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Unified Payments Interface System in Indian and Global Perspective

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Abstract: *Transaction is one of the best habits of human being which helped humans to survive and modernize. From the very beginning the mode of transaction changed from time to time and in 21st century the biggest change that happen in transaction system is the digitalization of it. UPI bring this digitalization of transaction system in India. It is one of the most convenient, advanced and safe transaction systems in the whole world. Due to this UPI witnessed a rapid growth and surpassed similar type of payments facilities within a couple of years. It also enables transactions of small amounts to happen digitally and has successfully created a new consumer behavior.*

Keywords: *Unified Payments Interface, Transaction, Retail, National Payments Corporation of India, Peer to Peer*

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INTRODUCTION: Ever since the humanity started becoming civilized, the process of transaction became its integral part of daily life. In the very early stage of humanity we learnt that we cannot fulfill all of our daily requirements ourselves and all the things that we can produce are not always needed. So we learnt to **EXCHANGE** things and that is how **TRANSACTIONS** began.

In the early stage people used to exchange their produced goods with another's (i.e. crop, art, garments, or other commodities) and fulfilled their needs. For example, Person A has two extra apples and person B has three extra bananas, now they exchange their fruits and enjoy both apples and bananas. This was known as **BARTER** system. The basic principle of barter system was **DOUBLE COINCIDENCE OF WANTS,** which means at least two persons need to agree on exchanging their products. But two parties can engage in this kind of transactions only when they can exchange the things that they require at that moment and satisfy their need. Now there are several problems with barter system like marketability of product, nature of product and quantity of product. Now to understand the problems here is an example.

Let us say that Mr. X is a herdsman and he needs garment, so he went to Mr. Y who is a waiver, now to make exchange of goods, Mr. Y should also need some animals, if he does not need any animals then no barter takes place. Secondly even if Mr. Y needs any animal, the amount of clothing he has to give in exchange of that will be huge and too much for Mr. X. So no barter takes place here. Now again let's say Mr. Z is a milk man, who needs a cow so he went to Mr. X, who is a herdsman. Now being a herdsman, Mr. X would give Mr. Z a cow but the amount of milk he has to take in exchange of that will be huge, and milk being perishable Mr. X will decline the offer.

Overall, it can be said that in **BARTER** system fair and equal exchange of value was not so much possible. Because of so much complications and problems the **BARTER SYSTEM** gradually ended.

In the 6th century BC, mankind learnt to use metals, because of the complications with BARTER system soon metal became their mode of payments. Primarily gold, silver and copper were the most used metals in this field.

This system was much better than **BARTER** system, and a fair and equal value of exchange was possible. However, it has its own problems. Like mining and exploitation of precious metals was being monopolized, carrying precious metals was subject to limited security, and in case of large transactions carrying so much metal was inconvenient also, then production of precious metals were also limited. But as trading were growing and metals were very limited, government started a new plan, which says people can deposit their precious metals with the

government and in exchange of that the government will give them different coins that would have different kind of seals on different metals of different sizes depicting different value and people will trade with them. It would be easy to carry and handle, and could curb malpractices and if they want metal back, they just need to present the coin worth of the value in front of the government, and the government promised them to give their precious metal back. This special coin is known as **currency.** It was a revolutionary change in the history of transaction. In case of India, **SHER SHAH SURI** first introduced **currency**.

This was the start of modern transaction era. However, as market emerges government needs to print and produce more and more notes and coins; first the government started producing coins with relatively cheaper and easily available metals. But the government realized that they have only a limited amount of stocks of gold but are producing huge numbers of currency which is more than the value of gold, so ultimately government ends the gold standard, and declares that the citizens needs to rely upon the promise of the government. And the currencies we use today are being circulated in the market on the promise of the government.

The currency circulation system that we use today is here on earth for quite a long time now. But in today's world of globalization, the currency system faces some major problems. In cash-based system user needs to physically carry the cash to make payments, which is not convenient in today's standard, Also carrying cash is subject to security concerns. To make this system easy we established banking system, where we can deposit our money with the bank, and if needed we can make payment through a specific legal tender known as check. But even that does not end the total problem as user needs to visit the bank quit often, losing precious time, and checks are also vulnerable.

To eliminate these challenges, during 1950's several banks and financial institutions came up with a new idea. They introduced a plastic card which would have a magnetic strip in it and carry the user data. Now if the user wants to withdraw money, they no longer required to visit the bank, but there will be several small booth facilitated with a machine, which will read the card and pay the user the amount they require, the machine in this booth is known as **AUTOMATED TELLER MACHINE (ATM),** and the card is known as **ATM CARD.** This system kept evolving since then. To increase the security the user data became encrypted and password protected, and in place of just a magnetic strip, a microchip was introduced. Later a new **POINT OF SALE (POS)** machine was introduced, which enabled the card system not just to withdraw money from **ATM** but card user can make payment through this with just a swipe and entering the pin.

