RELATIONSHIP BETWEEN DIGITAL PAYMENTS PLATFORMS, MERCHANTS AND BANKS IN INDIA USING SOCIAL NETWORK ANALYSIS

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ABSTRACT

The Digital India programme is one of the flagship programmes of the Government of India with a focus on promoting cashless transactions using various modes of digital payments. These modes include Mobile Wallets, Use of Credit and Debit Cards, Mobile banking, internet banking and UPI. The study aims to analyse the area of Digital Payments and understand how banks and financial institutions are strategizing themselves to gain a competitive advantage in this Digital Era. This will be achieved by mapping the relationship between the Indian Banks and the Digital Payment platforms using Social Network Analysis, thus trying to identify significant performing banks and their association with classified digital payment platforms. This network analysis will help banks to detect change-in-opinion, and design strategic decisions by resolving complications from the consumer's perspective. This study demands the latest data, collected from pertinent sources. Information is being gathered from the National Payments Corporation of India (NPCI), supported by the Reserve Bank of India (RBI) and the Indian Bank's Association (IBA), which is functioning as an often related umbrella organisation for retail payments, settlement systems and operations in India.

KEYWORDS

Digital Payments, Indian Banks, Social Network

INTRODUCTION

Conventionally India is a country that prefers cash due to the prevailing credence of ease of use and universal acceptance. As an emerging nation, India has high digital ambitions and included Digital India as a remark, way of life and known to be one of the early adopters of Digital technology in diverse fields such as retail, financial transactions, tax filings, public services, deliveries, etc., This aimed to achieve a cashless economy and the global trends such as pandemic also accelerated the pace for adoption. Though GOI made multiple attempts to reduce physical cash flow as it was resulting in more illegal-currency disputes, the initiative that resulted in major economic change is demonetizing high-value physical currency notes, which enabled in force push India towards a cashless future. Though payment systems like Electronic Fund transfer, NEFT, RTGS, and IMPS were performing well and trying to diversify payment options, there was always a problem of interoperability existing in this domain. It means, a clear deprivation in integrating accuracy of communication, information sharing and connectedness in the ecosystem exists.

Private fintech firms and Indian banks stood as pillar foundation in developing digital payment infrastructure with GOI support, along with their core functions, main focus is on imperatives that ensures hassle-free online transactions.

Growth estimates of digital payments in India revealed a forecast of a threefold increase meeting $1 trillion by 2026, which is about seven times greater than 2021. CLSA report also revealed UPI comprises over 60% of total digital payments fuelled due to cheap internet, mobile penetration, and online payment systems.

Hence, this research tries to understand important digital platforms and thus important banks through mapping relationships in a social network analysis format. We are seeing how Banks and Financial Institutions are strategizing themselves to gain a competitive advantage. Banks are focusing on Technological and Market contexts to have efficiency gain and support the efforts to reduce the size of the

shadow economy. But from a Consumer perspective, ambiguity started to appear that resists people in terms of lack of trust in digital transactions, ease of digitalization, payment options, security of systems, and merchant/vendor side breaches. Hence, utilizing this framework, a merchant/vendor or a normal consumer can find the connectedness useful to build trust to partner with or to invest in.

LITERATURE REVIEW

A large part of the existing literature is descriptive and primarily focuses on trends, recommendations, shifts that appeared in the Indian ecosystem, pathways (Haridasan. V. (2021)) and futuristic directions. On the other hand, there exists a solution that talks about numerous factors and technological solutions that could enhance underlying economic conditions, security challenges, policy changes and ideas, and opinions that can drive digital acceleration.

Concerning consumer adoption rate, based on the constraints such as Income levels, understanding of digital payment, primary analysis simple percentage analysis and chi-square test (K. Suma Vally, 2018), that analysed the impact on consumers from digital adoption and impact on the banking sector in India and age, education, income status, gender are recorded as important factors. Aggarwal *et al*., (2021) proposed considerable factors to adapt to new digital payment technologies which tried to identify elements that boosted maximum satisfaction in individuals experiencing online transactions. Not only about satisfaction and positive experience, due to extreme growth skewness being observed in this digital space, but there is also a segment of communities scared of losing money (Raghunath G, 2020) and merchants, losing personal data, are looking for sophisticated platforms to turn digital.

