

THE ROLE OF ICT INFRASTRUCTURE IN FINANCIAL INCLUSION: AN EMPIRICAL ANALYSIS

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ABSTRACT

In last fifteen years, Information and Communication Technology (ICT) has brought dramatic changes in functioning of banks. ATM channel, internet banking and mobile banking are a big success in India. These developments in banking are driven by the convergence of banking and telecommunications players (including the Internet service providers) and Web portals. The paper attempts to evaluate the role of Information and Communication Technology infrastructure in driving the growth for financial inclusion using linear regression method over a period of 1995-2013. The results financial inclusion represented by the number of bank account holders significantly has been impacted by the access to ICT infrastructure. The results indicates that ICT infrastructure facilities including telephone lines, mobile phones and internet usage are positively associated with the level of financial inclusion which is represented by number of bank account holders. This indicates the fact that connectivity and information play an important role in financial inclusion. However, personal computers did not show any significant relationship with financial inclusion in our estimation. This may be attributed to the fact that having a PC in household does not necessarily mean that it is being used for accessing banking services. The value of R2 (0.877) explains that the 87.7 % of ICT infrastructure variables had highly significant relationship with the financial inclusion. The Durban-Watson statistic value (1.30) shows that there is no problem of autocorrelation. The paper also outlines major steps which have been taken so far by the Reserve Bank and Government of India to enable financial inclusion for weaker sections of Indian society. Therefore, the paper recommended the government should undertake appropriate policy measures to ensure the access to physical infrastructure for increasing the outreach of banking services in rural and far flung areas.

Keywords: Financial inclusion, Telephone lines, Internet usage, ICT, Infrastructure

1. Introduction

In recent years, there has been a rapid diffusion of Information and

Communication Technologies (ICT) in the developing countries like India. Since 1990s, growth in telecom sector in terms of

fast penetration of mobile subscribers, internet users and personal computers has become fast. Mobile phone penetration is dominating the fixed line technology (Andrianaivo and Kpodar, 2011). Until 1990, focus of the banking sector was that of “distributed banking.” During 1995-97, the developments in telecom industry transformed the focus into a “networked banking”. Under this transformation, bank branches located in a region were interconnected through ICT technologies. Information and Communication Technology (ICT) not only enhanced the operational efficiency of the banks but also enhanced customer satisfaction. Most of the banks have invested in core banking systems for improving the access of banking services to the customers. In the era of digital technology, banks are focusing on digital banking and self-service channels to reduce the cost of operations which includes internet banking, mobile banking etc. The transformation of consumer banking is driven by the convergence of banking services, telecommunications services as well as Web portals. Therefore, technology has great role to play in achieving financial inclusion. Technology makes the processes faster which results in improvement in

productivity and thereby reduces the cost (Confederation of Indian Industry, 2014).

Financial inclusion may be defined as the providing access of financial services at affordable costs to disadvantaged sections of the society. “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”-The Committee on Financial Inclusion (Dr. C. Rangarajan, 2008). Nowadays, banking infrastructure has improved much with the advancements in information and communication technologies. Major technological development in banking system is Core Banking System (CBS) which provide anytime, anywhere banking facilities. Other developments include electronic payment systems such as the Real Time Gross Settlement System (RTGS), National Electronic Funds Transfer (NEFT), National Electronic Clearing Service (NECS), Immediate Payments Service (IMPS), Aadhaar Enabled Payment Systems (AEPS) etc. Banks are increasingly using alternate channels of delivery.

2. Status of Financial Inclusion in India

The status of financial inclusion has been evaluated by various committees in terms of people's access to avail banking and insurance services in India. The Eleventh Five Year Plan (2007-12) envisions inclusive growth as a key objective. Figure 1 shows the process of financial inclusion in India can broadly be classified under three phases.

Table 1 shows Financial Inclusion Plan – Summary progress of all banks including RRBs

Figure 2 depicts the Availability of Banking Services in Rural and Urban

Table 2 represents State-wise Percentage of Households availing Banking Services in 2011

3. Database and Methodology

The objective of this study is to evaluate the role of Information and Communication Technology infrastructure in driving the growth for financial inclusion. The empirical analysis is based on linear regression analysis over a period of 1995-2013. The study attempts to show the relationship between number of bank accounts and ICT variables including

telephone lines, mobile subscribers, internet users and personal computers in India. The equation is

$$BC = \beta + \beta_1 \text{Tele} + \beta_1 \text{Mob} + \beta_2 \text{Int} + \beta_2 \text{PC} + \mu$$

β is intercept

BC = Number of Bank Accounts (in 1000)

