



From Exclusion to Inclusion with Micropayments



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Preface

The Unique Identification Authority of India has envisioned the UID as a number that will make it possible for Indian residents to easily verify their identity to public and private agencies across the country.¹

The UID will pave the way for a variety of applications that leverage the reliable authentication the UID offers, within their infrastructure. This document lays out one potential application of the UID — the implementation of a universal, micropayments solution. Implementing the solution will require the collaboration of a variety of stakeholders, including banking institutions, the regulator, and the government.

This is a working paper. Suggestions and feedback are welcome.

¹The full document on the UID approach is available at the [UIDAI website](#).

Executive Summary

In the last twenty years, India has undergone a transformation of its economic and regulatory structures. Policy reforms in this period have led to the increasing maturity of our markets, as well as healthy regulation. The emphasis on de-licensing, entrepreneurship, the use of technology and decentralisation of governance to the state and local level have in particular, shifted India from a restrictive, limited access society to a more empowered, open access economy, where people are able to access resources and services more easily and effectively.

India is shifting from a limited access to an open access economy

But despite these efforts, access to finance has remained scarce in rural India, and for the poorest residents in the country. Today, the proportion of rural residents who lack access to bank accounts remains at 40%, and this rises to over three-fifths of the population in the east and north-east parts of India.

Access to finance remains constrained in rural India

This exclusion is debilitating. Economic opportunity is after all, intertwined with financial access. Such financial access is especially valuable for the poor — it offers a cushion to a group whose incomes are often volatile and small. It gives them opportunities to build savings, insure themselves against income shocks and make investments. Such savings and insurance protect the poor against potentially ruinous events — illness, loss of employment, droughts, and crop failures. However due to the lack of access to financial services, many of the Indian poor face difficulties in accumulating savings.

Financial exclusion limits economic opportunity

To mitigate the lack of financial access in India, the regulator has focused on improving the reach of financial services in new and innovative ways — through no-frills accounts, the liberalization of banking and ATM policies, and branchless banking with business correspondents (BCs), which enables local intermediaries such as self-help groups and kirana stores to provide banking services. Related efforts have also included the promotion of core-banking solutions in Regional Rural Banks; and the incorporation of the National Payment Corporation of India (NPCI) to provide a national infrastructure for payments and settlements in the country.

Policy innovations in improving financial access

Advancements in technology such as core banking, ATMs, and mobile connectivity have also had enormous impact on banking. Mobile phones in particular present an enormous opportunity in spreading financial services across India. These technologies have reduced the need for banks to be physically close to their customers, and banks have been consequently able to experiment with providing services through internet as well as mobile banking. These options, in addition to ATMs, have made banking accessible and affordable for many urban non-poor residents across the country.

Technology has helped drive financial access and affordability

With the poor, however, banks face a fundamental challenge that limits the success of technology and banking innovations. The lack of clear identity documentation for the poor creates difficulties in establishing their identity to banks. This has also limited the extent to which online and mobile banking can be leveraged to reach these communities.

Lack of identity documentation is a bottleneck

Inability of banks to do micropayments

Besides challenges of access and identity, a third limitation has been the cost of providing banking services to the poor who transact in smaller amounts, commonly referred to as micropayments. Banks consider such payments unattractive since transaction costs may be too high to bear.

The UID enables a renewed approach to financial inclusion

The Unique Identification number (UID), which identifies individuals uniquely on the basis of their demographic information and biometrics will give individuals the means to clearly establish their identity to public and private agencies across the country. It will also create an opportunity to address the existing limitations in financial inclusion. The UID can help poor residents easily establish their identity to banks. As a result, banks will be able to scale up their branch-less banking deployments and reach out to a wider population at lower cost.

UID can help integrate reforms for financial inclusion

An efficient, cost effective payment solution is a dire necessity for promoting financial inclusion. The UID number and the accompanying authentication mechanism coupled with rudimentary technology application can provide the desired micropayment solution. This can bring low-cost access to financial services to everyone, a short distance from their homes.