An interesting research work by Abbasi *et al*., (2021) declared technological advancements noting in e-commerce, IoT is reflecting the market patterns in the development of ways of interaction and ways of exchanging money. Virtual Currency, a new form of currency called Cryptocurrency is based on blockchain with a focus on improving transparency and anonymity. But these trends take time to indulge with the roots of Indian Business places touching brick-and-mortar stores. Network Analysis Diagram creates a connected relationship between interconnected topics that are co-occurring (Kar, A. K. 2021). Social Network Analysis is being used to analyse the relationships in a connected network and associations existing in different connected nodes. This approach re-validates the connectedness of the choice of factors that can be utilised in inferential analysis (Kar, A. K., 2021). The consumer payments sector is entering the growth phase while financial institutions are strategizing to gain a competitive edge and banks are focusing on enhancing third-party partnerships and thus gaining competitive advantage. This paper aims to focus on the consumer perspective, an important stakeholder among whom ambiguity started to appear, resisting to trust in digital payment, security of systems through which a bank can identify the change in opinion, a merchant/vendor who requires a roadmap to understand why and how a digital platform is best to associate and invest with thus, thriving strategic decisions that can support biggest stakeholder group-consumers, merchants/vendors.

METHODOLOGY

This section discusses the details of the methodology that is useful to attain the objective.

Initially, to stay in line with the research objective, the study required the latest data collected from pertinent sources. As the study requires UPI ecosystem statistics, Digital Payment platform data and merchants and type of banks information collectively, the data is collected from the National Payments

Corporation of India (NPCI), an initiative of the Reserve Bank of India (RBI) and Indian Bank's Association (IBA) which serves as an umbrella organisation for retail-payments, settlement-systems and operations in India.

From the data collected from NPCI, relating to product, platform, bank, merchant ecosystem and statistics, to ensure quality and connectedness the details, and information is pre-processed which included integration of facts, statistics, and information from multiple sheets, and thus used as input which is then transformed into useful data for analysis.

NETWORK ANALYSIS

Social Network Analysis utilises graph theory and the concept of networks concepts that analyse the behaviour of banks from possible granular levels to better understand relationships or social structures at a broad level. The network includes the study of relationships, interactions, and communications with entities of nodes and edges. One of the notable features of social network analysis is its focus on structure and strength of association. Network Analysis and visualisation appear to be an interesting tool using the open-source visualisation tool named Gephi. Gephi is a network visualisation software deployed in various domains as it is famous for the ability to display a spatialisation process, that can transform visualisation into a network map (Jacomy M *et al*., 2014). The objective of this study is to visualise the unstructured data recorded in the NPCI web environment, thereby retrieving interconnected information in a network graph that helps discover hidden structures and locate clusters and patterns. From these derived insights, the output network locates important banks and important UPI platforms, their types, and the association between them.

RESULTS AND DISCUSSION

ANALYSIS

Digital India Program was introduced which resulted in a confluence of factors that paved the way for digital payments transition. Under the umbrella of India Stack, Unified Payments Interface was launched to solve the problem of interoperability between financial institutions and banks, which is also recording a new phase in addressing 5 C of digital payments in India. (Coverage, Convenience, Confidence, Cost and Convergence). Today UPI platform has experienced huge and rapid adoption from both governmental and private players due to its forefront investments in user-friendly payment products and consumer marketing aiming to drive awareness.

Figure 1 is a simple time series analysis of how UPI gained importance. The dense area represents the total value of transactions that are being done every month starting from 2016. The line in the chart represents the number of banks that came live on UPI in 2016. We can see, 2020, and 2021 are major years that attracted many banks to come live on UPI. The dense region says, there was a decrease in the total amount transacted by UPI in April 2020, the value of transactions fell reaching INR 1.51 lakh crores (where March 2020 recorded 2.06 lakh crores INR transaction value) saying a 73% Reduce compared to the previous month. Analysed reasons are identified as this steep downfall is caused due to severe covid second wave impact Verma S., (2022). This impact when examined at a granular level depicted that this sudden downward steep caused decline:

FIGURE 1. VISUALISATION DEPICTING HOW UPI GAINED IMPORTANCE AND UPI LIVE MEMBERS FROM APRIL-2016 TO OCTOBER-2021.