Tele = Telephone lines per 100

Mob = Mobile Subscribers per 100

Int = Internet users per 100

PC = personal Computers per 100

μ is the error term

4. Results and Discussion

The result of regression analysis of number of bank account holders on ICT Infrastructure variables including telephone lines, mobile subscribers, internet users and personal computers is displayed in Table 2. The analysis reveals the fact that physical infrastructure facilities like telephones, Internet, mobile phones are highly significant (positively) in enhancing financial inclusion. The results of regression analysis show that, three ICT variables including telephone lines, mobile subscribers and internet users had significant linear relationships with number of bank account holders as shown by the p-values in

the table. This indicates the fact that connectivity and information play an important role in financial inclusion. However, personal computers did not show any significant relationship with financial inclusion in our estimation. This may be attributed to the fact that having a PC in household does not necessarily mean that it is being used for accessing banking services. The value of R^2 (0.877) explains that the 87.7 % of ICT infrastructure variables had highly significant relationship with the financial inclusion. The F-test value is significant at 1% level which indicates that model is good fit for the data. Durban-Watson statistics value of 1.30 shows that there is no problem of presence of auto-correlation.

Table 3 represents the Results of regression analysis for bank accounts on ICT infrastructure variables

5. Role of Technology in Financial Inclusion

One of the key constraints in achieving the objectives of providing access to financial services to the disadvantage sections of society is the uncertainty of

profits from customer segments with irregular incomes. The combination of Information Technology and mobile telephony has emerged as viable solution to these problems (www.ibef.org). Government and Reserve Bank have taken many proactive steps to remove the inadequacies in the system over the years. Information and Communication Technology has been widely used for the development of the Indian banking sector. A major technological breakthrough in banking sector is the adoption of the Core Banking Solutions (CBS) which is a significant step towards enhancing, customer convenience through providing ubiquitous information. The adoption of CBS led to various technological developments like NEFT, RTGS, mobile banking, Internet Banking, etc. Some of the technological based products have increased the access to banking services to the masses are briefly discussed below: (Government of India, 2014).

Electronic Clearing Service (ECS)/National ECS (NECS): ECS is an electronic mode of payment / receipt for transactions that are repetitive and periodic in nature. “ECS is used by institutions for making bulk payment of amounts towards distribution of dividend, interest, salary,

pension, *etc.*, or for bulk collection of amounts towards telephone/electricity/ water dues, cess/tax collections, loan installment repayments, periodic investments in mutual funds, insurance premium *etc.*” Essentially, ECS facilitates bulk transfer of monies from one bank account to many bank accounts or vice versa.

National Electronic Funds Transfer (NEFT): NEFT is a payment system facilitating one-to-one funds transfer. Under this service, “individuals, firms and corporate can electronically transfer funds from any bank branch to any individual, firm or corporate having an account with any other bank branch in the country participating in the Scheme.” Thus, this is an interbank fund transfer system.

Real Time Gross Settlement (RTGS) System: The Real Time Gross Settlement is a continuous (real-time) settlement of funds transfer individually on an order by order basis (without netting). ‘Real Time’ means the processing of instructions at the time they are received rather than at some later time. ‘Gross Settlement’ means the settlement of funds transfer instruction occurs individually (on an instruction by instruction basis). Considering that the funds settlement takes place in the books of the

Reserve Bank of India, the payments are final and irrevocable. (Gupta, 2011)

Immediate Mobile Payment System (IMPS): This initiative has been taken by the RBI to enhance the operational efficiency of the mobile banking system. Immediate Payment Service (IMPS) was launched by NPCI on 22 November, 2010. Using this service, electronic interbank funds can be transferred through mobile phones as well as internet banking & ATMs instantly, during 24X7 period. IMPS is operated by the National Payments Corporation of India (NPCI). Under this service, customer of one bank can transfer money from its bank account to the customer of another bank through mobile phone in real time. In this way, mobile phones can act as drivers of financial inclusion growth and financial services can be diversified (Confederation of Indian Industry, 2014).

Automated Teller Machines (ATMs): Automated Teller Machines (ATMs) is another major technological development, which has revolutionized the banking sector and enhanced the convenience of the account holders. Automated Teller Machines (ATMs). ATMs have developed the saving habits among the low income groups also, because using this device

money can be withdrawn as per requirement anytime and from anywhere. Nowadays, Micro-ATMs have become popular which is a biometric authentication enabled hand-held device. In order to make the ATMs viable at rural/semi-urban centers, low cost Micro-ATMs would be deployed at each of the Bank Mitra location. This would enable a person to instantly deposit or withdraw funds regardless of the bank associated with a particular Bank Mitra / Business Correspondent. This device will be based on a mobile phone connection. (Government of India, 2014).