The key features of UID-enabled micropayments outlined in this document are as follows:

UID KYR accepted as bank KYC will bring down costs

UID KYR sufficient for KYC: Banks in India are required to follow customer identification procedures while opening new accounts, to reduce the risk of fraud and money laundering. The strong authentication that the UID will offer, combined with its KYR standards, can remove the need for such individual KYC by banks for basic, no-frills accounts. It will thus vastly reduce the documentation the poor are required to produce for a bank account, and significantly bring down KYC costs for banks.

Access and choice for customers

Ubiquitous BC network and BC choice: The UID's clear authentication and verification processes will allow banks to network with village-based BCs such as self-help groups and kirana stores. Customers will be able to withdraw money and make deposits at the local BC. Multiple BCs at the local level will also give customers a choice of BCs. This will make customers, particularly in villages, less vulnerable to local power structures, and lower the risk of being exploited by BCs.

Large numbers of small transactions will create value for banks

A high-volume, low-cost revenue approach: The UID will mitigate the high customer acquisition costs, high transaction costs and fixed IT costs that we now face in bringing bank accounts to the poor.

Shift to electronic transactions

Electronic transactions: The UID's authentication processes will allow banks to verify poor residents both in person and remotely. Rural residents will be able to transact electronically with each other as well as with individuals and firms outside the village. This will reduce their dependence on cash, and lower costs for transactions. Once a general purpose UID-enabled micropayments system is in place, a variety of other financial instruments such as micro-credit, micro-insurance, micro-pensions, and micro-mutual funds can be implemented on top of this payments system.

The UID-enabled micropayments solution is just one of the many developmental applications of the UID number.

List of abbreviations

ATM	Automated Teller Machine
AML	Anti Money Laundering
BC	Business Correspondent
BPL	Below Poverty Line
CBS	Core Banking System
CIDR	Central ID Data Repository
DoT	Department of Telecommunications
FATF	Financial Action Task Force on Money Laundering
FMCG	Fast Moving Consumer Goods
ISO	International Organization for Standardization
IT	Information Technology
IVRS	Interactive Voice Response System
JSY	Janani Suraksha Yojana
KYC	Know Your Customer
KYR	Know Your Resident
MFI	Micro-Finance Institution
MoF	Ministry of Finance
NBFC	Non-Bank Financial Company
NEFT	National Electronic Funds Transfer
NPCI	National Payment Corporation of India
MGNREGS	Mahatma Gandhi National Rural Employment Guarantee Scheme
PDS	Public Distribution Scheme
RBI	Reserve Bank of India
RSBY	Rashtriya Swasthya Bima Yojana
SMS	Short Message Service
SSA	Sarva Shiksha Abhiyaan
TRAI	Telecom Regulatory Authority of India
UEBA	UID-enabled Bank Account
UID	Unique Identification Number
UIDAI	Unique Identification Authority of India

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1

Introduction

If a country's growth is to be truly transformational, it must come with economic access for the poor. However, enabling access for poor residents — to the economy, its infrastructure, and its institutions — has been a challenge in India, especially in rural areas. The lack of one form of access in particular, access to finance, has deeply constrained India's poor residents. Financial inclusion gives the poor the resources to migrate for better jobs, invest in entrepreneurship, and insure themselves against bad times and economic shocks. Without this, they often find themselves trapped in their circumstances.

The poor rarely consume everything they earn. Given the uncertainty of employment, and uncertain incomes, they typically save when they can, and borrow when they need to. In their book, "Portfolios of the Poor", Collins et al. [5] describe a host of different methods poor households deploy at any given point in time: storing savings at home, with others, or with banks, joining chit funds, borrowing from neighbors, relatives, employers, moneylenders, or financial institutions. Many of these informal financial tools are unreliable and expensive.

The UID can play a critical role in enabling access to formal financial mechanisms, by helping the poor to easily authenticate their identity to financial institutions. This in turn, can significantly improve the effectiveness of existing financial inclusion strategies, and address the last-mile challenges residents now face in accessing financial services.

All financial services (loans, insurance, pensions, etc.) eventually involve a financial institution making a payment to a customer or vice versa. For example, in a micro-insurance policy, the customer makes periodic payments for the insurance premium, and receives a payment when a specified event occurs. In a micro-pension policy, the pension fund collects contributions from the customer when young, and makes a set of payments to the customer in old age.

