INFLUENCE OF GEOGRAPHICAL AND TECHNOLOGICAL FACTORS ON FINANCIAL INCLUSIONS IN INDIA

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ABSTRACT

Purpose: This article intended to discuss the influence of geographical areas such as rural, urban, and thousand people per square kilometer along with deposits, credits, fintech products and gross state domestic product on financial inclusion in India.

Methodology: Researchers conducted descriptive study to explore the insights about financial inclusion. Data has been collected from all states in India including rural and urban areas. For variables credit account per person against states and no of deposits per person were subjected to Big data analytics tool K mean clustering techniques and further, validated by ANOVA techniques. Further, GIS mapping and Pareto charts were used to visualize the number of branches and number of ATMs. Finally, researchers compared sum of deposits and credits against Gross state domestic product to find the effectiveness of financial inclusion.

Findings: Researchers found that the number of deposits and number of credits were more in the developed states of India. Smaller states yet to catch the financial inclusion system developments. It was observed that the number of bank branches are more in the rural areas compared to urban areas. Number of branches per square kilometer and No of ATMs per square kilometer had shown that tourist and developed areas are more in contrast with other Indian states. There is a healthy deposit plus credit to Gross state domestic product ratio.

Conclusions: Financial inclusion in India is penetrating. However, there is a disparity between developed and developing states. Fintech products and branch banking is on the rise. Further, it was noticed that deposits and credits to GSDP are encouraging.

Limitations: The researchers collected cumulative data about rural and urban areas of the country. However, the effectiveness at micro level considering individual person could not be done.

Originality:*This paper is original and not a part of any publication.*

Keywords: Fintech, loan disbursement, savings accounts, branch spread, ATM Density, and GSDP

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INTRODUCTION

In sharp contrast, the bottom 50% of the population received only 6% of the nation's wealth. Financial services and products should be easy to access and economically priced. Father of our nation, Mahatma Gandhi, emphasized that all policy choices must take by keeping need of poorest person of our nation. However, over 60% of all wealth in India has been held by the top 10% of earners between 1961 and 2020, indicating that wealth inequality in India has significantly increased during the previous 40 years.

Figure 1: Wealth Distribution in India.





(Source: Reserve Bank of India)

Recent decades bring a lot of changes in financial wellbeing of the people with the financial revolution with the support of technology which is broadly termed as Fintech. Fintech really accelerates financial transactions which speed up multiplier effects of money and ensures better productivity and contribution to GDP. Even though fintech initiatives contribute more to the economy, we need to study its degree of contribution towards balanced growth of the nation as well as towards financial inclusion. The degree of financial inclusion varies on the basis of leveraging technology depending on place to place. This study intends to explore such factors to know the degree of success of fintech initiatives towards financial inclusion depending on different geographical areas in India.

REVIEW OF LITERATURE

Effective financial inclusion may be a significant economic growth engine by providing equal status to various demographic groups' better access of all financial services (Swamy, 2014). Only if access and usage of financial services are able to reach among bottom of pyramid, the financial inclusion can be considered as a reality. Metropolitan areas exposed more towards financial inclusion since the level of penetration will

be far better than level of penetration in rural areas. The technological advancements must penetrate among rural population and government authorities and regulatory bodies must ensure proper banking and financial services because of modernization (Lal, 2017). For a country to advance economically and socially, its weaker segments must be financially selfsufficient (Sharma & Kukreja, 2013)

Outreach is the ability of a bank or financial institution to provide the knowledge and support necessary to eliminate customer fears and bring them into the financial inclusion umbrella (Chattopadhyay, 2011; Paramasivan & Ganeshkumar, 2013). Additionally, Chakravarty and Pal (2013) looked into a number of outreach metrics that are essential for financial inclusion. This measure looks at the extent to which financial services and products are being provided to underserved or disadvantaged groups. Furthermore, Garg & Agarwal (2014) claim that inadequate outreach is a major issue with bank lending practices.

The degree to which a bank may provide financial services and products to the entire sector is referred to as "penetration." Cultural depth, demographic depth, or any other depth may hinder financial inclusion. Market penetration is necessary for the success of the water industry, and it also affects financial inclusion (Kelkar, 2010).