Mobile Banking: The term mobile banking consists of activities that result in an entity's access to the range of banking products (related to savings or credit) by using a cell phone. Application can be downloaded on smart phones for making bill payments (electricity bill, dish recharge etc.). The mobile banking can prove more convenient for the unbanked population. On banks side, mobile banking will be cost effective (would save costs of providing physical access). Thus, mobile banking can successfully tackle barriers of financial inclusion which are high cost of providing services and low accessibility. Total mobile subscribers as on March, 2013 are 867.80 million and according to the Analysis Mason report

there will be more than 1.36 billion mobile subscribers. TRAI has come out with the 'Mobile Banking (Quality of Service) Regulations 2012' specifying the standards facilitating mobile banking. Also, according to TRAI (Telecom Regulatory Authority of India) the rural India will cross 100 percent mobile penetration in 2020(Arun, 2013).

Electronically Know Your Customer (e-KYC): In the year 2013, RBI permitted e-KYC as a valid process for KYC verification under Prevention of Money Laundering (Maintenance of Records) Rules, 2005. In order to reduce the risk of identity fraud, documentary forgery and have paperless KYC verification, UIDAI has launched its e-KYC services. Under the e-KYC process under the explicit consent of the customer and after his or her biometric authentication from UIDAI data base individual basic data comprising name, age, gender and photograph can be shared electronically with authorized users like Banks, which is a valid process for KYC. The aforesaid process is paperless and has made the account opening of customers having Aadhaar number much easier (Government of India, 2014).

No Frills Accounts: In order to address the issue of financial exclusion, banks reviewed the existing practices and focused on making

available the banking services to the disadvantaged sections of society or who are excluded. In many banks, due to requirement of minimum balance and charges levied, deter low income sections of population from opening/maintaining bank accounts. In this context, with a view to achieving the objective of greater financial inclusion, all banks were advised to make available a basic banking 'no-frills' account either with 'nil' or very low minimum balances as well as charges that would make such accounts accessible to vast sections of population. Recently, Jan Dhan Yojna is a major step towards addressing the issue of financial exclusion (Gupta, 2011).

6. Conclusions

Financial inclusion and the extension of financial services to every citizen of the country is a priority for the Government. The paper highlights the role of technology in achieving the aim of financial inclusion. The empirical analysis reveals that ICT infrastructure has significant contribution to the achievement of financial inclusion. In this way, technology has led to the emergence of cost-effective alternatives to the bank branch with Low cost ATMs, use of internet, point-of-sale terminals and

mobile banking technologies, which have become very popular, in the last one decade.

However, mere opening up accounts will not help furthering the cause of financial inclusion. The people who are illiterate and do not have knowledge about credit facilities available in the banks with low interest rates often deal through middleman and fall into clutches of private money lenders. Such people need to be targeted to include them under financial inclusion. Recent Jan Dhan Yojna launched by the government in 2014 is a significant initiative in this regard. There is a need that the payments for social schemes like MNREGA, social security should be done through Direct Transfer Benefit Schemes so that issue of money pilferage could be plugged. Further, the paper recommended the government should undertake appropriate policy measures to ensure the access to physical infrastructure for increasing the outreach of banking services in rural and far flung areas.

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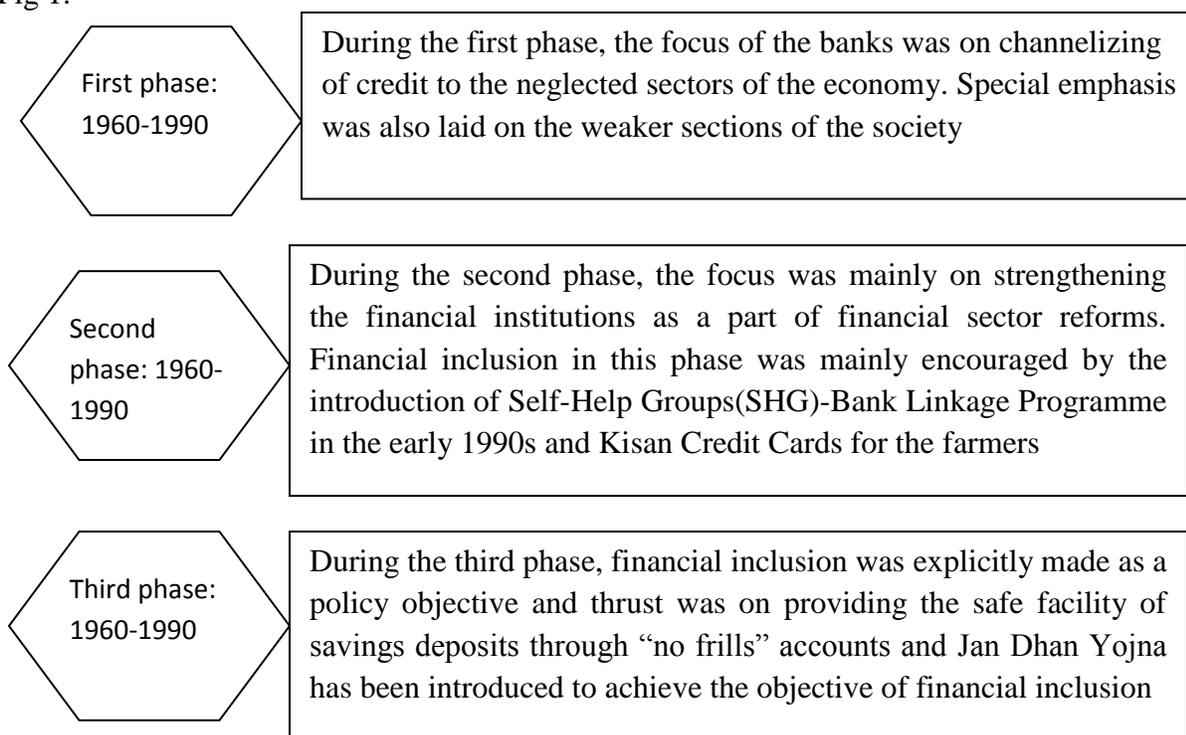
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List of Figures:

Fig 1.

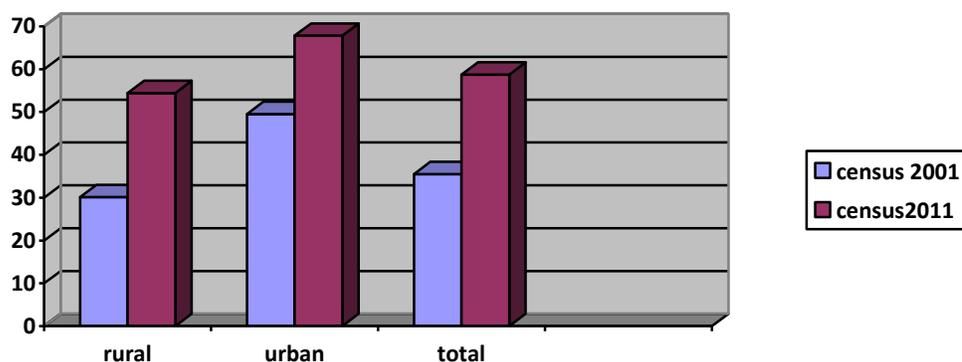
**Table 1: Financial Inclusion Plan – Summary progress of all banks including RRBs**

Particulars	2010	2011	2012	2013
Banking Outlets in Villages - Branches	33378	34811	37471	40837
Banking Outlets in Villages - BCs	34174	80802	141136	221341
Banking Outlets in Villages - Other Modes	142	595	3146	6276
Banking Outlets in Villages -TOTAL	67674	116208	181753	268454
Urban Locations covered through BCs	447	3771	5891	27143
Basic Savings Bank Deposit A/c -branches (No. In	60.19	73.13	81.20	100.80

millions)				
Basic Savings Bank Deposit A/c - branches (Amt. In billions)	44.33	57.89	109.87	164.69
Basic Savings Bank Deposit A/c - BCs (No. in millions)	13.27	31.63	57.30	81.27
KCCs - (No. in millions)	24.31	27.11	30.24	33.79
KCCs - (Amt in billions)	1240.07	1600.05	2068.39	2622.98

Source: RBI, Annual Report 2013-14

Figure 2: Availability of Banking Services in Rural and Urban



Source: Census of India 2011

Table 2: State-wise Percentage of Households availing Banking Services in 2011

States/UTs	Percentage of Households availing Banking services
Andhra Pradesh	53.1
Arunachal Pradesh	53.0
Assam	44.1
Bihar	44.4
Chandigarh	80.1
Chhattisgarh	48.8
Delhi	77.7
Goa	86.8
Gujarat	57.9
Haryana	68.1
Himachal Pradesh	89.1
Jammu & Kashmir	70.0
Jharkhand	54.0
Karnataka	61.1
Kerala	74.2

Madhya Pradesh	46.6
Maharashtra	68.9
Meghalaya	37.5
Mizoram	54.9
Nagaland	34.9
Orissa	45.0
Punjab	62.2
Rajasthan	65.0
Tamil Nadu	52.5
Tripura	79.2
Uttar Pradesh	72.0
Uttarakhand	80.3
West Bengal	48.1
All India	48.7

Source: Census of India, 2011

Table 3: Results of regression analysis for bank accounts on ICT infrastructure variables

Variables	Std. Error	Beta	t-Statistic	p-value	Durban-Watson statistic	F-value	Adjusted R ²
(Constant)	5894.696		15.858	.000	1.30	34.35 (0.000)	0.877
Mobile cellular subscriptions (per 100 people)	256.213	.197	4.509	.001			
Telephone lines (per 100 people)	1862.661	.364	4.433	.001			
Internet users (per 100 people)	2524.873	1.814	3.230	.006			
PCs (per 100 people)	542.429	-.895	-1.238	.909			