Importance of UPI in Socio-Economic Development: An Empirical Study

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The COVID 19 pandemic has developed to be a potential threat to the performance of Indian economy and financial development. To contain the spread of Corona Virus Indian government took various steps that included the implementation of nationwide lockdown and digitisation in financial system. It has been proved that digital transactions have emerged to be great support for common citizens by helping them to complete their monetary transactions with the help of the internet and various e-commerce platform. There has been an increasing trend in the number of digital transactions right from the start of the Covid 19 period . A different form of digital payment called Unified Payment Interface systems has seen a massive rise in its volume of the transaction from 1 billion in April 2020 to a high of 1.5 billion in July, 2020. This research aims to identify the trend analysis on rapidly increasing UPI payments during and post Covid 19 period and its impact on financial inclusion in our country. This research is performed a Cluster Analysis using k means algorithm among popular UPI platforms on the basis of their transaction volume in million and its value in cores. Our research has also found that the transaction value and volume of UPI transactions have significantly increased in the post covid period has positively contributed and associated in financial inclusion. This research has been restricted on socioeconomic development of our country.

Keywords: Financial Markets, UPI, Digital Payment, Digital Transactions, Financial Inclusion

1. Introduction

COVID-19 struck as a deadly disease bringing a halt to the entire economic system of operations worldwide. This infectious and fatal disease resulted in panic worldwide, and our government imposed several strict measures like declaring a nationwide lockdown in order to prevent the possibility of transmission of the virus. The health leaders and experts suggested that a potential solution to prevent the spread of the virus is by maintaining a social distance from individual contact. Administrations of several developed and developing countries restricted movement in the country by initiating total lockdown and requested the citizens to stay at home. Numerous nationalized and private banks, financial institutions urged their customers to use internet banking and to select online based shopping platforms for daily usage. Various digital banking techniques gained popularity right from the time of demonetization. One of the popular platforms was UPI (Unified Payment Interface). A Unified Payment Interface (UPI) is a platform that operates as a smartphone-based application that empowers the users to make transactions between several accounts. UPI is a unique payment system initiated by the National Payments Corporation of India (NPCI) and it's regulation is operated by the Reserve Bank of India (RBI) which enables the process of immediate transfer of funds between several bank accounts with the help of various applications`. UPI emerged to be one of the most popular digital payment methods during the Covid 19 period with a record number of transactions performed through this platform. The study aims to conduct a trend analysis on rapid increasing of UPI payments during and post-covid period, as well as the number of banks directly and indirectly participating in UPI and its role as an enabler of financial inclusion in India.

2. Salient Features of UPI

- Strictly follow a standardized setting for Banks, financial institution and different segments of customers.
- Use basic smartphones and apply different mobile application with linking of all bank accounts through internet.
- Immediate transfer of money among financial platforms through Immediate Payment Service (IMPS), which has a faster mechanism than National Electronic Fund Transfer (NEFT).
- This platform is one of the easiest replacements for any kind of cash transaction and everyone can use it within 24 hours including public holidays.
- Uses QR codes for payments among different financial systems through these applications.

3. Benefits Arising from UPI System

Banking System

- It uses Single click for two factor authentication among different customer segments for performing different transactions.
- Uses Universal Application for different transactions and leverages existing infrastructure for performing financial transactions across financial system.
- It is a safer, secured and innovative, user-friendly application for performing financial transactions.

Customer Segments

- The system has rounded the clock availability and UPI has a single application for accessing different bank accounts instantly for future transactions instantly.
- Authentication with the help of virtual ID is more secure, there is no need to share credentials and the system uses Single click authentication for smooth performing of financial transactions.

Merchant Segments

- No risk is associated with storing of virtual address of the customers like it is done in case of other cards or accounts.

- Helps to transact with customers not having credit/debit cards and the system is suitable for any e-Commerce transaction.
- It resolves the cash on delivery (COD) and In-App Payments (IAP) problems.

