

Impact of UPI Utilisation on Financial Inclusion: Empirical Evidence from India

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Abstract

Purpose: This paper intends to identify UPI utilisation's impact on financial inclusion in India.

Methodology: Researchers collected UPI information on India monthly. They compared the financial inclusion index value published by the Reserve bank of India with the value and volume of financial transactions happening among eligible banks. Further, researchers used linear regression to find the impact of the value and volume of UPI transactions on financial inclusion.

Findings: Researchers found a significant impact of the value and volume of UPI transactions in financial inclusion.

Conclusion: Researchers concluded that UPI is in its nascent stage in India. However, the popularity of QR codes and mobile payment applications brings fin-tech to the masses and enables more financial inclusion.

Limitations: The study restricted UPI transactions and their impact on financial inclusion; however, researchers believe that a few more variable influences on financial inclusion should be studied to strengthen the research model.

Originality: This paper is original and not a part of any publication.

Keywords: Digital Finance, Financial Inclusion, Fin-tech, Financial inclusion index. UPI, value and volume of UPI transactions.

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Introduction

Financial inclusion refers to the availability and accessibility of financial services to all individuals, including those who may not have access to traditional financial institutions or who may be excluded from the formal financial sector due to various factors such as low income, location, or lack of necessary documentation (Sarma, M., & Paris, J., 2011).

Financial inclusion allows individuals to participate in the economic activities of the country. It benefits people by aiding in managing their financial assets. These benefits construct financial resilience among individuals (Zachariadis, M., Hileman, G., & Scott, S. V., 2019). Governments and non-government organisations worldwide are putting effort into promoting financial inclusion. A few modes applied by these stakeholders are the use of mobile banking (Siano, A. et al., 2020) and digital financial services (Ozili, P. K., 2018), the establishment of microfinance institutions (Milana, C., & Ashta, A., 2020), and the expansion of financial literacy programs (Patwardhan, A., 2018). World Bank, IMF, and Reserve Bank of India formulated financial inclusion policies to boost financial activities among have-nots. The regulatory agencies consider financial inclusion as the source of poverty reduction and ascending economic development. Their thought revolves around the objectives of access to financial tools and resources enhancing business growth in the geographical areas. The improved financial activities ensure people invest in education, health and product consumption.

The international financial agency's efforts, along with its Indian counterparts, are resulting in massive gains in online payments (Parvez, 2021). The Unified Payments Interface (UPI) emerged as the most sought-after payment among youth in India. It opened new avenues for small businesses, students, and street vendors to include themselves in financial inclusion and create a new world of financial opportunities (Maindola, P., Singhal, N., & Dubey, A. D., 2018).

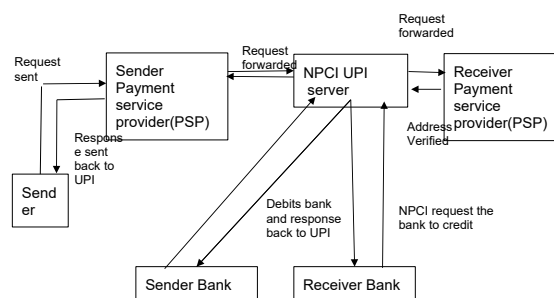
The unprecedented growth story of UPI in India led to the explosion of the bank to bank money transfers in India (Begum, M. F., 2018). Additionally, UPI opened a new window for the common man in India to transfer funds, check bank balances, and

shop at merchant kiosks (Sapovadia, V., 2018). Due to the non-existence of physical banking facilities in remote areas, most Indians were not part of financial inclusion. However, telecommunication growth and the proliferation of smartphones eradicate the need for physical facilities with mobile bank applications and UPI applications (Carriere-Swallow, M. Y., Haksar, M. V., & Putnam, M., 2021). These growth enablers led to the growth of economic activity in the country and have helped bring more people into the world of banking and finance. The success of UPI is attributed to its inherent attributes, such as the secure and convenient way of transactions and digital devices.

Digital finance has revolutionised banking, enabling customers to access services from digital devices (Ravikumar, T., 2019), regardless of their location and time (Chavan, J., 2013). This has dramatically increased financial inclusion among the unbanked population by reducing the reliance on physical cash and traditional banking infrastructure (Bali, S., 2021). Similarly, Fin-tech companies have played an important role in promoting financial inclusion by providing access to digital payments through Unified Payments Interface (UPI) (Badrudin, A., 2017). These companies have enabled the widespread adoption of UPI and are helping promote financial inclusion in India and beyond (Raj, B., & Upadhyay, V., 2020).

How does UPI work?