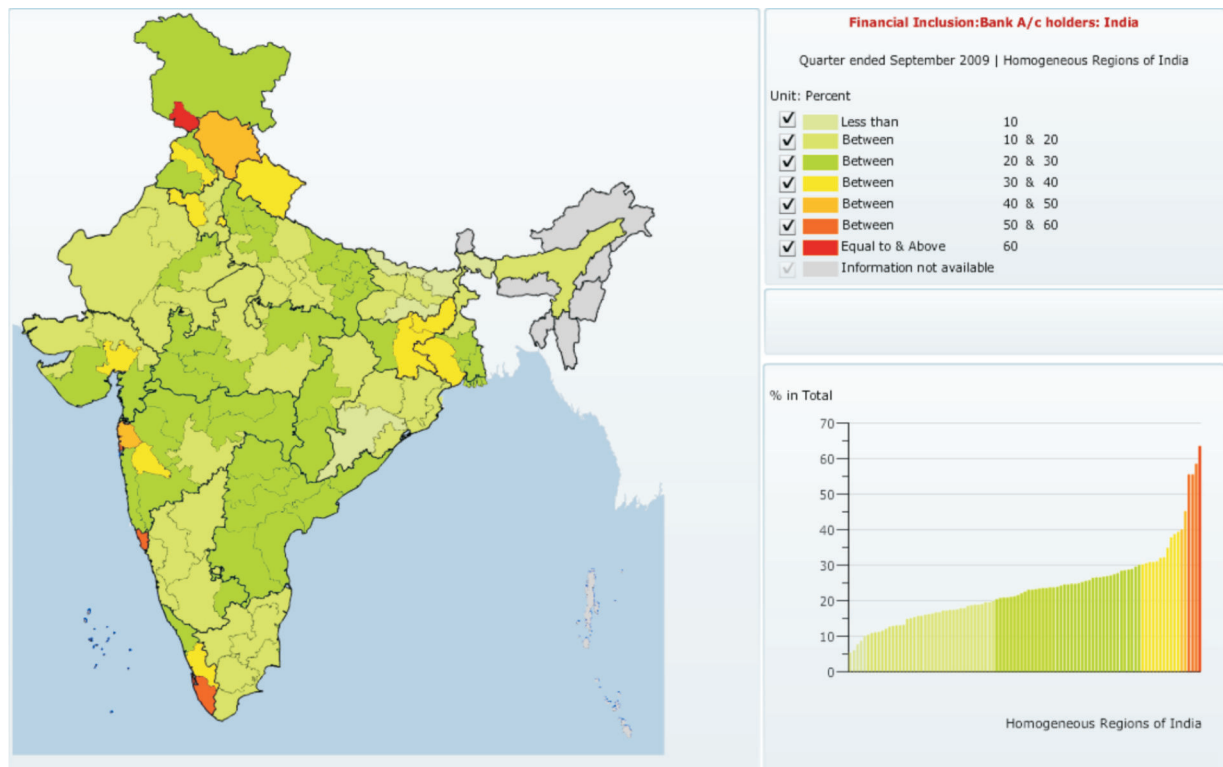
This poses the challenge of creating a payment system that can handle a large number of small value transactions. The UID approach to financial inclusion focuses on the creation of such a micropayments platform, addressing the last mile problems, streamlining the delivery of government benefits, and providing access to finance to those who have so far been excluded.

2

Access to Finance Today

In recent years, India has made substantial progress in broadening financial inclusion. The growth of business correspondents (BCs) has expanded banking services in rural India¹ [1, 4]. Liberalized branch expansion and ATM policies have encouraged rural banking, and new business models such as mobile banking are rapidly emerging. The notion of reduced Know Your Customer (KYC) norms for no-frills accounts — accounts where bank balances do not exceed Rs.50,000, and credit does not go above Rs.1,00,000 a year — makes it easier for

Figure 2.1: Bank account penetration across India (Source: CMIE Consumer Pyramids). It is estimated that 60,000 villages with population 2,000 and above have no banking facilities.



