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Role of Digital Literacy in the path of Financial Modernization

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ABSTRACT
This study attempts to determine the time when the Digital Financial Literacy would be adequate to conduct all the transactions digitally, and to find out the point when India would be Digitally Educated enough to replace the physical cash with digital currency completely. The study also aims to find out whether India could sustain closure of Banks for weeks had the COVID 19 outbreak hit the Country in the year 2015 instead of Financial Year 2020-2021 and lockdown would have been imposed then. The study uses Regression analysis and compares the total number of digital transactions as a percentage of total transactions during the year 2015 to 2024 to establish that India would be able to replace physical cash with digital currency in the next five to six years with this pace of digitalization of Banking transaction.

KEYWORDS: Demonetization; Digital Financial Literacy; E- Banking; Financial Inclusion and Services; Internet, Mobile Banking apps.

1. INTRODUCTION

There is growing evidence that financial inclusion has substantial benefits for the excluded population especially for women and poor adults in many countries, and policy makers in many countries have embraced financial inclusion as the key to economic empowerment and a solution to rising poverty levels (Ozili, 2021). Financial inclusion is the process of ensuring access to financial services and timely and adequate credit where needed by vulnerable groups such as weaker sections and low income groups at an affordable cost. (RBI, 2008). Financial inclusion has gained notable attention among researchers and policymakers due to four main reasons. One, financial inclusion is considered to be a major strategy used to achieve the United Nation's sustainable development goals; secondly, financial inclusion helps to improve the level of social inclusion in many societies; thirdly, financial inclusion can help in reducing poverty levels to a desired minimum, and lastly, financial inclusion brings other socio-economic benefits. (Ozili, 2021).

There is growing evidence that Financial Inclusion has a big role to play in the overall development of any nation. And for the successful implementation of the Financial Inclusion, the need for Digital Financial Literacy has more than its pronounced role to play in the present world. Financial literacy is described as the integration of awareness, knowledge, skills, attitudes, and behaviors needed to make informed financial decisions and attain personal financial well-being. Financial Education, on the other hand is defined as the process by which financial consumers/ investors improve their understanding of financial products, concepts and risks and through information, instruction and/ or objective advice, develop the skills and confidence to become more aware of financial risks and opportunities, to make informed choices, to know where to go for help and to take other effective actions to improve their financial well-being (RBI, 2021). Reason for Digital Financial Literacy for implementation of successful Financial Inclusion: Mitigation of various risks related to online transactions

Digital financial services (DFS) refer to financial activities carried out using digital technologies. This includes electronic money, mobile banking, online banking, e-tellers, and branchless banking models—whether operated by banks or non-banking institutions. DFS covers a wide array of monetary services such as cash deposits, withdrawals, fund transfers, payments, loans, savings, pensions, and insurance. DFS can also include non-transactional services, such as viewing personal financial information through digital devices (Infe & Guidance, 2018).

The structure of the paper is as follows: The First section focusses on finding out a point at which India will be Digitally Educated enough to replace the physical cash with digital currency. The second section provides a comparative study on level of Digital Financial Literacy in India in the year 2015 and 2020-2021 to find out whether India could survive the lockdown and closure of banks in 2015, as done in the years 2020 and 2021 due to Covid pandemic.

2. REVIEW OF LITERATURE

According to Vitak et al., (2018), more Americans are now turning to the internet and mobile apps for personal tasks such as financial transactions and job applications. This growing reliance poses challenges for individuals with poor digital access or limited tech skills, often forcing them to share sensitive data on public devices or unfamiliar platforms. Globally, people depend on connected devices for banking, shopping, job applications, and news. The study also found that low-income users (earning under $20,000 annually) were more than twice as likely as higher-income users (earning over $100,000) to suffer financial losses due to online scams. Many participants distrusted online content due to difficulty in identifying reliable sources, leading them to avoid digital platforms. Interestingly, they were more likely to trust big,

familiar companies like Google, Amazon, or Walmart, believing these firms had stronger incentives to protect customer data. The study emphasizes the importance of partnerships, noting that technology alone isn't enough—without understanding user needs, tech solutions risk being underutilized.

There are five basic digital skills: managing information, communicating, problem solving, transacting and creating French et al., (2020). The paper also highlights that a person's financial actions are influenced by their level of financial awareness, comprehension, fundamental abilities, along with their mindset and motivational drive. The apps improved ability and mindset to an extent that the paper examined whether these effects translated into better financially capable behaviours. For establishing their research, French et al., (2020) used four smartphone apps, packaged together under the title 'Money Matters'. Smartphone applications were distributed to members aged 16–65 years of Derry Credit Union, the largest credit union in Northern Ireland. These apps included features such as loan interest comparison, expense tracking, a cash calendar, and debt management tools. Statistically significant progress was observed among recipients of the apps (the treatment group) in areas related to financial knowledge, comprehension, and essential skills, as well as in their attitudes and motivations. These positive changes ultimately led to improved financial behavior; individuals who used the apps were more consistent in monitoring their income and expenses and displayed greater resilience when dealing with unexpected financial challenges.

The evaluation by French et al., (2020) initially assessed whether access to the smartphone apps, improved financial knowledge, understanding and basic skills (i.e. loan confidence, financial literacy and digital literacy) as well as attitudes and motivations (i.e. the ability to effect change, resilience in the face of stressful events, spending behaviour and planning for the future). The evaluation next examined whether enhancements in competence and perspective resulted in improved financially responsible behaviours (such as managing bills, tracking expenses, increasing earnings, and building financial resilience through consistent saving). It concluded by analyzing whether such behavioural shifts contributed to better financial well-being (such as staying on top of bills and credit obligations, and improved planning of finances). Several key findings emerged. Firstly, individuals who used the smartphone apps showed enhanced financial awareness, knowledge, and essential skills. They also felt more assured in their understanding of loans and exhibited higher financial literacy. Secondly, the apps influenced attitudes and motivation—users became more forward-thinking, felt a greater sense of personal efficacy, and were more confident in improving financial decisions via technology use. Lastly, the changes in financial understanding, knowledge, basic skills, and motivation translated into more capable financial behaviours.