By citing penetration as the most crucial component in determining financial inclusion, Anand and Chhikara (2013) and Lal (2017) linked the financial inclusion of rural communities to the economic success of a nation. Kabakova and Plaksenkov (2018) did explore and remark varied patterns of financial inclusion based on different levels of penetration. The criteria used to quantify it suggest that penetration is focusing more on the quality of the services. According to the notion of financial inclusion, emphasizing accessibility without also emphasizing the sufficiency of services could not have the same effect. Unmistakable differences exist between the two notions. Due to the possibility that what is readily available may not always be adequate to satisfy consumer requirements or demands.

Emerging banking technologies like internet and mobile banking are part of the technology aspect of financial inclusion, and their use has increased in order to enhance financial inclusion (Kabakova & Plaksenkov, 2018). Social media has a big impact on who can access and use financial services (Bongomin et al., 2017). According to Sharma and Kukreja, technology may be leveraged to provide financial services even in remote or rural areas (2013). Technology was identified by Ramakrishna and Trivedi (2018) and Rastogi and Ragabiruntha (2018) as a crucial component with a positive influence on financial inclusion.

Financial literacy is the degree of informational understanding or awareness required to make informed financial decisions. Inclusion or exclusion is determined by financial literacy, according to Kabakova and Plaksenkov's (2018) study, however Fischer's (2011) study revealed that usage is more important. Financial literacy has an impact on financial inclusion, which in turn is influenced by financial knowledge, behaviour, and attitude (Rastogi & Ragabiruntha, 2018; Rai et al., 2019; Shankar, 2013).

Financial inclusion appears to be regionally restricted to a few areas of the country when it comes to banks. To examine the distribution of banking services, two ratios are computed: the State-wise Banks Credit-Deposit Ratio (Chart I) and (ii) Amount of Bank Credit with the State GDP (Chart II). Gupta, S. K. (2011)

Access to money is a key component, according to Banerjee and Newman (1993), that helps people to escape poverty through increasing production. The Indian Rural Expansion Programme, according to Binswanger and Khandker (1995), significantly decreased rural poverty and increased employment in non-agricultural sectors. According to a 1999 study by Eastwood and Kohli, branch expansion programmes and targeted lending initiatives have also enhanced small-scale industry output. The proliferation of predatory money lenders, which are often seen as unauthorised sources of credit, can be helped by a more open financial system. Bell and Rousseau claim that there is empirical evidence that financial intermediaries have had an impact on India's economic performance (2001). According to Beck et al., a well-established financial system that is accessible to all people lowers information and transaction costs, influences savings rates, investment preferences, technological breakthroughs, and longterm growth rates (2009).

The worldwide support provided by numerous governments and international organisations serves as evidence of the value of financial inclusion to national economies. Frot & Sullivan Report for 2009, moreover it is considered a public utility that financial services are freely available to everyone. A typical public good like "protection" might have a different amount of "publicness" than financial inclusion. However, because it is as essential as having access to water or receiving a minimal level of education, it does qualify as a "quasi-public benefit" (Mehtrotra et.al 2009).

The factors affecting the level of financial inclusion may be driven by supply and demand. Demirgüc-Kunt, Klapper, Singer, and Van Oudheusden (2015); Dittus and Klein (2011); European Commission (2008); Abel, Mutandwa, and Le Roux (2018). In addition, socioeconomic factors and people's perceptions and attitudes about monetary issues are included in the supply-side factors. Lack of access to financial services, often known as financial exclusion, can occur willingly or involuntarily. Cultural or religious beliefs, a lack of interest in financial services, or a combination of these factors may all contribute to voluntary financial exclusion. Lack of trust in financial institutions, incorrect pricing, product maturity, subpar product design, and failure to meet other eligibility standards are some of the barriers that lead to involuntary exclusion. Income, education level, age, gender, transportation, and telecommunications infrastructure are only a few examples of the socioeconomic and technological demand-side features.