Figure 1: UPI work ecosystem



(Source: Review of Literature by authors)

The sender, using his mobile application, sends the payment request. The sender payment service provider forwards this request to the National Payment Corporation of India (NPCI). From there the request is forwarded to the receiver payment service provider. Once the address is verified on the receiver

side, the information is sent to the NPCI server. Further, the NPCI server requests the receiver bank to credit the transaction. After this, information is sent back to the NPCI server. Here, NPCI debits the bank account and responds back to UPI. Later sender gets transaction completion messages.

Security and UPI.

UPI follows a two-step authentication process. In stage 1, customers enter the mobile application (Google Pay, Phone pe etc.) using the 4-6 digits Personal Identification Number(PIN). Once the PIN is accepted in stage 1, the Customer logs into the UPI services. After that, a customer performs transactions such as bank transfers, mobile number-based payments, QR code-based payments or utility bill payments. To validate the transaction, customers are asked to enter the bank transaction PIN. The whole process ensures the security of transactions ((Lakshmi, K. K., Gupta, H., & Ranjan, J.2019). Due to enhanced security features, customers access digital financial services such as savings, credit, and investments conveniently (Malladi, CM, Soni, RK, & Srinivasan, S, 2021).

UPI and Weaker section of Indian society

The weaker section of Indian society was away from banking services due to entry barriers. The Know Your Customer (KYC) details, Minimum Account Balance(MAB) requirements, transaction fees and processing charges. Another major reason for the weaker section of Indian society away from financial inclusion was financial literacy. The lack of financial products and their benefits did not bring the masses to financial services. However, the Jan Dhan account and Direct Benefit Transfer(DBT) of the Indian government brought many weaker sections of people into the financial mainstream. In the aftermath of this large exercise, the government's launch of UPI was detrimental. The ease of use, availability of banking operations round the clock and proximity of services through smart devices boosted the confidence of weaker sections of Indian society. More than that, the lower transaction fee of UPI made them very popular in society.

UPI cost dynamics and financial Inclusions

The cost of service plays a significant role in service usage. The UPI cost of services varies from bank to bank. However, it was noted that NPCI, a central agency for UPI, does not charge for the transactions. Although the end customers' transaction cost is meager, payment banks charge merchants who accept UPI payments. The capital cost of establishing UPI infrastructure borne by NPCI. These costs were dedicated to establishing servers, mobile applications and backend systems. Further, UPI application development costs in India vary from lakhs to crores depending upon the user interface and services offered by various players in the market. The development costs rely on employee costs, design costs, functionalities costs, securities and compliance costs, and testing and maintenance costs. In India, launching UPI was very easy. The UPI company approaches NPCI and submits its application. They pay a meagre Rs 10000 registration fee to launch their application. Thus, the development of UPI infrastructure, applications, and services offered are at a significantly low cost. This ensured the lower cost of operations to UPI and transaction costs to customers. This has enthused many Indians to experience the UPI resulting in higher financial inclusion.

Ease of operations and Financial Inclusion

The UPI revolution in India ensured that customers did not carry serious cash with them; instead, they were willing to pay more with UPI. The instant payment and security features made UPI a grand success in India (Pandey, A, Kiran, R, and Sharma, RK,2022). The removal of operational bottlenecks of physical banking by UPI companies got an overwhelming response from customers, and they began using the digital payment system, which is the prime example of digital finance in financial inclusion. Moreover, the rural population benefited more than the urban population in India by not necessarily visiting the physical banks.

On the flip side, UPI requires multiple steps to complete the transactions. This has become a

blockage for rural people to use UPI. Neelam, K, & Bhattacharya, S (2022) expressed that multiple steps transactions put rural customers away from transactions and defeated the purpose of financial inclusion. The authors also stressed a bridging solution that completes transactions in an obstruction-less environment in one or two steps.

Business growth via UPI and financial inclusion

The robust growth with a bunch of exciting services offered by UPI applications in the secured environment encouraged customers to buy more goods and services. This is evident from the significant growth ensured by small businesses in India. Hence, it ensured improved financial inclusion in India.

Infrastructure bottlenecks in rural areas for financial inclusion.

UPI growth story in a few rural areas broken by poor telecom infrastructure. Even though telecom service penetrated nooks and corners of India, the availability of networks through at high speed is still a problem. On the other hand, lack of UPI awareness and merchants' reluctance to enable UPI payments to have not accelerated at the pace the government expected. This resulted in the gap between rural and urban population financial inclusion in India (Kandpal, V, & Khalaf, OI, 2020). Hence, the intermediary role by the government is essential to ensure digital infrastructure development at breathtaking speed (Croxon Et.al, 2022). If digital infrastructure is developed in the stipulated period, it can assist with poverty reduction and economic growth in rural areas, providing opportunities for development (Sharma, M, Shrivastava, D, & Jain, P, 2021).