In the 1990's with the rapid development of internet and information technology system, a new kind of payment system started. Basically it was the era of globalization and international trade was increasing day by day, which resulted in a more international payments. The old payment method took too long to make any payment process completed, and it required a lot of physical movement also. To make it easier and safe financial institutions came up with a technology. In this system every bank account holder can send their money to another person who has a valid bank account by just entering his/her credentials online through internet. In the beginning the user especially who sends money must possess a**ATM** card, and in case of international payments the same method is applied, but it was done under the supervision of **SWIFT.** In this whole system the user does not need to possess cash. So it was recognized as the beginning of **CASHLESS CULTURE.**

It is true that up to now society was moving towards cashless transaction, but this convenience comes at a cost, the card services company charge some amount every year, the banks charge service charge, the POS machine is costly and need regular maintenance and electricity and this is what we can call out as the challenges of this system, and also this is why these systems failed to cater the peer to peer transaction, specially people with very low amount of transaction value, in the countries with low per capita income, and small and micro businesses the POS system and online transaction system failed drastically. People here show no interest for going cashless. So it resulted in two parallel transaction system, one is cashless and other is cash based. The problem was even bigger because the number of cash-based transaction was much bigger than cashless transaction. While the cashless transaction was primarily done by business to business (B2B), the regular consumer still preferred the cash-based transaction.

The government around the world was also encouraging cashless transactions, as it is much cost efficient, easy to manage and monitor. It also helps different agencies to track activities in micro level, which were not possible before.

While many countries around the globe were trying to figure out how to solve this problem, it was **INDIA**, who comes up with a revolutionary solution. With previous experience with **RUPAY CARD** which became a success story itself, in 2016 the **NATIONAL PAYMENTS CORPORATION OF INDIA (NPCI)** comes up with **UNIFIED PAYMENT INTERFACE (UPI).** In this system a user just needs to have a valid mobile number, which is linked to their valid bank account, and a mobile phone (primarily it was launched for just smart phone, but from 08/03/2022 UPI for feature phone was also introduced). So, it is convenient and as it is

controlled by the central bank, so it is secure, and the service of UPI is absolutely free as of now.

The UPI system is new but it definitely has a lot of potential. And in this paper, we shall try to analyze whether UPI is really a game changer or not.

LITERATURE SURVEY: According to fortune magazine UPI is the biggest revolution in India after independence (source:*https://www.fortuneindia.com/enterprise/how-upi-is-making-indias-digital-economy-boom/105433*). But this revolution did not happen overnight. In 2008, NPCI was established with an aim to integrate all the existing payment mechanism (*https://www.npci.org.in/npci-profile#:~:text=National%20Payments%20Corporation%20of%20India,and%20settlement%20systems%20in%20India.*).

But In march, 2011 government data shows an average Indian makes only 6 digital payments in a year, that was the time when digital payments meant card based payment system where mostly master card and visa were used, but surprisingly data shows that in the same year India had over 1cr.+ merchants who would accept digital payments (mostly card based payments), but card based payments failed to be mainstreamed (source: *https://rbi.org.in/scripts/AnnualReportPublications.aspx?Id=1322*).

There were many reasons behind that, like complexity, if someone wants to make a payment via a card then the retailer must have a POS machine, and it should be connected to an electric source and internet, moreover if someone wants to send money online then the bank account details such as IFSC code, bank name, branch name, account number had to be disclosed, which makes the end consumer less confident. Again, every merchant had to pay a sum of money to the card vendor partners, in this case master card, visa. For the amount of transaction, sometimes this charge was a huge amount for a small shop, and after all this card-based payment system was very vulnerable to frauds. And because of these reasons digital payments did not get a momentum in India. To fulfill this gap RBI released a vision statement in 2012 (source: *https://rbi.org.in/Scripts/PublicationVisionDocuments.aspx*) for the upcoming

4 years, under which a safe, efficient, accessible, inclusive, interoperable, authorized payment system would be developed. This system also has to be the part of GREEN INITIATIVE (aim to reduce paper in domestic payment market) and this was the start of UPI system. In the year 2016 UPI was released for public use, and as the end product what we get is an amazing product which is free from most of the hassle of card based payment system. Like card based payments system UPI does not have those complexities, UPI works on mobile phones so, no POS machines are required, UPI is already linked to the bank accounts so no bank details need to be given, and it is less exposed to frauds. Moreover UPI is free and interoperable, that means we can make payment between two separate apps. That is why after the launch, UPI had seen exponential growth in India. As per ACI (source: *https://go.aciworldwide.com/Global-Payments-Report-india.html*) and GLOBAL DATA (source: *https://www.globaldata.com/media/banking/entry-privately-owned-new-umbrella-entities-disrupt-retail-payment-space-india-says-globaldata/*) in 2020 India has conducted 2550cr. UPI based transactions which was more than UNITED STATES and CHINA. The success of UPI was so big that in 2019 GOOGLE itself urged the UNITED STATES FEDERAL RESERVE to follow India's UPI examples and build 'FEDNOW'. According to ECONOMICS INTELIGENCE UNIT REPORT 2021, INDIA has emerged as a global leader in digital payments because of UPI based transaction (source: *https://country.eiu.com/India/ArticleList/Analysis/Economy*). In October 2021 UPI crosses 100 billion dollar transaction value (source: *https://economictimes.indiatimes.com/tech/tech-bytes/value-of-upi-transactions-crosses-100-billion-in-october/articleshow/87461168.cms?from=mdr*). In April, 2020 UPI transaction value was 218391cr. And within a year this value jumped to Rs. 493391cr. And in Oct. 2021 it records 7,71,444cr. According to the CEO of ZERODHA, NITIN KAMATH, UPI plays a significant role in IPO and capital market investments also. India is currently the biggest real time payments market in the world.