4. Different UPI Payments Apps

UPI (Unified Payments Interface) is emerging to be one of the most chosen platforms for digital transactions in India. Various several applications provide users with online payment facility and various banks have collaborated with UPI platforms and as a result the UPI transactions can be done by customers with the help of bank applications. Many mobile wallets are now providing the option for UPI payments.

Here are various applications that provide UPI features in our country namely

PhonePe: PhonePe is extremely popular app among different customer segments and provides different option to make UPI payments. This is one of the most popular apps for UPI applications. The app was founded in 2015 and is powered by Yes Bank and Axis Bank in financial system.

Google Pay: Google Pay is built on the basis of fulfilment of different mobile application using UPI application. With an UPI-enabled wallet, it is possible to send and receive money without requiring any specific bank accounts. GooglePay can also be used to pay and receive money instantly using the existing bank account details. Google Pay can be used to perform transfer money instantly, make payment for different types of bills like phone, electricity etc., and make payment for businesses like DTH, food delivery etc.

Paytm: Different mobile wallet applications-based company has made a joint collaboration with the UPI platform to provide customers different types of facilities to transact and transfer funds in a convenient manner. It is possible for customers to easily send money into different Paytm wallets with distinct UPI ID. It is possible for customers to make payment and they can also collect money requests through Paytm with UPI based platform. After the remittance the system automatically accepts the payment request, the money is added to the Paytm wallet.

BHIM App: The National Payments Corporation of India (NPCI) has developed the BHIM (Bharat Interface for Money) app for different customer segments. This app is identified for its simplicity and user friendliness. It also offers a very secure interface. The payment interface comes with all the important features and is known for its good user experience. Funds transfers can be executed either through VPA, QR code, and different bank accounts number using different IFSC Code.

MobiKwik: These Indian payments network is also a part of the UPI interface. All Mobikwik customers can utilise the service of UPI to to transfer money into their wallet. There are various types of services such as fund transfer using debit/credit card, net banking, cash pickup and cash deposit etc are easily possible through this application. The e-wallet service provider also has tied-up with various e-commerce merchant for smooth performing of financial system.

5. Key Drivers for Growth of UPI Payments

- Change in customer payment behaviour which is now showing a huge inclination towards digital payment system.
- Integration of different payment modes which is facilitated by FinTechs and PayTechs led to ease using of different resources. During Post COVID, cash transactions have substantially reduced, resulting in ATM usage growing at a very slow pace. Urban and semi-urban areas may witness a sharp shifting from ATM usage to other digital modes of payment networks.
- Different Government initiatives have promoted digital payments which are major factors promoting UPI payment and its popularity among different systems.
- Digital payments are essentially enabled for a business on its website/app by a payment gateway. Once anyone has chosen the right payment gateway, all the transaction-related processes are taken care of by different service provider.
- Extensive use of smart phone with high-speed internet among the people has been considered a primary factor for increase of rapid UPI payments.

6. Literatures Review

Harikumar et.al. (2022) opined that there is a significant impact of Covid on the adoption of cashless methods among the general public of India. Technological advancement in banking has enabled world wide access and permitted the users to make any financial transactions at any time by single click. In this era of globalization, Indian company, small shops to individual do business and various other transactions using e-banking as opined by Gopinath et.al. (2022)**.** According to Jawada et.al. (2021) pointed out that there was rapid increase in UPI payments during Corona Virus lockdown, people prepared to use UPI instead of cash and UPI payments helped to ensure social distancing. According to Rastogi et.al (2021) recommend that digitalization through UPI is necessary to support the goal of financial literacy and eventually financial inclusion and economic development of the country. Indoria & Devi (2021) opined that in contrast to all of payment systems it can be say that UPI is the most advanced payment system in the world. Jain & Sarupria et.al (2020) revealed that during the COVID-19 outbreak where people were compelled to stay away from public gatherings, a substantial increase in orders placed on ecommerce websites has been observed especially in cases of apps that provide various food and entertainment services. Singh and Malik et.al. (2019) recommended that there is a critical and potential innovative support for Indian companies to enable active, fastest technology transfer in digital payment system and connect this innovation in research and developments to drive the financial presence among different customer segments.

