

ICT AND DEVELOPMENT EXPERIENCE IN INDIA: AN EMPIRICAL ANALYSIS OF ICT AND FINANCIAL INCLUSION

Dr. Karimullah

Assistant Professor

Department of Economics, University of Allahabad, Allahabad- 211002

E-mail- drkarimeco@gmail.com

Dr. Sushil Kumar Tripathi

Assistant professor

Department of Economics, Baba Baruaa Das PG College, Paruiyya Ashram,

Ambedkar Nagar Uttar Pradesh

E-mail- tsushil.kumar584@gmail.com

Abstract

Proper Economic Development cannot be considered without financial inclusion in the economy like India. With the agenda of financial inclusion, the Government of India (RBI) is trying to provide universal access to banking services and improving the forms of credit delivery, especially for the poor and marginalized sections of the population residing in the rural areas. A number of strategies are being used to ensure financial inclusion day by day such as, appropriate relaxations in guidelines, provision of new products, educating the public about financial services, but particular attention is being given to the use of new Information and Communication Technology (ICT) as a means of financial Inclusion under the ICT solution model of RBI. Emergence of Reliance JIO has shown a revolutionary growth in the use of internet facility including rural and remote areas. According to the market research firm Cyber Media Research

(CMR), India had 83 million, or 35%, of the 238 million 4G subscribers coming from rural areas.

In this scenario, the present study is an attempt to examine the role of IC technology in the growth of financial inclusion, with particular analysis of impact of Reliance Jio information and communication technology (ICT). Growth of financial inclusion is measured by growth in electronic banking transactions (based on mobile phones and internet). The analysis is based on the secondary data which has been collected from the website of RBI on monthly basis for the period of 2015–2018. The data has been analyzed with the help of regression models. The finding suggests that introduction Reliance JIO Internet mobile facility has served to advance the goal of financial inclusion in India through encouraging the growth of electronic banking transactions.

Keywords: *financial inclusion, Information and Communication Technology, Reliance JIO Internet mobile.*

INTRODUCTION

In the present scenario of development, Inclusive growth has been a matter of major concern before the policy maker as it has been an essential tool for ensuring the equal development process which is highly required in the case of country like India. It is impossible to think about inclusive growth without access to formal finance at an affordable cost (Kaur 2016, NABARD report 2015, Songu and Moor 2015, Finance Commission Reports 2009). So, Finance being a basic requirement for the development, ensuring financial inclusion in being given high priority for proper inclusive development. According to S. Mundra (2016), ‘to address the issue of poverty, financial inclusion is very important means along with an inclusive society. Likewise financial literacy is required to achieve universal financial inclusion’. Focusing on the need of financial inclusion Mago and Chitokwindo (2014) narrated that ensuring financial inclusion is an urgent issue in UDCs, like India, because of the existence of a large number of unbanked people who are also unemployed and low income.

No doubt that the Reserve Bank of India (RBI) has taken several initiatives to push towards universal financial inclusion since last decade such as, advising banks on devising their Financial Inclusion Plan (by a Financial Inclusion Advisory Committee of RBI 2004), sensitizing financially illiterate people through introducing financial literacy programmes and so on. The Committee on Financial Sector Reforms (2005), formed by RBI and ministry of finance, indicated the higher need to ensure financial inclusion at the policy level. It recommended that a new approach to financial inclusion was needed that builds on the lessons of the past. It also suggested that it was required a change in mindset on the part of policymakers, practitioners, and others stakeholders in India to figure out effective ways to provide financial services to the poor.

Apart from reforming the banking system directly, the Reserve Bank has adopted some more oriented policies of providing credit through multiple channels such as, involving self-help groups (SHGs) and microfinance institutions (MFIs) and expanding the scope of the business correspondence (BC) model. The BCs provide banking facilities, particularly cash in-cash out transactions, at a location much closer to the rural population. The banks have been also mandated by RBI to open at least 25 per cent of their new branches in unbanked rural centres with giving high priority to their Financial Inclusion Plans (FIPs).