From the study, French et al., (2020) found that receiving the smartphone apps proved more resilient when subject to a financial shock and were more likely to keep track of their income and expenditure. When examining how the apps impacted financial understanding, knowledge, and essential skills, it was observed that recipients of the apps showed increased confidence in managing loan repayments, particularly among frequent users. Financial literacy also improved significantly among those who used the apps more often. In terms of attitudinal and motivational shifts, those who received the apps leaned more toward future planning, with a stronger impact observed among regular users. They also expressed stronger self-belief and greater trust in their capacity to enhance financial choices by engaging with technology.

Key findings in the paper by Ozili, (2021) indicate that financial inclusion affects, and is influenced by, the level of financial innovation, poverty-levels, the stability of the financial sector, the state of the economy, financial literacy, and regulatory frameworks which differ across countries. There is increasing proof that financial inclusion delivers significant benefits to underserved groups, especially women and low-income adults across various nations. Consequently, policymakers have widely accepted it as a vital tool for promoting economic empowerment and tackling poverty. Ozili, (2021) also explores several challenges in financial inclusion research. One key issue is the inactive user dilemma—individuals join the financial system but later disengage. Despite efforts to integrate them, many users stop actively using financial services, opting not to use credit or debit cards, not maintaining balances, or not initiating transactions. Often, they use their accounts only to receive funds but not to send. Another contentious issue is extreme financial inclusion—providing access to everyone regardless of financial risk or income. Policymakers usually favour eliminating only selective barriers. For example, regulators would avoid completely unrestricted bank account openings without ID checks, since this could expose the sector to high-risk individuals, including potential defaulters or fraudsters. The financial inclusion strategies adopted in certain countries, such as India, resemble the model of 'extreme financial inclusion' because they provide access to all individuals. In these cases, policymakers have often overlooked the adverse consequences that such inclusiveness can create. Countries like the UK and South Africa, which steer clear of extreme financial inclusion, generally experience fewer fraud cases in their formal financial systems. Hence, avoiding extreme financial inclusion is considered preferable as it helps reduce potential negative spillovers.

Ozili, (2021) further highlights that another issue is that **financial institutions may not cooperate with policy makers** seeking to achieve financial inclusion through banks. Banks typically perform an internal cost-benefit analysis before engaging in financial inclusion initiatives. If anticipated costs exceed the expected gains, they may hesitate—particularly when governments do not offer compensation. In regions with both public and private sector banks, private banks might resist involvement, assuming the government should deploy public sector banks to carry out these programs.

By conducting a study on remote villages in China, Shen et al., (2019) says that more than 1,700 remote villages in China have no access to banking services. The World Bank's Global Findex Database (2017) noted that 20% of people in China lacked bank accounts, and 91% did not have formal loans. The Chinese government has aimed to utilize the widespread

availability of the Internet to boost inclusive finance. Internet use has shown a positive relationship with financial inclusion, but this doesn't align perfectly with the adoption of digital financial products. As per the 41st China Internet Development Report (2017), 772 million were online, yet only 16.5% used it for financial tasks. This gap hampers China's digital financial inclusion efforts. Further analysis suggests this is tied to user financial literacy. Shen et al., (2019) found that Internet access alone doesn't bridge the literacy-inclusion gap. But when paired with digital financial product usage, it helps channel financial literacy into financial inclusion. In essence, both digital product usage and Internet access act as mediators in the relationship between literacy and inclusion. To make this link effective, promoting the usage of digital financial tools is essential.

A study has investigated the driving factors of mobile money adoption and the policies package that may alleviate the bottlenecks of the low digital financial inclusion in WAEMU (Senou et al., 2019). The West African Economic and Monetary Union (UEMOA), known by its French acronym, comprises eight member states: Benin, Burkina Faso, Côte d'Ivoire, Guinea-Bissau, Mali, Niger, Senegal, and Togo. In the WAEMU region, only 34.5% of adults had accounts at formal financial institutions. Despite widespread mobile and Internet penetration, digital finance adoption remained low. Mobile subscriptions grew by 208% annually in sub-Saharan Africa. The study found that national factors like education levels, workforce size, mobile networks, and banking infrastructure (measured by ATMs per 100,000 people) influenced mobile money usage. It concluded that younger, educated, male, wealthier, and already banked individuals were more inclined to adopt mobile money services in WAEMU.

A study has been made to study the effects of financial and digital literacy on SMEs growth Fauzi et al., (2020). The study suggests that while financial and digital literacy are crucial in the short run, digital literacy becomes more critical over time due to its influence on business development. This is especially important given the rise of competitive markets and the transition from traditional to digital platforms, including a shift in both market environments and consumer behaviour. Research by Setiawan et al., (2021) studied that Fintech (Financial Technology) adoption optimization expands the financial access to formal financial institutions, especially to vulnerable groups such as the unbanked population who predominantly reside in rural areas far from formal financial institutions. Fintech is recognized as a transformative force that extends financial services to previously unreached communities through digital innovation and IT. The research highlighted that among various influencing factors, user attitude emerged as the most significant driver of Fintech adoption, whereas financial literacy had the least impact. However, the study also underlined the need for regulatory empowerment and public education, as government involvement can positively influence Fintech adoption by enhancing user innovation and awareness.

