ELECTRONIC RETAIL PAYMENT SYSTEMS AS AN INSTRUMENT TO ACHIEVE A CASHLESS ECONOMY: CHALLENGES DUE TO INFRASTRUCTURE GAP AND USER ADAPTABILITY IN DEVELOPING COUNTRIES

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ABSTRACT

Globally there is a unified drive towards a digitisation of economies including a large-scale adoption of cashless payment systems. However, the challenges faced by developing countries in acquiring and facilitating these payment systems are quite different from those experienced by developed countries. It has been observed that gaps in basic infrastructure, lack of positive network externalities due to the small-scale of operation and illiteracy have been hindering the adoption of electronic and internet based digital transactions. Despite the need to access the private and social costs of various forms of transactions, such studies are not available for developing countries. This paper aims to comprehend the status of digital infrastructure and identify the factors that hinder its development. This study also highlights the various factors that are deterrence to consumers in the adoption of digital modes of payments. It is observed that instead of infrastructure costs ECM machines, it is due to high interchange fees and higher tax incidence because of which merchants are reluctant to accept cashless payments. Further, network gap was found to be one of the prime deterrents to the use of cashless payments among customers followed by the size of transactions. It is recommended that cost to merchants are rationalised, and digital infrastructure systems such as mobile banking which have minimum physical costs are adopted and promoted instead of ATMs and branch banking.

KEYWORDS: Cashless Electronic Payments, Digital Infrastructure Gap, Merchant Adaptability, Information and Communication Technology (ICT)

INTRODUCTION

Various Forms of Cashless Electronic Payments

A series of electronic payment forms are in trend and are being promoted among consumers and merchants. These include Automated Teller Machines (ATMs), Electronic wallets, Electronic Fund Transfers (EFTs), credit cards and debit cards, smart cards, and mobile and telephone banking and internet banking. There are also electronic cheques in replacement of paper cheques and home banking facilities. (Nwaolisa and Kasie, 2012).

Benefits of Heading towards a Cashless Economy: Evidences

An obvious motive behind promoting electronic modes of payments is capitalisation of increased business opportunities, reduction in transaction costs along with tackling the vices of terrorism financing, corruption, bribery, rigging of elections and risk of robbery and frauds (Swartz, Hahn, and Layne-Farrar, 2004; Yaqub, et al., 2013; Omotunde, Sunday and John-Dewole, 2013).Different countries have progressed to different levels in adopting a digital payment infrastructure. Developed countries such as Singapore, Netherland, Sweden, and France are relatively quite ahead and have the highest level of digital payments (Gorlamandala, 2017). Hahn and Anne (2006) compare the costs to merchants in the US while accepting various kinds of payments. Since transaction costs may vary according to the size of the transaction, keeping it in consideration Hahn and Anne (2006) estimated the processing cost for a standard transaction size. The estimated marginal processing costs for various payment instruments at grocery store merchants in a sample studied in 2004 was found to be the highest for the credit cards and signature debit cards, and the lowest for verified cheques, cash and pin debit. Processing costs are the costs such as theft or counterfeit, tender time, deposit preparation, bank charges, and other direct costs.

Private and social marginal costs are other forms of costs which include costs incurred by merchants, the central bank, commercial banks and consumers. They find that although the private costs for all types of card payments are higher for merchants while the marginal costs of cash and cheques are lower, the reverse is true for the private costs incurred by the customers. A similar case is witnessed in the case of private costs to the central bank and commercial banks where commercial banks incur higher marginal costs on card transaction, while central bank incurs nil. (ibid, 2006).In summation, Hahn and Anne (2006) find a higher total private marginal cost associated with card payments compared to cash and cheques, while the social marginal costs were found to be the least for debit card payments compared to cash and other forms of payments.

Sweden is another developed country which has a progressive digital payment system. Bergman, Guibourg and Segendorf (2007) estimate the Total and marginal social costs for cash and card payments using a sample collected by Riksbank in 2002. They found that the private costs, as well as the social costs, were lower for card payments compared to cash payments.