Among all these efforts, the most important is adaptation of new technological innovations in banking system. The government of India (RBI) has provided all the possible facilities to the banks based on modern Information and communication technology (ICT) with the views that it would act as a bridge between last mile customers and service providers, particularly in rural areas. The emergence of technological innovations has made it very easy to expand the financial services at lower cost. Banks were able to overcome all the barriers of expanding their branches to the remote areas with the usage of information technology. It gives a viable option to reduce transaction cost significantly and create a platform which is user friendly and more convenient to use.

ICT helps banks to reduce their front-end and back-end cost significantly. Reduced costs lowers the transaction and maintenance costs, which can lower lending cost, and thereby increases the viability of financial inclusion in rural area. For example, The ATMs and online banking are playing a key role in reducing the front-end cost (transaction cost) in comparison to physical cash transaction, and has revolutionized the banking delivery chain in all over the country. The banks are trying to extend online banking services as a preferred mode of transaction for SMEs along with large co-operations. Banks are also using Rural Internet Kiosks in rural areas to carry out such transactions (different annual reports of RBI and NABARD, Bansal, 2014).

Further, to make effective use of ICT, Banks have adopted Core banking solution (CBS), which links all the branches of the banks with each other. It helps customer to operate from any branch regardless of their account in any other branch. It provides door step banking services through Business Correspondents Model wherein the accounts can be operated by even illiterate customers by using biometrics, thus, ensuring the security of transactions and enhancing confidence in the banking system. National electronic fund transfer (NEFT) and Real time gross settlement (RTGS) are two centralize payment system provided by the banks. These two are very significant and convenient payment channel.

Thus a number of series of reforms have been initiated by the government directly or indirectly since the last ten years. The eleventh five year plan was developed with the basic focus area of inclusive growth. Sometimes RBI has taken direct measures to expand the banking services and on the other way, all the government transfers of money to the public, especially of the transfer of the fund of schemes running in the rural areas, are being done through the banks under the direct transfer benefit schemes. An important example is transfer of the wages directly in the accounts of workers in the MNREGA. Thus After so many efforts of the authorities (RBI and Government), the situation of growth in the access to financial services increases by doubling in the duration of 10 years, as in 2001, number of households availing banking services was near about 30.1% (table-1). It increased till 54.4% of household in the census 2011 in rural areas.

Table -1: Position of households availing banking

	As per Census 2001			As per Census 2011		
Households types	Total number of households	households availing banking services	Percent	Total number of households	households availing banking services	Percent
Rural	138,271,559	41,639,949	30.1	167,826,730	91,369,805	54.4
Urban	53,692,376	26,590,693	49.5	78,865,937	53,444,983	67.8
Total	191,963,935	68,230,642	35.5	246,692,667	144,814,788	58.7

Source: www.rbi.org.in

Table -2: Number of branches opened Scheduled Commercial Banks (SCBs) during last five years

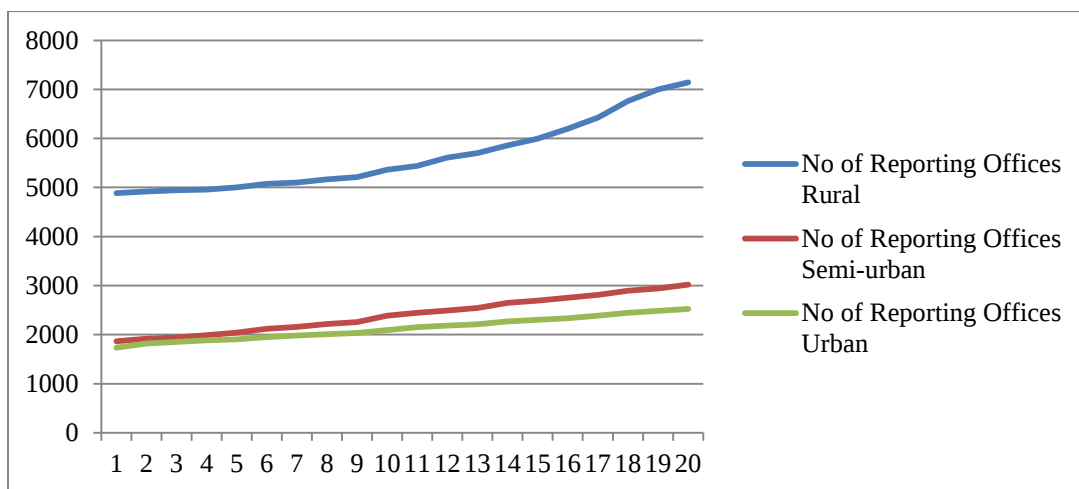
	Number of functioning branches							
	Rural	Gr. rate	Semi Urban	Gr. rate	Urban	Gr. rate	Metropolitan	Gr. rate
31.03.2011	20658		16217		13450		12612	
31.03.2012	22379	8.3	17905	10.4	14322	6.5	13244	5.0
31.03.2013	24243	8.3	19642	9.7	15055	5.1	13797	4.2
31.03.2014	27547	13.6	21952	11.8	16319	8.4	14644	6.1
31.03.2015	29634	7.6	23549	7.3	17387	6.5	15325	4.7
Total growth		37.9		39.1		26.5		20.0

