

An Inter-State Exploration of Unified Payments Interface (UPI) Adoption and Digitalization Advancements

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Abstract:

The rapid proliferation of digital technologies has reshaped the financial landscape across the globe. In the context of India, the Unified Payments Interface (UPI) has emerged as a groundbreaking innovation, facilitating seamless digital transactions. This study delves into the dynamics of UPI adoption and digitalization advancements at the inter-state level within India.

This research employs a multidimensional approach to investigate the factors influencing UPI adoption rates across different Indian states. Furthermore, this study explores the impact of UPI adoption on various aspects of digitalization, including financial inclusion, e-commerce growth, and the evolution of digital ecosystems. It examines how UPI, as a digital payment platform, has catalyzed the transformation of traditional economic practices, fostering a more inclusive and efficient financial ecosystem.

By conducting a comparative analysis of UPI adoption and digitalization advancements across diverse Indian states, this research provides valuable insights into the regional disparities and challenges in harnessing the full potential of digital financial services. It also offers recommendations for policymakers, financial institutions, and businesses on strategies to promote UPI adoption and leverage digitalization for socio-economic development at both the state and national levels.

This study concludes with the policies in which it suggests that how we need to increase the bank branches in the Low GDP states for the development of the states. And the transactions show how much differences between High GDP States and Low GDP States. This Inter-state study exploration sheds light on the evolving landscape of UPI adoption and digitalization advancements in India, offering a comprehensive understanding of the intricate relationships between technology, finance, and socio-economic development in one of the world's largest and most dynamic digital payment ecosystems.

1. Introduction:

In India, the value and volume of digital payments have multiplied during the last few years. A number of reasons have influenced this national tendency improvements in payments included infrastructural problems and information interruptions with information and communication technologies, a supportive policy, a regulatory framework a stronger emphasis on the environment customer-centricity. Additionally, increased availability and smartphone adoption people's increasing ease with the internet, by utilizing technology and better financial capability has also contributed to this increase.

National Payments Corporation of India (NPCI) has created and led the efforts to build an open and secure digital ecosystem. The efforts have positively transformed access to digital payments solutions for the masses. Further, the COVID-19 pandemic has triggered a series of concerted efforts from various stakeholders to drive the adoption of digital payments in India in the past two years. These include the launch of the Pradhan Mantri Jan Dhan Yojna (PMJDY), Aadhaar, the India Stack, the launch of differentiated

banks, and the demonetization of high-value currency.

1.1 Going from Cash to Less-Cash:

Consumer use of digital technology has been increasing annually over the last few years. Digital payments were eventually adopted as a logical outgrowth of the behavioral shifts brought on by the COVID-19 epidemic. Over 26 crore transactions are processed daily by India's digital payment networks, with the UPI system handling more than two-thirds of those transactions. In addition to domestic financial institutions, Big-Tech and Fintech firms were early adopters by supporting UPI transactions. Convenience, cost, confidence, and competition are just a few of the factors contributing to the faster acceptance of digital payments. Frameworks supported by the RBI include the regulatory sandbox, contactless payments, waivers of fees for several payment systems, the Payments Infrastructure Development Fund (PIDF), rules for payment aggregators, and 24-hour accessibility to digital payment systems. A number of government initiatives and programs that are connected to Jan Dhan bank accounts and Aadhar via Direct Beneficiary Transfers (DBTs) have been a big driver of the adoption of digital payments, this is known as the JAM trinity (Jan Dhan, Aadhar, and Mobile). A sudden increase in Business Correspondent driven Aadhar enabled Payment Systems (AePS) via micro-ATMs has been the logical extension to this. Additionally, a steady rise in the number of mobile users—114 crore as of February 2022, including 84 crore smartphone users—has contributed to an increase in digital payments made through mobile banking apps, digital wallets, and UPI.

According to the RBI's Payment Vision 2025 statement, the number of businesses accepting payments increased by more than 500% between March 2019 and the half-year that concluded in September 2021. In the same period, there was an increase of more than 1200% in UPI transactions.

The Evolution India's digital payments has grown rapidly, with a CAGR of 38% by volume and 7.5% by value from 2017-18 to 2021-22. From the volume perspective, digital payments in India have already crossed the 60 billion transactions mark, which is expected to quadruple by 2026. Products, such as Unified Payments Interface (UPI), Aadhaar-enabled Payment Systems (AePS), BHIM Aadhaar Pay (BAP), Bharat Bill Payment System (BBPS), RuPay debit card, and RuPay credit card, among others, have aided India's journey of digital payments and extended it to the Low Middle Income (LMI) segments (Ministry of Electronics and Information Technology, 2023).

1.2 History of Payment system in India:

Real-time and safe large-value interbank financial transfers are now possible because to the RBI's Real Time Gross Settlement (RTGS) system, which was introduced in **2003**. In order to facilitate electronic financial transfers for retail transactions with deferred settlement, the National Electronic Funds Transfer (NEFT) system was launched in **2005**. The National Payments Corporation of India (NPCI) was founded in **2006** with the goal of enhancing and integrating the nation's different retail payment systems.

