Volume on No. of Banks</i>	
Multiple R	0.99
R Square	0.97
Adjusted R Square	0.97
Standard Error	1044.18
Observations	111

ANOVA for Regression	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	3987172434	3987172434	3656.931	0.00
Residual	109	118843317.4	1090305.664		
Total	110	4106015751			

<i>Volume (In Mn.)</i>	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	-2687.48	166.7655067	-16.11531272	0.00
No. of Banks live on UPI	28.65	0.473816496	60.4725629	0.00

Table 4. Regression Analysis of Value of Transaction (in Cr.) on No. Banks live on UPI

<i>Regression of Value on No. of Banks</i>	
Multiple R	0.99
R Square	0.99
Adjusted R Square	0.99
Standard Error	93218.425
Observations	111

ANOVA for Regression	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	7.69393E+13	7.694E+13	8854.109	0.00
Residual	109	9.47175E+11	8.69E+09		
Total	110	7.78865E+13			

<i>Value (In Cr.)</i>	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	-312100.78	14887.91415	20.963365	0.00
No. of Banks live on UPI	3980.25	42.29975048	94.096276	0.00

Table 5. Regression Analysis of Volume of Transaction (in Mn.) on No. Banks live on UPI

<i>t-Test: Paired Two Sample for Means</i>	<i>Volume (In Mn.)</i>	<i>Value (In Cr.)</i>
Mean	5423.10	814560.69
Observations	111	111
Pearson Correlation	0.9935614	
Hypothesized Mean Difference	0	
df	110	
t Stat	10.2045368	
P(T<=t) one-tail	6.6194E-18	0.00
t Critical one-tail	1.66	
P(T<=t) two-tail	1.3239E-17	0.00
t Critical two-tail	1.98	

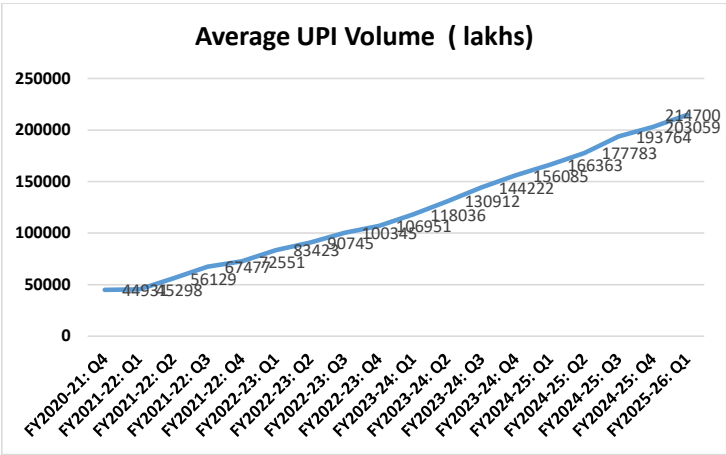


Fig. 2. Quarterly Average No. of UPI Transactions [Volume (in Lakhs)] **Source:** RBI

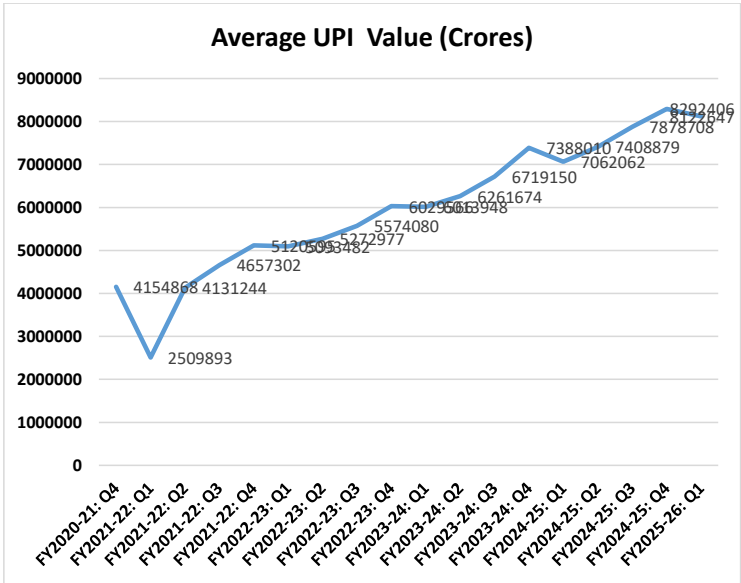


Fig. 3. Quarterly Average No. of UPI Transactions [Value (in Crores)] **Source:** RBI