Source: www.rbi.org.in

Table-2 shows the status of growth in number of functioning bank branches India in rural, semi urban, urban and metropolitan areas from March 2011 to March 2015. All the different regions have registered regular growth in establishment of bank branches.

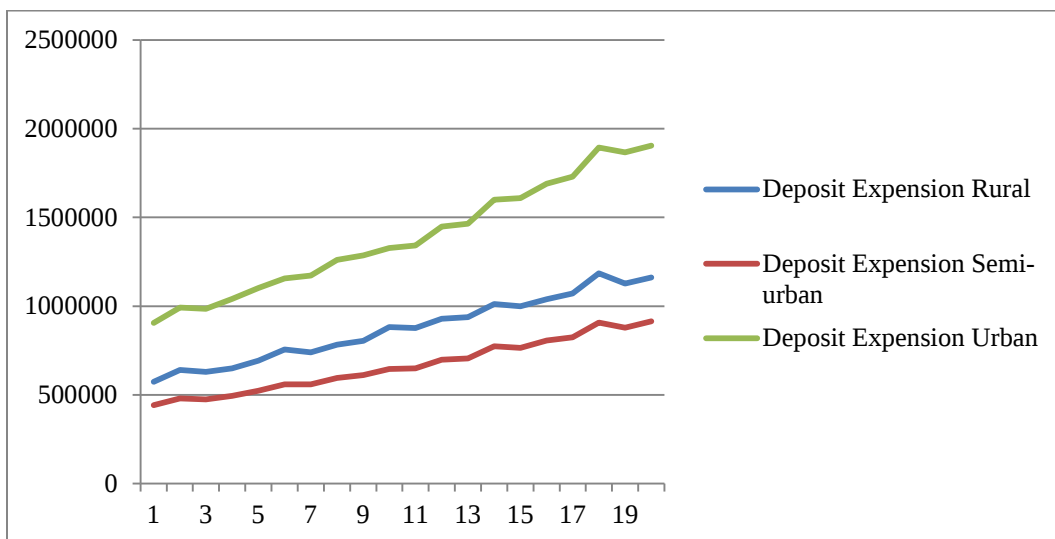
But the growth, especially semi urban (39.1%) followed by rural areas (37.9%) in comparison to urban area. This report indicates progress in the financial inclusion, as most of the excluded people are living in the rural and semi-rural areas.

Figure -1: Population wise trend in the branch expansion of Scheduled Commercial Banks (SCBs) during last five years (2011-2015)