Tompkins (2015) found the volume of transactions in Canada through various payment modes for the year 2011 and compared it with the changes in 2014. He found that in 2014, 35% of the payments were still made through cash followed by 24% and 21% by debit cards and credit cards, respectively. However, the transactions made through cash and cheques and paper fell by as large as 16% and 20%, respectively from 2011 to 2014 while the payments by cards and EFT rose in double digits and online transfers grew by 184%. The development of electronic payment system has subsequently assisted in the cumulative growth of the Canadian economy by a share as high as 25%. The electronic payments are progressively taking over cash based transactions.

Usage of Electronic Retail Payment Systems

Nigeria, a developing country has rapidly progressed towards digitisation of transactions. Yaqub, Bello, Adenuga and Ogundeji (2013) find that with the speeding growth in the economy, the need of transactions increases and this has resulted in high costs on the financial system of Nigeria. Among the various electronic transaction channels, the volume of transaction conducted through cheques was the highest, followed by point of sale transactions. Cash

withdrawal from ATMs and OTC (Over the Counter) still remain the largest used electronic mediums. The data available on e-payments in Nigeria from 2008 to 2011 finds that the market share of ATMs, Web payments, POS payments and mobile payments has been increasing in terms of both volume and value. The majority of the transactions however are completed through ATMs.

The card based transactions were estimated to be about 2% of India's GDP in 2010 (Das and Agarwal, 2010). Mukhopadhyay and Rath (2011) conducted a sample survey and utilised the data on transaction mode preferences and behaviour for 2465 Indian urban household and enterprises in 2010. They utilised this information and found that the majority of the households did not use cashless payments because of a lack of network infrastructure, followed by the size of a transaction as another reason (Mukhopadhyay, 2016). Mukhopadhyay (2016) combined and compared the data collected by Mukhopadhyay and Rath (2011) in 2010 with the Global Findex data collected in 2014 containing 3000 Indian respondents. On comparing the data for the two periods, he found that a majority of the increase in cashless payments have been instrumentalised through mobile payments. Between 2010 and 2014, the value and volume of digital transactions recorded a compounded annual growth rate (CAGR) of about 24% and 20%, respectively. This increase was not only brought about by an increase in the number of cashless transactions per individual but by means of a higher number of people opting for cashless transactions, the CAGR transforming from 3.5% in 2011 to a double-digit growth rate.

Need of Research

Private and social marginal costs of electronic modes of payment such as internet banking and mobile banking have not been researched well in developing countries including India. In response to a technical report published by IIT Bombay in 2010, ICICI bank, the largest private sector bank in India, commented the following, "The payments infrastructure in India is in the development stage and requires further investments for continued growth. Unlike a mature market as in developed countries, acceptance infrastructure in India is underpenetrated and new and emerging forms of payment require continued investments." (Das and Agarwal, 2010; p. 80).

The present paper aims to review the literature available that has empirically and theoretically looked at the determinants and importance of infrastructure in adopting a digital payment network in various countries which could help in drawing inferences for the case of India.

The study follows a review of the previously conducted empirical studies on the forms of infrastructure essential for digital payments and their impact on the propagation of a cashless economy.

A rigorous comparison of various studies was aimed to bring forward the factors that study the impact of infrastructure on the penetration of digital forms of transactions, along with recognising some particular challenges for the digitisation of payments in the Indian economy concerning infrastructure gap. The paper uses secondary data sources to arrive at the analysis and formulate a discussion, a conclusion and make recommendations.

LITERATURE REVIEW

Policies Instrumented to Build or Promote a Cashless Economy

Different countries have focused on different forms of promotional policies in order to push through the drive to a

cashless economy. Sweden began heading towards a digital economy by bringing about a slow structural change. It began with gathering support from labour and bank unions and disbursing wages in bank accounts directly instead of cash payments. Simultaneously, the country also began charging a higher fee on processing paper based transactions such as cheques (Arvidsson, 2016).