7. Scope of the Research

An extensive analysis of the literature review reveals that there has not been much study done on the growth of UPI payments in Covid and post Covid period. The scope of the research includes analysing the growth of UPI payments in Covid and Post-Covid period and to analysing its impact on the system of financial inclusion in India.

Objectives of the Research:

1. To conduct a trend analysis among increasing UPI payments during and post Covid 19 period.
2. To study a trend analysis of the extent of banks participating in UPI payments during and after the Covid 19 period.
3. To analyse the impact of UPI on financial inclusion in our economic system.
4. To study the importance of India as an emerging leader and hub of UPI transactions.

8. Methodology

This research has been conducted based on secondary data. Researchers have considered data for this study for three consecutive years i.e., 2020, 2021 and 2022. The following type of analysis has been conducted in our research:
Analysis of growth among UPI transactions in Covid and post-covid period and simultaneously evaluate growth in the banking system for active participation in UPI transactions. Researcher also performs cluster analysis among UPI apps based on their volume and number of transactions.

9. Discussion and Analysis

The entire analysis is divided into 5 major sections. First section highlights the trends among UPI transactions over different periods and researcher also performs SWOT Analysis based on UPI applications. The second sections depicts role of UPI in financial inclusions. Third sections points out a brief analysis of UPI usage in rural areas of our country. Section four highlights top 5 countries among the world which are very much familiar in digital payment system. Section five performs a cluster analysis among popular UPI apps based on their volume of transactions (million) and value of the transactions (crores). This section also highlights contribution of UPI in the growth of Fintech start-ups in India.

Trend analysis among UPI transactions

The total no of banks and financial institutions directly involved in UPI transactions have been analysed over three consecutive years, namely 2020, 2021 and 2022 (based on availability of data) and simultaneously analysed trends between two successive years have been depicted in Table 1.

Table1 *Trend Analysis in UPI Transactions among Three Consecutive Years*

Months	No. of Bank on UPI in 2020	No. of Bank on UPI in 2021	No. of Bank on UPI in 2022	Trend Analysis	Trend Analysis
				2020-2021	2021-2022
March	148	216	314	46%	45%
April	153	220	316	44%	44%
May	155	224	323	45%	45%
September	174	259	358	49%	38%
October	189	261	365	38%	40%

***Source**: National Payments Corporation of India (NPCI)*

Interpretation of the data in Table 1 shows that there has been the highest increase of 49% growth between 2020 and 2021 in the month of September. Between 2021 and

2022, there has been a highest growth of 45% in the month of March and May respectively.

The total value of UPI Transaction over three consecutive years, namely 2020, 2021 and 2022, have been analysed and simultaneously depicted trends over two consecutive years have been pointed out in the Table 2.

Interpretation of the data in Table 2 shows that there has been the highest amount of 69% growth between 2020 and 2021 in the month of April, and between 2021 and 2022, there has been a highest growth of 62% in the month of October.

The total value of UPI Transaction to digital payment system has been analysed in the month of March among three consecutive years, namely 2020, 2021 and 2022 and simultaneously depicted growth and contribution over two successive years have been pointed out on Table 3.

Table 2 *Trend Analysis of Transaction Value (in Crores) among Successive Years*

0.3	Value in 2020	Value in 2021	Value in 2022	Trend Analysis 2020-2021	Trend Analysis 2021-2022
Mar	206462.31	5,04,886.44	9,60,581.66	144%	90%
April	151140.66	4,93,663.68	9,83,302.27	226%	99%
May	218391.60	4,90,638.65	10,41,520.07	124%	112%
Sep	329027.07	6,54,351.81	1,116,438.09	98%	70%
Oct	386106.07	7,71,444.98	1,211,587.50	99%	57%

Source: *National Payments Corporation of India (NPCI)*

Table3 *Contribution of UPI to Total Digital Payments (In Billion)*

	20-Mar	21-Mar	Growth	22-Mar	Growth	Contribution of UPI on total Digital Payments
UPI Transactions	1.2BN	2.7 BN	119%	5.4 BN	98%	68%

Source: *National Payments Corporation of India (NPCI)*

The above Table depicts the rise of UPI transactions by 119% from 1.2 billion in the month of March 2020 to 2.7 billion in 2021 and 98% from the month of March 2021 to 2022respectively.