How UPI system works: Before UPI if any user wanted to withdraw his money from the bank account, or make any payment they needed to give direct instructions to the bank. For example, to withdraw money user needed to submit a cheque, or in case of online or digital transaction this debit access had to be given by the user directly to bank's portal.

But in case of UPI this whole work is done by a third party, an existing third-party company which already has user's permission and details would collect this access from user and transfer money from user's account to any other bank account. Now UPI is that platform where third party apps can collect debit instructions from user and submit it to the user's bank on behalf of the user, and all this system is secured by a backend system which facilitates this transaction and it is developed by NATIONAL PAYMENTS CORPORATION OF INDIA. Some of the

known third-party apps are GOOGLE PAY, AMAZON PAY, PHONEPE, PAYTM etc.

UPI made payments simple by removing the steps for entering bank account number, IFSC etc. A user just needs to put these details once when creating his/her UPI BASED VIRTUAL PAYMENTS ADDRESS, and after that the user just needs to put his / her virtual address. Now a user can link one single bank account with many third party payments apps, and for each app his / her address will be different but the password will be the same. As the payment shares a common platform, this virtual address is a modern "mobile first system" where physical cards are not used. This simple payment facility is one of the reasons of UPI's immense success, because for a country like India where digital literacy is low only a simpler facility like this can bring financial inclusion.

According to RBI, UPI is going to overtake MasterCard and visa very soon, and UPI transaction has increased by 13 times from the financial year 2018 to the financial year 2020, and the transaction value has increased by 20 times.

On April, 2016 only 21 banks were listed on UPI, compared to 316 banks on April, 2022

RESEARCH GAP: There are not much of studies or researches on UPI dedicatedly; a number of studies which happened are mostly related to the technological perspective, which in this case do not contribute much in our study. Although some basic articles in some newspapers have been published but those focus on the then contemporary or current situation or it was largely about some major achievements. There are some expert's opinion posts on the internet which talk about the future perspective of UPI and some are about how can UPI take over other digital fund transfer method which were useful but are not that much elaborative in nature. So, a serious fact based detailed comparative study on UPI has not yet been made and that is a serious research gap. In this paper we would try to fill this gap with a study that is based on numerical facts and figures.

OBJECTIVE OF THE STUDY: A digital transaction system is the first step towards a digital economy. It not only helps to grow a nation economically but also makes people live easier. Government can look after and monitor their resources more easily and a more detailed and factual data representation is possible. Digital transactions are easy to monitor and track and it helps to investigate, control and prevent corruption. But in a developing country like India digital transaction was limited only to the rich and urban people. In 2016, UPI was introduced to overcome these shortcomings of digital payments system faced by the entire world including

India. In this paper we will try to analyze if UPI is really a success or not. If yes then how does it compete with its competitors and which type of change in users' behavior it brings with it, and if it is a success in India can it compete at the world stage, what are its strong benefits that it offers to the consumer etc.

DATA SOURCE: UPI is developed and maintained by NPCI which is an initiative of the Reserve Bank of India. And as the policy of the union govt. most of the fiscal data are publicly available. In case of UPI all the necessary data is available in the websites of NPCI and RESERVE BANK OF INDIA. So, most of our data is taken from these web links and apart from them we have also used soma data from various websites and some paper articles.

RESEARCH METHODOLOGY: In this project most of the data that we have collected are from secondary sources, and apart from that we have talked to some people that we know using UPI payments system to understand their point of view and how much impact UPI really makes in consumers' behavior. However that part is very small and is only done to maintain a rationality in our observation.

First, we collected all the necessary data from different sources and then we shortlisted them, after that we rearranged them in a manner that would help us to interpret and the readers to understand. Then we tried to showcase those data graphically and in tables and interpret those continuously.

