Enhancing Branchless Banking Technology Solutions for Improving Consumer Adoption

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Abstract - Branchless banking can greatly extend the outreach of financial services to the poor people, both by reducing the cost of delivery (of building and maintaining branches, and handling large volumes of low value transactions) and by reducing the cost to customers for accessing the services (travel and direct costs and opportunity costs). Over the years several technology solutions for branchless banking have emerged. However an optimal solution that can fulfill consumer expectations of banking services is yet to emerge. This paper presents a technology solution with the potential to address consumer needs much better than possible currently.

Keywords: Financial Inclusion, agent based branchless banking, mobile banking, POS/POT, micro-ATM, kiosk/internet banking.

Introduction

In the recent years, branchless banking through agents, using portable hand-held devices, has been emerging as a promising model for offering financial services to the poor and the rural unbanked people in the developing countries. Under this model, financial institutions provide services through the use of information and communication technologies; and using existing, but more widespread and extensive networks– such as retail convenience stores, pharmacies, supermarkets, gas stations, and mobile airtime retailers – as alternate delivery channels for providing financial services.

This approach is very powerful due to its ability to reduce cost-to-serve, while allowing financial institutions to reach and service low-income unbanked people in their neighborhood. As a result, financial institutions have the potential to cater to this vast but untapped customer segment at the bottom of the pyramid; recognized to have a considerable potential (CGAP 2005 ; Wilcox, 2011-2015).

Moreover, agents, providing the services as intermediaries of the financial institutions, better appreciate and understand the context and the needs of these customers; can develop deeper relationships; and service them more effectively. The model is therefore beneficial for everyone - the unbanked poor, the agents who have an opportunity to earn additional income; and the financial institutions for targeting inclusive, but market driven growth.

In India too, the Reserve Bank of India (the central bank) has been actively pursuing the agenda of financial inclusion since 2006, through an agency banking model using business correspondents. Banks have partnered with a range of technology service providers (TSPs) who provide and support the technology for branchless banking used by the business correspondents (BCs or agents) and institutions who serve as the corporate business correspondents.

A number of companies such as FINO, Eko, A Little World (ALW), Nokia/Obopay and Mobile network operators (MNOs) such as – Airtel, Vodafone, and Idea; have been building technology solutions and platforms for providing banking and financial services. More recently fast moving consumer goods (FMCG) companies such as Hindustan Unilever (HUL), Bayer CropScience and ITC have begun to examine the potential to add financial services to their distribution networks. (Bharathan, V., & Bhargava, S. 2009; Karmakar et al., 2011).

As a result, a range of technology options and delivery models have evolved over time. They emerged due to the need for lowering capital expenditure and operating costs, automation of processes, improving security and reliability, enabling low-value high-volume transactions at a mass scale, safeguarding consumers and enhancing trust, and delivering acceptable customer service levels. As India follows a bank-led model, the ownership of the services and accountability remains with the banks, even though the technology might be provided by TSPs and services delivered by the BCs. While banks needed to ensure this, the available branch-based banking solutions (such as core banking solution, CBS) could not be extended directly to agency banking; and hence new technology models evolved.

The main technology options for branchless bankingcurrently prevalent at the front-end are:

1. Point of Sales / Transaction (POS/POT) terminal based solutions with or without Smart Card;
2. Mobile technology solutions with USSD, SMS, STK or IVR as interface options;
3. Micro-ATM solutions with Aadhaar authentication;
4. PC/laptop based kiosk banking solutions using low bandwidth Internet for connectivity;

The corresponding back-end technology solutions are:

1. Offline banking solution (on the lines of core banking);
2. Online core banking solution (CBS);
3. Online transaction processing solutions with ability to support select banking services (platforms used by MNOs or large airtime distributors, for example Oxigen or Suvidhaa)

Based on the delivery model, the business correspondents are equipped with a combination of point-of-sale/transaction (POS/POT) terminal with or without a smart card reader, micro-ATM, mobile phone, biometric (usually fingerprint) scanner, personal computers (PCs) or laptop that connect with the one of the aforesaid back-end system, either in an online mode; or synchronize and reconcile periodically, while operating offline for the rest of the time.

The above models co-exist in various forms but no solution has achieved scale or universal adoption; and at the same time met consumer aspirations and delivered to service standards comparable to those offered to mainstream banking consumers (such as availability, accessibility, simplicity, interoperability, safety, and reliability). This is in stark contrast to solutions for other banking or financial services channels – such as ATMs or POS solutions for merchant transactions – which (though largely in use for mainstream customers) are now very standard, universal and interoperable, having adopted common protocols like ISO 8583. This allows any person with a standard magnetic stripe ATM/debit or credit card to undertake transactions at virtually any ATM or merchant POS (acquiring bank), irrespective of the bank or service provider issuing the card (issuing bank). (Khan H. R., 2012)

For branchless banking channels, a technology solution with a target architecture which can be adopted at scale and eventually become universal is yet to emerge. Options exist as islands of technology with limited standardization, leading to challenges in terms of achieving interoperability, critical mass and therefore lower costs that can be passed on to the financially excluded. Apart from this, each technology has a different operating processes and performance standards, leading to diverse and often sub-optimal Consumer experience and level of satisfaction (or rather

Dissatisfaction) with the services. (Affleck & Mellor, 2006; Heyer & Mas, 2010)

Though technology platforms have evolved over the years from offline smart card based highly proprietary and non-interoperable forms, to online card-less and interoperable solutions, a utopian solution is yet to emerge. (Hoffmann, J. 2006). The poor levels of adoption of branchless banking services in India is reflected from the Reserve Bank of India (RBIs) published data (RBI, June 2013). Of the over 180 million no-frills-accounts opened and serviced under the various models mentioned above, less than 50% have any level of activity. Within these, apart from the accounts that are used to pay government benefit payments (particularly wages under MGNREGA and pensions under NSAP) are used once a month, the rest are used less than once a year. This exhibits that the unbanked consumers for whom these accounts were opened have not adopted branchless banking services in any significant manner. At the same time, it is observed that there is a considerable level of adoption for remittance services. (Chakrabarty, K. C. 2013; Kumbhar and Vijay, 2011).

There have been few studies in the past to assess consumer perspective, experience and satisfaction levels with the various models through which services are delivered, and to analyze if the consumer adoption can be described with certain common characteristics of the technology solutions employed to deliver these services.

This paper, based on studies of needs, aspirations and experiences of a sample of recently banked poor consumers, analyses the adoption of branchless banking services; and establishes a causal effect of this behaviour to the technology models employed. The technology models are compared through a set of common characteristics that are known to explain consumer adoption of mobile, Internet and similar new technological innovations.