According to Kass-Hanna et al., (2018), with the rise of the Fintech movement and over two-thirds of the global population owning mobile phones, digital financial literacy has gained new relevance. The research emphasized the need to revise traditional financial literacy frameworks to include digital literacy elements. Basic digital competencies—such as navigating mobile phones and the internet—are crucial for accessing and using DFS. Higher levels of digital literacy, in turn, empower users to feel more confident and independent in using such tools, potentially leading to more frequent usage. However, the study also highlights that increased digital usage does not automatically result in wiser financial choices. True value from DFS is realized when individuals utilize them not only for payments but also for saving, borrowing, planning for emergencies, insuring risks, and receiving funds during financial shocks. Therefore, understanding how financial and digital literacy shape these behaviors is key to fostering financial security and resilience. (Kass-Hanna et al., 2018) used data from the 2017 Financial Inclusion Insights (FII) surveys to investigate the relationship between financial and digital literacy and resilience-building financial behaviors for seven developing economies in South Asia and Sub-Saharan Africa. Overall, the findings demonstrated that both financial and digital literacy are essential components in enhancing inclusion and building financial resilience. The outcomes across the models were consistently favorable and statistically significant. Notably, the marginal impact of digital literacy was found to be greater than that of financial literacy in the domains of saving and borrowing behavior. Regarding risk management, digital literacy was more influential for decisions involving insurance, while financial literacy played a bigger role in planning for emergencies. Taken together, the results point to the crucial contribution of digital literacy in encouraging sound financial behaviors—potentially equaling or surpassing the importance of financial literacy—especially within the digital financial services (DFS) framework. Rather than limiting the focus to traditional banking savings, the study considered a broader scope of financial actions, including saving, borrowing, and managing risk through both formal and informal systems.

Using survey data on 832 entrepreneurial farmers in rural China, Su et al., (2021) has found that both online purchases and online sales have a significant and positive impact on farmers' participation in the digital financial market. Furthermore, the study found that farmers' involvement in the digital financial marketplace, influenced by their experiences with online buying and selling, was significantly shaped by their level of digital financial literacy. The data also provided solid evidence that this impact was stronger among farmers with higher education levels, those engaged in skills training, innovators in agriculture, or those pursuing agripreneurship.

In his study to analyze the effect of digital finance, digital marketing and digital payment variables on financial performance, (Daud et al., 2022) found that the digital finance had a positive and significant effect on the finance performance, the digital payment had a positive and significant effect on the finance performance and the digital marketing had a positive and significant effect on the finance performance in Indonesia. The study was done based on the responses of online questionnaires from 180 SMSs, based on snowball sampling. Kurniasari et al., (2021) analyzed the factors of

the growing digital technology that influence customer decisions in choosing financial technology services using customer knowledge as the intervening variable. The results showed that in Indonesia, customers' choices when selecting financial technology services were largely influenced by their level of financial knowledge. The study has been done by taking a sample of 1000 respondents from six provinces in Java, Indonesia.

The study made by Rastogi et al., (2021) aimed at exploring how UPI is impacting financial literacy, financial inclusion and the economic development of the poor in India. Findings indicate that UPI plays a role in enhancing financial literacy. Additionally, financial literacy has a significant influence on financial inclusion, which in turn fosters economic progress. Furthermore, the connection between literacy and inclusion is partially mediated by financial stability, and the link between inclusion and economic development is partly influenced by trust. Essentially, the study highlights UPI's multifaceted impact on individuals. Further, in a study on scope of Mobile payment and cashless economy in India, Pal et al., (2021) revealed that Mobile Payment adoption in India post demonetization spiked the promise of a cashless economy, but its sustenance holds greater accountability. The study also examined how aspects like ease of use, thoughtfulness, and security differently affect current usage and the intention to use digital services in the future..

3. RESEARCH METHODOLOGY

To get a real picture about the current scenario of the Financial Inclusion in the country and the factors which promote and limit the rise and fall of the Financial Inclusion programme, interview was conducted with the field functionaries who are directly involved with the cause.

For gathering idea about the latest state of activities in Digital Financial Literacy, interview was held with various industry experts from Public Sectors Banks. Experts from Public Sector Banks were taken because Public Sector Banks are the main implementing body of Financial Inclusion. The concerned PSU Bank has 35.14 per cent branches in rural area, 26.77 per cent branches in semi urban area, and 19.93 per cent branches in urban area, 18.16 per cent branches in metropolitan area in India (RBI Publication Dec 28, 2021). In Chhattisgarh, the bank has 32.14 per cent branches in rural area, 32.14 per cent branches in semi urban area, and 25.00 per cent branches in urban area, 10.71 per cent branches in metropolitan area.

Interview was held with various Head of Departments of profiles relating to the implementation of Financial Literacy. The officers were asked the question, 'Please share your views on Financial Inclusion and the various factors which helps in promoting the digital products in banking, and also the factors which limits their uses.'

A **brain storming session** was also held with various sub staff and peons, who help the branch customers in villages/ towns to fill their forms, install various apps relating to banking in the mobile phones of villagers, and educate them about banking activities. They were asked to give their insight about Digital Banking, how the banking services can reach to the remotest areas, and the problems faced by the customers.

Analysis of Interview of officers and Brain Storming session

The interview and brain storming session was analyzed using NVIVO software. Top 50 words were selected from the word count, and we could get the following results.

Table 1: Weighted percentage of various words as outcome of Interview with experts and field functionaries

Sl	Word	Length	Count	Weighted Percentage	Similar Words
1	Digital	7	30	5.46	digital, digitalization, digitally, digitization
2	Banking	7	19	3.46	bank, banking, banks, rely
3	transactions	12	15	2.64	dealing, transact, transacting, transaction, transactions
4	Branch	6	14	2.55	branch, branches
5	Use	3	12	1.91	function, habits, use, used, using
6	Financial	9	10	1.82	financial, financially
7	People	6	9	1.64	People
8	Literacy	8	8	1.46	Literacy
9	government	10	7	1.28	government, regulations, regulators
10	Keeping	7	8	1.20	keeping, prevent, saved, support
11	Making	6	9	1.15	gives, make, makes, making, takes, taking
12	Education	9	6	1.09	developed, educate, educated, education
13	Important	9	6	1.09	important, means