Observation and Analysis of present scenario: There is no doubt that UPI is one of India's best financial product but is it really a success? To make it clear I will try to analyze the data

UPI MONTHLY PRODUCT STATISTICS TRENDED		
MONTH	**NO. OF BANKS LIVE UPI**	**VOLUME (Mn.)**
APRIL, 21	220	2641.060
MAY, 21	224	2539.570
JUNE, 21	229	2807.510
JULY, 21	235	3247.820

AUGUST, 21	249	3555.55
SEPTEMBER, 21	259	3654.300
OCTOBER, 21	261	4218.650
NOVEMBER, 21	274	4186.480
DECEMBER, 21	282	4566.300

Table 01
(Source:https://www.npci.org.in/statistics/monthly-matrix)

UPI MONTHLY PRODUCT STATISTICS TRENDED		
MONTH	**NO. OF BANKS LIVE UPI**	**VOLUME (Mn.)**
JAN, 22	297	4617.150
FEB, 22	304	4527.490
MAR, 22	314	5405.650
APR, 22	316	5583.050

Table 02
(Source: https://www.npci.org.in/statistics/monthly-matrix)

Now if we see table 01 and 02 (these tables are of NPCI's monthly product statistics records) we can see that even after 6 years since its launch, UPI is still witnessing a steady and speedy growth in almost every month, not just that in just a year 96 new bank has joined the platform. The total volume of transaction per month also almost doubled in this same span of time.
Note, though this table shows about the growth of UPI But how does UPI stand to other electronic real time payment systems?

Electronic Payment Systems - Representative Data														
Volume in million, Value in Rs. billion														
Data for the period	RTGS		NEFT		CTS*		IMPS*		NACH*		UPI*		USSD**	
	volume	value	volume	value	volume	value	volume	value	volume	value	volume	value	volume (in thousand)	value (in Rs. thousand)
May-20					30.7	2600.1	166.7	1694			1234.4	2183.8	74.8	135483.1
Jun-20					49.6	4014.4	198.9	2069.5			1336.8	2618.2	84.6	145563.9
Jul-20					51.3	4174.3	222.1	2257.8			1497.3	2905.2	91	152898.5
Aug-20					52	4252.5	246.1	2351.4			1618.7	2982.9	92	150867.1
Sep-20					61.3	4851.1	279.6	2486.6			1800.1	3290.1	89.3	142715.4
Oct-20					64.3	5240.9	319	2746.4			2071.5	3860.9	97.1	159980.8
Nov-20					59.6	4943.8	339.1	2764.6			2210.1	3909.8	90.7	152466.2
Dec-20					71.9	6116.7	355.7	2923.2			2234.1	4161.6	87.8	141024
Jan-21					65.7	5506.7	346.6	2885.4			2302.6	4311.7	91.9	145628.5
Feb-21					63.6	5471.1	319	2752.3			2292.8	4250.5	81.5	130329
Mar-21					80.7	7219.6	363.1	3272.3			2731.6	5048.7	94	145639
Apr-21					55.8	5533.6	323	2995.3			2641	4936.5	96.1	147115.5
May-21					36.8	3001.7	279.8	2662.4			2539.5	4906.2	101.2	161368.1

Table 03

(Source: https://www.npci.org.in/statistics)

As we can see in table 03 (this is a comparative table depicting comparison between different digital transaction system in India), data showing from May 2020 to May 2021, we can see that overall digital transaction is increasing, which is a good sign for new age payment system.

But what is more noticeable is UPI's growth among them, if we observe closely, we can see that UPI already has an upper hand in digital fund transfer compared to IMPS (Immediate Payment Service), but it was far less than CTS (Cheque Truncation System). Now what is notable here is that IMPS was the most used peer to peer individual transaction system before UPI. Of overtaking IMPS proves that users are not reluctant if a better system is available. Whereas CTS was mostly used in official purposes and per transaction value of CTS is much more than others. Also, the total value of transaction in case of CTS are also more than UPI, and it was only in may 2021 UPI beat CTS in total value of monthly transaction, though it is not clear if UPI can sustain this upper hand.

From the above data we can clearly see that in terms of individual fund transfer UPI already has an upper hand and it is growing in the fastest way.

(Note: Both RTGS and NEFT are not included in the list because minimum limit of RTGS is 2,00,000 and offline banking support is needed and NEFT is a payment system used for bulk payments)

Till now it is quite clear that the main focus of UPI is retail payments, so how does UPI stands in front of different platforms?

Now, UPI was launched in 2016 for public use and till then IMPS was the most used peer to peer digital fund transfer platform, if we look at table 04, we can see that in financial year 2016-17, we can see that people used to with draw money from ATM most at 3170 million no. of times (value of Rs.10818.39 billion), and this was the time when depositing money through

ATMs were not introduced, whereas IMPS was comparatively much below at 506.84 million (value of Rs. 4116.24 billion). But whereas the no. of transactions were low in IMPS compared to ATM, volume of IMPS was far more than ATM. Now this analysis makes us come to another conclusion that till 2016 people were not using online fund transfer service that much specially on peer to peer basis, people used to withdraw cash from ATMs and then spend them in the market, so the habit of digital payments were not build till then. And digital payments were limited to business firms only

Although it was the same year when UPI was launched but the size of UPI payments were barely minimum of just 17.86 million transactions for the value of just 69.47 billion.