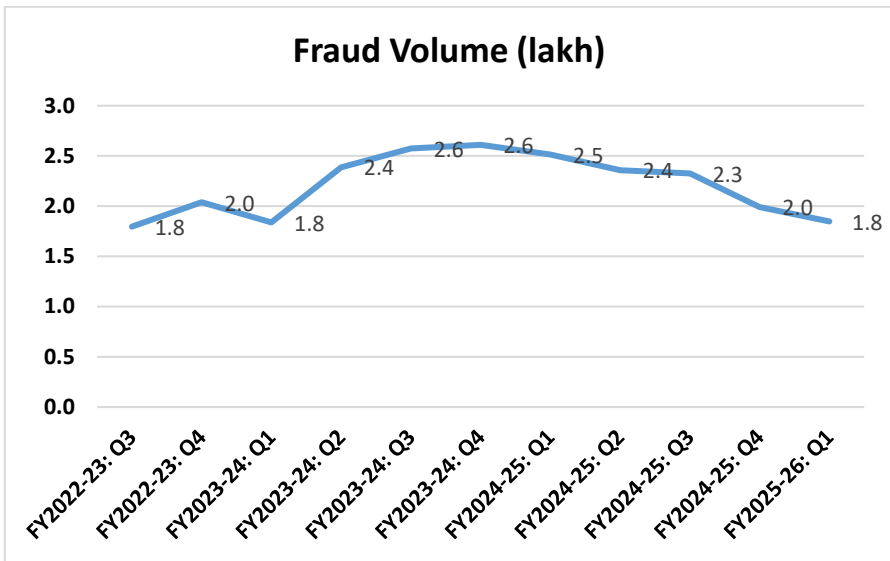


Fig. 4. Quarterly Average No. of Domestic Payment Frauds [Volume (lakh)] Source: RBI

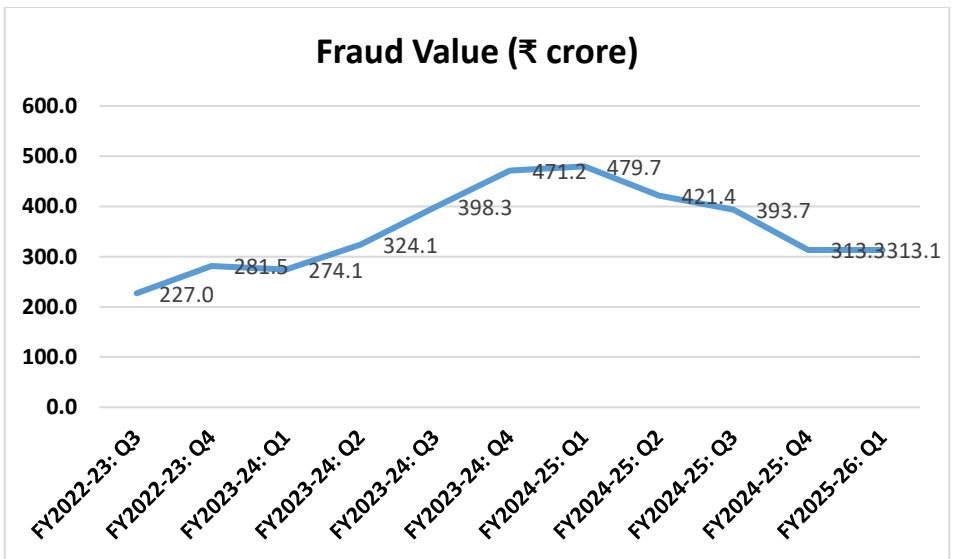


Fig. 5. Quarterly Average No. of Domestic Payment Frauds [Value (₹ crore)] Source: RBI

7 FINDINGS

From Fig.1 on Average No. of Banks on UPI payments, it was observed that in the FY 2016-17, only 31 banks were started their UPI services, but later it has gone to 679 banks in FY 2025-26, which shows the more adaptability in banking sector regards UPI payment. Just only during the FY 2024-25 to FY 2025-26, a record number of 218 banks involved in the UPI payments.

From Table 1 on Descriptive Statistics of No. of Banks live on UPI, Volume (in Mn.) and Value (in Cr.) of Transactions, it was observed that:

- On an average, 283 Banks live on UPI with a Standard Deviation (Error) of 19 and at a minimum of 21 and maximum of 688 Banks live on UPI during the period of study.
- On an average, Rs. 5423 Mn. Volume of Transactions taken place with a Standard Deviation (Error) of 579 and at a minimum of Rs.0.09 Mn. and maximum of Rs.20,008 Mn. Volume of Transactions during the period of study.
- On an average, Rs. 8,14,560 Cr. Value of Transactions taken place with a Standard Deviation (Error) of 79,868 and at a minimum of Rs.0.38 Cr. and maximum of Rs.25,14,297 Cr. Volume of Transactions during the period of study.