Government Support for UPI-based Financial Inclusion

The government has launched several initiatives to promote the use of digital payments and UPI-based financial services, to further the cause of financial inclusion in the country. These initiatives have opened up digital finance services for a large section of the population that previously lacked access to formal banking and digital payments (Prasad, M, 2019). Through digital finance, users can benefit from digital

banking services such as transfers, bill payments, insurance and much more. This has improved India's financial inclusion and digital economy by making digital finance widely accessible, providing a secure and simple payment mode, and increasing financial literacy among the citizens (Agarwal, S, Qian, W, & Tan, R, 2020). This includes providing subsidies for digital transactions and incentivising banks to offer digital banking services in order to enable financial inclusion (Sarkar, KK, & Thapa, R, 2021). Digital finance offers an array of convenient services that can make banking easier and more accessible to a greater number of citizens. This is especially beneficial for those that lack access to traditional banking services, allowing them to take advantage of digital payment options. By encouraging digital financial inclusion, digital finance can help bridge the digital divide, providing those in rural or remote areas with access to digital banking services and other digital payment facilities (Dabbeeru, R, Rao, DN, & Gulati, K, 2022).

It also includes encouraging banks to offer low-cost accounts with minimal paperwork, enabling more people to access financial services. Additionally, financial inclusion also includes providing access to a wider range of financial services, such as payments through UPI and other digital payment methods, enabling more people to access these services. It also encourages banks to offer low-cost accounts with minimal paperwork, ensuring that those who do not have the resources to engage in traditional banking can still benefit from financial services.

Success Stories of UPI-driven Financial Inclusion

UPI-driven financial inclusion has enabled millions of Indians to access banking services, regardless of their location or economic status. This has helped bridge the gap between the banking haves and the have-nots, thereby providing people with limited resources with access to financial services. Financial inclusion thus empowers the unbanked population by providing them with convenient outlets to make payments, receive money, transfer funds, and apply for loans and other banking services. It also helped create a level playing field in terms of access to banking services amongst people at different socio-economic levels.

Further, it has helped many small businesses to grow by providing them with access to working capital and digital payment solutions. More than all these, financial inclusion has revolutionised the banking system by allowing those who have been traditionally excluded from formal financial services to gain access to them. This means that more people and businesses are now able to benefit from the advantages of formal banking, such as transfer of funds, making payments, and receiving credit (Kherala, H, 2019). Additionally, financial inclusion has helped to reduce inequalities in access to credit, and it is becoming increasingly important for economic development. With Financial inclusion, individuals, small businesses and entrepreneurs are able to increase their savings, access cheaper money transfers and open new opportunities for growth. Furthermore, UPI-based payments have made it easier for people to pay bills, transfer money and make purchases from the comfort of their homes. However, UPI-based payments have furthered financial inclusion by making it easier and more convenient for people (Thirupathi, M., Vinayagamoorathi, G., & Mathiraj, S. P., 2019) to manage their financial transactions from the comfort of their own homes. This has allowed more people to access banking services (Kakadel, R. B., & Veshne, N. A., 2017), and they no longer have to worry about carrying cash with them. UPI is an important step forward in the journey of financial inclusion (Sarkar, A, & Swami, OS, 2020).

Interrelation between Parameters of Financial Inclusion Index and UPI

Reserve Bank of India presently considers the financial inclusion index which is the composition of three dimensions of financial inclusion. First, "Access" to accounts, which measures the percentage of adults with an account at a formal financial institution; Second, "Usage" of accounts, which measures the frequency of transactions made through these accounts; Third, "Quality" of the account, which measures the level of functionality of the account and the availability of electronic transaction capabilities. There are 97 indicators which span over all these parameters. Twenty-six indicators belong to

construct, sub-index "access", 52 indicators belong to the sub-index "usage", and 19 indicators belong to the sub-index "quality". The FII is a useful tool for policymakers and other stakeholders to identify areas where financial inclusion can be improved and to monitor progress over time. A higher score on the FII indicates a higher level of financial inclusion in a country.

Methodology

Researchers conducted descriptive research to gain valuable insights into the impact of UPI on financial inclusion. The research information was gathered from varied secondary sources such as newspapers, websites, and journals. Since there are so many research studies proven access, usage and quality of financial services uplifted by UPI (Rastogi, S., Sharma, A., Panse, C., & Bhimavarapu, V. M. 2021); (Lakshmi, K. K., Gupta, H., & Ranjan, J. 2019) (Kumar, U., 2021) it is clear that there is a high positive correlation between access, usage and quality of financial services and UPI. In the meantime, RBI came out with a Financial Inclusion Index with the same "Access, Usage and Quality" as sub-indices, which will be a totality of 97 indicators. In this article, researchers considered Access, Usage and Quality for bridging the gap between UPI and Financial Inclusion Index. Further, researchers identified that 'Value' and 'Volume' of the UPI systems are crucial for financial inclusion and worked on the impact of these two values on financial inclusion. Hence, UPI e, researchers used linear regression analysis to infer the sample study results for the population.