Comparison of growth of different NPCI operated systems

Comparison of growth of different NPCI operated systems

Sr. No.	NPCI Operated Systems	F.Y-2016-17		F.Y-2017-18 (Apr'17 to Mar'18)		F.Y-2018-19	
	Financial Txns:	Volume (in Mn)	Value (in Bn)	Volume (in Mn)	Value (in Bn)	Volume (in Mn)	Value (in Bn)
1	**NFS - National Financial Switch**	3,170.18	10,818.39	3,503.44	13,357.49	4,017.42	15,125.64
1.1	*NFS - ATM Cash Withdrawal **	3,170.18	10,818.39	3,503.44	13,357.49	4,017.41	15,125.62
1.2	*NFS - Cash deposit transactions*	-	-	0.00	0.00	0.01	0.02
2	**NACH- National Automated Clearing House**	**1,968.03**	**7,207.84**	**2,375.33**	**9,752.88**	**2,861.38**	**13,383.60**
2.1	*APBS Credit (Disbursement based on UIDAI No.)*	949.28	286.63	1,298.18	559.65	1,494.90	862.26
2.2	*ACH Debit*	88.39	1,479.84	211.05	2,789.01	421.03	4,794.58
2.3	*ACH Credit*	730.73	3,844.25	703.27	5,210.42	883.43	7,296.73
2.4	*NACH Credit*	1.47	27.05	-	-	-	-
2.5	*NACH Debit*	198.16	1,570.08	162.84	1,193.80	62.02	430.03
3	**CTS Cheque Clearing (Processed Volume)**	1,111.86	74,035.22	1,138.06	79,451.24	1,112.07	81,535.92
4	**IMPS**	506.84	4,116.24	1,009.84	8,924.98	1,752.91	15,902.57
5	**RuPay Card usage at (POS)**	195.22	289.95	459.55	488.23	695.02	808.23
6	**RuPay Card usage at (eCom)**	87.56	59.34	208.11	166.09	432.06	366.90
7	**AEPS (Inter Bank) Txn over Micro ATM (e.g. Cash wi**	16.29	22.82	106.27	269.17	254.47	678.31
8	**BBPS (Bill Payment passing through BBPCU)**	0.03	0.04	10.60	10.98	73.50	90.99
9	**UPI - Unified Payments Interface**	**17.86**	**69.47**	**915.23**	**1,098.32**	**5,353.40**	**8,769.70**

Table 04

(Source: https://www.npci.org.in/statistics)

Business transactions (where transaction in bulk and in comparatively big volume is being done were still happening under NACH (National Automated Clearing House) and CTS (Cheque Truncation System), where NACH has higher no of transaction, but CTS still leads the ways with much higher volume per transaction. Also compared to all of this CTS has the highest volume by far

Note:

1. The National Payments Corporation of India (NPCI) has implemented an electronic payment service termed as "National Automated Clearing House (NACH)" for banks, financial institutions, Corporates and Government Departments. NACH has both Debit and Credit variants. NACH (Debit) & NACH (Credit) aims at facilitating interbank, high volume, debit/credit transactions, which are bulk and repetitive in nature
2. Truncation is the process of stopping the flow of the physical cheque issued by a drawer at some point by the presenting bank end-route to the paying bank branch. In its place an electronic image of the cheque is transmitted to the paying branch through the clearing house, along with relevant information like data on the MICR band, date of presentation, presenting bank, etc. Cheque truncation thus obviates the need to move the physical instruments across bank branches, other than in exceptional circumstances for clearing purposes. This effectively eliminates the associated cost of movement of the physical cheques, reduces the time required for their collection and brings elegance to the entire activity of cheque processing.

Comparison of growth of different NPCI operated systems

Sr. No.	NPCI Operated Systems	F.Y-2019-20	
	Financial Txns:	**Volume (in Mn)**	**Value (in Bn)**
1	**NFS - National Financial Switch**	4,311.62	16,151.40
1.1	*NFS - ATM Cash Withdrawal **	4,311.59	16,150.98
1.2	*NFS - Cash deposit transactions*	0.03	0.42
2	**NACH- National Automated Clearing House**	**3,401.77**	**17,629.99**
2.1	*APBS Credit (Disbursement based on UIDAI No.)*	1,675.12	990.73
2.2	*ACH Debit*	610.95	6,253.26
2.3	*ACH Credit*	1,114.96	10,380.40
2.4	*NACH Credit*	0.01	0.72
2.5	*NACH Debit*	0.72	4.87
3	**CTS Cheque Clearing (Processed Volume)**	1,035.89	79,174.61
4	**IMPS**	2,579.17	23,375.41
5	**RuPay Card usage at (POS)**	822.59	1,146.81
6	**RuPay Card usage at (eCom)**	658.13	610.40
7	**AEPS (Inter Bank) Txn over Micro ATM (e.g. Cash wi**	437.19	1,188.58
8	**BBPS (Bill Payment passing through BBPCU)**	145.69	216.62
9	**UPI - Unified Payments Interface**	**12,518.62**	**21,317.30**

Table 05

(Source: https://www.npci.org.in/statistics)