When the Immediate Payment Service (IMPS) was introduced in **2010**, clients could instantly send money between banks using their mobile devices, even after regular banking hours. The RBI promoted the use of mobile devices for financial transactions by issuing guidelines for mobile banking in **2011**. Direct benefit transfers and Aadhaar-based payments are now possible thanks to the 2011 launch of the Aadhaar biometric identification system. In order to further encourage financial inclusion, the RBI published guidelines for the licensing of Payment Banks in **2014**. These organizations might provide a limited range of banking services.







	Cash Dependent Society
	Deficiency of trust in Digital Payments
	Financial Inclusion
	Inadequate infrastructure- Acceptance and high Speed Network
	Lack of participations – Start-ups, Fin-techs, Big-techs
	Lack of incentives for Digital Payments

Fig 1. Roadblocks to financial digitalization before 2014 (Source: Ministry of Electronic and Information Technology)

1.3 The Rise of Digital Payments

The Unified Payments Interface (UPI) was introduced by NPCI in 2015. By facilitating real-time, seamless financial transfers between bank accounts using mobile phones, UPI revolutionized digital payments by making transactions as simple as sending a text message.

Financial service providers have been able to develop cutting-edge solutions for the unserved and underserved groups because of rising smartphone penetration, expanded internet access, and growing technology comfort. India had more than 1.14 billion wireless telecom subscriptions as of April 2022. In addition, the percentage of Indians who own smartphones rose from 26% in 2014 to 61% in 2022. By 2026, there will probably be 1 billion smartphone users in India, which will hasten the adoption of digital payments. This digital revolution has been mostly driven by rural India, where smartphone penetration increased from 9% in 2015 to 25% in 2018. As of March 2022, India had over 761 million mobile internet subscribers. Rural India now has 345 million mobile internet users, whereas urban India continues to have more than four times as many users (416 million+). Many new users have also been attracted by the expansion of 4G services, with rural India seeing a 45% rise in new internet users since 2019. At INR 9.91 (about USD 0.13) per GB as of December 2021, an average wireless internet subscriber in India uses 14.97 GB per month, making it the cheapest internet in the world. New generations of mobile-first internet users will continue to push the boundaries of the digital world with affordable access to smartphones and low-cost internet.

1.4 Examining Inter-State Variations in Digital Payment Adoption Across India:

With the swift adoption of digital payment technologies, India has recently seen a dramatic transition in its financial landscape. The rise in digital transactions has been facilitated by the widespread use of smartphones, the accessibility of inexpensive data plans, and government programs like Digital India. The development of digital payments has shown notable variances in various Indian states, but, as with any

national trend. This article examines the data-supported inter-state differences in the adoption of digital payment systems and discusses the benefits of looking at these differences state-by-state.

Understanding the state-wise variations in digital payment adoption can help policymakers design more targeted interventions. Different states have unique socio-economic and demographic characteristics that influence payment preferences. Tailoring policies to address these variations can lead to more effective outcomes. By analyzing which states are lagging in digital payment adoption, policymakers can focus on promoting financial inclusion and digital literacy in these regions. This can bridge the gap between technologically advanced and less developed states.

Our study takes an inter-state approach because we understand that different parts of India's vast and diversified geographical terrain have had varying effects on the trajectory of UPI acceptance. Our goal is to pinpoint the elements that have helped or hindered UPI's adoption across various states, providing insightful information for decision-makers, companies, and financial institutions looking to improve financial infrastructure and digitalization initiatives.

1.Literature Review:

Cracknell, David (2004) identified the e-banking partners as post office, mbank, ATM kiosk, internet kiosk, petrol stations, POS, mobile service provider and the accessibility for the poor. The result of the analysis reveals that e-banking can offer customers an enhanced range of services at a very low cost.

Enders, Albrecht, et al. (2007)⁴ analyzed the case of Nordea Bank (Scandinavia), an incumbent that has over the last decade enjoyed extraordinary success in e-banking. The paper first demonstrates how the internet has been a sustaining innovation at Nordea and then concludes that pure e-banks are unlikely to create a disruptive innovation in the retail banking industry.

Ravi, V., Mahil Carr, and N. VidyaSagar (2007) says that internet banking is a new delivery channel for banks in India. The internet banking channel was both an informative and a transactional medium. However, i-banking has not been popularly adopted in India as expected.

Al Nahian Riyadh, Md, Shahriar Akter, and Nayeema Islam (2009) identified seven variables affecting e-banking adoption by SMEs in Bangladesh as 28 organizational capabilities, perceived benefits, perceived credibility, perceived regulatory support, ICT industries readiness, lack of financial institutions readiness and institutional influence.

Malhotra, Pooja, and Balwinder Singh, (2009) observed that financial products and services have become available over the internet and has thus become an important distribution channel for several banks. Banks boost technology investment spending strongly to address revenue, cost and competitiveness concerns.

Chigamba, Cleopas, and Olawale Fatoki(2011) investigated the factors deciding the selection of commercial banks by University students. The University of Fort Hare (Alice Campus) was the study area. The study revealed that technology played an important role in the selection of banks by university students. The findings declared that the bank should distinguish themselves in terms of quality and reliability services given to university students.