¹RBI circular, *Financial Inclusion by Extension of Banking Services — Use of Business Correspondents (BCs)*, November 30, 2009

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the unbanked poor to now get a bank account.² Despite these efforts, large segments of the population outside the urban, non-poor population remain financially excluded. Large variations still exist across states in bank account penetration, as shown in Figure 2.1. Major challenges remain in making banking truly accessible for the poor. Some of the challenges are discussed below.

KYC (Know Your Customer) Challenges

Even with reduced KYC norms, banks must corroborate the identity and address of a resident, before they get a bank account. Prospective customers applying for a no-frills account must consequently provide identity documentation or letters from local authorities verifying their identity and residence. These requirements make it difficult for many among the poor to get a bank account. This challenge is further accentuated for the migrant poor, who due to their mobility and transitory work are less likely to have either relevant identity documentation or acceptable substitutes.

High Costs

Today, despite the network of 82,000 bank branches of commercial banks (Source: RBI) across the country, India's banks cater to only about 5% of the villages. The cost of this financial distance is paid by the poor (Box 2.1). A visit to the bank for the poor often means substantial travel and expense, and the loss of a day's wages. The poor find such costs especially untenable given their preference for micro-transactions.³

Box 2.1: Lal Singh's financial distance from his family

Lal Singh, a migrant labourer in New Delhi, lives in the JJ Bandhu slum in Vasant Kunj. He saves Rs.50 everyday, which he intends to send back home to his wife and children, who live in Hariharpur village in Sitamarhi, Bihar. Lal Singh has no ID proof, which makes it difficult for him to get a bank account.

Every few months, Lal Singh saves enough money to send a remittance to his family. Initially, he used to send the money through the post office, and was charged 5% of the amount for the service. However, his family experienced delays of a month or more in receiving the payment. Lal now uses a private agent, who delivers the money to his family's doorstep for a charge of 5–7% of the amount. The drawbacks here are that this is an expensive system with low accountability, and the money often takes a few days to reach his village.

Source: Personal Interview, October 2009.

Limited Accessibility

The challenges that people like Ram face are not unique to MGNREGS⁴ beneficiaries (Box 2.2), but are common across much of rural India, and across government schemes. The lack of a common shared payments infrastructure across government programs means that beneficiaries have little choice in where their accounts reside, and have to collect different payments — MGNREGS and Janani Suraksha Yojana (JSY)⁵ benefits, Sarva Shiksha Abhiyan (SSA)⁶ salaries, pensions — from different agencies. The distance beneficiaries are required to travel to various agencies for their money incurs opportunity costs as well as travel costs.

²As a result of this policy, 33 million no-frills accounts have been created as of March 2009.

³This preference among the poor for regular transactions in micro-amounts has led other Indian industries to tailor their products and services accordingly, to target this income group. These include telecom company offerings of ten rupee prepaid top-ups for mobile phones, and the popular two rupee detergent and shampoo sachets sold by FMCG firms.

⁴National Rural Employment Guarantee Act, which guarantees 100 days of wage employment a year to every rural household.

⁵Janani Suraksha Yojana is aimed at reducing maternal and infant mortality rates for Below Poverty Line (BPL) families. It provides young mothers with a cash benefit that is conditional upon them receiving proper ante and neo-natal care.

⁶Sarva Shiksha Abhiyan is a program for universalising elementary education across the country.

Box 2.2: Receiving a cash payment: 20 kms away, 15 days late and only once a week

The present challenges in financial access are well-illustrated in the case of Ram, who lives in the village Atariya in Bundelkhand. To collect the MGNREGS wages deposited into his bank account, Ram must walk for an hour and a half to the village of Kakarwaha, six kilometres away. Three buses everyday ply from Kakarwaha to Badagaon, 14 kms away, where the nearest bank branch is based.

Ram can collect his wages only on the Thursday of each week — the bank has divided the days among the surrounding villages so as to manage the workload. MGNREGS beneficiaries must reach the branch before closing time at 2:30 pm, else come again the following week. The bus fare for Ram costs Rs.10, and the moneylender gets a cut of his wages.