Again in table no 04 we can see within a year (from 2016-2017 to 2017-2018) UPI shows a gigantic improvement with a growth of 5208.1834% in volume of transactions (no of transactions) and 1480.99899% growth in value of transaction (total amount transferred). And more surprisingly UPI almost touched both IMPS and CTS in volume of transaction (only 10.337% less than IMPS and 24.3468% less than CTS) though the total value of total amount of transaction was very less, which proves UPI's popularity in small scale transactions. Again in table no 04 if we look closely at year 2018-2019 we will

Comparison of growth of different NPCI operated systems

Sr. No.	NPCI Operated Systems	F.Y-2020-21	
	Financial Txns:	**Volume (in Mn)**	**Value (in Bn)**
1	**NFS - National Financial Switch**	3,661.67	14,988.02
1.1	*NFS - ATM Cash Withdrawal **	3,660.95	14,979.84
1.2	*NFS - Cash deposit transactions*	0.72	8.18
2	**NACH- National Automated Clearing House**	**3,626.20**	**19,032.78**
2.1	*APBS Credit (Disbursement based on UIDAI No.)*	1,432.69	1,105.64
2.2	*ACH Debit*	589.19	5,929.86
2.3	*ACH Credit*	1,604.20	11,991.37
2.4	*NACH Credit*	0.12	5.92
2.5	*NACH Debit*	-	-
3	**CTS Cheque Clearing (Processed Volume)**	668.28	56,026.11
4	**IMPS**	3,278.34	29,414.96
5	**RuPay Card usage at (POS)**	701.99	1,169.38
6	**RuPay Card usage at (eCom)**	679.68	926.72
7	**AEPS (Inter Bank) Txn over Micro ATM (e.g. Cash wi**	963.27	2,286.29
8	**BBPS (Bill Payment passing through BBPCU)**	276.08	429.74
9	**UPI - Unified Payments Interface**	**22,330.65**	**41,036.54**

Table 06

(Source: https://www.npci.org.in/statistics)

See that UPI witnessed a straight growth of 484.924% in the second year (from 2017-2018 to 2018-2019) in terms of volume of transactions (no of transaction) and a growth of 698.4649% in terms of value of transactions (total amount transferred). And surprisingly UPI surpassed

the volume of transaction of both IMPS and CTS by a huge margin (205.4% more than IMPS and 381.39% more than CTS). And UPI touched the halfway mark of IMPS in terms of value of transaction (55.1464% to be precise) but was way after than CTS (only 10.7556% of CTS). This undisputed growth of UPI continued in the 3rd year also (see table no.05). Where UPI witnessed a growth of 133.844% in volume of transactions and a growth of 143.0755% growth in value of transaction. And UPI managed to increase the gap between itself and IMPS and CTS in case of value of transaction to its favor. (385.3499% of IMPS and 1108.489% of CTS in case of volume of transaction). And it almost touched IMPS in value of transaction but was still ways after than CTS in terms of value of transaction. (91.195% of IMPS and 26.9244% of CTS in terms of value of transaction). This growing trend of UPI shows its acceptance and dominance in the small-scale payment market.

Comparison of growth of different NPCI operated systems

Sr. No.	NPCI Operated Systems	F.Y-2021-22		Apr'22		F.Y-2022-23	
	Financial Txns:	Volume (in Mn)	Value (in Bn)	olume (in Mn	Value (in Bn)	Volume (in Mn)	Value (in Bn)
1	**NFS - National Financial Switch**	3,793.51	15,771.55	335.96	1,432.11	335.96	1,432.11
1.1	*NFS - ATM Cash Withdrawal **	3,791.86	15,753.94	335.78	1,430.24	335.78	1,430.24
1.2	*NFS - Cash deposit transactions*	1.65	17.61	0.18	1.87	0.18	1.87
2	**NACH- National Automated Clearing House**	**3,821.96**	**21,724.55**	**344.61**	**2,154.73**	**344.61**	**2,154.73**
2.1	*APBS Credit (Disbursement based on UIDAI No.)*	1,246.93	1,318.89	111.95	111.18	111.95	111.18
2.2	*ACH Debit*	732.95	7,713.39	99.67	929.02	99.67	929.02
2.3	*ACH Credit*	1,841.97	12,687.52	132.98	1,114.53	132.98	1,114.53
2.4	*NACH Credit*	0.11	4.74	-	-	-	-
2.5	*NACH Debit*	-	-	-	-	-	-
3	**CTS Cheque Clearing (Processed Volume)**	698.24	64,210.34	61.10	6,676.85	61.10	6,676.85
4	**IMPS**	4,659.70	41,686.46	471.62	4,446.70	471.62	4,446.70
5	**RuPay Card usage at (POS)**	843.90	1,487.12	80.52	148.20	80.52	148.20
6	**RuPay Card usage at (eCom)**	672.46	965.92	43.80	62.70	43.80	62.70
7	**AEPS (Inter Bank) Txn over Micro ATM (e.g. Cash wi**	1,136.45	3,065.01	100.20	284.50	100.20	284.50
8	**BBPS (Bill Payment passing through BBPCU)**	668.13	1,139.70	74.12	113.24	74.12	113.24
9	**UPI - Unified Payments Interface**	**45,967.52**	**84,175.72**	**5,583.05**	**9,833.04**	**5,583.05**	**9,833.04**