Gbadeyan, R. A., and O. O. Akinyosoye-Gbonda(2011) on customers' choice of banks influenced by the quality of e-banking services is provided. It was recommended that various measures should be put in place to ensure more security such as installation of encrypted software, verification system of customer's identification cards, frequent change of password, examining test questions and using alpha numeric password. The study concluded that e-banking has become an important phenomenon in the banking industry, and it will continue as more progress and innovations are made in information technology.

Mumuni Moro Wandaogou, Abdil, and Stephen Pambiin Jalulah (2011) Technology adoption by the banks has enabled the use of different technology tools in banking, which enable banks to reduce transaction costs, saving money and time which is categorized as electronic banking. E- banking refers to the development of banking services and products over electronic and communication networks directed to customers.

Brian Le Sar and David Porteous, (2013): "Introduction to the National Payments System", National Payments System Institute., They define EPS as the one that considers an electronic message to authorize and effect the payments. Amongst five main categories of payments instrument – Cash, Cheques or bills of exchange, electronic credit transfers, electronic debits and Payments cards – any payments system that uses the later three is considered as an EPS.

Kabir, M A, Saidin S Z and Ahmi A, (2015): "Adoption of e-Payment Systems: A Review of Literature" Proceedings on International Conference on E-Commerce 20-22 October, Malaysia., These definitions were mainly viewed from different perspectives ranging from scholars in the field of accounting and finance, business technology to those in information systems.

Kaur, K., & Pathak, A. (2015): "E-Payment System on E-Commerce in India", International Journal of Engineering Research and Applications, Vol. 5(2), suggests that payments made in electronic commerce environment in the form of money exchange through electronic means are e-payments.

2. Objectives:

1. To find the relation between Usage of UPI and GDP growth of States.
2. To recommend some major practical and policy implications.

3. Research Methodology:

4.1 Data Sources: The whole study is dependent on Secondary Data, which has been collected from certain multiple and reliable sources which include Annual Report of Ministry of Electronics and Information technology named as “Digital Payment se Pragati ko Gati”, RBI Data Release Bank wise Volumes in NEFT/RTGS/Mobile Transactions/Internet Banking Transactions, National Payments Corporation of India (NPCI) Data.

4.2 Research Design: For this study descriptive research design has been employed. 12 states have been selected for the study in which 4 belong to the High NSDP category, 4 belong to medium NSDP category whereas last 4 belongs to low NSDP category. Therefore, the study distinguishes between the states based on their level of economic growth as measures by their respective income levels. For all these states data have collected on various banking and financial statistics which include Total number of Bank branches, Total number of Transaction, proportion of transactions carried on through Digital payment mode, Total number of shares of UPI mode of transaction in total transaction and Number of Transaction per capita. By collecting these financial figures for selected states, the study aims to understand the extent of UPI usage among various states considering their income levels.

The data has been collected for the financial year 2019-20 to 2021-22. Analysis of the growth rates and proportions have been performed to understand the data and draw conclusions. Below table 1 provides the data of various variables taken in this study.

Table 1: Banking and Financial Statistics among selected states

States:	Branches of Banks	Total No. of Transactions	Contribution of Digital Payments	UPI Share in Overall (In crores)	No. of Transaction per capita
States with High GDP:					

Maharashtra	14,157	17,01,53,55,506	13%	695	74.02
Tamil Nadu	12,383	7,93,17,31,226	7%	282	54.01
Uttar Pradesh	18,452	14,10,13,64,627	11%	551	35.25
Gujarat	8,841	4,66,77,74,072	0.24%	173	37.53
	53,833	43,71,62,25,431	31%	1701	200.81
States with Medium GDP:					
Bihar	7,802	3,06,13,32,611	3%	134	14.26
Odisha	5,545	2,49,74,29,407	0.05%	104	29.3
Punjab	6,669	1,89,19,97,560	2%	59	33.88
Chhattisgarh	3,019	1,17,42,28,380	1%	45.74	22.6
	23,035	8,62,49,87,958	6%	342.74	100.04
States with Low GDP:					
Sikkim	168	5,29,03,468	0.05%	2.06	41.81
Nagaland	193	5,76,19,877	0.05%	2.83	13.96
Arunachal Pradesh	182	6,52,34,201	0.02%	3.42	21.71
Mizoram	230	4,22,43,261	0.04%	2.49	17.46
	773	21,80,00,807.00	0.0016	10.8	94.94

Source: Author's Construction using Data from Digital Payment se Pragati ko Gati of MEIT Publication