Research Objective

The main objectives of this empirical study are to (a) analyze and explain adoption levels of currently prevalent technology models through characteristics that can explain consumer adoption; and (b) to develop attributes of enhanced technology solution options, that are likely to achieve more rapid consumer adoption based on articulated preferences, thereby leading to achieving scale and more universal adoption over a period of time. The broader objective is moving towards widely acceptable forms of delivery solutions that can accelerate rapid and mass adoption by the beneficiaries or the consumers, fulfilling the vision of achieving financial inclusion in real terms.While the potential solution options could differ by markets, the focus of this study is Indian context.

Branchless Banking in Emerging Markets and Developing Countries

In the past few years, branchless banking has had enormous impact on expanding the outreach of banking and other financial services to the unbanked; and thereby accelerating inclusive growth in developing countries like Kenya, Uganda, Philippines, Brazil, Bangladesh, Pakistan and South Africa. SMART Communications in the Philippines and MTN in South Africa both have extensive branchless banking services. WIZZIT in South Africa, is an independent third party channel for mobile based branchless banking services, with Bank of Athens as the holder of customer accounts. (Alampay, E. & Bala, G.,2010 ; GSMA, G. ,2009; Mas, I. and Ng'weno, A.,2010).

Brazil is providing branchless banking services through the use of point-of-sale (POS) devices and cards at various retail locations. It is seen as one of the leaders in providing branchless banking (Mohan, C. P., 2007). Latin American countries like Uruguay, Paraguay, Argentina, Venezuela and Colombia are witnessing early success. Countries like Sudan, Ghana and Mexico have adopted mobile technology for inclusive finance. (WIZZIT, 2005).

Telenor Pakistan has launched a branchless banking solution, in coordination with Taameer Bank, under the label Easy Paisa, which started operations in 2009. Dutch Bangla Bank in Bangladesh launched branchless banking service through mobile phones in 2011. This service operates with 'Agent' and 'Network' support from mobile operators, Banglalink and Citycell. With this solution, Dutch-Bangla Bank can now reach out to the rural and unbanked population, of which, 45 per cent are mobile phone users. (Sultana, R., 2009) Several mobile financial products have emerged, for example Tigo cash in Ghana, Pago Movi in Peru, Nipper in Mexico and Oi in Brazil.

Characteristics Influencing the Adoption of Technology for Branchless Banking

Many theories have been developed to study Information Technology (IT) adoption issues, including the theory of reasoned action (TRA) (Fishbein and Ajzen, 1975), the technology acceptance model (TAM) (Davis, 1989), the extended technology acceptance model (TAM2) (Venkatesh and Davis, 2000), the theory of planned behaviour (TPB) (Ajzen, 1991), the innovation diffusion theory (IDT)(Rogers, 1995) and the unified technology acceptance user technology (UTAUT) (V. Venkatesh and Davis, 2003).

According to TAM, perceived usefulness and perceived ease of use are two attributes in determining user's intention to use a system. The model has been used widely in IS research (Arbuckle, 1995). However, the model has a number of limitations in studying information technology and mobile based services (Nysveen et al., 2005). One of the limitations of TAM is that it was designed to be used in an organizational context rather than in everyday life context, making it less relevant to study technology based banking. (Venkatesh and Davis, 2000) introduced social and organizational factors as subjective norms, impressions, quality of output and work relevance into the TAM model and proposed the extended TAM model (TAM2).

Another theory which pertains to the adoption of new technology like internet and mobile banking is the Innovation Diffusion Theory (IDT) by Rogers. According to Rogers (Rogers, 2003), there are five characteristics that influence the adoption of an innovation, or the lack of it. These five characteristics are: (1) Relative advantage, (2) Compatibility, (3) Complexity, (4) Trailability and (5) Observability. In mobile services research, although the Innovation Diffusion Theory has been discussed in general by previous researchers, perceived characteristics of the innovation are often trimmed down based on (Tornatzky and Katherine, 1982) meta-analysis research findings (Teo and Pok, 2003; Y.-S.Wang et al., 2009) and recommends that relative advantage, complexity (perceived ease of use) and compatibility are consistently related to adoption decisions. However, (Moore and Benbasat, 1991) argued that observability is another important factor as it is visible and communicable to others. However, (Nadim and Noor Jahan, 2008) found that perceived usefulness, ease of use, security, privacy and customer attitude are significantly and positively related to customer adaption of internet/mobile/technology-driven banking.

Some studies have also suggested that in the case of internet and mobile devices, attributes like user interface (such as large or tiny displays), connection speed (slow or fast data connection) and cost; are additional enablers or inhibitors of mobile banking services (Laukkanen and Pasanen, 2008). In addition to these factors, certain consumer demographic factors like age, gender and education are found to have a some influence on the use of internet/mobile phone in banking services (Huang et al., 2007; Laukkanen and Pasanen, 2008).

Analysis Framework and Methodology

Based on the aforesaid studies and analyses, it was decided to include five characteristics to analyze and explain the level of adoption of technology enabled branchless banking services. These are explained below:

Observability

(Rogers, 1995) defines observability as "the degree to which the results of an innovation are visible and tangible to others".(Teo and Pok, 2003) affirm that the probability of adopting an innovation increases when the benefits and usage of innovation are easily observed.

Compatibility

(Rogers, 1995) defines compatibility as "the degree to which an innovation is perceived to be consistent with existing values, past experiences and the need of potential users." In the context of internet/mobile banking, compatibility refers to the extent to which it is consistent with consumer's lifestyle and current or future needs.

Complexity

(Rogers, 1995) describes complexity as "the degree to which an innovation is perceived as relatively difficult to understand and use". Complexity is similar to the "perceived ease of use" component of TAM and is a significant predictor of the intention to use and adopt an innovation as the more complex an innovation is the slower its rate of adoption.

Relative Advantage

(Rogers, 1995) defines relative advantage as "the degree to which an innovation is perceived as better than the idea it supersedes." Others define relative advantage as the degree to which an innovation is perceived as a better alternative to currently available (or substitute) products and services.

Perceived Risk

In the context of mobile banking, the perception of risk is very significant due to security concerns and the extent of financial loss that can be experienced (Nadim and Noor Jahan, 2008). Some examples of this perceived risk are - Loss of PIN codes or loss or theft of a mobile device with stored data (Huang et al., 2007). Therefore, perceived risk is likely to be a significant characteristic influencing adoption.

Survey Instrument

Based on a review of the available literature; and inputs from pilot case studies and market experts, a survey instrument was developed to conduct this study. The survey instrument consisted of a two-part administered questionnaire.