Table 07

(Source: https://www.npci.org.in/statistics)

Now in table No.06 we can see CTS witnessed a fall in its payment platform and on the other hand we can see that IMPS and UPI continues to grow. UPI still shows a progress of 78.37% in volume of transactions and 92.5124% in value of transactions (*all this in the pandemic situation) and this was the first time UPI overtakes IMPS payments system in terms of value of transactions for the first time that that too by 39.5090% and by 581.1572% in terms of volume of transactions. In the same year (2020-2021) UPI almost touched 3/4th of CTS

in terms of value of the transaction (73.2453%) and maintains a big difference in volume of transactions (3241.511%). Now if we look at table no 06 and 07 we can notice that CTS system is losing significantly compared to table no. 05 (32.56% in volume of transaction and 18.9% in value of transaction compared between table no 05 and table no 07) whereas UPI (105% in volume of transaction and same 105% in value of transaction compared to the previous year) and IMPS (42.135% in volume of transaction and 41.719% in value of transaction compared to the previous year) has been growing. But now if we compare between UPI and IMPS in table no 06 and table no07 we can see UPI has grown at a higher rate than IMPS and this time UPI has recorded 886.49% more no. of transaction in its platform (volume of transaction) and has recorded 101.925% more total value of transaction. And for the first time UPI has beaten CTS in both volume of transaction (UPI has recorded 6483.34% more volume of transaction than CTS) and value of transaction (UPI has recorded 31.09% more in volume of transaction than CTS). Now by the growth rate of UPI and its share of digital transaction in India it is quite safe to say that UPI has become a leading platform in digital payments in India by the year 2021-2022.

*as the financial year 2022-2023 is going on, only the data up to April,2022 is present, and this part of the data is kept for future representation and analysis.

Why UPI is so successful: The whole world was trying to change the payment system from physical cash system to digital transaction, and numerous attempts were made but there was no success story like UPI so far. Even from countries like Europe and America where the per capita income is higher than the rest of the world and technologically far more advanced than the rest of the world could not succeed. So how a third world country like India with a low per capita income achieved this? To understand this we need to see the transaction pattern on UPI. To elaborate this, we have used the data for the month of April, 2022 (value and volume can be seen in table no 07.)

Now if we look at table no 08 and 09 we can see that 59% of all the transactions happened between peer to peer that means two individuals had made payments digitally, and this is one sector that can never be possible with POS machines, because neither everyone need a POS machine nor everyone would carry a POS machine. And this peer to peer transaction is responsible of 82% of total value of the transaction, which is not only disruptive and insane but changes the whole purpose and perspective of digital transactions.

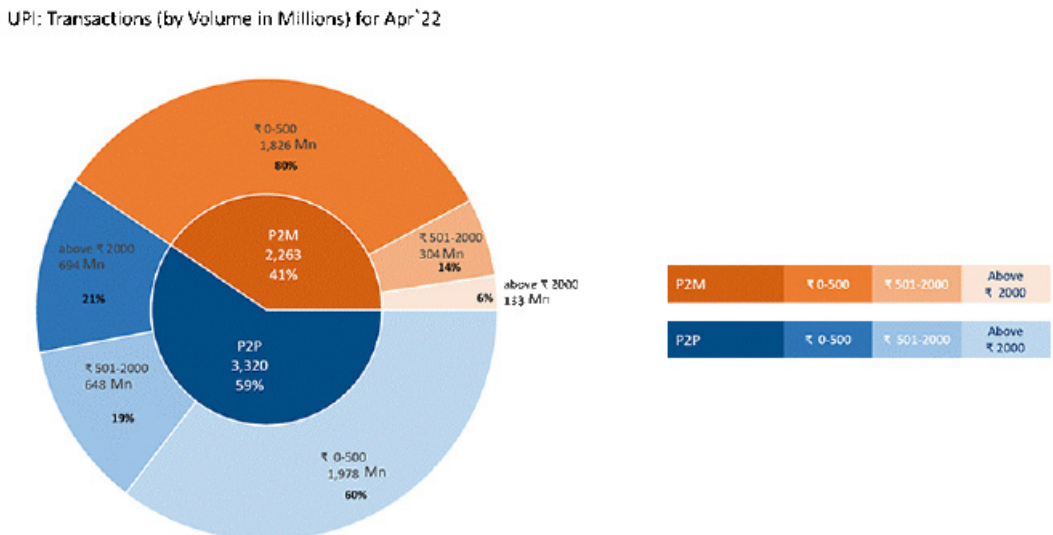

Table 08

(Source: https://www.npci.org.in/statistics/monthly-matrix)

Earlier it was taken for granted that digital transaction can mainly happen in business places like shopping malls, cinema halls, restaurants, hotels etc. but general public would always consider paying in cash than paying digitally. But data proves that UPI changes the whole perspective and people can choose digital transaction over physical currency if a better alternative is given. Not only that if we look closely, we can see in case of volume of transactions between Rs. 0-500 it is responsible for 60% (1978 million times) in P2P and 80% (1826 million times) in P2M, which means small local vendors are accepting payments in digital mode as well as individual people are accepting digital payments for loose cash more often than other big amount of payments. Now this Rs. 0-500 bracket in P2P in only responsible for 3% (28,775 Cr.) of total value of payments, and in case of P2M it is again only responsible for 3% (24,467 Cr.) of total value of transactions, combining a total effect of only 6% in total value of transactions, which is very insignificant. Again, this proves though most of UPI users made small scale payments but in terms of value their portion is very small.