The economy is seen as one of the stronger indicators of financial inclusion. Numerous studies demonstrate that factors like unemployment, poverty, and income inequality have a detrimental impact on people's access to and use of financial services and that financial inclusion is positively connected with economic development. Bittencourt (2012), Jeanneney and Kpodar (2011), Pal and Vaidya (2011), and Clarke, Xu, and Zou (2006) are a few examples. Socio-demographic factors may have a significant role in fostering financial inclusion. When socio demographic factors do not promote financial inclusion, people are more likely to avoid using financial services, fewer people have bank accounts, and cash transactions are more prevalent. Chu (2019) used profit estimates based on data from the World Bank's 2017 Global Financial Inclusion database for a number of financial inclusion variables. The study's findings indicate that men who are older than a certain age, more educated, wealthy, and employed are more likely to have access to formal financial services.

Data from 120 countries from 2011 to 2014 were used by Bozkurt, Karakus, and Yldz (2018) to assess the factors that might affect changes in the levels of financial inclusion. The findings of their investigation showed that political, banking, and societal difficulties are the main factors impacting change in financial inclusion. The World Bank's 2005-2014 Development Indicators datasets for 15 African nations, Evans and Osi (2017), used a Bayesian VAR model in their analysis. The findings demonstrate the beneficial and significant impacts of financial inclusion on the availability of credit, literacy, internet users, and servers. In their study, Van der Werff, and Hogarth, and Peach (2013) used data from thirty OECD countries and discovered that high levels of trust in financial institutions and the government increase the amount of financial inclusion.

Theoretical Model

After conducting an extensive review of literature, researchers formulated a theoretical model that worked as the basis for objectives and Hypothesis formulations.





METHODOLOGY

Descriptive research identifies relations between selected variables (Dulock, H. L. 1993). Researchers conducted a descriptive study to explore the insights about financial inclusion.

Sources of data: Researchers collected primary and secondary data for the research. They have collected data of all states in India including rural and urban areas. For variables credit account per person against states and no of deposits per person were subjected to Big Data Analytics tool K mean clustering techniques and further, validated by ANOVA techniques. In addition to this, GIS mapping and Pareto charts were used to visualize the number of branches and number of ATMs (not used in paper due to lack of clarity of image). Finally, researchers compared sum of deposits and credits against Gross State Domestic Product to find the effectiveness of financial inclusion

DISCUSSIONS

Credit account per person v/s states of India.

Researchers collected the credit information from different states of India. To know the difference between various states of the country and credit account per person, researchers conducted cluster analysis (Figure). Further, researchers decided to have three clusters to divide the data to simplify for the policy implementations. The clustering analysis depicts that southern states Tamil Nadu, Goa and Kerala are in the forefront to establish credit accounts per person. The developed states such as Maharashtra, Karnataka and Punjab have high credit accounts per person. However, smaller states and underdeveloped states credit penetration is yet to reach the masses.

Cluster analysis of credit accounts per person versus Indian states.

To validate the cluster data, researchers conducted ANOVA test between states and within a 5 years of time span from 2015 to 2019. The result showed that credit distribution is uniform across states.

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Table 1: ANOVA of credit distribution across different states of India.							
Source of		٩t	MC	Г	Dyalua	г	
Variation	55	ar	IVIS	F	P-value	F	
Between Groups	0.11	8	0.0141	2.924293	0.003993	1.979713	
Within Groups	1.08	225	0.0048				

Table 1: ANOVA of credit distribution across different states of India.

Thus, researchers concluded that credit account per person is showing significance however, disparity between different states co-exist. There is an urgent need for policy makers to address the issue.

No of deposits versus states

Researchers collected the deposit information from different states of India. To know the difference between various states of the country and deposit collected, researchers conducted cluster analysis. Further, researchers decided to have three clusters to divide the data to simplify for the policy implementations. The clustering scatter plot diagrams depict the progressive or developed states of India have better deposits made compared to other states in India. Thus, researchers concluded that financial inclusion in the developed states is better than

Cluster analysis of States of India v/s Deposits made.

To test the hypothesis for deposits made across five years starting from 2015 to 2019 and to validate the cluster analysis, researchers conducted Analysis of Variance technique. The result showed that (F= 8, 21, p<0.05) alternative hypothesis accepted. It means that financial inclusion through deposit in India is significant.