India, on the other hand, rushed through the drive to digitisation and a form of drastic structural transformations. The economy was bombarded with subsidies and freebies on digital transactions followed by the demonetisation drive in November 2016. The government announced discounts at petrol pumps and on rail tickets, and insurance policies sold by public sector insurance companies, for instance, a discount of 0.75% was furnished on the purchase of fuel by a cashless electronic medium and service tax waiver on digital transactions up to INR 2000 (Warke and Patil, 2017).

The Presence of Digital Infrastructure Gap

Nwaolisa and Kasie (2012) identify the various infrastructure gaps that have hindered adoption and widespread development of digital payments. These include an inadequate power supply, shortage of technological infrastructure, and lack of behavioural adaptability.

Although a huge amount of infrastructural development has been taking place in India in regards to digital transactions. The numbers of debit cards have doubled, so have the number of POS machines available at the merchants and the numbers of ATMs have multiplied. However, the gap still persists because of the issue of availability and affordability. A majority of the infrastructure development relating to digitisation of transactions is urban-centric. While in Brazil, the number of ATMs and commercial bank branches per 1,00,000 adults in 2014, was 129 and 47, respectively; the corresponding figure for India was 18 ATMs and 13 commercial bank branches, respectively. On the other hand, the smart phone and internet penetration pan India is also quite low. Another difficulty is the acceptability of non-cash payments among merchants. (Warke and Patil, 2017)

Challenges in Building an Infrastructure for a Cashless Economy

In a survey conducted by CII (2017) among it was found that loss of business and safety of transactions were one of two primary reasons behind the adoption of digital POS machines and accepting wallet payments subsequent to demonetisation. A major determinant to the lack of infrastructure adoption at the merchant's end has been the motive of tax deterrence while the other major deterrent is the lack of availability of cash for payment of business activities other than the sale of product and services, such as payment to the labours and suppliers (CII, 2017). This issue of lack of network infrastructure has been tackled quite well by Sweden which gradually developed a norm of digital payment of wages and wide acceptability among labour unions.

The adoption of digital payment has also been opposed by various stakeholders by pointing out its drawbacks such as a high possibility of fraudulent incidences due to a high rate of illiteracy and infrastructural gap and substandard quality of infrastructure (Achor and Robert, 2013). There are mental as well as monetary costs involved whenever people have to deal with erroneous transactions or transactions failed due to network errors or machine errors. Non-dispensation of money at ATMs debited from the bank account is a common issue when infrastructure is not well managed or constituted poorly.

The quality and security of ICT infrastructure is an issue in Nigeria which has been observed to have hindered adoption of a cashless dominated payment system (ibid, 2013; Dahunsi and Akinyede, 2014). Information and Communication Technology (ICT) which includes wireless connectivity and a broadband connection is another infrastructure requirement for a cashless economy (Dahunsi and Akinyede, 2014).

Singapore created a digital landscape equipped with a high degree of regulations and security provisions along with sound infrastructure (KPMG, 2016). However, fishing and hacking is a serious issue in India in light of high incidence of digital illiteracy among the people of India accompanied by incidences of hacking and theft of bank details and card data (Warke and Patil, 2017).

Under the current revenue model in India, the merchant is required to furnish Merchant Discount Rate (MDR) to the banks which have issued debit and credit card to their clients on per usage basis, and the customers are not charged any surcharge over and above the retail price on payments through cards. The standard MDR for banks for transactions of up to INR 2000 are capped at 0.75% while the rate is capped at 1% for payments valuing above INR 2000 (Shashidhar, 2016). Although the MDR rate is quite marginal, Retailers Association of India argues that considering the small profit margins of the retailers these are inhibiting to cashless payments and buying and accepting Electronic Data Capture (EDC) machine based payments (Das and Agarwal, 2010). These costs have been a strong deterrent in the availability of retail infrastructure for cashless payments even though the prices of EDC machine have reduced in accord with the fall in prices of mobile phones (ibid, 2010).