SWOT Analysis based on UPI Applications

SWOT analysis is an effective strategic tool that can be used efficiently to assess the possible strengths, weaknesses, opportunities, and threats of any businesses particularly e-commerce-based business (Benzaghta et.al, 2021).This strategic framework is to develop different ways for creating a firm's long-term sustainability-based business model, which better matches an organization's resources and capabilities, credibility’s of its operational environment by evaluating it’s positive and negative elements that affect the firm's success, both inside and outside of the economic system (Aithal et.al,2015).

Strengths

- UPI allows all small business merchants to accustom and accepting digital payments without the need for a point of sale (POS) particularly in India, where payment infrastructure is very poor initially for accepting digital payments, now is increasing at a rapid space with help of modern technology.
- UPI operates on a safe, stable, and robust platform that includes numerous security features that make it more secure than that of any other payment system which is currently in operational stage. Biometric authentication in UPI will not only make the payments more reliable but also mark a significant step forward in the integration of next-generation technology with current payment systems with artificial intelligence mechanism.
- In developing countries, digital financial transactions contribute significantly to reduce corruption and reduction in the contagion of the parallel economy.
- Multiple identifiers, such as customised Virtual Payment Address (VPA), 12-digit AADHAR Number allotted by Unique Identification Authority of India (UIDAI) or unique account number of financial institutions, and Indian Financial System Code (IFSC) can be used to smooth performing payment system across different segments of customer.

Weaknesses

- Payment settlement may be delayed due to bottleneck of technological disturbances, leaving a transaction to be interrupted due to rapid customization.
- Two-factor authentication like mobile and PIN verification may irritate the users in some cases and leads to make payment not successfully.
- Payments done through means other than Virtual Payment Address (VPA), such as account number and IFSC, are subject to the same cooling period as NEFT/RTGS transactions generally used in standard financial system.
- The greatest disturbing area using UPI is that the banks are not assisting customers properly regarding security issues and helps regarding this. The majority of fraudsters nowadays ask for money to be transferred via UPI transactions.

Opportunities

- A strong Banking network, and the simultaneously launching of digital India especially after demonetization, propelled and boost the country’s economy toward a cashless zone.
- During year 2020-21, the retail payment segment has seen growing rapidly with the help of digital payment services, leads to doubling transaction volume and value from 12.5 billion to 22.3 billion among 2020 to 2021 and from Rs 21.3 trillion to Rs. 41 trillion respectively.
- A large portion of the country's population lives in semi-urban and rural areas. So possible prospective consumer base in these geographical regions will rise as they gradually accustomed with internet and mobile phones which directly increase growth of UPI usage.
- As per the vision of RBI, 2021 is to build a strong digital payment ecosystem for indirectly generating a cashless economy. The government wants to reduce the

use of real currency by implementing easy digital payment channels across different financial system.

- To encourage the use of digital payments, the government has promoted different mechanism for UPI and RuPay-based payment platforms namely reduce the merchant discount rate, tax benefits etc.

Threats

- Awareness regarding UPI usage among the rural and semi urban people are very less and accustomed these citizens with different tools of cashless economy are really challenging to policy makers.
- Even though many e-commerce sites have adopted digital payment methods but in reality, majority of rural consumers still prefer to pay with cash. This trend is linked to concerns about cyber security in digital transactions across these regions.
- Strengthening the traditional banking system with latest technology-based customization to compete with tech generation companies i.e., FinTech Players are more challenging now a days to all UPI based applications.