Source of Variation	SS	Df	MS	F	P-value	F
Between Groups	19.28379	8	2.410474	8.217165	9.5E-10	1.979713
Within Groups	66.00291	225	0.293346			

Table 3: ANOVA of Financial deposits and financial inclusion

(Source: Reserve Bank of India)

However, the validation using cluster and ANOVA infer that overall country financial inclusion via deposits has increased but disparity between developed and developing states widened.

Number of branches in rural areas versus urban areas

Number of branches in rural and urban areas in different states of India.

Rural area versus urban area branch penetration provides the glimpse of financial inclusion. The data analysis showed the outcome in which populous and developed states of India have more branches. More interesting fact is that rural branches outnumbered urban branches supporting the claim of rural market financial inclusion story is revealing in India.

Number of branches per square Kms

Number of branches per square kilometers in different states of India.



(Source: Primary data)

Financial inclusion is measured based on the number of branches the banking industry is having per square kilometer in India. It included both rural and urban branches. States such as Kerala, Goa, and Punjab have the most branches per square kilometer compared to other states in India. However, surprisingly, developed states such as Telangana and Andhra Pradesh have the lowest penetration of banking branches per square kilometer.

No of ATMs per 10000 persons

Technology penetration for financial organizations boosts financial inclusion. The revolutionary UPI system bought in India is a miraculous story. Similarly, ATM's are treated as one of the financial inclusion measures in India. Smaller states and progressive states have more ATMs. It is also observed that tourist destinations have a better ATM penetration compared to other states.



Figure: No of ATMs per 10000 persons across the state.

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⁽Source: Primary Data)

(Deposits + credits)/GSDP

Researchers worked on financial inclusion considering deposits and credits for Gross state domestic product. They have collected deposits, credits and GSDP of every Indian state and analyzed using t test.

Table: T test between deposits, credits and Gross state domestic product

	2018	2019			
Mean	1.456108965	1.544512479			
Variance	0.224051991	0.217797103			
Pearson Correlation	0.994613082				
t Stat	-9.329610589				
P(T<=t) one-tail	4.41E-10				
(Source: Primary Data)					

(Source: Primary Data)

The table showed that there is a healthy deposits + credits compared to states GSDP(P<0.05 t= -9.329)

CONCLUSIONS

Research Implications:

The number of credit accounts per person is more in the south Indian states and other developed states such as Maharashtra and Punjab. However, the penetration of credit accounts in other states needs improvement. Researchers observed the number of deposits versus different states. They found that developed states outnumbered developing states in the financial inclusion efforts. It was also unearthed that rural banking infrastructure is strengthening financial inclusion compared to urban banks. Apart from this, the number of ATMs per person is found to be very high in tourist destination states. Added to this, States such as Kerala, Goa, and Punjab have the most branches per square kilometer compared to other states in india. However, surprisingly, developed states such as Telangana, and Andhra Pradesh have the lowest penetration of banking branches per square kilometer. Finally, deposits and credits compared to GSDP are encouraging throughout India. In terms of its effectiveness, financial inclusion was found to be lacking when comparing the total deposits and credits with the gross domestic product. However, these figures do not take into account the informal financial sector, which is significant in many developing countries. When the informal financial sector is included, the picture of financial inclusion changes significantly. In fact, in some cases, the informal financial sector may be more important than the formal financial sector in providing access to financial services.

Policy Implications:

Central government of India and state governments need to work together to eradicate the imbalance in the financial inclusion between developed states and developing states. The penetration of technology tools in the rural areas is not yet significant. Governments either subsidize or support technology implementation efforts of banks in the rural area. Apart from this, the central government needs to focus on states like Anadhrapradesh and Telangana to spread banking branches to ensure ascended financial inclusion.

Societal implication

Financial inclusion in India has shown early improvement. The research outcome also highlighted improvement in rural financial inclusion. The deposits, credits and their contribution to Gross State Domestic Product have increased. It depicts that there exists a robust economy and inclusion of more people in the development. However, a caution is that a skewed growth in a few states is an area of concern for migration.

Future scope:

Researchers' efforts were at the macro level considering a state as the sampling unit. The aggregate value for the state may not be the actual picture of improvement in all rural areas. There is the scope for micro level analysis at district or even at village level to understand the impact of technology in financial inclusion via fintech and digital finance domains.

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