5. Analysis and Interpretation:

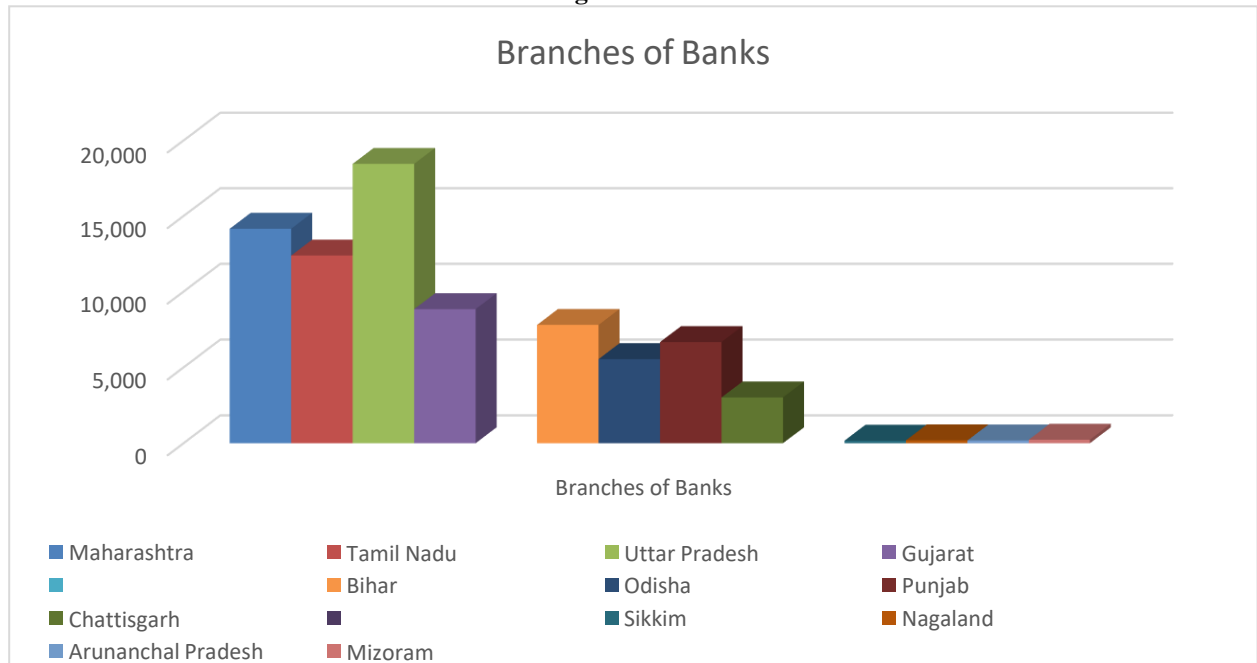
In this section, Analysis of all the chosen variable for the selected states to show the variations of the financial indicators among different states based on their NSDP has been done and ultimately it provides meaningful explanation.

5.1 Bank Branches: Inter-states variation in bank branches have been studied in consideration to states in different income categories and it was found that Maharashtra has the highest number of bank branches (14,157), which is expected given its status as one of India's leading economic states. Tamil Nadu follows closely with 12,383 branches, indicating its strong presence in the banking sector. Uttar Pradesh has a significant number of branches at 18,452, which is not surprising given its large population. Gujarat has 8,841 branches, which is relatively lower than the other three high GDP states, but still a substantial number.

Whereas when the states with medium GDP are considered, it was seen that Bihar has the lowest number of bank branches among the medium GDP states with 7,802 branches. Odisha has 5,545 branches, which is relatively lower compared to some other states. Punjab has a moderate number of branches at 6,669, reflecting its economic status. Chhattisgarh has 3,019 branches, the lowest among all the states, which is partly due to its smaller population compared to other states.

While states having lowest GDP exhibit the following scenario in which Mizoram has the highest number of bank branches at 230. Nagaland has 193 branches, indicating some presence of banking services. Sikkim has 168 branches, which is relatively low but not unexpected given its small population and hilly terrain. Arunachal Pradesh has 182 branches, which is similar to the other low GDP states.

Figure 2:



Source: Author's Construction

Taking into account the above scenario, it can be said that the number of bank branches tends to correlate with the economic development of a state. High GDP states generally have a greater number of bank branches, reflecting the demand for financial services in these regions. Uttar Pradesh stands out with the highest number of bank branches among all the states, which is in line with its high population and economic activity. Chhattisgarh has the fewest bank branches among all the states, which could be attributed to its relatively smaller population and possibly lower economic development compared to other states. Nagaland, among the low GDP states, has a relatively higher number of bank branches, suggesting a demand for banking services even in economically challenged regions. It's important to consider the population and economic activity when evaluating the adequacy of banking services in a state. Some states with lower GDP may still have enough branches if they have a smaller population and lower banking needs.

5.2 Banking Transactions: Maharashtra has the highest number of banking transactions, with a total of 17,01,53,55,506 transactions. This is expected given its status as one of India's leading economic states. Tamil Nadu follows with 7,93,17,31,226 transactions, indicating its strong economic activity and banking needs. Uttar Pradesh has 14,10,13,64,627 transactions, which is significantly higher than the other high GDP states, reflecting its large population and economic activity. Gujarat has 4,66,77,74,072 transactions, a substantial number but lower than some other high GDP states. Whereas the states with Medium GDP like, Bihar has 3,06,13,32,611 transactions, which is lower than the high GDP states but still substantial, given its population. Odisha has 2,49,74,29,407 transactions, indicating moderate banking activity. Punjab has 1,89,19,97,560 transactions, which is relatively lower, possibly due to its smaller population compared to other states. Chhattisgarh has 1,17,42,28,380 transactions, the lowest among all the states, reflecting its smaller population and lower economic development.