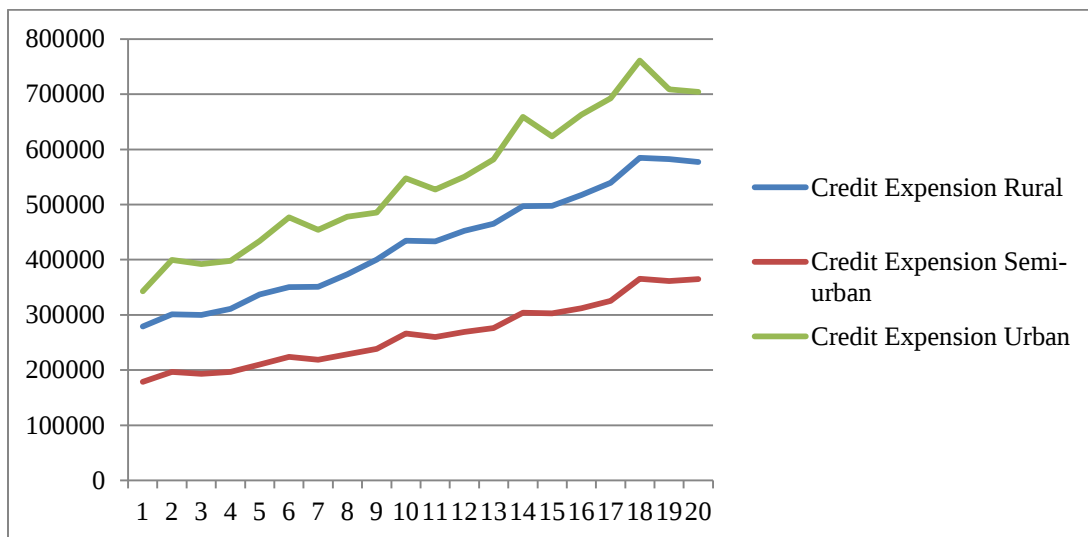
Source: www.rbi.org.in

Figure -2: Population wise trend in the Financial Inclusion deposit expansion of Scheduled Commercial Banks (SCBs) during last five years (2011-2015)



Source: www.rbi.org.in

Figure -3: Population wise trend in the Financial Inclusion credit expansion of Scheduled Commercial Banks (SCBs) during last five years (2011-2015)



Source: www.rbi.org.in

The trend of growth in Financial Inclusion measured by branch expansion, Deposits and Credits expansion in India, shown in the figure 1, 2 and 3 respectively, suggests that the volume as well as rate of expansion is positive in all areas and for all variables. There is regular growth in the branch expansion, Deposits and Credits expansion in the both rural as well as urban India.

Besides all of these efforts, the progress is still slow. According to the studies regarding financial inclusion, Accessibility of financial services by those in remote areas, often rural areas, has been cited as a major barrier to financial inclusion. On the other side less demand of financial services, particularly by the rural population has inversely affected to the vision of financial Inclusion. For an efficient payment and settlement in term of banking services (study reports suggested). So, Reserve Bank of India (RBI) took a robust initiative as a second phase of the technological advancement. RBI established National Payments Corporation of India (NPCI) with the help of Indian Banks' Association (IBA) for creating a robust Payment & Settlement Infrastructure in India (under the provisions of the Payment and Settlement Systems Act, 2007). It started its proper work in 2013. NPCI, during its

journey in the last seven years, has made a significant impact on the retail payment systems in the country.

Apart from many initiatives of RBI based of modern technology towards payment and settlement system, NCPI has introduced number of instruments based of cashless transactions. For example, Implementation of the electronic payment system such as RTGS (Real Time Gross Settlement), Electronic Clearing Service (ECS), Electronic Funds Transfer (NEFT), Cheque Truncation System (CTS), Banking transaction by using Mobile phones etc. a new card payment scheme was launched by the National Payments Corporation of India (NPCI) to offer a domestic, open-loop multilateral system enabled all Indian banks and financial institutions in India to participate in electronic payments. The trend of the growth in the banking transactions based on mobile phone and internet has been predicted by the below figure -4.