The costs Ram pays in order to collect the Rs.500 in wages due to him are substantial. He incurs the loss of a day's wage, the cost of the bus fare, and additional interest charged by the moneylender. In all, Ram incurs a cost of more than 20% of the benefit, in his efforts to collect the benefit payment.

Source: Indian Express, September 9, 2009.

The costly processes of cash management⁷, cumbersome identity verification processes and high transaction volumes create inefficiencies across the system, and a web of delayed payments and long waiting times for the ultimate beneficiaries. The information asymmetry between the bank and the beneficiaries on when payments have arrived also gives rise to middlemen, who pass on this information to the beneficiaries for a price. The net costs that beneficiaries pay out to access their payments across government schemes and social programs is estimated to be in excess of Rs.6000 crore.⁸ These constraints prevent the poor from using banking services regularly.

If a resident moves away from their village, their ability to access their money becomes even more challenging. Today, benefit payments that the poor receive are often tied to their location. This affects residents in a variety of situations — when they migrate for jobs to the city and then return to the village, when pensioners move to the village or town their son/daughter lives in, or when pregnant women move to their parents' home for delivery.

Storing savings safely

The lack of access to banking services for the poor also makes the safety of their savings, which the middle class takes for granted, a challenge (Box 2.3). Due to the limited safety of savings stored at home, the poor resort to

Box 2.3: Paying a premium for safety

Rashid Ul Sheikh, a migrant in New Delhi, is employed as a mason in the city, and lives in the Kapashera slum. The migrant workers in the slum are usually housed four people to a room, which makes it difficult for them to store their money and valuables where they live.

Migrants often do not have the documents for a bank account. The ration card they have is often from the village, and not accepted by bank authorities. Thus, they do not have a means of storing their savings safely. Rashid consequently gives his savings to his landlord for safekeeping, who charges him 10% to keep the money secure.

Source: Personal Interview, October 2009.

⁷It has been estimated that for microfinance institutions, the cost of cash handling is 1% of the value of the loan.

⁸This amount is estimated from the fact that over Rs.60,000 crore is paid out to residents through various central schemes across the country, and beneficiaries incur costs equivalent to an estimated 10% of benefit payouts, to access their payments.

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other means to ensure the security of their money, including converting it into investments in gold or livestock, or lending it to friends and family. The lack of access to institutional services for savings means that the poor pay a premium to private agents such as moneylenders to store their cash securely and ensure the safety of their money.

Challenges for banks

Banks in India face unique challenges in fulfilling the goals of greater financial accessibility and affordability for the poor (Box 2.4). In much of rural India, unbanked regions are those that are sparsely populated, which lack basic infrastructure, and where large numbers of small transactions is common. As a result, banks face high costs of customer acquisition; high potential transactions costs of micropayments; and large expenditures on infrastructure and IT.

Box 2.4: Savings accounts in Cuddalore

A study of no-frills accounts in Cuddalore, a district that achieved full financial inclusion, revealed some interesting findings, some of which are consistent with the regulator's own observations. One aspect that emerged was that reaching the last mile, and financial illiteracy are the largest impediments to achieving financial inclusion.

The experience of providing no-frills accounts in this rural district also demonstrated that these accounts are expensive to create and operate, largely due to the process being labour-intensive for banks. Since most no-frills bank accounts have very little balance, banks cannot recoup the account operation costs through float. The study did however, publish one very encouraging fact: accounts that stay active have steadily increasing balances as time progresses.

Source: Cost-Benefit and Usage Behaviour Analysis of No Frills Accounts: A Study Report on Cuddalore District, S. Thyagarajan, Jayaram Venkatesan, December 2008.

3

A Tipping Point for Financial Inclusion

Today, inclusive growth is a national priority. Much has already been done by banks, non-bank financial institutions, regulators, and the Ministry of Finance to achieve financial inclusion. A tipping point in favour of financial inclusion has now been reached due to the recent alignment of various policy as well as market factors.