States with Low GDP, like Arunachal Pradesh, have the highest number of banking transactions among the low GDP states at 6,52,34,201, suggesting a demand for banking services even in economically challenged regions. Nagaland has 5,76,19,877 transactions, indicating some banking activity. Sikkim has 5,29,03,468 transactions, which is relatively low but not unexpected given its small population. Mizoram has 4,22,43,261 transactions, which is like the other low GDP states.

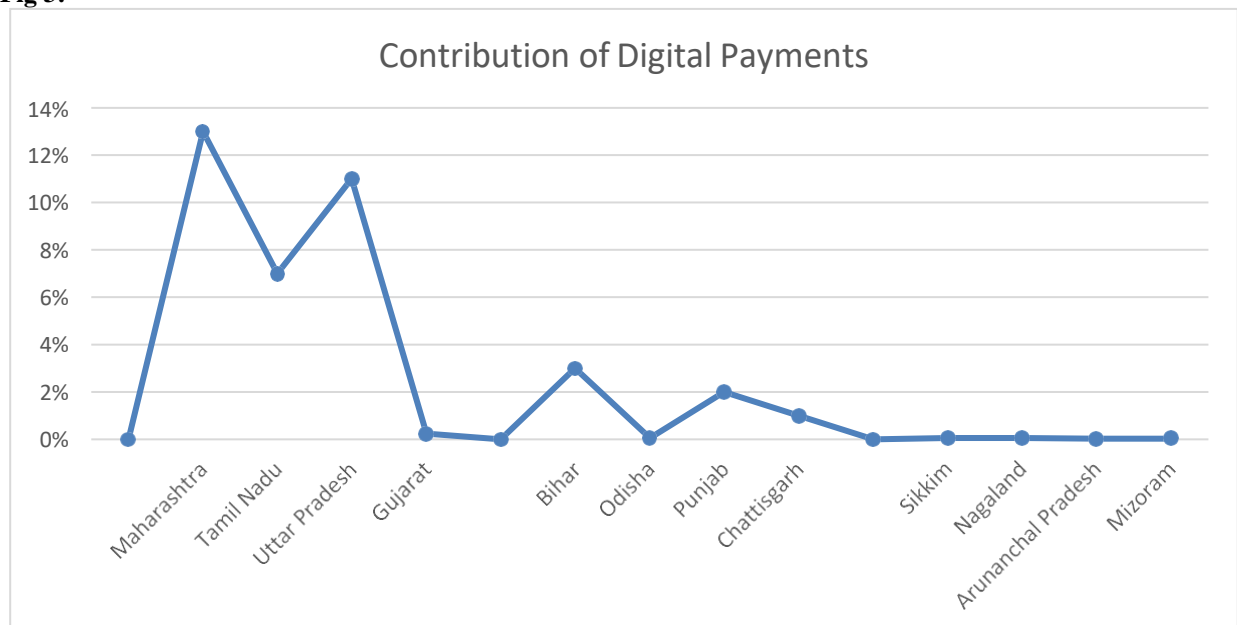
Considering it the above scenario said that the number of banking transactions tends to correlate with the economic development and population of a state. High GDP states and those with larger populations

generally have higher banking transaction numbers. Uttar Pradesh stands out with the highest number of banking transactions among all the states, reflecting its large population and significant economic activity. Chhattisgarh has the fewest banking transactions among all the states, which is consistent with its smaller population and possibly lower economic development compared to other states. Arunachal Pradesh, among the low GDP states, has a relatively higher number of banking transactions, suggesting a demand for banking services even in economically challenged regions. The data on banking transactions provides insights into the banking needs and economic activity in each state. It's important for policymakers and banks to consider these factors when planning banking services and financial inclusion initiatives.

5.3 Contribution of Digital Payments: States with High GDP like Maharashtra has the highest contribution of digital payments at 13%, which is expected given its status as a leading economic state and the presence of major cities like Mumbai. Tamil Nadu has a moderate contribution of digital payments at 7%, indicating a decent level of digital adoption. Uttar Pradesh has 11% contribution, reflecting a significant shift towards digital payments in a highly populous state.

Gujarat has the lowest contribution among high GDP states at 0.24%, which is relatively low compared to the others. States with Medium GDP like Bihar have a relatively low contribution of digital payments at 3%, which might be due to challenges in digital adoption in less economically developed regions. Odisha's contribution is exceptionally low at 0.05%, suggesting a need for efforts to promote digital payments in the state. Punjab has a moderate contribution of digital payments at 2%, reflecting a reasonable level of digital adoption. Chhattisgarh also has a low contribution at 1%, indicating limited digital payment usage in the state. States with Low GDP like Arunachal Pradesh, Sikkim, Nagaland, and Mizoram have very low contributions of digital payments, ranging from 0.02% to 0.05%, indicating the need for significant efforts to promote digital transactions in these states.