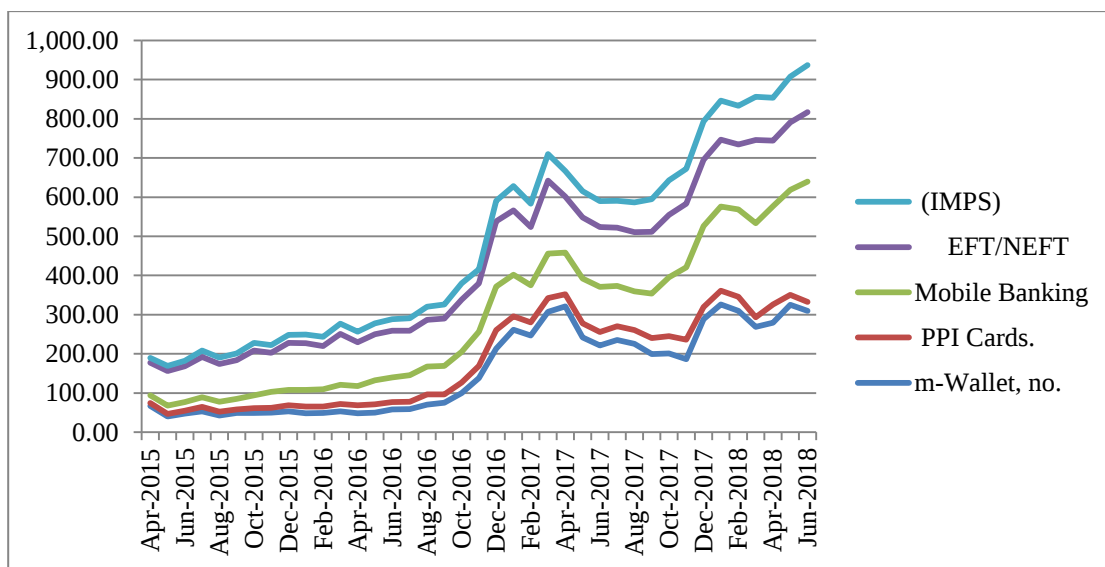
The figure shows the trend of **moods of payment through electronic instruments such as**, NEFT (National electronic funds transfer), IMPS (Immediate payment service), PPI (Prepaid payment, instrument) Cards, M-Wallet and Mobile Banking. The trend analysis shows that the payment and settlement culture through instruments based on mobile an internet is increasing day by day in India but it has shown a drastic change from the last quarter of 2016. This is the period of emergence of Reliance JIO mobile an internet which has provided easy access to the internet and mobile facilities, encouraging awareness about and use of financial services.

About Reliance JIO

Mobile phones and internet are really affecting the lives of billions of people around the globe, including the poor and rural people. The Reliance JIO mobile technology has revealed opportunities and allowed easy access of the people to the Mobile phones and internet, thus facilitating easy access to financial services. Reliance Jio is the only company to have 4G spectrum in 22 zones of India. They have laid 2,50,000+ Kms of high quality fiber optic cable and have installed over 90,000 Eco friendly 4G towers. Jio is using cables of 288 fibers or 96 fibers in most places while other network builders have cables with only 12 to 24 fibers. More fibers mean more bandwidth and more speed. According to the market research firm Cyber Media Research (CMR),

India had 83 million, or 35%, of the 238 million 4G subscribers coming from rural areas, which means every one out of three 4G subscribers in the country come from a rural territory (The Economic Times, April 03, 2018).

Figure 4- trend of mobile based and other electronic transactions with banking system in India



JIO services include unlimited HD voice calls, video calls, unlimited SMS, unlimited high speed data and a host of Jio Premium Apps such as Jio Play, Jio on Demand, Jio Beats, Jio Express News, Jio Drive, Jio Security and Jio Money. It will be not wrong to say that the Reliance Jio will definitely change the world of rural people with its services at such a low cost Reliance Industries is planning to begin a new format of stores called " Jio Points" in rural areas as well as tier 2 and tier 3 towns in order to increase its retail touch points across the country and specifically in rural areas. In order to reach the masses and increase its sale of products and services, the company is planning to open 50,000 Jio Points by the end of 2018.

Issues to be Research

For faster solution of financial inclusion, The Government of India (RBI) has adopted information and communication technology (ICT) solutions with an anticipation that Modern ICT can act as a tool to develop a platform which helps us to extend the

financial services in remote rural areas. But still the progress is slow because of less internet connectivity. The same problem was concluded by a report of a national seminar on ‘*cashless economy and financial inclusion- issues and challenges*’ organized by department of Economics, University of Allahabad. It was also reported by an executive officer (a mobile infrastructure company of Sunil Mittal-driven Bharti Airtel) that the success of present government’s ambitious scheme of Digital India as well as financial inclusion programs lies in making Internet connectivity available in all parts of the country. (Economic times, September 20, 2017). Recently Reliance InfoTech has launched JIO mobile and internet facility providing 4G internet connectivity and smart phones at affordable cost all over the India. In the above scenario, the research problem is that has really Modern ICT provided a better solution for financial inclusion? In addition, has the emergence of JIO mobiles and internet facility imparted a significance impact on growth of financial inclusion process ensuring better access and use of the financial services in India, particularly in remote rural areas?