Standard Charted commented that the size of transactions and their volume through Credit and Debit cards in India are still insufficient to realise the scale of economies. Due to this, the high infrastructure costs of issuing and acquiring cards incurred by banks are not yet profitable. Simultaneously, costs based on arranging payment terminals are a deterrent in India due to low scale of operation which is not covered even with the presence of current revenue model. (Das and Agarwal, 2010).

Successful Measures Used To Tackle the Challenges in Developing Countries

Olatokun and Igbindion (2009) used diffusion of innovation (DOI) theory to investigate the adoption of ATMs in Nigeria. They concluded that variables such as the relative advantage of using ATMs than other forms of banking, its usage complexity and ease of trial positively influenced its adoption by the people. Thus, improvisation and innovation of payment infrastructure that suits the need of the population is imperative.

Mobile banking has emerged as a value-added service offered to the bank clients by their respective banks. It is found that the infrastructure required for mobile banking is much easier and efficient to increase in scale compared to traditional banking facilities. In Kenya, according to its central bank report, the number of conventional bank branches stood at 876 and the number of ATM machines stood at 1424 in the year 2008. However, the number of mobile banking outlets tripled within three years of their introduction (Njenga, 2009).

DISCUSSIONS

Bolt and Chakravorti (2008) have stated that payment systems hold a positive network externality implying that a large-scale participation of consumers and merchants enable the development of both physical and social infrastructure for

the transition to an electronic payment based economy.

Based on empirical data Mukhopadhyay (2016) advocated a need of short run a positive "shock" towards developing a social network and promote adoption of an infrastructure network. This is based on the observation that cashless payments are positively correlated to an increased amount of credit being available in the bank account. However, he also identifies that a steady inflow of credit in bank accounts is also essential to maintain a steady-state equilibrium of digital transactions.

Table 1 describes the volume and change in volume of transactions through various modes of electronic payments in India for the financial year 2015-2016 and the financial year 2016-2017. Over the year, while there was not a significant increase in the number of ATMs, the number of POS machines increased by 82.5% which signifies a huge increment in the development of retail infrastructure for retail based transactions. Mobile banking increased by approximately 150% and card payment also increased by 20.09%. Within the growth of payments from cards, the majority of the increase was brought about by the increase in credit card and debit card usage at POS. This could be related to the impact of demonetisation. However, it needs to be seen that as postulated by Mukhopadhyay (2016) that whether such a short term shock can result in a permanent shift in payment mode behaviour. A large momentum of payment growth was witnessed in Prepaid Payment Instruments (PPIs) which includes instruments such as m-wallets, PPI cards and paper vouchers. However, the majority of the growth was in m-wallets and PPI cards while the paper vouchers witnessed a negative growth. The year 2016-2017 also saw a huge increment in the IMPS and NEFT transactions for retail transactions. Further, since the growth in the RTGS transaction was not impressive compared to IMPS and NEFT growth, while a significant portion of the transaction growth was witnessed in IMPS transactions, it can be argued that the impact of demonetisation led people to explore all means of payments, and led to an increased adoption of cashless transaction based infrastructure for retail payments. Simultaneously, the government also assisted in the construction of digital infrastructure by launchings the BHIM mobile application and UPI (united payment interface) solutions (Ali, Akhtar and Safiuddin, 2017).

It is observed that not only the expansion of digital payment infrastructure is resource efficient and economical; it has a higher acceptance among the customers who were unbanked earlier. In the case of Kenya, it was found that almost half of the respondents in the sample have not used traditional banking methods before begin using the mobile banking service. Further, the low and middle-income groups found mobile banking more convenient to adopt than traditional banking system (Njenga, 2009).

The MDR and other components of interchange fees which are accused by Das and Agarwal (2010) and the feedbacks of Standard Charter bank (Das and Agarwal, 2010) of being deterrent to the merchants' adoption of EDC machines and other infrastructure can be said to conform with the increased POS transactions during the period of demonetisation as during that period merchants were more accepting to the card payments while the MDR charges were waived (Shashidhar, 2016).