Fig 3:



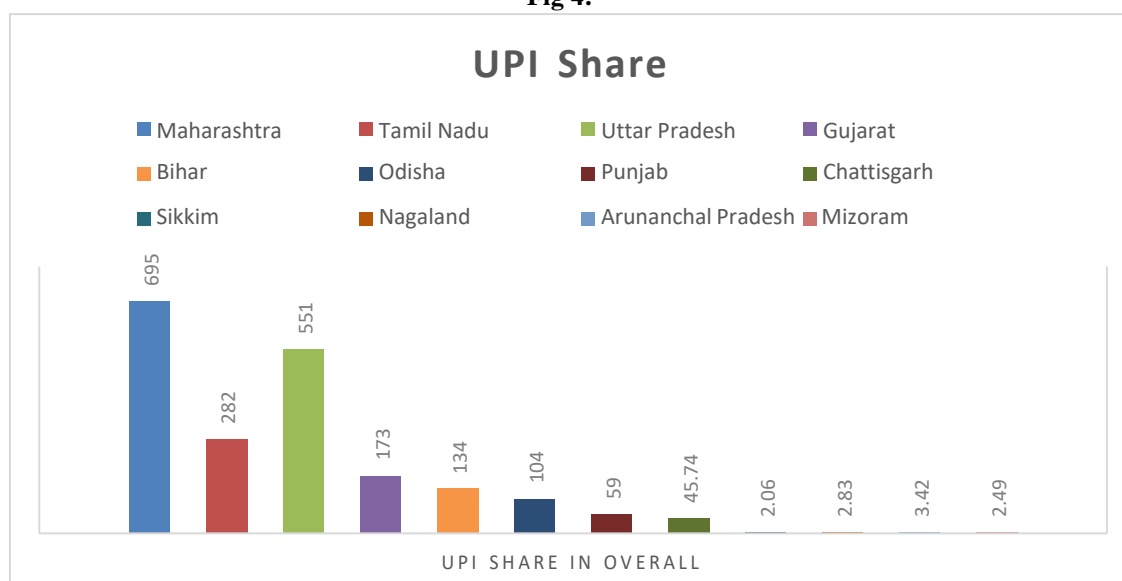
Source: Author's Construction

The analysis finds that the contribution of digital payments is closely related to the economic development and urbanization of a state. High GDP states generally have a higher contribution due to better digital infrastructure and awareness. Maharashtra leads in the contribution of digital payments, which is in line with its economic status and the presence of financial hubs like Mumbai. Uttar Pradesh has a notable contribution of digital payments, reflecting the increasing adoption of digital transactions in one of India's most populous states. States in the low GDP category, such as Arunachal Pradesh, Sikkim, Nagaland, and Mizoram, have

very low contributions to digital payments, indicating a significant need for digital literacy programs and infrastructure development to promote digital financial inclusion. The data highlights the importance of promoting digital payments, especially in less economically developed states, to improve financial inclusion and support the transition to a digital economy.

5.4 UPI Transaction Share in total Transactions: States with High GDP like Maharashtra has the highest UPI share in overall transactions, with 695 crores, reflecting a significant adoption of UPI payments in the state. Tamil Nadu follows with 282 crores, indicating a reasonable level of UPI usage. Uttar Pradesh has a UPI share of 551 crores, suggesting a substantial shift towards digital payments. Gujarat has a UPI share of 173 crores, which is lower compared to the other high GDP states but still noteworthy. States with Medium GDP like Bihar have a UPI share of 134 crores, which is relatively lower than high GDP states but still represents a decent adoption of UPI. Odisha has 104 crores, indicating moderate UPI usage. Punjab has 59 crores, reflecting a lower UPI share compared to some other states. Chhattisgarh has a UPI share of 45.74 crores, which is relatively low, possibly due to lower economic development in the state. States with Low GDP like Arunachal Pradesh stand out among the low GDP states with a UPI share of 3.42 crores, indicating a growing adoption of digital payments. Nagaland has a UPI share of 2.83 crores, indicating some usage of UPI. Sikkim has a UPI share of 2.06 crores, which is relatively low but not unexpected given its small population. Mizoram has a UPI share of 2.49 crores, suggesting a small but existent UPI adoption.

Fig 4:



Source: Author's Construction

Considering the above scenario, it can be said that the UPI share in overall transactions is a good indicator of the adoption of digital payment methods, and it closely correlates with the economic development and urbanization of a state. Maharashtra leads in UPI share, which is in line with its high GDP and the presence of major urban centres where digital payment adoption is common. Uttar Pradesh, with a high UPI share, reflects a significant shift towards digital payments in one of India's most populous states. Among low GDP states, Arunachal Pradesh stands out with a relatively higher UPI share, suggesting a growing trend towards digital payments, possibly due to awareness and infrastructure development. The data highlights the importance of UPI as a popular

digital payment method in India and the need for promoting digital financial inclusion in less economically developed states to encourage further adoption.

5.5 Number of Transactions Per Capita: States with High GDP Maharashtra has the highest number of transactions per capita at 74.02, indicating a relatively high level of financial activity per person. Tamil Nadu follows with 54.01 transactions per capita, suggesting a moderate level of financial activity. Uttar Pradesh has 35.25 transactions per capita, indicating a lower but still significant financial activity level. Gujarat has 37.53 transactions per capita, which is also relatively high. States with Medium GDP like Bihar have the lowest number of transactions per capita among all the states at 14.26, reflecting lower financial activity per person. Odisha has 29.30 transactions per capita, indicating a moderate level of financial activity. Punjab has 33.88 transactions per capita, which is relatively higher compared to Bihar but lower than high GDP states. Chhattisgarh has 22.60 transactions per capita, which is lower than some other states but not the lowest.