10. Role of UPI in Financial Inclusion

The key contributor of countries economic transformation into digital payment landscape is Jan Dhan account no, Aadhaar number and mobile no. Pradhan Mantri Jan-Dhan Yojana (PMJDY) is one of the biggest financial inclusion initiatives in the country, launched in August 2014, to provide universal banking services for every unbanked household. The Aadhaar no, the Unique Identification Authority of India's flagship product, is a simple but effective method to verify individuals and beneficiaries based on their biometric information link with his mobile no for accessing real time information. The combination of Aadhaar and Jan Dhan accounts have helped to create the foundation of digital India and create benefits that helped to create benefits for citizens of India. A major goal of India's economic system is achievement of "Faceless, Paperless and Cashless" state of system and it has been promoted by Government of India at every stage. The promotion of digital payments has been accorded the highest priority by the Government of India (GOI) to bring each and every segment of our country under the formal fold of digital payment services.

Table 4 *Financial Inclusion Index*

FI Index	2017	2018	2019	2020	2021	2022
	43.4	46.0	49.9	53.1	53.9	56.4
Growth		6%	8.48%	6.42%	1.51%	4.43%

Source*:* *RBI Bulletin*

As per RBI report, there has been a significant increase in the value of Financial Index that has increased to 56.4 in March 2022 from 53.9 in March 2021 with growth witnessed across all related sub-indices. It has been observed that the annual FI-Index over the years has shown a constant increase with its value at 53.9 for the period ending March 2021 as compared to 43.4 for the period ending March 2017. (from reference Table 4).

An Analysis of UPI Usage in Rural Areas of India

There has been an enormous success that has been observed in the growth of UPI and that is not just confined to our economy but across world. It has been currently recorded that India has around 26 crore with the number of transactions exceeding 628 Cr and the value of transactions being around 10.63 Lakh Cr. A very effective measure has been adopted by the Reserve Bank of India (RBI)as it adopted the enablement of linking credit cards to UPI platforms like RuPay. Google Pay etc. leads to generating steady growth across rural India. However, there is a significant amount of growth among online payments left to be done in rural areas. 15% of transactions accounted for our online payment system and the number is steadily rising. India's rural infrastructure is slowly being digitalized and Indian Government is coming up with more initiatives like digital banking units to fulfil the faith among citizens in the digital banking system. The rise of UPI is also significantly increasing in rural traders and customers segment in recent years. A very significant trend has been observed that the average value of transactions for payments of UPI was INR 1,450 – which has a deep impact on the success of the digital revolution. This can be interpreted in a way that people are comfortable with using UPI platforms as an important tool for making transactions. There has been a huge development in the usage of UPI among the urban population and that is only going to grow steadily.

Table 5 shows the top ten states and cities where UPI transactions are widely used. Top five states and cities where UPI is widely used namely Maharashtra, Tamil Nādu, Karnataka, Andhra Pradesh, Kerala and Hyderabad, Bengaluru, Chennai, Mumbai and Pune respectively.

Table 5 *Top Usage of UPI among Different Cities and States*

Sl No	UPI usage among top states	UPI usage among top cities
1	Maharashtra	Hyderabad
2	Tamil Nādu	Bengaluru
3	Karnataka	Chennai
4	Andhra Pradesh	Mumbai
5	Kerala	Pune
6	Gujarat	Delhi
7	Delhi	Kolkata
8	Uttar Pradesh	Coimbatore
9	Telangana	Ahmedabad
10	West Bengal	Vadodara

Source: *Worldline*

Top Countries Among World in Digital Payment System

Table 6 depicted top five countries with real time payment transactions value in million among the world and simultaneously analysed growth between two consecutive years have been pointed out.