The first part was designed to capture demographic details of the respondents and the second part consisted of qualitative as well as quantitative questions, designed to capture the five aforesaidcharacteristics. The quantitative questions were designed on a 5 point Likert scale to statistically analyze the factors affecting the adoption of branchless banking services. Whereas, the qualitative questions were designed to assess other dimensions to get a well-rounded perspective, as well to capture and analyze any additional characteristicsor factors, beyond the pre-identified one's, as explained earlier.
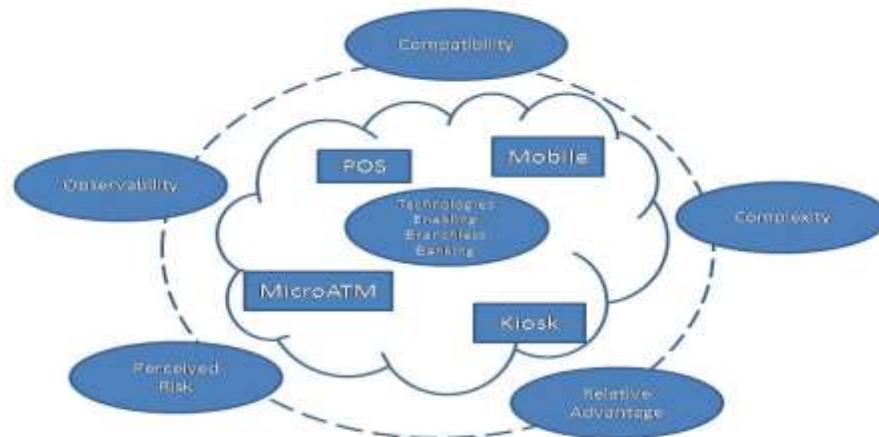

Fig : Various factors to test the acceptance for adoption of technology enabled banking services

The probes used in the instrument to access each of the characteristic are summarized in the table below.

Characteristic	Probes in the survey instrument
Complexity	Documentation requirements
	Account opening process
	Self-service or assisted transactions
	Ease of use of services
Compatibility	Transaction location
	Distance to be travelled to receive services
	Transaction time
	Interconnectivity and Interoperability of services
Relative Advantage	Ease and convenience of service compared to branch banking
	Denial of services
	Channel preference
Perceived Risk	Technology / channel safety
	Perception of loss
	Convenience of authentication mechanisms
Observability	Savings in terms of money and/or time
	Satisfaction with financial needs being met

After developing the instrument, a focus group discussion was conducted among post graduate students having exposure to mobile banking.
This was done to ensure validity of the survey instrument and its clarity.

Sample Selection

Based on the various attributes in the questionnaire, it was critical to identify the right geography and the relevant deployments for conducting the survey.

The target population of this study is resident in India. The four technology solutions that were identified for analysis are as follows.

1. Mobile based front-end device with fingerprint biometric/PIN authentication and with online CBS connectivity at the back-end;
2. Point of Sale/Transaction (POS/POT) based front-end device with smart-card based offline fingerprint biometric authentication and transaction processing; with periodic synchronization to the proprietary banking application at the back-end;
3. Micro-ATM based front-end with *Aadhaar* based online fingerprint biometric authentication and online CBS connectivity for transaction processing;
4. PC/laptop based kiosk banking application at the front-end with fingerprint biometric authentication; and online CBS connectivity for transaction processing.

In order to capture the experience for mobile based branchless banking, State Bank of India was chosen because it has emerged as one of the largest bank using this technology and high levels of adoption. Its business correspondents include Zero Mass Foundation, Eko, and Society for Advancement of Village Economy (SAVE) amongst others. In Mumbai, Zero Mass Foundation (ZMF) has the largest number of agent outlets, so it was selected for this study.

In order to capture the experience with handheld Point of Sale/Transaction (POS/POT) devices and Micro-ATMs, Bank of India was selected. Bank of India has deployed both POS and Micro-ATMs for branchless banking in Maharashtra and other states. The business correspondents working with Bank of India are TranServ, Integra, as well as individual BCs appointed by the Bank of India. Rural parts of Maharashtra were chosen to conduct the survey to assess the POS and Micro-ATM based technology models.

In addition for both State Bank of India and the Bank of India, the kiosk based delivery model was included in the study. These kiosks are mainly operated by the banks through individual business correspondents. In many cases these kiosks have been converted into 'Ultra Small Branches' or USBs, as per the guidelines of the Department of Financial Services, Ministry of Finance and Government of India.

As the target population was rural and urban poor; a vast majority of whom were illiterate and find it difficult to understand the questions in English, so the survey instrument was translated into local languages – mainly Hindi and Marathi. Support of a local agency and an NGO was taken for conducting a large part of the survey in the local languages. They were briefed and the enumerators were trained on conducting the survey.

To increase the accuracy and the precision of the study, the data collected went through several rounds of cleaning and multiple reviews, screening out illegible, inconsistent and ambiguous responses. After this process, data was analyzed using SPSS software. A total sample of 311 responses was used after screening the invalid responses. ANOVA and other statistical tools were used for the analysis and for establishing statistical significance of the results.

There were 85% male responses and 15% female responses. 50% of the respondents were in the age group of 25-40, while 46% were in the age group of 40 and above. Only 4% of the respondents were in the age group of 18-24 years. Interviews were not conducted for people aged less than 18 years, as they cannot hold individual accounts as minors. 34% of the respondents were 9th -12th passed. 17% were illiterate, 15% had studied up to 5th standard and 29% had studied up to 5th - 8th standard. Only 5% were graduates or post graduates. With regards to occupation, 33% were casual labor, 15% were in agriculture, 7% were handling small businesses and 6% were salaried, 2%were housewives and rest all were either unemployed or doing some other work. 44% were earning between Rs. 5,000-10,000 per month, 14% were earning Rs.10,000 or more and 5% were earning between Rs. 3,000-5,000 and 37% were below 3000.

Analysis

Of the respondents of branchless banking services, 58% were using it for remittance, 31% for receiving government benefit (G2P) payments and 11% for savings related services. No respondent was availing branchless banking for credit or insurance related products.
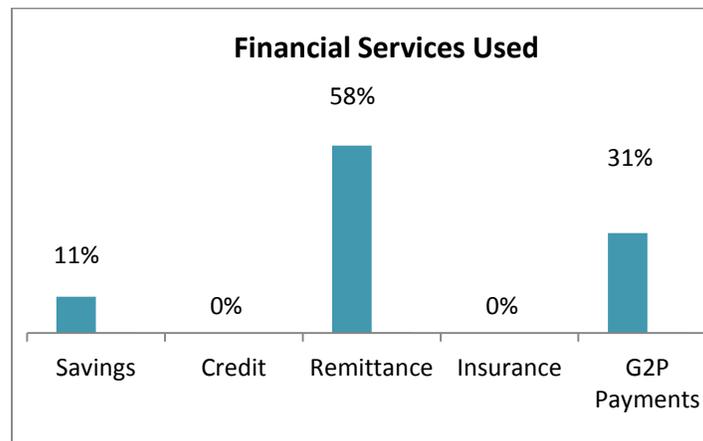

A comparison of the five characteristics across the various technology solutions is brought out below.

Complexity

On the aspect of opening accounts to avail services, 72% reported that they had difficulty in opening accounts, whereas only 28% mentioned not having much difficulty, most of these were using over the counter remittance services and did not even need an account at the sender end to transact. Most respondents preferred BC assisted transactions due to illiteracy, apprehension of technology and fear of theft of PIN. In the case of POS and kiosk based services anyways, the BC agent (CSP) has to be present to transaction, hence for 75% of the sample this option was invalid.