(Source: Original)

- The decline in the Travel sector by 87%,
- Food and beverage industry by 68%,
- Groceries by 54%.

But the interesting fact is, during the same time, a report by Razorpay stated these 30 days are crucial as it highlighted the UPI as the most popular digital payment method, accounting for 43% of total transactions.

PSP AND ISSUER BANKS

FIGURE 2. NETWORK VISUALISATION OF BANKS STAYING AS BOTH PSP AND ISSUER.

(Source: Original)

From Figure 2 and Figure 3, two network visualisations, it is evident that many Indian banks are preferring to stay as an ISSUER bank rather than PSP and ISSUER. Figure 2 also states that most of the PSP and Issuer banks are Private players whereas, Figure 3 depicted the behaviour of Government

banks, State co-operative, Gramin, Sahkari, and Local banks, which came live on UPI as an Issuer banks only.

IDENTIFIED PROBABLE REASONS FOR THIS BEHAVIOUR IN BANKS

Contrary to the popular belief that QR codes, VPA verification, and fund transfers have to be processed by 'banks only' instead of TPAP. This made TPAP tie up with PSPs and turned them into sponsors- to promote payment options for customers. TPAP targeted private players that have a bigger hand in e-commerce, and website shopping to promote their presence and SIMPLICITY in service. For example, Axis Bank association with Flipkart_ Flipkart Buzz card and Freecharge with Axis Bank promote opening a virtual bank account in 2 minutes.

Possible reasons why Third Party Aggregator Platforms are targeting to get sponsorship or tie-ups with private PSPs:
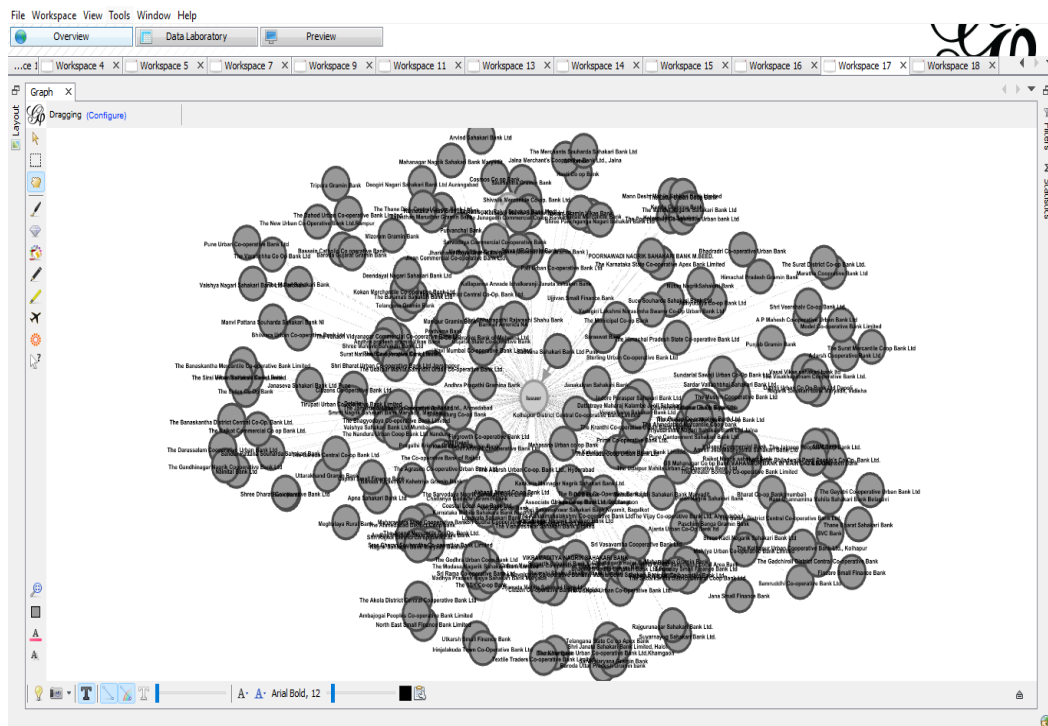
ISSUER BANKS:

FIGURE 3. NETWORK VISUALISATION OF BANKS STAYING ONLY AS ISSUER
(Source: Original)

Along with the stated reasons, another visible reason is Government and public banks are prone to higher technical decline in UPI. Whereas, Figure 4 stated that Private banks developed in the past 2 years, where Business Decline and Technical decline seemed to be less, due to superior technological superiority, looking for a highly competitive outlook, high-quality service oriented and aiming to attract more customers. Figure 5 states that, most of the rural, public banks are not involved in instant Debit Reversal Success percentage and also Private banks recorded less number of total Debit Reversal Counts.
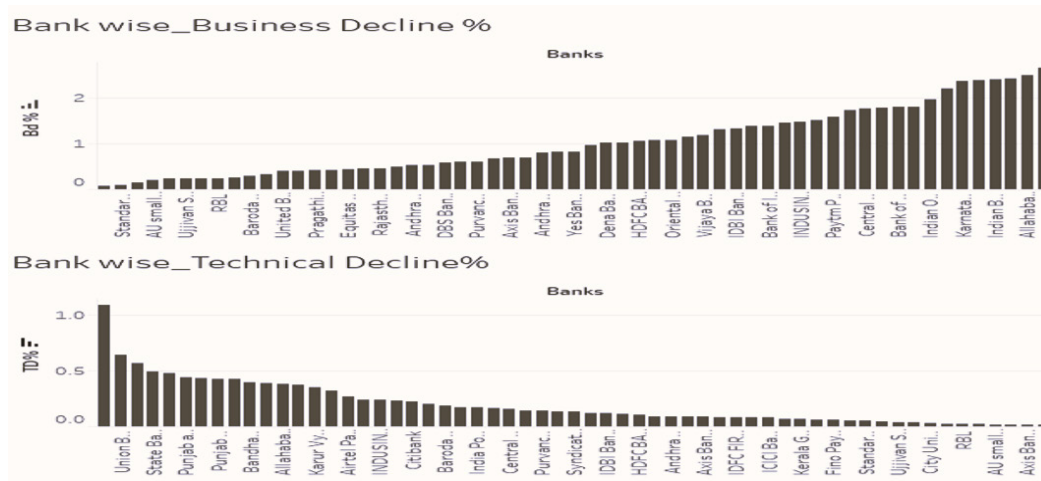
**FIGURE 4. VISUALISATION OF BANK WISE_BUSINESS DECLINE %
AND BANK WISE_TECHNICAL DECLINE %**
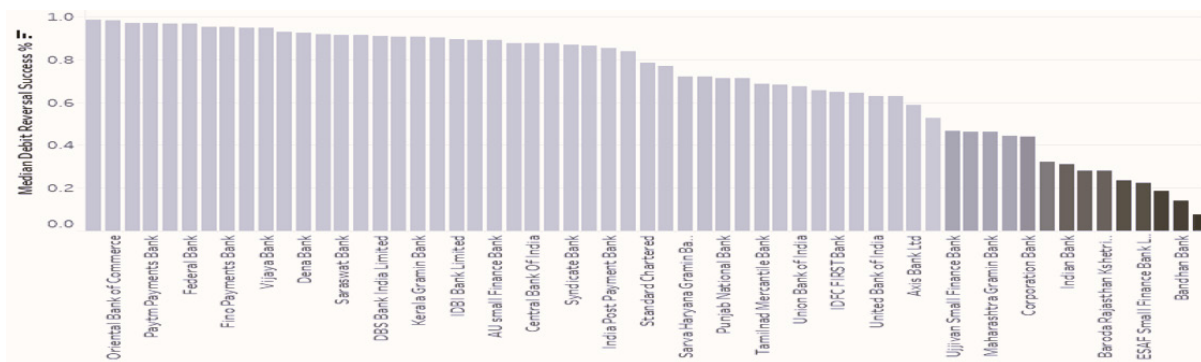
(Source: Original)