A Conducive Policy Environment

The regulator has expanded the list of entities that can act as Business Correspondents (BCs). This list, among others, includes kirana shops, petrol pumps, self help groups, etc. Thus, banks either by themselves, or along with retail partners such as FMCG firms, MFIs, telcos can appoint kirana shops, self-help groups, and other similar entities as BCs. The regulator prescribes outsourcing guidelines that ensure that there is no conflict of interest when certain banking activities are outsourced [2].

The Finance Minister, in the 2010 budget speech has indicated converting several subsidies into direct cash benefits. The government has created two funds for financial inclusion¹, which can be instrumental in scaling up financial inclusion efforts in the country. Various benefits programs may even be able to bear part of the capital and operations costs, if an effective micropayments system can be put into place. Thus, the last mile, which is expensive to reach, given the country's large size and geographical diversity, can be serviced effectively.

A Conducive Technology Environment

The National Payments Corporation of India (NPCI) has been setup to manage the national payments infrastructure. It will deploy an interoperable modern payments, clearing, and settlement infrastructure that can handle large volumes of transactions at very low cost.

This, combined with the increasing ubiquity of mobile communications, can make branch-less banking a reality. The regulator prescribes guidelines for mobile banking that ensure protection of customer data and customer interests [3]. As a result, crucial parts of the technology infrastructure for micropayments are already falling into place.

A Scalable Model with UID-enabled Micropayments

The final piece of the micropayments solution is the UID number. Banks can leverage the UID enrollment process and infrastructure to acquire customers and open UID-enabled Bank Accounts (UEBAs). Thus, banks will not have to bear the cost of biometric devices, or pay for enrollment agencies to travel from village to village acquiring customers.

¹NABARD manages two funds, the Financial Inclusion Fund and the Financial Inclusion Technology Fund, which contain Rs. 500 crores each.

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The Know Your Resident (KYR) verification performed by UIDAI will match the Know Your Customer (KYC) verification done by banks today. When UID KYR is accepted as KYC for no-frills bank accounts, banks will save on KYC costs.

Lastly, since a person's UID will be tagged to every transaction, the regulator achieves full traceability and accountability.² Thus, no trade-off is required between inclusion and security.

The UID-based micropayments model is similar to the familiar online PoS/ATM world that banks are already comfortable with. Using similar ideas and infrastructure dramatically brings down operational costs and risks. The real-time online authentication offered by UIDAI also provides secure identification of branch-less banking customers to banks at low cost.

The current policy and technology environments, combined with the benefits of using the UID infrastructure as an overlay on the existing banking infrastructure can usher in an era of ubiquitous branch-less banking.

²The UID-based micropayments offer stronger compliance with Anti Money Laundering laws, both to the banks and the regulator.

4

UID-enabled Micropayments

A stable and secure channel for the delivery of micropayments will be central to successful, widespread financial access. A UID-enabled Bank Account (UEBA) linked to a UID number can provide this channel.

A customer can access their UEBA through a BC operating a handheld microATM device.¹ A UEBA provides four basic banking features:

1. It provides a convenient store of cash for savings, with a facility for making electronic deposits and withdrawals in micro-amounts
2. It is a convenient way to make payments
3. It works as a fast channel for sending and receiving remittances
4. It allows balance queries, and provides a history of transactions

Transactions on the UID-enabled bank account function essentially as a prepaid system, similar to that used by mobile operators. This enables local BCs such as self-help groups and kirana shops to offer basic banking services at low risk to the bank. The customers are already familiar with this model and comfortable with paying for talk-time, an electronic good.

The BC starts out by depositing a certain amount with the banking institution. This 'prepaid balance' paid up by the BC to the bank changes with every transaction the BC makes. It decreases when a customer makes a deposit transaction, when some part of it is transferred to the customer's account, and increases when a customer withdraws money.

When the customer is making a deposit, he pays physical cash to the BC, who subsequently makes an electronic transfer from the BC account to the customer account (Figure 4.1). When making a withdrawal, the electronic transfer is made from the customer account to the BC account, and the BC hands out physical cash to the customer (Figure 4.2).