States with Low GDP like Sikkim stands with the highest number of transactions per capita at 41.81, indicating relatively higher financial activity per person. Nagaland has 13.96 transactions per capita, which is the lowest among all states, reflecting lower financial activity. Arunachal Pradesh has 21.71 transactions per capita, which is higher than Nagaland but still relatively low. Mizoram has 17.46 transactions per capita, indicating a moderate level of financial activity.

The analysis found that the number of transactions per capita provides insights into the financial activity and digital payment adoption in different states. High GDP states generally have higher transactions per capita, suggesting greater financial activity and digital payment usage. Maharashtra leads in transactions per capita, which is in line with its high GDP and the presence of major financial hubs like Mumbai. Among low GDP states, Sikkim stands out with a relatively higher number of transactions per capita, indicating a relatively higher level of financial activity, possibly due to awareness and infrastructure development. Nagaland has the lowest transactions per capita, indicating the need for efforts to promote financial inclusion and digital payments in this state. Overall, the data highlights the importance of financial literacy and digital infrastructure development in promoting financial inclusion and increasing financial activity per capita, particularly in less economically developed states.

6. Conclusion and Discussion:

It is evident that there is a strong correlation between the number of bank branches and the economic development of a state. High GDP states like Maharashtra, Tamil Nadu, and Gujarat tend to have a higher number of bank branches, reflecting the demand for financial services in these economically prosperous regions. States with large populations, like Uttar Pradesh, have a significant number of bank branches to cater to the banking needs of their residents. The sheer size of the population necessitates a greater presence of banking services. States with a moderate GDP, such as Punjab, have a moderate number of bank branches, which aligns with their economic

status. This suggests that economic development plays a role in determining the presence of banking infrastructure. States with lower GDP, like Chhattisgarh, tend to have fewer bank branches. This could be due to both a smaller population and lower economic development. These states may face challenges in accessing financial services. Nagaland, among the low GDP states, stands out with a relatively higher number of bank branches. This indicates a demand for banking services even in economically challenged regions, highlighting the importance of financial inclusion efforts. When evaluating the adequacy of banking services, it's essential to consider both the population size and economic activity. States with lower GDP may still have sufficient branches if they have a smaller population and lower banking needs per capita.

There is a clear correlation between the number of banking transactions and a state's economic development and population size. High GDP states with large populations tend to have significantly higher numbers of banking transactions. States with strong economic activity, such as Maharashtra and Tamil Nadu, demonstrate

a higher demand for banking services. This suggests that economic development drives the need for financial transactions. Uttar Pradesh, with its massive population, records the highest number of banking transactions among all states, emphasizing the significance of population size in driving transaction numbers. States like Bihar and Odisha, with medium GDPs, still exhibit substantial banking activity. This indicates that even states with moderate economic development have considerable banking needs. States with low GDPs, like Arunachal Pradesh, Nagaland, and Sikkim, still demonstrate a demand for banking services, albeit at lower levels. This suggests that access to banking is essential even in economically challenged regions.

The contribution of digital payments is closely linked to a state's economic development. High GDP states like Maharashtra and Uttar Pradesh tend to have higher contributions due to better digital infrastructure and awareness. States with major urban centres, such as Mumbai in Maharashtra, often exhibit higher contributions to digital payments. Urbanization encourages digital payment adoption. States with lower GDPs, such as Odisha and states in the low GDP category like Arunachal Pradesh, Sikkim, Nagaland, and Mizoram, face significant challenges in promoting digital payments. Their low contributions indicate a need for digital literacy programs and infrastructure development. The digital payment divide between high GDP and low GDP states highlights the importance of promoting financial inclusion and digital literacy in less economically developed regions.

UPI share in overall transactions serves as a reliable indicator of the adoption of digital payment methods in different states of India. UPI adoption closely correlates with a state's economic development. High GDP states like Maharashtra and Uttar Pradesh exhibit higher UPI shares, indicating a stronger preference for digital payments in economically developed regions. States with major urban centres tend to have higher UPI adoption, reflecting the influence of urbanization on digital payment usage. Some low GDP states, notably Arunachal Pradesh, show promising UPI adoption, suggesting a growing trend towards digital payments. This may result from awareness campaigns and infrastructure development efforts.

The number of transactions per capita serves as a valuable indicator of financial activity and digital payment adoption within states. There is a clear correlation between the number of transactions per capita and a state's economic development. High GDP states like Maharashtra exhibit higher transaction rates per capita, indicating greater financial activity and digital payment usage. States with major urban centres tend to have higher transactions per capita, reflecting the impact of urbanization on financial activity. Medium GDP states, like Odisha and Punjab, exhibit moderate transaction rates per capita, while low GDP states, like Nagaland and Mizoram, have relatively lower rates. Sikkim, among the low GDP states, stands out with a higher number of transactions per capita.