**FIGURE 5. VISUALISATION OF BANK WISE_DEBIT
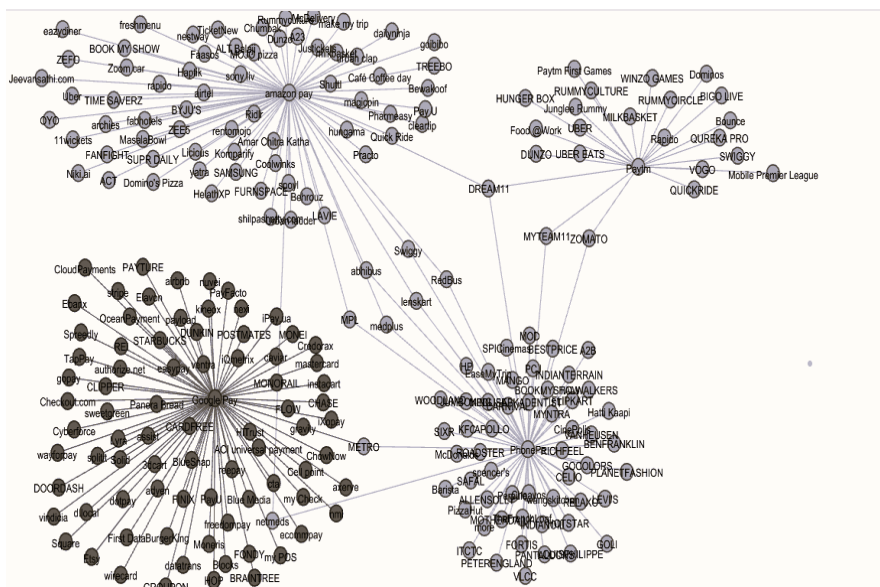REVERSAL SUCCESS %.**

(Source: Original)

**FIGURE 6. NETWORK ANALYSIS OF DIGITAL PAYMENTS PLATFORMS
AND THE ASSOCIATED MERCHANTS.**

(Source: Original)

DISCUSSION

From the modularity report generated for Figure 6, it is observed that there are 5 communities identified, where nodes are more densely connected than to the rest of the network allowing to see vulnerable spots of the network graph and trying to give generic idea about its structure. When applied specific parameters in Figure 6, using edge weights, and randomisation, it is identified modularity value is 0.67, which says there is a strong community structure that exists for Figure 6 communities. Closeness centrality is depicting the average length of the shortest path between a node and all other existing nodes. From the closeness centrality measure estimated in Figure 6, it is identified that Dream11- an Indian Fantasy sports platform has the highest degree of centrality value. Along with that, Pharma stores(such as Netmeds, Med Plus), Bus ticket booking applications (Abhi Bus & Red Bus), Mobile gaming (MPL), and Online food ordering app (Swiggy) are showing almost equal and second highest centrality values which say high potency to associate with only top digital platforms. Other merchants are almost in the same zone, showing a homogenous number of associations with these four digital platforms, as we see almost the same centrality among all others.

Analysed association of different digital platforms with types of merchants from Figure 6:

TABLE 1. IDENTIFIED TYPE OF MERCHANTS(INDUSTRIES) WITH STUDIED FOUR DIGITAL PLATFORMS NETWORK ANALYSIS

Platforms	Merchants
Google Pay	Instore - Offstore POS, IT gateways, supermarket companies, food, hotel, passes and tickets, e-commerce platforms.
Amazon Pay	Travel, Medical, Pharmacies, Entertainment.
Phonepe	Food, Fashion, Pharmacies, Offline stores.
Pay tm	Food, Taxi hailing market, Paytm subsidiaries, Mobile gaming companies.

(Source: Original)

CONCLUSION

This study used building network analysis to locate and understand different digital platforms by mapping relations in a network format, identifying the type of merchants, and their association with important digital platforms. Based on the analysis, a merchant/vendor or a normal consumer can find a framework and build trust to associate with or download the application. The customer reviews are serving this purpose, they mainly talk about hassle-free UI, user experience, and other factors that are required to download the application. But this study reveals another dimension, a framework that can be used by private players merchants, banks and digital platforms, how trust is built with an application, in terms of security, and data privacy that aims to balance consumer/merchant confidence in investing in the platform or recommending to bank. Considering the third-wave adverse effects in India, this framework can be utilised by UPI players and merchants to make strategic decisions, that reduce fraud in UPI channels, facilitates real-time mobile, e-transactions and thus promote 'safe banking' practices in taking meaningful decisions.

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