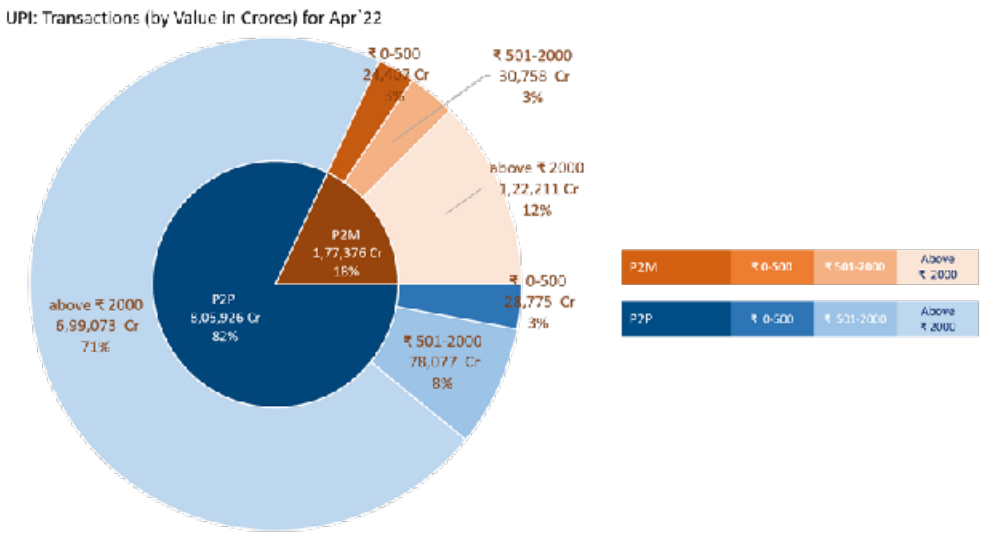

Table 09

(Source: https://www.npci.org.in/statistics/monthly-matrix)

Again, in case of volume of transaction between Rs. 501-2000, it is responsible for 19% (648 million times) in P2P transactions and 14% (304 million times) in P2M transactions. Out of which P2P transactions are responsible for 8% (78,077 Cr.) of total value of transactions, and P2M transactions are responsible for 3% (30,758 Cr.) of total value of transactions only, which combines a total of 11% market share in value of transactions against 33% market share in volume of transaction. This proportion is comparatively better than the other two value bracket.

Now again, if we look at volume of transaction of above Rs.2000, it covers 21% (694 millions) of total P2P transactions and 6% (133 millions) of total P2M transaction, and P2P transactions are responsible for 71% (6,99,073 Cr.) of total value of transaction and P2M is responsible for 12% (1,22,211 Cr.) of total value of transaction. Combining both represent a huge market share of 83% of value of transaction. From which we can understand that retail and personal payments have also made on UPI platform in a big scale.

Now from these tables we can clearly say that people from low payment scale (0-500), mid payment scale (501-2000) and upper payment scale (<2000) all have used UPI and people

who use UPI payment platform for payments use it for all scale of payments. Now data proves that UPI has successfully developed a new consumer habit/ behavior of using digital payments rather than using physical currency.

Conclusion: In this whole study we tried to be impartial, and we have been honest with our observations. In this study, data shows that upi successfully created a new consumer behavior of using digital payments system rather than physical cash and within a very short period of time UPI has beaten its competitors. This tendency is a result of continuous effort and understanding of users' need. UPI has created this phenomena because of some of its unique features.

- UPI is way more secure than its competitors
- User does not need to share his or her personal details (such as bank account details, personal information etc) to anyone
- A virtual address is all to pay or receive money
- This virtual address is like a phone number which is easy to remember
- User can use his or her actual mobile number (which is linked with the bank account)
- To protect the user from online fraud, users need to remember one thing that they should not share their password with anyone
- Password is only needed to send money, receiving money does not need any password
- The money is directly deposited in their bank account. This gives the users a sence of security, which creates a tendency of users to use it more often.
- Using UPI is totally free which again helps small scale businesses and retail users to use it.

All these small factors and continuous improvement from the central bank helped UPI to grow and become No. 01 digital payment system (in volume of transaction).

Other than all of this UPI has also created a separate ecosystem by connecting users, banks, PSPs, APPs, UDIRs together which makes UPI even better trusted

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