7. Policy Implications:

To bridge the gap in less economically developed states, policymakers should focus on promoting financial inclusion initiatives. This can include setting up more branches, mobile banking units, and financial literacy programs to encourage the use of banking services. Recognize that a one-size-fits-all approach may not work. Different states have different needs and challenges. Policymakers should tailor their strategies to each state's unique circumstances. Embrace technology to extend banking services in remote or less economically developed regions. Mobile banking, digital payments, and online services can help reach underserved populations. Encourage the growth of microfinance institutions and community-based credit unions to provide financial services to small businesses and individuals in economically challenged areas. Continue to collect and analyse data on banking infrastructure, economic development, and population size to make informed decisions about resource allocation and policy development. Invest in physical infrastructure, such as roads and electricity, in economically challenged regions, as improved infrastructure can attract banks and other financial institutions. Launch public awareness campaigns to educate residents about the importance of banking services and how to use them effectively.

Given that banking transactions correlate with economic development and population, policymakers should

prioritize financial inclusion initiatives. These initiatives can include setting up more bank branches, ATMs, and promoting digital banking services to reach underserved populations. Encourage the adoption of digital banking solutions, especially in states with lower transaction volumes. Mobile banking, online payments, and digital wallets can help bridge the gap and improve accessibility. Implement financial literacy programs to educate residents about the benefits and usage of banking services, especially in states with lower banking activity. In states with high transaction volumes, consider expanding the physical banking infrastructure to meet the demand effectively. Recognize that different states have unique needs. Tailor policies to address these specific needs, whether they involve urban-rural divides, literacy levels, or cultural preferences. Encourage partnerships between banks and local governments or NGOs to reach remote and economically challenged areas effectively. Continue to collect and analyse data on banking transactions, economic activity, and population to make informed decisions about resource allocation and policy development. Invest in physical and digital infrastructure development, particularly in states with lower economic development, to improve connectivity and access to banking services.

Launch comprehensive digital literacy programs in less economically developed states. These programs should educate citizens about the benefits of digital payments and how to use them securely. Invest in digital infrastructure, including reliable internet connectivity and mobile network coverage, especially in remote and rural areas. Improved infrastructure can facilitate digital payment adoption. Collaborate with banks and fintech companies to expand access to digital financial services, including mobile banking and digital wallets, in underserved regions. Encourage government agencies to offer more services online and promote digital payment options for government transactions, taxes, and fees. Implement incentives and discounts for digital transactions, such as cashback rewards or discounts on digital payments for essential services. Introduce mobile banking vans in remote areas to provide on-ground support for digital payment adoption and financial education. Conduct public awareness campaigns to inform citizens about the advantages of digital payments and the security measures they should follow. Partner with private sector companies to establish point-of-sale (PoS) terminals and digital payment acceptance in local businesses, markets, and stores. Explore options for providing affordable smartphones or devices to economically disadvantaged populations to enable access to digital payment platforms. Continuously monitor the progress of digital payment adoption in each state and make necessary adjustments to policies and initiatives based on the evolving landscape.

Launch targeted digital literacy and awareness campaigns in less economically developed states to educate citizens about the benefits of UPI and how to use it securely. Continue investing in digital infrastructure, including internet connectivity and mobile networks, especially in rural and remote areas. Improved infrastructure can facilitate UPI adoption. Collaborate with banks and fintech companies to expand access to UPI-based financial services in underserved regions. Establish UPI-based kiosks or agents in remote areas. Promote the use of UPI for government transactions, such as subsidies, benefits, and payments, to encourage citizens to adopt digital payments. Implement incentives, cashback rewards, or discounts for UPI transactions to motivate individuals and businesses to shift from cash to digital payments. Encourage small businesses, markets, and street vendors to adopt UPI payment acceptance through simplified onboarding processes and incentives. Promote the use of UPI-enabled mobile apps and wallets to make digital payments more accessible and user-friendly. Foster collaboration between states to share best practices and experiences in promoting UPI adoption, especially among low GDP states. Continuously monitor UPI adoption rates in each state and assess the effectiveness of initiatives. Adjust strategies based on real-time data. Collaborate with private sector players to drive UPI adoption, as they often have the technology and resources to reach a broader audience.

Implement comprehensive financial literacy programs in less economically developed states to educate citizens about the benefits of digital payments and how to use them securely. Continue investing in digital infrastructure, including internet connectivity and mobile networks, especially in rural and remote areas. Improved infrastructure can facilitate higher transaction rates per capita. Collaborate with banks and fintech companies to expand access to digital financial services in underserved regions. Establish financial inclusion centres to provide guidance on digital transactions. Promote the use of digital payments for government

transactions, subsidies, and benefits, creating incentives for citizens to adopt digital payment methods. Implement incentives, cashback rewards, or discounts for digital transactions to motivate individuals and businesses to shift from cash to digital payments. Encourage small businesses, markets, and street vendors to adopt digital payment acceptance through simplified onboarding processes and incentives. Promote the use of digital wallets and mobile apps for digital payments to make transactions more accessible and user-friendly. Continuously monitor and analyses transaction rates per capita in each state and use this data to fine-tune policies and initiatives for better results. Collaborate with private sector players to drive digital payment adoption, as they often have the technology and resources to reach a broader audience. Customize awareness campaigns to target specific regions and communities, taking into account cultural and linguistic diversity.

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