Reasons for not doing self-service transactions (prefering assisted transaction)
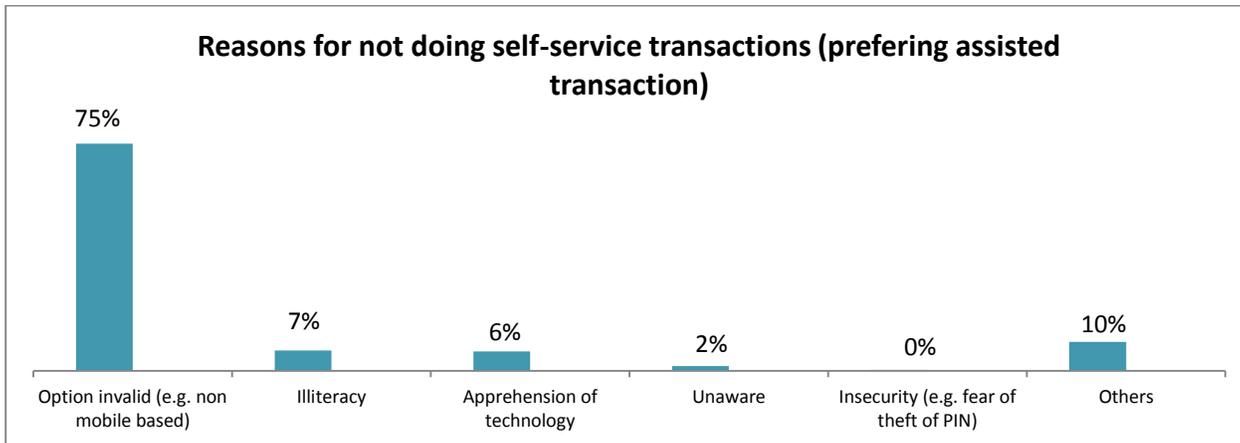

45% of the respondents reported that the branchless banking services are difficult or very difficult to use. Whereas 21% could not explicitly respond and only 34% felt the services were easy or very easy to use.

Ease of use of technology
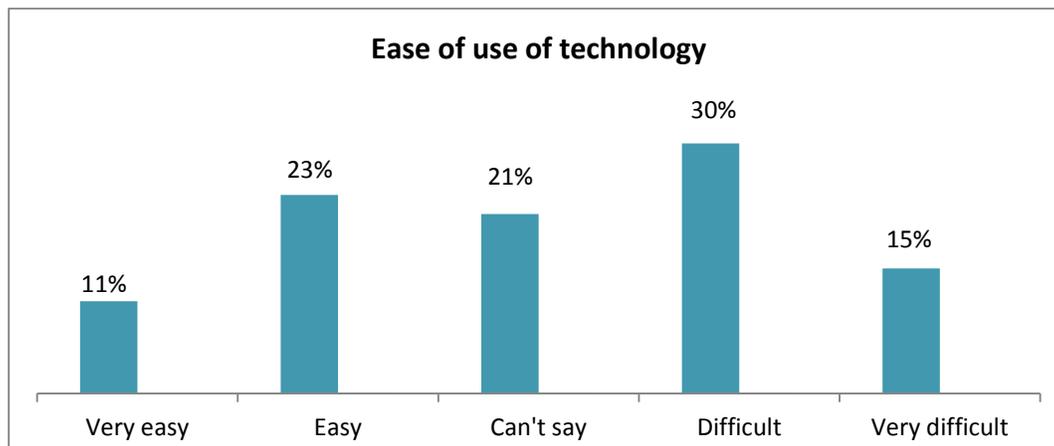
In order to identify that out of four technologies, which one is least complex and easiest from the consumer standpoint, the data was statistically analyzed using SPSS and the test of Analysis of Variance (ANOVA) was conducted, followed by other tests like 'Post Hoc Tukey's Test' and 'Multiple Comparisons' across groups. "Technology" was used as independent factor (variable) and "Easeof Use" was taken as a dependent variable.

There was a statistically significant difference between groups as determined by one-way ANOVA ($F(3,307) = 36.365$, $p = .000$). A Tukey post-hoc test revealed that the mobile technology (2.30 ± 1.1 min, $p = .000$) was statistically significantly better and easier followed by Kiosk (2.87 ± 1.1min, $p = .001$) as compared to MicroATM (3.38 ± 1.1min) and POS ($4.03\pm .8$min).
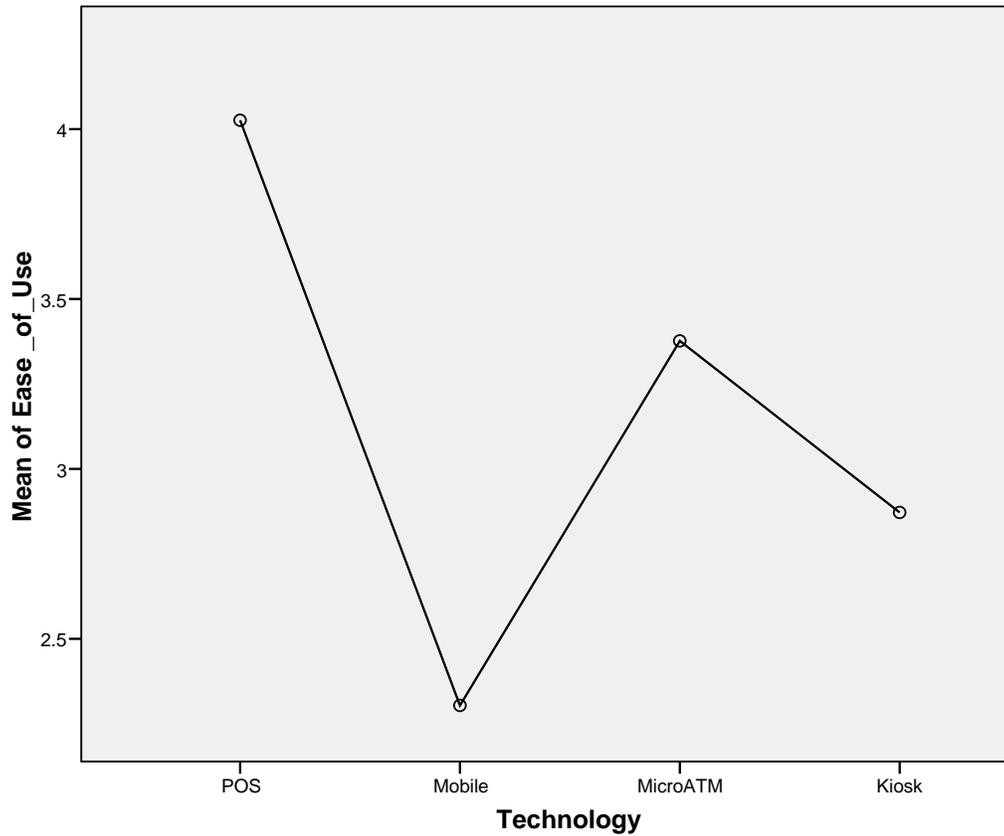
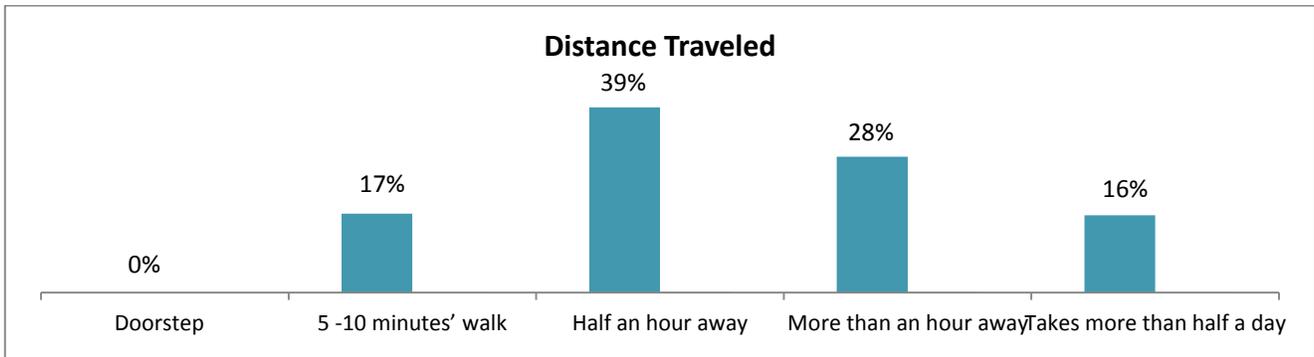## Compatibility