Table 1: Volume and Change in Volume of Electronic Transactions in India

Payment System	Volume (Million) in Financial Year		Percentage Change in Volume
	2015-2016	2016-2017	
1 RTGS	98.34	107.86	9.68
1.1 Customer Transactions	93.95	103.66	10.34
1.2 Interbank Transactions	4.37	4.17	-4.58
1.3 Interbank Clearing	0.016	0.018	12.50
2 Retail Electronic Clearing	3,141.53	4,204.96	33.85
2.1 ECS DR	224.75	8.76	-96.10
2.2 ECS CR (includes NECS)	39.00	10.10	-74.10
2.3 EFT/NEFT	1,252.88	1,622.10	29.47
2.4 Immediate Payment Service (IMPS)	220.81	506.73	129.49
2.5 National Automated Clearing House (NACH)	1,404.08	2,057.27	46.52
3 Cards	10,038.67	12,055.87	20.09
3.1 Credit Cards	791.67	1,093.51	38.13
3.1.1 Usage at ATMs	6.00	6.37	6.17
3.1.2 Usage at POS	785.67	1,087.13	38.37
3.2 Debit Cards	9,247.00	10,962.36	18.55
3.2.1 Usage at ATMs	8,073.39	8,563.06	6.07
3.2.2 Usage at POS	1,173.61	2,399.30	104.44
4 Prepaid Payment Instruments (PPIs)	748.02	1,963.66	162.51
4.1 m-Wallet	603.98	1,629.98	169.87
4.2 PPI Cards	143.47	333.11	132.18
4.3 Paper Vouchers	0.56	0.51	-8.93
5 Mobile Banking	389.49	976.85	150.80
6 Cards Outstanding	686.04	884.72	28.96
6.1 Credit Card	24.51	29.84	21.75
6.2 Debit Card	661.54	854.87	29.22
7 Number of ATMs (in actuals)	212061	222475	4.91
8 Number of POS (in actuals)	1385668	2529141	82.52

Source: RBI Bulletin 2016 and RBI Bulletin 2017.

CONCLUSIONS

Availability of ICT is vital to the adoption and continued usage of digital payment infrastructure. Besides the availability of ICT and other forms of digital infrastructure, the quality and security of such an infrastructure is imperative.

The card processing and acquiring network is a key infrastructure for digital payments, however, at present; this infrastructure is not growing fast enough due to losses to the banks and other stake holders such as Visa and MasterCard, retailers, merchants and consumers.

Acquiring business under the credit card management is not conducive which necessitates employing more resources on promoting debit card payments and unconventional banking services such as mobile banking, which is more cost effective and has a wider adoption rate among the people.

LIMITATIONS AND RECOMMENDATIONS

The study is limited by the fact that it uses previous studies for arriving at its conclusions, which may have at their end included only a part of the views on the concerned topics.

This review identifies a scope for empirical research on studying the impact of demonetization on the payment infrastructure in India and study the impact on the transaction behavior of consumers and merchants.

There is a need to rationalize the costs imposed on the merchants and card users in accepting and making digital payments through credit cards and debit cards which further hinders the wider acceptability of these digital payment methods and infrastructure adoption. In order to boost the security measures, cards are recommended to be issued with photo IDs and soft copies of receipts be e-mailed or SMS alerts be provided on card payments on the user's mobile phone even for small transactions. This is bound to reduce doubts and boost confidence in using cashless payments.

Focused educational campaigns are to be instrumentalised to increase the scale of operation by instilling a behavior demanding an infrastructure landscape for digital payments. In order to promote adoption of digital payment infrastructure at retail end, there is a need to impose similar process charge incidence on customers and merchants in order to balance the incentives. A greater autonomy to retailers is also recommended in order to compensate their infrastructure financing such as buying the EDC machines and service costs such as interchange charges and MDR

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