14	Online	6	6	1.09	Online
15	Channels	8	9	0.96	channels, direction, heading, line, point
16	Also	4	5	0.91	Also
17	Customer	8	5	0.91	customer, customers
18	Like	4	5	0.91	Like
19	Time	4	5	0.91	time, timings
20	Views	5	5	0.91	Views
21	House	5	5	0.79	home, house
22	Alternate	9	4	0.73	alternate, option
23	App	3	4	0.73	app, apps
24	Chhattisgarh	12	4	0.73	Chhattisgarh, Chhattisgarh’
25	Even	4	5	0.73	equally, even, level, still
26	Frauds	6	4	0.73	fraud, frauds, fraudulent
27	Lack	4	4	0.73	Lack
28	Peon	4	4	0.73	Peon
29	Task	4	4	0.73	task, tax
30	Charge	6	6	0.72	charge, direction, level, point
31	Now	3	6	0.71	direction, now, present, presently
32	Back	4	5	0.70	back, funds, support
33	Direction	9	8	0.69	direction, engineers, focus, focusing, leads, point, takes, taking
34	Activities	10	4	0.64	activities, activity, participated
35	Book	4	4	0.64	book, recorded
36	Products	8	4	0.61	generation, products
37	Heading	7	6	0.58	brain, heading, leads, point
38	Bilaspur	8	3	0.55	Bilaspur
39	Cash	4	3	0.55	Cash
40	Difficult	9	3	0.55	difficult, difficulties
41	Done	4	3	0.55	Done
42	Given	5	3	0.55	given, tend
43	Happen	6	3	0.55	chances, happen
44	Increasing	10	3	0.55	increases, increasing
45	Insurance	9	4	0.55	insurance, secure, security
46	Keeper	6	3	0.55	Keeper
47	knowledge	9	3	0.55	Knowledge
48	Literate	8	3	0.55	Literate
49	Mbanking	8	3	0.55	Mbanking
50	Mobile	6	3	0.55	Mobile

Source: Author’s Calculation

Following is the word cloud giving a pictorial view of the occurrence of various words:

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Figure 1: Word cloud - Occurrence of various words

Source: Author's Calculation

If we select the top 15 words, the collection is as follows (in decreasing order of number of occurrences):
digital, banking, transactions, branch, use, financial, people, literacy, government, keeping, making, education, important, online, channels

From above, the importance of 'branches' can be observed, because the word has been used more frequently, but often use of words like, literacy, government, education and channels are also been observed. So, it can be inferred that there could be relationship between the government initiatives, literacy, and online channels.

Moving in the direction of the above analysis, it can be said that with increase in Financial Literacy, there is an increase in the use of digital channels; and with increase in other diminishing factors, like fraud, phishing activities; use of digital channels decreases. People are afraid using digital channels. However, with proper digital literature programmes, people can be educated to use the digital channels safely.

The paper studies the effect of Digital Financial Literacy on Financial Inclusion. It tries to give an answer whether India could have survived the closure of banks for long intervals, had the Covid pandemic hit the country in 2015 or before. The paper also tries to find out the point when India would be able to conduct all its financial transactions online, and the country would be ready to shift from the physical currency to digital currency.

VARIABLES

Independent Variable : Digital Financial Literacy
Dependent Variable : Financial Inclusion

Since, there is a precise idea about which variable is dependent variable, and which variable is independent variable, so, Regression Analysis is applied.

For the first study,

There are two variables involved

1. Digital Financial Literacy
2. Banking Transactions

It is, therefore, bivariate analysis.

Looking for indicators for Digital Financial Literacy and Banking Transactions

In the present time, people in India are more inclined towards using a mobile phone for online activity, be it an online search, sending a file to some friend in India or abroad, or watching a youtube video, or doing some online transaction. Rather than switching on their computer, laptop or tablet and then doing the transaction, people prefer to use their already switched on and working mobile phones. While using mobile phone, the first thing which comes to mind for online transaction is UPI (Unified Payments Interface). With the growing awareness and merchants accepting UPI's like PayTM, BharatPay, PhonePe, etc, there has been an increased use of UPIs. It is seen as an alternative to hard cash, and a mode of convenience, as it saves time spent in looking for the change amount.

For the present study, volume of UPI transactions has been taken as an indicator of Digital Financial Literacy. It has been assumed that when a person is willing to do a digital transaction, and the person is digitally literate, the person will start the application from a UPI transaction.

For Banking Transactions, the total number of payments has been taken as an indicator.

And since both the variables are metric.

So, we are going for Regression Analysis.

Following is the data on UPI volume (in lakh) and Total Payments

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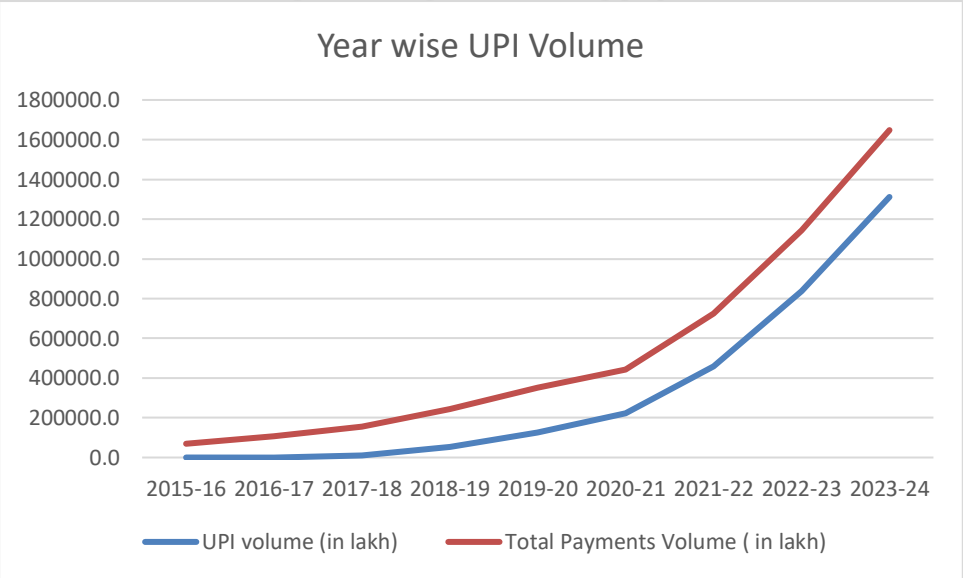
Table 2:

	Independent variable	Dependent variable
Year	**UPI volume (in lakh)**	**Total Payments**
2015-2016	0.0	69341
2016-2017	178.6	107901
2017-2018	9048.7	156371
2018-2019	53915.2	244211
2019-2020	125186.1	352362
2020-2021	223306.5	442229
2021-2022	459675.3	724689
2022-2023	837511.4	1144065
2023-2024	1311647.1	1648234

Source: 'Reserve Bank of India - Annual Report', 2021, 2024

Figure 2: We get the following graph:

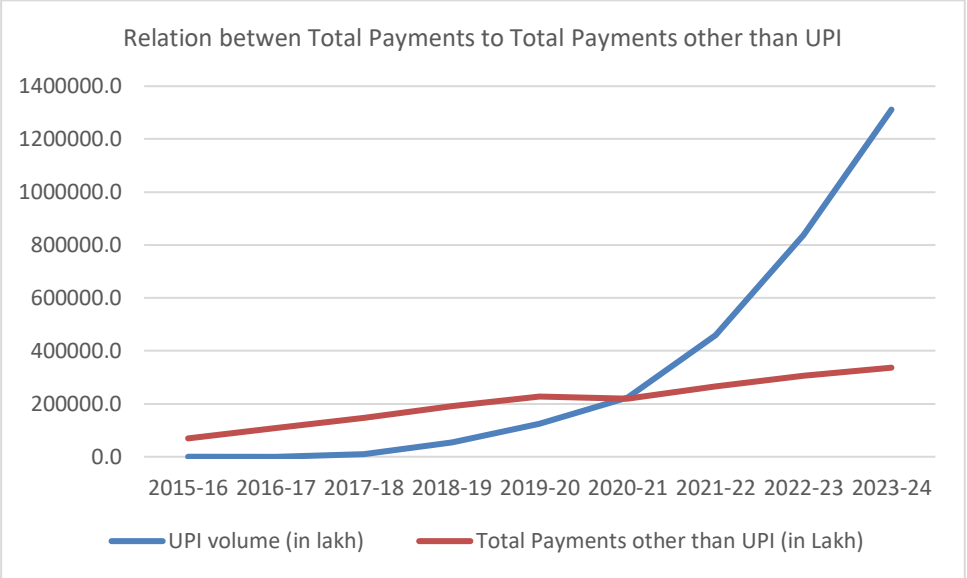


Source: Author's calculation
{x-axis: Year, y-axis: Volume (in Lakh)}
Now, we find the equation of the two lines
Equation of the blue curve (lower curve)
$y = 4309x^3 - 30410x^2 + 77234x - 57100$ --(1)
Equation of the red curve (upper curve)
$y = 4782x^3 - 38083x^2 + 145058x - 52029$ --(2)
It is observed that the number of UPI transactions are going very close to the total number of transactions.
We would now plot a graph to determine the relationship between the total number of UPI transactions vis-à-vis the number of transactions other than UPI transactions to see the point where the number of other transactions, including the paper transactions can be reduced to zero, and all the transactions may be completed by UPI sitting in the comforts of the office or home.

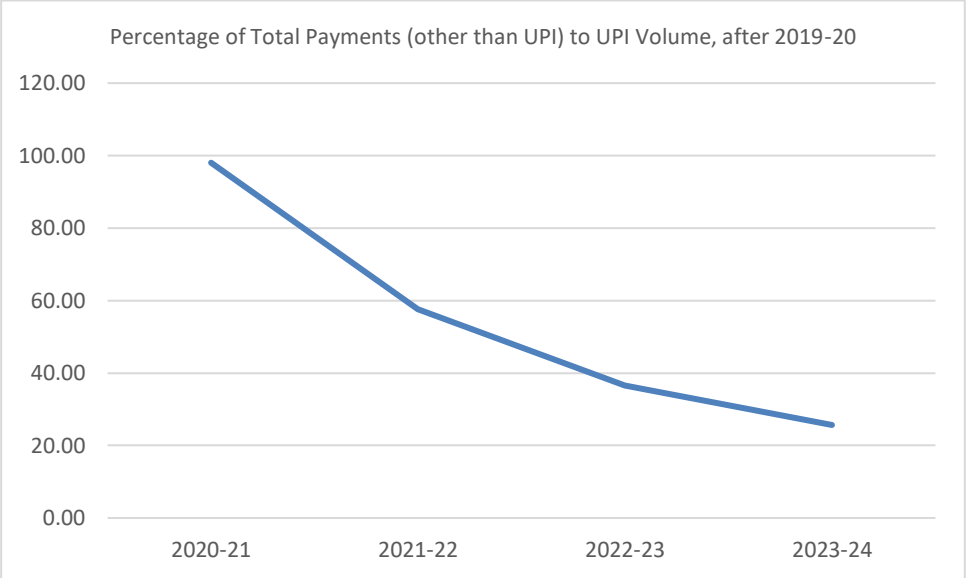
Year	**UPI volume (in lakh)**	**Total Payments (other than UPI)**	**Percentage of total payments (other than UPI) to UPI Volume**
2015-2016	0.0	69341.0	#DIV/0!
2016-2017	178.6	107722.4	60314.89
2017-2018	9048.7	147322.3	1628.10

2018-2019	53915.2	190295.8	352.95
2019-2020	125186.1	227175.9	181.47
2020-2021	223306.5	218922.5	98.04
2021-2022	459675.3	265013.7	57.65
2022-2023	837511.4	306553.6	36.60
2023-2024	1311647.1	336586.9	25.66

Following is the graph representation of UPI Volume (in Lakh) and Total Payments (other than UPI)



Now considering the Percentage of total payments (other than UPI) to UPI Volume after 2019-2020, the point from where the UPI Volume outnumbers the Total Payment (other than UPI), we draw a graph:



The Liner Equation of the graph comes to be, $y = -1.5378x^3 + 18.895x^2 - 86.303x + 166.98$
From this equation, we put the value of y=0 to get the point where Percentage of total payments (other than UPI) to UPI Volume comes to be 0, and all the transactions are potentially done by UPI.
Putting the value of y=0, in equation, $y = -1.5378x^3 + 18.895x^2 - 86.303x + 166.98$
We get,
$-1.5378x^3 + 18.895x^2 - 86.303x + 166.98=0$
Solving for x,
x = 5.89, or 5 years and 11 months
Now, we considered Percentage of total payments (other than UPI) to UPI Volume after 2019-20, so, we can extrapolate

the years as:

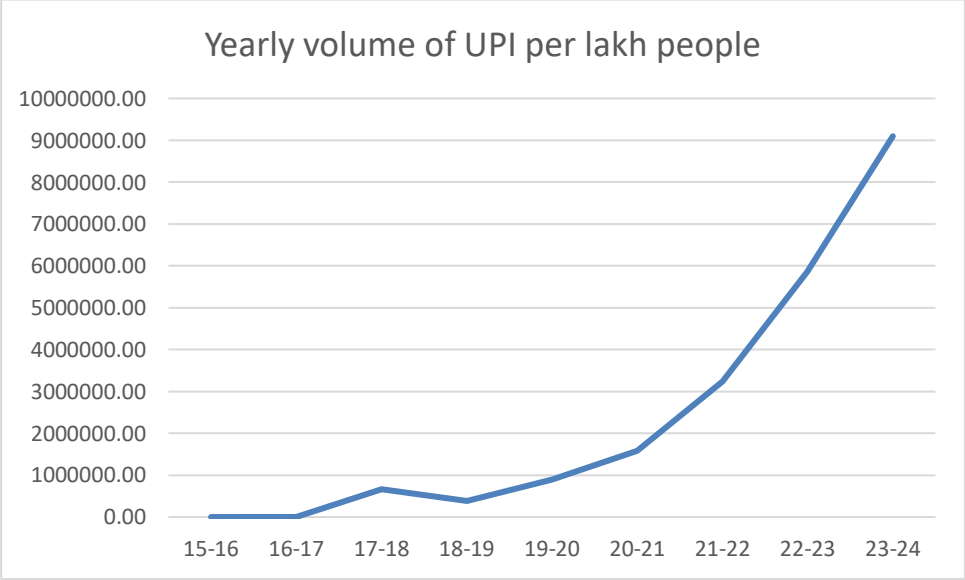
Year Serial	Year
1	2020-2021
2	2021-2022
3	2022-2023
4	2023-2024
5	2024-2025

From our calculations, we can conclude that with the present rate of increase in digitization, we would be able to do all the transactions through UPI in the next five to six years.
We reach February, 2031 as follows: 5 years from : March 2025, and then eleven months added, goes to February, 2031. It would be the time when India will be able to do all the transactions, including paper transactions using UPI, and the dependency of paper currency would be reduced to zero.

For the second study and moving to our hypothesis testing

Financial Year	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	2023-2024
Yearly volume of UPI (in mn)	1	17.86	904.8	5391.52	12518.61	22330.65	45,967.53	83751.14	131164.71
Yearly volume of UPI	1000000	17860000	915220000	5391520000	12518610000	22330650000	45967530000.00	83751140000	131164710000
Population of India	1338636340	1354195680	1369000330	1383112050	1396387127	1407563842	1417173173	1428627663	1441719852
Population of India (in lakh)	13386.36	13541.96	1369.00	13831.12	13963.87	14075.63	14171.73	14286.28	14417.20
Yearly volume of UPI per lakh people	74.70	1318.86	66853 1.78	389810.80	896500.04	1586476.06	3243607.52	5862347.65	9097793.61
Percentage increase in UPI volumes		1765.48	50689.98	58.31	229.98	176.96	204.45	180.74	155.19

Source: Author's Calculations



Source: Author's calculation
{x-axis: year, y-axis: Yearly Volume of UPI transactions per lakh people}
It is seen from the table, that prior to year 15-16 including year 15-16, there is negligible use of UPI in India. However, in the year 16-17, there has been huge increase in the usage of UPI, a record growth of 1667 per cent. It is further seen from Table III, that the bulk of the usage has been mainly done from December to March. The main factor for such an increase was the demonetization of Rs. 500.00 and Rs. 1000.00 notes by the government from 8th November 2016 to 30th December, 2016. From this point, Government has taken various drives for further promotion of digital transactions.
Earlier, for any money and bank related transaction, there was a need to visit the bank. But now, with the increasing use of digitization, a visit to a bank branch is not required. People have increasingly been made aware and educated about the

digital use of money, and as a result of which it can be seen that the use of digital means for transactions has been increasing exponentially. At this point of time, even if the banks remain closed for a few weeks, transactions can go on digitally.

However, if we see the situation in 2015, there was hardly any transaction which could suffice the small needs of the people. Even for purchasing small and essential commodities like vegetables, we needed to visit the bank, and get cash, and then purchase the smallest of the commodities. But with time, people have been using digital means which involved direct account to account transactions through UPI.

So, it can be concluded that it would have been very difficult for the country to survive the lockdown and closure of banks in 2015 compared to 2020.

4. DISCUSSION

As the calculations suggest, India has moved rapidly towards digital transactions. Many initiatives taken by the Government has helped/ forced the people to move towards digital transactions. Before 2016-17, Indians were hardly using digital transactions, but if we see today, even the small stall and tea vendors are accepting payments through digital means. If the current rate of increase in digital transaction usage continues, India will be able to remove the dependency on physical cash and totally replace it with digital means of transactions.

5. CONCLUSION

In the present time, the use and dependency of people on Mobile phones is increasing day by day. Mobile phones have become a norm, and majority of the people in India are using mobile phones for communication, entertainment and for financial transactions. Mobile phones have become an alternative for computers, laptops or tables because of their convenient size. Phones are always switched ON, and it also saves time in switching them.

In the present day, people are becoming more aware, and preferring the digital modes of transactions through various UPIs, like PayTM, BharatPay, PhonePe, etc. It not only eliminates the risk of carrying cash. A UPI transaction can be of a small Rs. 1.00 to any large amount we can think of; so, one is not dependent on the size of the physical wallet, and digital wallet is taking its place. In addition to this, it also saves time in returning change, and the time and energy taken by the shop keepers to calculate how much to return.