In order to avail the services, 7% of the respondents go to the bank, while93% avail them from a BC. 91% of the respondents reported going to the BC agent locations and only in 2% cases the BC agents come to the consumer's doorstep to provide the services.
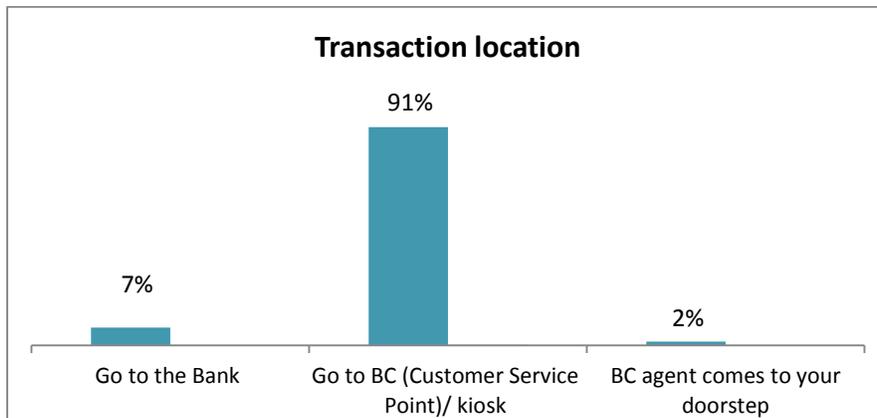
17% respondents have to walk 5-10 minutes, whereas 39% need to travel more than half an hour, 28% take more than an hour and 16% have to spend more than half day, in order to avail the services.

Distance Traveled

0%	17%	39%	28%	16%
Doorstep	5 -10 minutes' walk	Half an hour away	More than an hour away	Takes more than half a day

25% respondents reported that the transactions took a few seconds to complete, while 75% reported wither medium or slow speed of transaction.

Transaction Time

25%	35%	39%
Fast	Medium	Slow
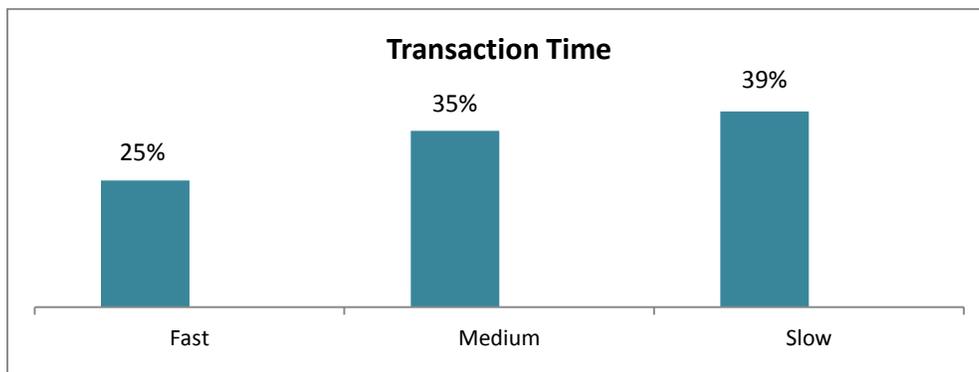
Further, analysis across the technology solutions, using "Technology" as a factor variable and "Transaction Time" as dependent variable, brought out the following.

There was a statistically significant difference between groups as determined by one-way ANOVA ($F(3,307)$ = 38.971, p = .000). A Tukey post-hoc test revealed that the transaction time was statistically significantly lower for Mobile (1.49 ± o.6 min, p = .000) followed by Kiosk (2.08 ± 0.8min, p = .000) compared to MicroATM (2.44 ± 0.5min) and POS (2.56± 0.5min). However, there was no statistically significant difference between MicroATM and POS.
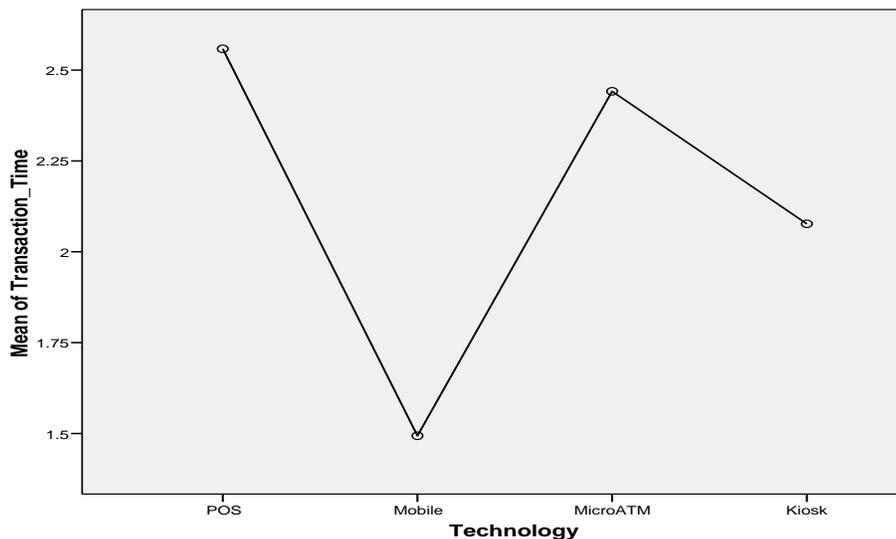
The respondents using POS and card enabled services were able to conduct transactions only at a single nominated agent, whereas respondents using mobile, micro-ATM and kiosk based services were able to transact at multiple agents.
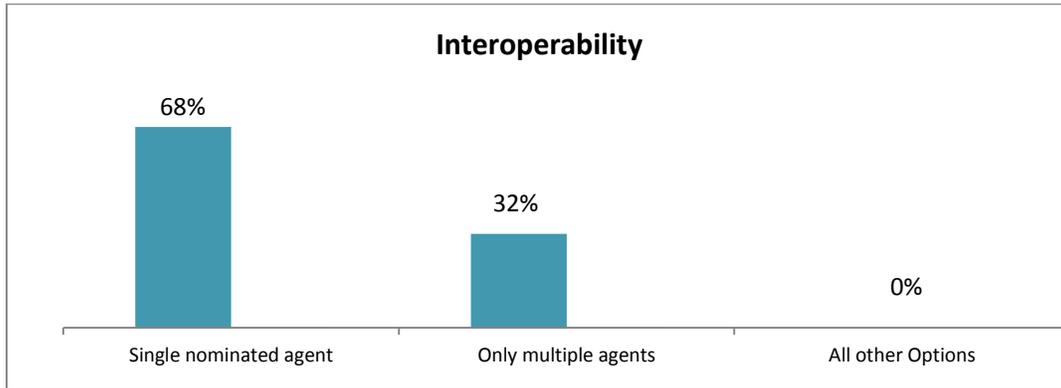