From Table 2 on Correlation between No. of Banks live on UPI, Volume of Transactions (in Mn.) and Value of Transactions (in Cr.), it was found that there was a very strong positive correlation (Correlations Coefficient 0.985) between No. Banks live on UPI with Volume of Transactions (in Mn.) as well as (Correlation Coefficient 0.994) Value of Transactions (in Cr.). Interestingly, it was found that there was a very strong positive correlation (0.994) even between Volume of Transactions (in Mn.) and Value of Transactions (in Cr.).

From Table 3, it was found that 97% of the variation (Coefficient of Determination) in Volume of Transactions was due to the No. Banks live on UPI and it means that only 3% variation in Volume of Transactions may be due to other reasons. It was observed that Regression is a good fit (as p-value 0.00 using F-test) that the Volume of Transactions was due to the No. Banks live on UPI. The Regression Equation of Volume of Transactions = $-2687.48 + 28.65 * \text{No. Banks live on UPI}$ (as both the Regression Coefficients are significant under t-test as p-value is 0.00).

From Table 4, it was found that 99% of the variation (Coefficient of Determination) in Value of Transactions was due to the No. Banks live on UPI and it means that only 1% variation in Value of Transactions may be due to other reasons. It was observed that

Regression is a good fit (as p-value 0.00 using F-test) that the Value of Transactions was due to the No. Banks live on UPI. The Regression Equation of Value of Transactions = $-312100.78 + 3980.25 * \text{No. Banks live on UPI}$ (as both the Regression Coefficients are significant under t-test as p-value is 0.00).

From Table5, it was found that there is a significant difference between Volume and Value of Transactions (using paired sample t-test and the p-value is 0.00, also as the sample size is 111, its asymptotic normal).

From Fig.2 and Fig. 3 on Quarterly Average UPI Transactions in terms of Volume and Value, it was noticed that from FY 2020-21 Q4 to FY 2025-26 Q1, the transactions in the internet banking were multiplied four times, but in terms of value, it was just increased to two times, which indicates that small payments have increased. The average UPI volume has an upward trend.

From Fig.2 on Quarterly Average No. of UPI Transactions in terms of Volume (in Lakhs), it was observed a steady growth from FY 2020-21 Q4 to FY 2025-26 Q1 without any fluctuations.

From Fig.3 on Quarterly Average No. of UPI Transactions in terms of Value (in Crores), it was observed that after the COVID-19 pandemic, the average UPI value has doubled in the remaining 15 quarters, in which the latest quarter 2025-26 Q1, the value has touched to 82 trillion.

8 PROBLEMS FACED IN FINTECH OPERATIONS

The rapid growth of internet banking has transformed financial services in India by offering convenience, accessibility, and efficiency and brings numerous challenges and risks that affect both customers and banking institutions. Despite its advantages, FinTech operations continue to face several problems related to security, technical issues, legal frameworks, and customer awareness. The following are a few listed by different sources during the review of literature and from other secondary Sources:

- a) Internet Related Issues
- b) Lack of Awareness and Technical Knowledge
- c) Poor Internet Connectivity
- d) Technical Glitches and Downtime
- e) Transaction Failures
- f) Legal and Regulatory Challenges
- g) Lack of Personal Interaction
- h) Privacy Concerns
- i) Language Barriers
- j) Resistance to Change

From Fig.4 on the Quarterly-wise Average Domestic Payment Frauds, it was noticed that fraud volume has started in FY 2022-23 Q3 with 1.8 Lakhs and ended with the 1.8 Lakhs in FY 2025-26 Q1, seemingly no change, but it has taken some ups and downs.

From Fig.5 on the Quarterly-wise Average Domestic Payment Frauds, it was observed that the fraud value from FY 2022-23 Q3 to FY 2024-25 Q2, the frauds got increased from Rs. 227 crores to Rs. 479.7 crores, but after the FY 2024-25 Q2, the frauds have decreasing from Rs. 479.7 crores to Rs. 313.1 crores, which has shown the control by the banks.

9 CONCLUSION

One can understand the transactional size of the payments happening through UTI (digital wallets and mobile payments) in terms of both volume and value and also the issues and challenges that the bankers as well as customers may be facing in several aspects.

Introduction of FinTech services in terms of digital wallets and mobile payments in India, was a great success, inspite of other challenges like internet bandwidth or fraudulence. While India's financial sector continues to advance toward a fully digital ecosystem, addressing these challenges is essential for sustainable growth. Strengthening cybersecurity infrastructure, improving digital literacy, enhancing internet access from 4G to 5G, and developing robust legal frameworks can significantly reduce risks. A customer-centric approach that builds trust, ensures data protection, and provides localized support will be crucial in overcoming the ongoing problems and challenges faced in internet banking.

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