Table 6 *Top Five Countries with Real Time Payment Transaction (In Million)*

Country	Payment Transactions in 2020	Payment Transactions in 2021	Growth Among Consecutive Years
India	25.5	48.6	90.59

China	15.7	18.5	17.83
Thailand	5.2	10	92.31
Brazil	1.3	8.5	553.85
South Korea	6	7.3	21.67

Source*: RBI Bulation*

India has emerged to be a leader in digital transactions with 48 million transaction in the year 2021. This figure can be analysed as three times the number of digital transactions of China that recorded 18 million transactions, and India's digital transaction count was 6.5 times the volume of the US, Canada and the UK.

Cluster Analysis among Popular UPI Apps

K means that Cluster Analysis is forming groups from objects that are similar in nature and groups that are treated in a common manner form clusters

Cluster A			Cluster B			Cluster C		
Name of App	**Volume (Millions)**	**Value (Cr)**	**Name of App**	**Volume (Millions)**	**Value (Cr)**	**Name of App**	**Volume (Millions)**	**Value (Cr)**
Phonepe	3,452.87	5,93,759.02	Cred	21.28	20,259.70	Mobikwik	3.28	708.56
Google Pay	2,496.42	4,20,978.38	Bhim	25.49	8,523.17	WhatsApp Money	8.38	708.12
Paytm	995.34	1,33,620.54	Amazon Pay	56.42	6,060.50	Samsung Pay	5.09	554.33
-	-	-	-	-	-	Jupiter	2.18	280.43

Source*: Data from NCPI and Authors' Calculation*

This research is conducted a Cluster Analysis of popular UPI on the basis of their UPI transaction volume in terms of million and its value in terms of cores. The analysis has been conducted and constructed on the k means clustering methods and three distinct clustered are formed.

Cluster A comprises of different Apps whose total volume of UPI transaction is 6944.63 million and value of transactions are more than 12 lack cores. The Apps which are belongs to these cluster are namely PhonePe, GooglePay and Paytm that is most of citizen are frequently used these Apps. So, they are very much popular as user-friendliness' and very high popularity among citizen level.

Cluster B comprises of the Apps whose total volume of UPI transaction is 104.63 million and value of transactions are more than 24 hundred cores. The Apps which are belongs to these cluster are namely CRED, BHIM and Amazon Pay that is median no of citizen are using these Apps. So, they are moderately popular as its moderate user-friendliness' and popularities etc.

Cluster C comprises of the Apps whose total volume of UPI transaction is only 19 million and value of transactions are more than 35 thousand cores. The Apps which are belongs to these cluster are namely Mobikwik, Whatsapp Money, Samsung Pay and Jupiter etc. that is less no of citizen are using these Apps. So, they are least popular among citizens as its least user-friendliness' and less popularity.

List of Companies offering UPI Payments

There are several immensely popular UPI apps in India today. The most popular UPI apps that are very popular now, and different companies are offering them, namely Google Pay, AmazonPay, BHIM, PhonePe , UPI, , BharatPe, Paytm, Bank apps – ICICI, HDFC etc. Graph 1 shows a list of companies offering UPI payments are shown below.

UPI Contributes in the Growth of Fintech Start-ups in India

Approximately start-ups with valuation 21 billion-dollars in the environment are developing in our economy in year 2022 including various unicorn companies, and all of them have integrated into UPI solutions for a seamless experience across digitization platforms. Razorpay, CRED, PhonePe and Paytm are among popular companies in the UPI etc. PhonePe emerged as a leader in the UPI market with 47.7% market share in July 2022 and recorded value of transactions valuing INR 5.24 lakh Cr driving India towards achieving the goal of becoming a cashless economy in near future.

11. Conclusion

It can be observed that UPI transaction growth has increased substantially from March 2020 to March 2022. It has been observed that:

1. Volume of UPI transactions has significantly increased from March 2020 to March 2022.
2. The number of banks living on UPI has increased substantially from March 2020 to March 2022.
3. UPI plays a crucial role in financial inclusion and is a major component of digital payments in India. UPI has made a substantial contribution to the process of achieving the goal of making India a cashless economy.
4. India has proven to be the future hub of digital payments as a leader all across the globe, and the UPI system is giving India an edge to be a world leader in the arena of financial development.

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