Relative Advantage

Unanimously everybody in the survey reported that branchless banking is more convenient than the other alternatives and especially compared to going to the bank.

Further, analyzing the reasons for preference of branchless banking,out of a sample of 311, 123 respondents reported that they find difficulty in filling forms when they go to bank,

138 reported that banks are overcrowded and 100 mentioned the limited bank working hours as a cause of inconvenience.

99 reported too much travelling distance to be the problem, whereas 102 reported that they have to loose day's wage to avail these services through banking. These 102 respondents were mainly casual labourers.
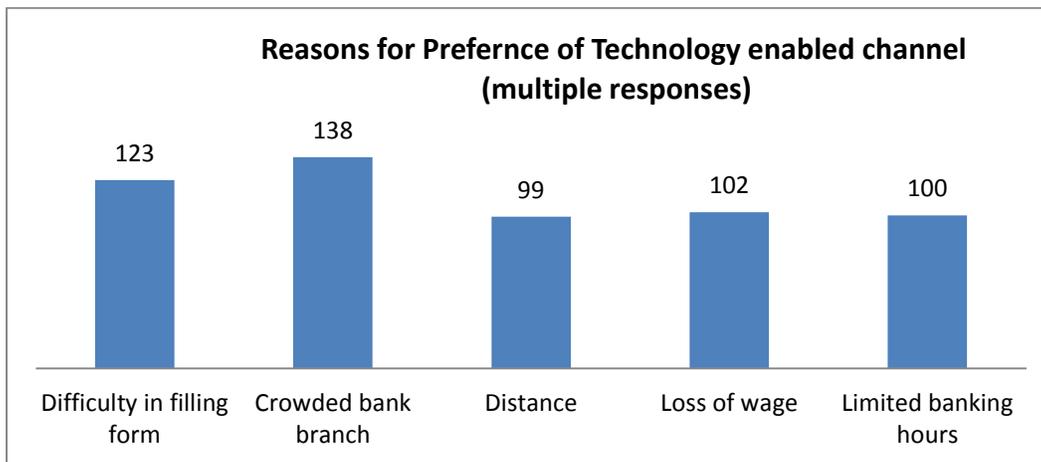

Denial of service up to 3 times was reported by 78% of the respondents.

Denial of service (# times)
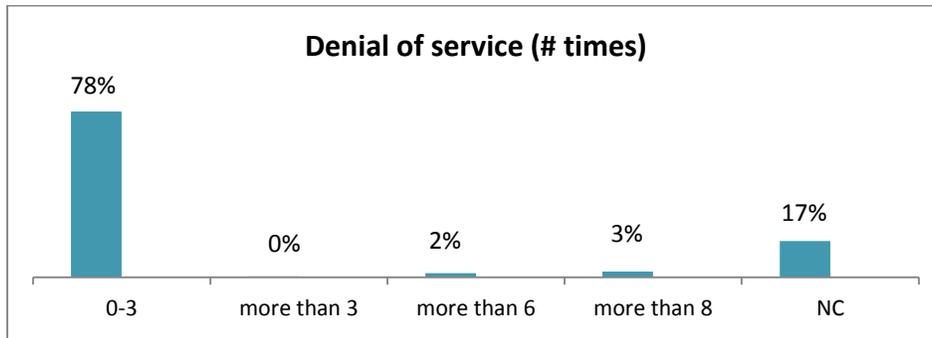
Perceived Risk

Mostly respondents reported that the felt branchless banking was safe and there were no majorincidences of cheating or fraud.

Most of the people preferred biometrics based authentication over PIN, as they had difficulty in remembering PINs. Micro-ATMs with *Aadhaar* authentication was perceived as an even better authentication mechanism.