LITERATURE REVIEW

A vast literature is available which suggested to give high priority to financial inclusion for inclusive (Lakshmi and Reddy 2016, Swamy 2014, Venugopal 2014). Swamy (2014) analyzed the need, significance and the advantages of ‘reforms in institutional finance for inclusive growth. He examined effectiveness of Institutional reforms in development finance in making services work for the poor in the context of Indian economy. Analyzing the various data related to the banking sector, he concluded that the institutional reforms in the Indian financial sector should be motivated with the prime objective of making the services work for the poor and enable them to steer out of the chronic poverty.

Technological innovation has been a boon for the banking system. The studies concluded that it would improve the efficiency of financial services in availability and use. It was reported by the government studies that Information and Communication Technology (ICT) solution would be a better way to ensure financial Inclusion (several RBI committee reports formed time to time for financial Inclusion). Recently the mobile and internet technology has imparted a revolution in information

technology. The further studies have concluded that Mobile banking has the ability to reach the ‘unbanked’ sectors of the economy (Klein and Mayer, 2011) but under the condition that there is mobile connectivity. Capturing of this market increases the participants in the financial services sector (Agarwal 2010). mobile banking provides greater financial intermediation of the economy as a whole solving both the demand side as well as supply side problems (Gonzalez-Vega, 2003, Drabu 2009; Altay and Atgur 2010).

Mago and Chitokwindo (2014) examined the impact of mobile banking on financial inclusion in Zimbabwe. The paper adopted a qualitative research methodology and a survey design. The survey was based on the Masvingo district in Zimbabwe. The results revealed that the low income people are willing to adopt mobile banking and the reasons are that it is easily accessible, convenient, cheaper, easy to use and secure. The Committee on Medium-term Path on Financial Inclusion (CMPFI 2015) constituted by Reserve Bank of India submitted its report in December 2015. Among the various recommendations made by the committee, some of the important ones that have been implemented include Registration of mobile numbers through ATMs connected with NFS.

Thus, reliance JIO is providing both mobile and internet facility for last two years and there is no proper study to examine the role of JIO facilities on financial inclusion.

Objectives of the Study

Main objective of the study is to examine the role of new information and communication technology, particularly introduction of Relaince JIO mobile and internet, in the growth of financial inclusion. In other words, to examine whether the reforms have facilitated significant financing to the inclusive growth in India, with special reference to Uttar Pradesh or not, ensuring financial inclusion.

RESEARCH METHODOLOGY

The analysis is based on secondary data. The study is an analysis of impact of reliance JIO on financial Inclusion. In this concern, the independent variable is introduction of Relaince JIO mobile and internet facility. On other side, dependent variable is growth

in banking transactions which are based on mobile and internet connections. There are several banking transactions which are based on mobile and internet connections. In this study, five such instruments are selected as dependent variable for empirical analysis. These are; NEFT – National electronic funds transfer, IMPS – Immediate payment service, PPIC – Prepaid payment instrument card, M-Wallet and Mobile Banking. Data for transaction of these instruments are recorded by RBI wings.

A dummy variable (DUMJIO) is used for the introduction of Reliance JIO mobile and internet facility. The proper use of JIO mobile and internet facility in bulk emerged in the last quarter of 2016. So December 2016 has been selected as the starting month of JIO. The dummy variable is given '0' value before December 2016 and value of '1' after December 2016. Pre and post impact of the JIO technology has been examined with the help of regression analysis. Thus, there are five dependent variables named NEFT, IMPS, m-Wallet, M-Banking and PPIC followed by one independent variable, DUMJIO, a Dummy variable. Brief description of the variables is given below as;

NEFT- number of banking transactions done through ECT/NEFT in Million

IMPS - number of banking transactions done through Immediate Payment Service (IMPS) in Million

m-Wallet - number of banking transactions done through m-Wallet in Million

M-Banking - number of banking transactions done through M-Banking in Million

PPIC - number of banking transactions done through Prepaid Payment Instrument Card (PPIC) in Millions.