Discussions

Researchers considered the past six years of data pertaining to the financial inclusion index value, The banks on UPI and the volume and value of the transaction. The detailed statistics are given below (Table 1)

Table 1: Financial Inclusion index developed on the number of banks, the volume of transactions, and the business value among buyers.

Month	Financial Inclusion Index Value	Total No Banks on UPI	Volume (In Million)	Value (In Crore)
March 2022	56.4	314	5405.65	9,60,581.66
March 2021	53.9	216	2731.68	5,04,886.44
March 2020	53.1	148	1246.84	2,06,462.31
March 2019	49.9	142	799.54	133460.72
March 2018	46.0	91	178.05	24,172.6
March 2017	43.4	0	0	0

Source: Combining FII data available in RBI and UPI data available in NPCL

Since March 2017, there has been a steady growth in the financial inclusion index value. Similarly, the government and the reserve bank of India encouraged the number of participating banks to go up from 0 to 314 in 2022. As the number of banks involved enhanced in the financial inclusion, volume and value ascended to an all-time high, touching a whopping 5405 million and 960581 crore, respectively, value and volume transactions.

Researchers were interested to know the UPI value versus volume growth in UPI and its impact on financial inclusion. They conducted a regression analysis to know the impact of UPI value on volume (Table 2)

Table 2: Regression Statistics of UPI value versus volume analysis

Multiple R	R Square	Adjusted R Square	Standard Error	Observations
0.9966	0.99328	0.99315	125.46	Fifty-five days of data across six months.

Adjusted R square value has shown higher significance with 0.99 for 55 days of data across six months of the research scope. Further, researchers conducted an Analysis of Variance between the value and volume of UPI transactions for inclusion and found that (N+ 53, p<0.05 F= 7840) there is a significant influence of the value and volume of the financial transactions.

Table 3: ANOVA between value and volume of transactions

ANOVA					
	df	SS	MS	F	Significance F
Regression	1	1.23E+08	1.23E+08	7840.10	0.0000026
Residual	53	834330.1	15742.08		
Total	54	1.24E+08			

(Source: Primary data)

Researchers arrived at the equation financial inclusion = volume of the transaction + Intercept.

Table 4: Regression equation of the research.

	Coefficients	Standard Error	t Stat	P-value
Intercept	-74.17121527	24.48538	-3.0292	0.003784217
Volume	1.859897752	0.021005	88.54435	2.85371E-59

(Source: Primary data)

Y= 1.85x- 74.17.

From the analysis, it is clear that the value of UPI transactions can be predicted based on the volume of transactions by applying the above regression equation. Since it is clear that RBI Financial Inclusion Index is also positively correlated with both value and volume of transactions, Financial Inclusion Index is strengthened with the exponential growth of UPI transactions.

Conclusion

Financial inclusion is essential to eliminate poverty and promote economic growth around the world. Fin-tech is playing a vital role in this process, providing access to financial services for those who were previously excluded from the financial system. Fin-tech companies are leveraging technology to create innovative products and services that are more accessible and affordable than traditional banking options, opening up the world of finance to more people than ever before (Ranade, A, 2017). Fin-tech is enabling individuals and businesses to take control of their finances, build credit histories, access new markets and drive economic progress. The potential of Fin-tech to empower people is limitless, and its impact on financial inclusion will be far-reaching.

With more people having access to financial services, they can save, invest and secure their financial future. A major step towards achieving this is by improving financial inclusion, especially in developing countries. UPI plays a crucial role in this regard as it enables quick and secure money transfers without the need for a bank account. This makes it an ideal payment solution for individuals and organisations who may need access to traditional banking services. UPI's ease of use has resulted in its rapid growth, and its adoption is helping to expand financial inclusion globally.

Governments around the world should prioritise policies that enable better financial inclusion so that everyone can benefit from a fair and equitable financial system. Also, governments worldwide should prioritise policies that enable better financial inclusion for all so that everyone can access and benefit from a fair and equitable financial system. Financial inclusion should thus be a cornerstone of national and international policy agendas to ensure that no one is left behind and to provide opportunities for all. In conclusion, the Unified Payments Interface is enabling financial inclusion in India and creating an easier, safer, and more secure way to pay digitally. UPI has opened up opportunities for people to access financial services from anywhere and at any time,

which is a major step towards realising India's goal of a cashless society. With the UPI continuing to grow in popularity and acceptance, the future of digital payments in India looks very promising indeed.

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