**Preferred authentication option**
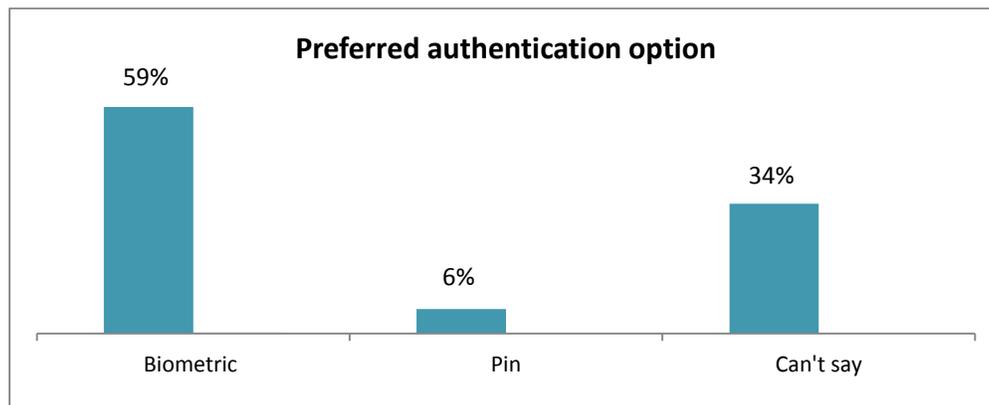
Observability

Most respondents mentioned that they are able to save money and / or time with branchless banking. In terms of the overall Customer Experience and the financial needs being met, 42% respondents mentioned being satisfied or very satisfied, whereas 25% were wither dissatisfied or very dissatisfied.
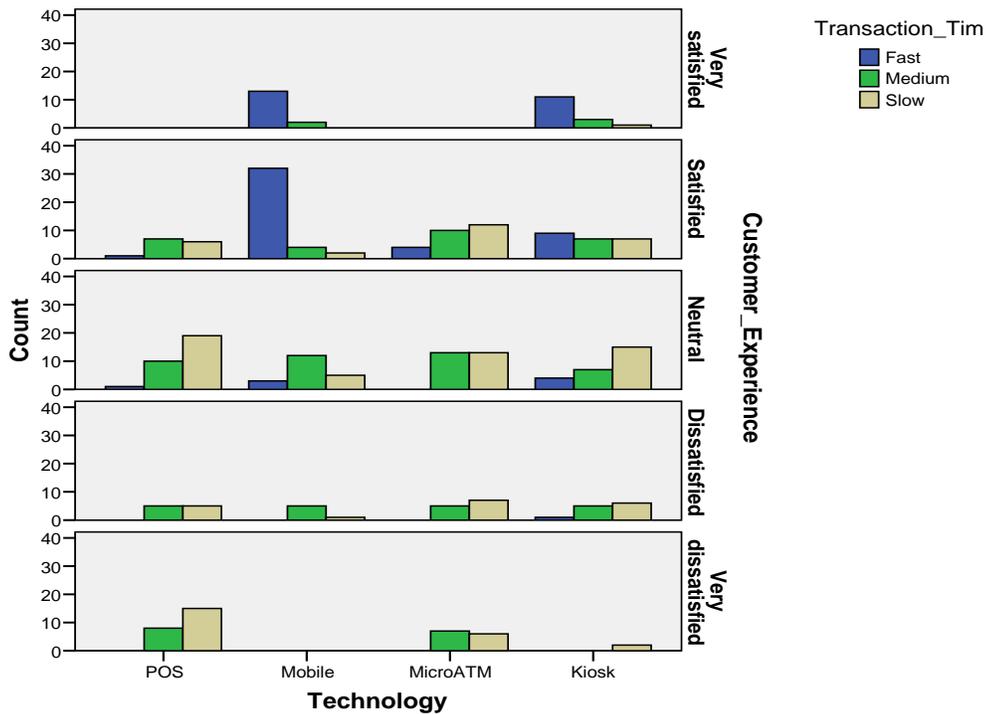
Consumer Experience
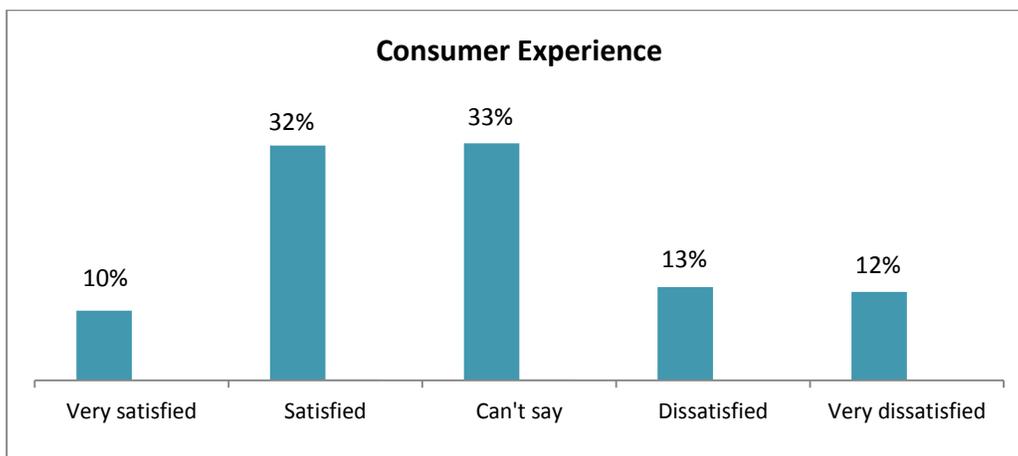
In terms of specific technology solutions, an analysis was done using ANOVA, with "Technology" as an independent factor (variable) and "Customer Experience" as a dependent variable. There was a statistically significant difference between groups as determined by one-way ANOVA ($F(3,307) = 26.846$, $p = .000$). A Tukey post-hoc test revealed that the satisfactory customer experience with Mobile was statistically significantly (2.22 ± 0.8 min, $p = .000$) and Kiosk (2.53 ± 1.0min, $p = .001$) compared to Micro-ATM (3.16 ± 1.0min) and POS (3.55 ± 1.1min). However, there was no statistically significant difference between the Mobile and Kiosk ($p = .231$).
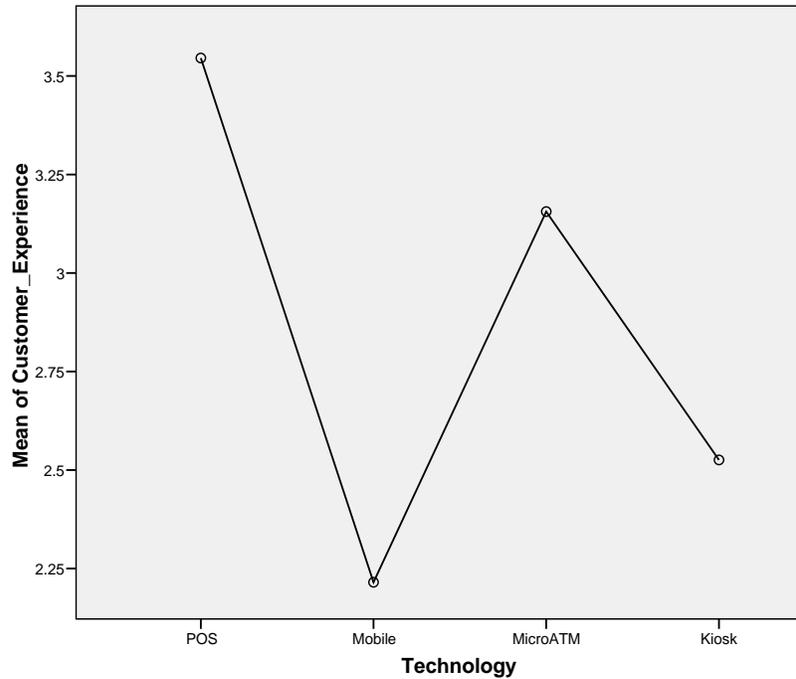
Multiple comparisons led to more insights on consumer experience across technology solutions.