Seeing the pace of Digitalization of financial transactions in India, and assuming the pace will continue for the years to come, Regression Analysis has been performed.

By analyzing the UPI volume and Total Payments other than UPI, we find that our UPI transactions will surpass Total Payments (other than UPI) in the next five to six years, i.e. at this time, all the transactions will be carried on using UPI, and this would be the time, the country would be able to switch from hard currency to digital currency.

With the increase in Digital Literacy, number of transactions increases, i.e. with the passage of time, people are becoming more and more educated, and it is leading to increase in the number of transactions and lesser dependency on going to brick and mortar branches or the physical branches for basic banking needs. In the year 2015-2016, only about 1 million transactions took place through UPI, and the yearly volume of UPI per lakh people was mere 75. When we compare it with the present scenario, we find very different scenario. In the year 2023-2024, about 131164.71 million transactions took place through UPI, and increase of 155.19 per cent than previous year and an near infinite growth over the last ten years. The growth in the last few years has been exponential and exceptional.

By looking at these figures, we can confidently say that it would have been very difficult for the country to keep the banks closed for weeks for fighting the Covid-19 pandemic, had the pandemic hit in the year 2015 or before. By 2020, we were in a much better state to do the transactions online and decrease our dependency on brick-and-mortar branches or physical branches for our banking needs.

Policy Implications: Role of Banks, Government, and Fintech Companies in Driving a Cashless India

The rise in digital transactions across India marks a significant shift in how the country manages its financial ecosystem. With the rapid adoption of online payments and mobile banking, it is evident that India is on the path toward becoming a cashless economy (RBI, 2023). However, to realize this vision sustainably and inclusively, policymakers and stakeholders—including banks, the government, and fintech companies—must take coordinated and strategic actions. The findings of this research underline several policy implications that can shape the future of India's digital financial landscape.

1. Role of Banks:

Banks must take a proactive role in bridging the digital divide, especially in rural and semi-urban regions. Many bank branches still rely heavily on traditional cash-based operations. Banks need to upgrade their digital infrastructure and ensure that their services are accessible through user-friendly mobile applications and online platforms, preferably in regional languages (KPMG, 2021). Moreover, banks must invest in digital literacy programs for customers unfamiliar with online banking tools. Providing secure, simple, and intuitive user experiences will reduce hesitancy and increase confidence in digital payments. Banks should also partner with local self-help groups or NGOs to conduct grassroots

awareness campaigns (NITI Aayog, 2020).

2. Role of Government:

The government plays a central role in setting the regulatory and infrastructural foundation for a cashless economy. First, investments must be made to improve internet connectivity and electricity supply in underdeveloped areas (Ministry of Electronics and Information Technology (MeitY), 2022). Without these basic utilities, digital banking cannot flourish. Second, the government must incentivize digital payments through tax rebates, discounts on digital utility bill payments, or direct benefit transfers into digital wallets to encourage adoption (RBI, 2023). Regulatory bodies should enforce cybersecurity and data privacy laws to protect users from fraud, thereby building trust in digital transactions (Data Security Council of India, 2022).

Additionally, the government can establish public-private partnerships to install digital kiosks and mobile banking units in remote areas. By facilitating financial inclusion through Jan Dhan accounts, Aadhaar-enabled payment systems, and the Unified Payments Interface (UPI), the government can lay the groundwork for a robust digital economy (Ministry of Electronics and Information Technology (MeitY), 2022).

3. Role of Fintech Companies:

Fintech firms have been the game changers in India's digital revolution. Their agility and innovation can complement traditional banking services. These companies should focus on developing hyper-local, vernacular-language apps and simplified interfaces that can be easily used by low-income and first-time users (PwC India, 2021). Fintech firms must also address concerns related to transaction failures, cyber fraud, and poor grievance redressal mechanisms by building stronger customer support networks and transparent platforms (Data Security Council of India, 2022).

Furthermore, fintech companies should invest in AI-driven fraud detection and customer behavior analysis to enhance security and personalization. Collaborations with educational institutions and skilling centers can spread awareness about digital finance and create trust among the masses (KPMG, 2021).

In conclusion, while digital transactions are undoubtedly the future of India's financial system, achieving a completely cashless economy requires a thoughtful, inclusive, and multi-pronged policy approach. Banks, government bodies, and fintech firms must work in harmony to remove access barriers, promote digital trust, and ensure that no one is left behind in this financial transformation.

6. LIMITATIONS AND FUTURE SCOPE

While the paper outlines the potential trajectory of India becoming a cashless economy, there are several significant limitations that warrant a deeper and more critical discussion. One of the foremost challenges lies in the technological access gap. Although urban India has embraced digital transactions rapidly, large segments of the rural population remain underserved. Many rural areas continue to struggle with poor internet connectivity, lack of digital infrastructure, and limited access to smartphones or computers. These infrastructural gaps create a digital divide, leaving a significant portion of the population unable to participate in the digital economy. The individuals who are yet to adopt any form of digital payment often face systemic barriers, such as lack of electricity, digital illiteracy, or unaffordability of digital devices. Bridging this gap requires long-term policy interventions, improved digital infrastructure, and extensive outreach programs.

Another key limitation is the challenge posed by low literacy and digital awareness among a substantial portion of the population. A significant number of people in India, especially among the elderly and those in rural or economically weaker sections, are either illiterate or have limited educational exposure. For them, digital payment systems can appear confusing, intimidating, or unreliable. Fear of making mistakes, losing money due to fraud, or misunderstanding transaction procedures often prevents them from using digital platforms. These groups require sustained hand-holding, awareness campaigns, and the development of user-friendly interfaces in regional languages. Without addressing this digital literacy barrier, the goal of a fully cashless India may remain out of reach.