DUMJIO - The dummy variable as a proxy of introduction of Reliance JIO.

Data Collection

The nature of data is secondary which is collected from RBI website on the monthly basis. The time period is from April 2015 to March 2018.

About the variables

Immediate Payment Service (IMPS) is an instant payment of electronic fund transfer system in India. It offers an inter-bank electronic fund transfer service through mobile phones. The service is available 24/7 throughout the year including bank holidays.

NEFT allows the customer to transfer fund electronically from any bank branch to customer having an account with any other bank branch in the country. While RTGS allows us to transfer the funds at real time i.e. processing the instruction at the time they receive.

A mobile wallet (m-Wallet) primarily enables an individual to pay as well as receive payment using a mobile device. Typically, a mobile wallet is delivered through several payment processing models. This includes, but not limited to: Mobile-based billing, SMS-based transactions, and Mobile web payments.

DATA ANALYSIS

Table-3: Result of Unit Root Test (ADF test model)

Variables	Para. Estimates	t-value	p-value	Stationarity
m-Wallet	-0.2713	-2.5789	0.290	no
D ₁ m-Wallet	-1.0312	-4.7202	0.00	yes
PPIC	-0.2967	-1.2841	0.890	no
D ₁ PPIC	-2.002	-5.888	0.00	yes
M- Banking	0.0010	0.0140	1.00	no
D ₁ M- Banking	-0.8020	-3.59	0.03	yes
NEFT	-0.7901	-3.2398	0.08	no
D ₁ NEFT	-2.27	-7.80	0.00	yes
IMPS	-0.1383	-1.522	0.82	no
D ₁ IMPS	-1.567	-5.444	0.00	yes

Source: Author's calculation

The result of unit root test is tabulated in the table (3) and it shows that the data series of all variables are non-stationary for their level but becomes stationary after taking first difference.

Table-4: Impact of Reliance JIO (mobiles and internet facility) on the growth of Mobile banking in India

Dependent variable: Y = M-Banking

Ind. Variables	Parameter Estimates	t-value	p-value	Sign.
DUMJIO	0.43102	2.510	0.0120	Yes
L ₁ M-Banking	7.221	2.398	0.016	Yes

Source: Author's calculation

The table- 4 shows that according to the p-value, the Dummy variable (DUMJIO) is a significant variable in affecting the M-banking (p- value = 0.012). Interpretation is that Reliance JIO (mobiles and internet facility) has significantly affected the growth in the use of mobile banking in India. However, the growth in the use of mobile banking has been also significantly affected by its own past records, as lag 1 of m-banking (L₁M-Banking) is significant. The result suggests that use of mobile culture is increasing as use of one person is also encouraging the person to use it.

Table-5: Impact of Reliance JIO (mobiles and internet facility) on the growth of PPI Cards Payments in India

Dependent variable: Y = PPIC

Ind. Variables	Parameter Estimates	t-value	p-value	Sign.
L ₁ PPIC	-0.47047	-0.47317	0.0016	yes
DUMJIO	-0.47317	-0.298	0.76	no

Source: Author's calculation

The table-5 shows that, according to the p-value, the Dummy variable (DUMJIO) is not a significant variable in affecting the PPIC (p- value = 0.72). Interpretation is that Reliance JIO (mobiles and internet facility) has not significant effect on the growth in

the use of PPI cards in India. However, the growth in the use of mobile banking has been significantly affected by its own past records, as p-value of L_1 PPIC is 0.001. The negative sign of its beta (-0.47317) of the dummy variable suggests that the emergence JIO has discouraged card type payments by encouraging electronic transactions.