It is apparent that customer experience and satisfaction level with mobile based technology solutions is the highest.
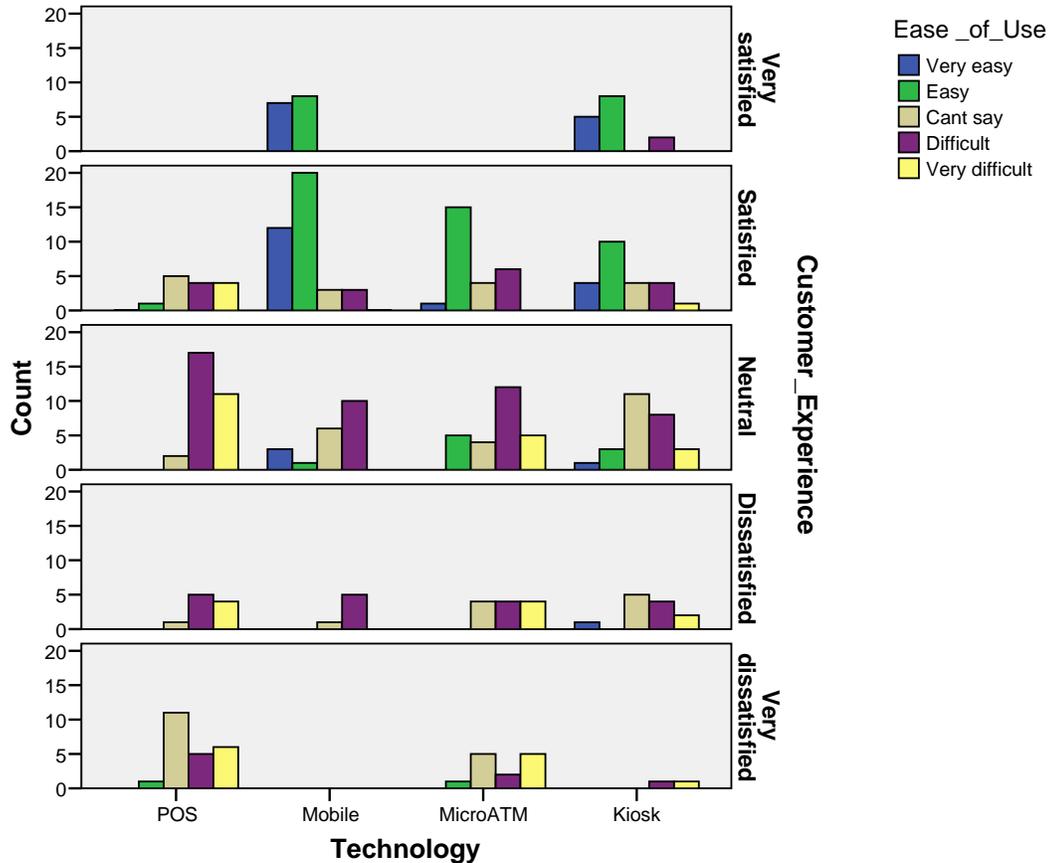
A comparison across technologies on the attribute of "ease of use" also demonstrates high level of satisfaction with mobile based technology compared to the other forms, in particular the POS and Micro-ATMs.

Results and Discussions

The major findings of the study are:

1. Rural and urban poor have a greater preference for business correspondence (BCs) agents as a delivery channel for most of their financial needs, particularly for savings products, government welfare payments and receipts of remittances.

2. They prefer to avail banking services from business correspondents due to convenient and lower costs, whereas bank branches are usually far away, are crowded, have limited banking hours, and they encounter difficulties of access (in providing extensive documentation, filling various forms and direct and opportunity costs for accessing services).

3. Respondents mentioned a preference for BCs because they need assistance due to illiteracy and apprehension

of technology and also BCs are able to provide these services at their doorstep or very near to their home.

4. Amongst the four technology models studies, the respondents find the UIDAI*Aadhaar* authentication, with mobile based technology platform for transaction fulfillment to be able to meet their needs and expectation much better than other delivery solutions or platforms.

5. Rural people prefer biometrics compared to PINs, as authentication mechanism for a variety of reasons, including fear of loss, difficulty in remembering PIN. The handling and safe keeping of PIN compared to smart cards is also a challenge for them.

6. The rural people want banking facilities and features (delivered through BCs) at par with mainstream savings account holders. Due to lack of adequate integration and interoperability of BC channels, they are unable to have access to many of the services they need or aspire for. So, there is a need to integrate BC channel with mainstream banking. Forward looking banks like State Bank of India have already provided direct CBS access to

BCs, taking giant strides in bridging the divide between FI and mainstream banking.

7. Overall in terms of the consumer experience, they have a high level of satisfaction with mobile based technology solutions.

8. The overall findings prove the hypothesis that consumers have a satisfactory experience withmobile based solutions and *Aadhaar* authentication, instead of offline POS solutions with smart card based authentication models.

The findings from this research establishes that consumers have a greater preference and a better experience with mobile based solutions. A strong preference for biometric authentication, particularly with *Aadhaar,* and online, better integrated and interoperable solution, instead of offline solutions, also come out clearly from the analysis. A mobile based solution with UIDAI *Aadhaar* biometric authentication can therefore potentially form a technology solution that can be superior to any existent technology solutions for branchless banking being offered. It is likely to better meet many of the consumer expectations, while being inexpensive (compared to Micro-ATMs that are the primary devices being used for *Aadhaar* authentication currently) and address several challenges that other technology solutions face today.

Conclusion

Appropriate and affordable technology accompanied by the right business model can make financial inclusion economically viable for the formal financial sector and transform it from an obligation to an opportunity.

Two key services have emerged to support the growth of agent or business correspondent networks. First, there is a growing range of government payments that are being processed through branchless banking channels. Specifically, two main programmes account for Rs.462 billion ($9.2 billion) of the Government payment flows in 2011-2012. The National Rural Employment Guarantee Scheme (NREGS) supports the poorest households by providing them 100 days of assured work each year, and the National Social Assistance Programme offers social security through pensions for a range of poor needing financial support. These include old age pensions, widow pensions, disability pensions and the like. While some of these payments are currently being delivered through branchless banking channels, the government is keen to make all these payments through *Aadhaar* authentication. Future government programmes, including monetising those currently delivered in-kind (e.g. fertiliser and domestic fuel subsidies), are also being targeted to be moved to direct benefits transfers and supported through branchlessbanking infrastructure.

Second, banks and BCs are harnessing the huge potential of domestic remittances from migrant labour in cities across India. For example, the cities of Mumbai and Surat alone are believed to be the temporary home to about 10 million migrant labourers remitting $10-30 each month. These remittances have created another anchor product for agent-based branchless banking initiatives. The SBI Tatkal product in particular has seen spectacular success.

The size and scale of payments and transactions envisaged through these G2P payment programmes and remittance transactions (apart from the transactions consumers would eventually conduct on their own for savings or payments; or simply cash-in or cash-out), would require simple yet robust, low-cost, integrated, standards based ubiquitous technology solutions, that find quick and rapid adoption by the agents and the consumers alike. Current technology solutions that have been in existence for a few years have failed to demonstrate adoption. An enhanced technology solution that builds on the proven attributes of the extant solutions, with additional features driven by the characteristics that consumers aspire to, can emerge in the form of mobile based branchless banking solutions, supporting *Aadhaar* authentication. MNOs are well positioned to designs such solutions and demonstrate its potential through undertaking appropriate pilots.

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