Resistance to digital adoption is also a substantial hurdle. Beyond literacy and access issues, there are psychological and socio-cultural barriers. Some individuals are simply uncomfortable with the idea of moving away from tangible cash transactions. They may harbor mistrust toward digital systems or feel alienated by the rapid pace of technological change. Moreover, a portion of the population deliberately avoids digital payments to maintain anonymity in transactions. This includes entities involved in the informal or unaccounted economy, where cash transactions are preferred to avoid taxes or regulatory scrutiny. For these groups, resistance is not due to a lack of resources or understanding, but a conscious choice to evade transparency. Overcoming such resistance would require not only technological solutions but also robust legal and financial reforms to bring these segments into the formal economy.

In conclusion, while the paper sets the stage for envisioning a digitally empowered Indian banking ecosystem, these limitations highlight the need for a multifaceted approach. Future research can explore strategies to mitigate these challenges, such as policy-driven financial literacy programs, incentives for rural digital adoption, and technological innovations tailored to marginalized groups. The journey toward a completely cashless India is a gradual one, requiring inclusive planning, resilient systems, and sustained public engagement.

Declaration of Conflicting Interests
We, the authors of the paper, declare that there are no conflicts of interest

REFERENCES

1. Data Security Council of India. (2022). dsci01.pdf. DSCI. https://www.dsci.in
2. Daud, I., Nurjannah, D., Mohyi, A., Ambarwati, T., Cahyono, Y., Haryoko, A. D. E., Handoko, A. L., Putra, R. S., Wijoyo, H., Ari-Yanto, A., & Jihadi, M. (2022). The effect of digital marketing, digital finance and digital payment on finance performance of indonesian smes. International Journal of Data and Network Science, 6(1), 37–44. https://doi.org/10.5267/J.IJDNS.2021.10.006
3. Fauzi, F., Antoni, D., & Suwarni, E. (2020). Women entrepreneurship in the developing country: The effects of financial and digital literacy on SMEs' growth. Journal of Governance and Regulation, 9(4), 106–115. https://doi.org/10.22495/JGRV9I4ART9
4. French, D., McKillop, D., & Stewart, E. (2020). The effectiveness of smartphone apps in improving financial capability. European Journal of Finance, 26(4–5), 302–318. https://doi.org/10.1080/1351847X.2019.1639526
5. Infe, O., & Guidance, P. (2018). Digitalisation and Financial Literacy. OECD (2018), G20/OECD INFE Policy Guidance on Digitalisation and Financial Literacy. https://www.oecd.org/finance/G20-OECD-INFE-Policy-Guidance-Digitalisation-Financial-Literacy-2018.pdf
6. Kass-Hanna, J., Lyons, A. C., & Liu, F. (2018). Building financial resilience through financial and digital literacy in South Asia and Sub-Saharan Africa. Emerging Markets Review, 100846. https://doi.org/10.1016/j.ememar.2021.100846
7. KPMG. (2021). kpmg01.pdf. KPMG. https://home.kpmg/in/en/home.html
8. Kurniasari, F., Gunardi, A., Putri, F. P., & Firmansyah, A. (2021). The role of financial technology to increase financial inclusion in Indonesia. International Journal of Data and Network Science, 5(3), 391–400. https://doi.org/10.5267/j.ijdns.2021.5.004
9. Ministry of Electronics and Information Technology (MeitY). (2022). meity01.pdf. https://www.meity.gov.in
10. NITI Aayog. (2020). niti01.pdf. NITI Aayog.
11. Ozili, P. K. (2021). Financial inclusion research around the world: A review. Forum for Social Economics, 50(4), 457–479. https://doi.org/10.1080/07360932.2020.1715238
12. Pal, A., Herath, T., De', R., & Raghav Rao, H. (2021). Why do people use mobile payment technologies and why would they continue? An examination and implications from India. Research Policy, 50(6), 104228. https://doi.org/10.1016/j.respol.2021.104228
13. PwC India. (2021). pwc01.pdf. https://www.pwc.in
14. Rastogi, S., Panse, C., Sharma, A., & Bhimavarapu, V. M. (2021). Unified Payment Interface (UPI): A digital innovation and its impact on financial inclusion and economic development. Universal Journal of Accounting and Finance, 9(3), 518–530. https://doi.org/10.13189/ujaf.2021.090326
15. RBI. (2008). Financial inclusion VII. RBI Publications Financial Inclusion, 294–348. https://www.rbi.org.in/scripts/PublicationsView.aspx?id=10494
16. RBI. (2021). RBI Reports. RBI Report 2021, 2020–2025. https://m.rbi.org.in/scripts/PublicationReportDetails.aspx?UrlPage=&ID=1156
17. RBI. (2023). rbi01.pdf. RBI. https://www.rbi.org.in
18. Senou, M. M., Ouattara, W., & Acclassato Houensou, D. (2019). Is there a bottleneck for mobile money adoption in WAEMU? Transnational Corporations Review, 11(2), 143–156. https://doi.org/10.1080/19186444.2019.1641393
19. Setiawan, B., Nugraha, D. P., Irawan, A., Nathan, R. J., & Zoltan, Z. (2021). User innovativeness and fintech adoption in indonesia. Journal of Open Innovation: Technology, Market, and Complexity, 7(3), 1–18. https://doi.org/10.3390/joitmc7030188
20. Shen, Y., Hueng, C. J., & Hu, W. (2019). Using digital technology to improve financial inclusion in China. Applied Economics Letters, 27(1), 30–34. https://doi.org/10.1080/13504851.2019.1606401
21. Su, L., Peng, Y., Kong, R., & Chen, Q. (2021). Impact of e-commerce adoption on farmers' participation in the digital financial market: Evidence from rural china. Journal of Theoretical and Applied Electronic Commerce Research, 16(5), 1434–1457. https://doi.org/10.3390/jtaer16050081
22. Vitak, J., Liao, Y., Subramaniam, M., & Kumar, P. (2018). "I knew it was too good to be true": The challenges economically disadvantaged users face in assessing trustworthiness, avoiding scams, and developing self-efficacy online. Proceedings of the ACM on Human-Computer Interaction, 2(CSCW). https://doi.org/10.1145/3274445