Table-6: Impact of Reliance JIO (mobiles and internet facility) on the growth of IMPS Payments in India

Dependent variable: Y = IMPS

Ind. Variables	Parameter Estimates	t-value	p-value	Sign. Level
L_1 IMPS	-0.28415	-1.863	0.06244	no
DUMJIO	5.552	5.185	0.0000	yes

Source: Author's calculation

The table - 6 shows that according to the p-value, the Dummy variable (DUMJIO) has significantly affected the IMPS (p- value = 0.00). It means that the Reliance JIO (mobiles and internet facility) has significantly affected the growth in the use of electronic payment through IMPS in India. However, the growth in the use of IMPS has been also significantly affected by its own past records, as its lag 1 (L_1 IMPS) is significant.

Table-7: Impact of Reliance JIO (mobiles and internet facility) on the growth of m-Wallet Payments in India

Dependent variable: Y = m-Wallet

Ind. Variables	Parameter Estimates	t-value	p-value	Sign. Level
L_1 m-Wallet	0.84764	9.142	0.000	yes
DUMJIO	47.503	1.940	0.052	yes

Source: Author's calculation

The table-7 shows that, according to the p-value, the Dummy variable (DUMJIO) is a significant variable in affecting the M-banking (p- value = 0.012) suggesting that Reliance JIO (mobiles and internet facility) has significantly affected the growth in the

use of mobile Wallets in India. However, the growth in the use of mobile banking has been also significantly affected by its own past records, as its lag 1 (L_1 m-Wallet) is significant.

Table-8: Impact of Reliance JIO (mobiles and internet facility) on the growth of NEFT Payments in India

Dependent variable: $Y = \text{NEFT}$

Ind. Variables	Parameter Estimates	t-value	p-value	Sign. Level
$L_1\text{NEFT}$	-0.5956	-4.408	0.00001	yes
DUMJIO	4.0918	1.194	0.2324	NO

Source: Author's calculation

The table-8 shows that the Dummy variable (DUMJIO) is a significant variable in affecting the NEFT (as p- value = 0.23). Interpretation is that Reliance JIO (mobiles and internet facility) has no significant impact on the growth NEFT in India. However, the positive sign of beta (4.09) suggests that there exist positive impact of the JIO on the growth of NEFT culture. NEFT has been significantly affected by its own past records but negative sign of beta suggests that NEFT culture has no contribution in encouraging the NEFT. There may be some other important variables such as truncation cost, etc.

Overall, the result of empirical analysis suggests that the emergence of Reliance JIO (mobiles and internet facility) has a significant impact on the growth of electronic banking transaction which is based of on mobile phones and internet. It also suggests that card (digital) culture has a declined trend due introduction of Reliance JIO (mobiles and internet facility). Another important finding is that the electronic payment culture has also significant contribution in the growth electronic banking transaction.

CONCLUSION AND SUGGESTIONS

The financial sector reform is highly based on the modern technology to ensure financial inclusion. Recently Reliance JIO has generated a boom in information and

communication technology. This study examines the role of information and communication technology (ICT) in the growth of financial inclusion, with particular analysis of impact of Reliance JIO information and communication technology (ICT). The independent variable is introduction of Reliance JIO mobile and internet facility. On other side, dependent variable is growth in banking transactions which are based on mobile and internet connections. A dummy variable (DUMJIO) is used for the introduction of Reliance JIO mobile and internet facility emerged in the last quarter of 2016. So December 2016 has been selected as the starting month of JIO.

The finding of empirical analysis suggests that the emergence of Reliance JIO (mobiles and internet facility) has a significant impact on the growth of electronic banking transaction which is based on mobile phones and internet. The very much supportive result is that the card (even digital) culture has a declined trend due introduction of Reliance JIO (mobiles and internet facility). It means the people are able and desired to adopt new technology but the access of these facilities is a major constraint. Another important finding is that the electronic payment culture has also significant contribution in the growth electronic banking transaction. Thus the study concludes that introduction JIO Internet mobile facility has served to advance the goal of financial inclusion in India through encouraging the growth of electronic banking transactions. It is suggested on the basis of the finding of this study that the government should adopt the information and communication technology as a major means of expanding the financial services to the poor and rural people. This practice would be the best solution for financial inclusion.

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