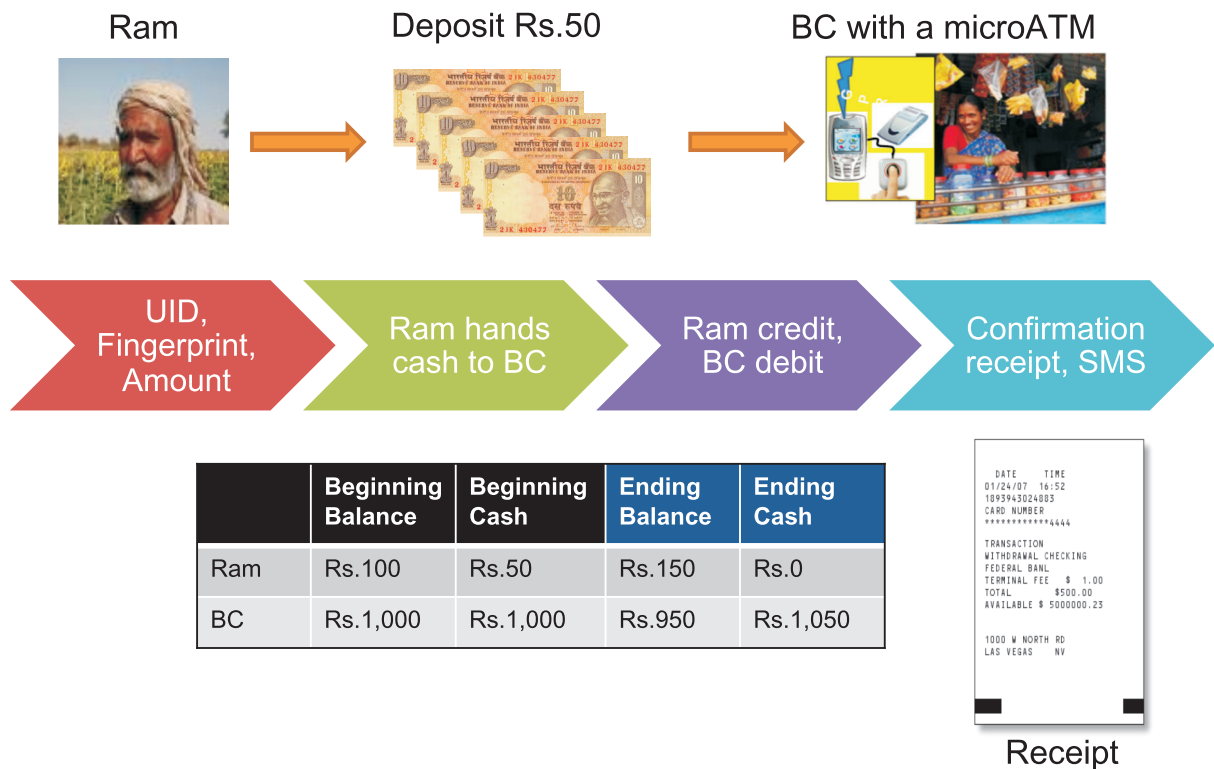
This transfer from physical cash to its electronic equivalent has precedence across India — including villages — in the purchase of mobile prepaid cards. The bulk of mobile subscribers have prepaid subscriptions, and each time a customer purchases talk-time for his phone in the form of Rs.10 or Rs.50 prepaid cards, he is exchanging physical cash for electronic cash in the form of talk-time.

The primary advantage of this approach is that even as it runs electronic transactions at the account level, thus bringing down the costs of cash management for banks, it also supports physical cash transactions at the local level — which is an important component of rural banking.

¹A microATM is a device used by the BC to connect to his bank, authenticate customers and perform transactions. Although the device is called a microATM, it does not have cash storage or dispensation facilities. The cash balances are reflected online, but physical cash is deposited or handed out from the BC's cashbox.

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Figure 4.1: The process flow for a deposit transaction. When a customer deposits money with a BC, an electronic transfer is made from the BC's account to the customer's account.



This approach also substantially reduces the risk to the bank, since the cash transacted at the local level is already paid-up by the BC. The banking institution is consequently protected from fraudulent actions by the BC.

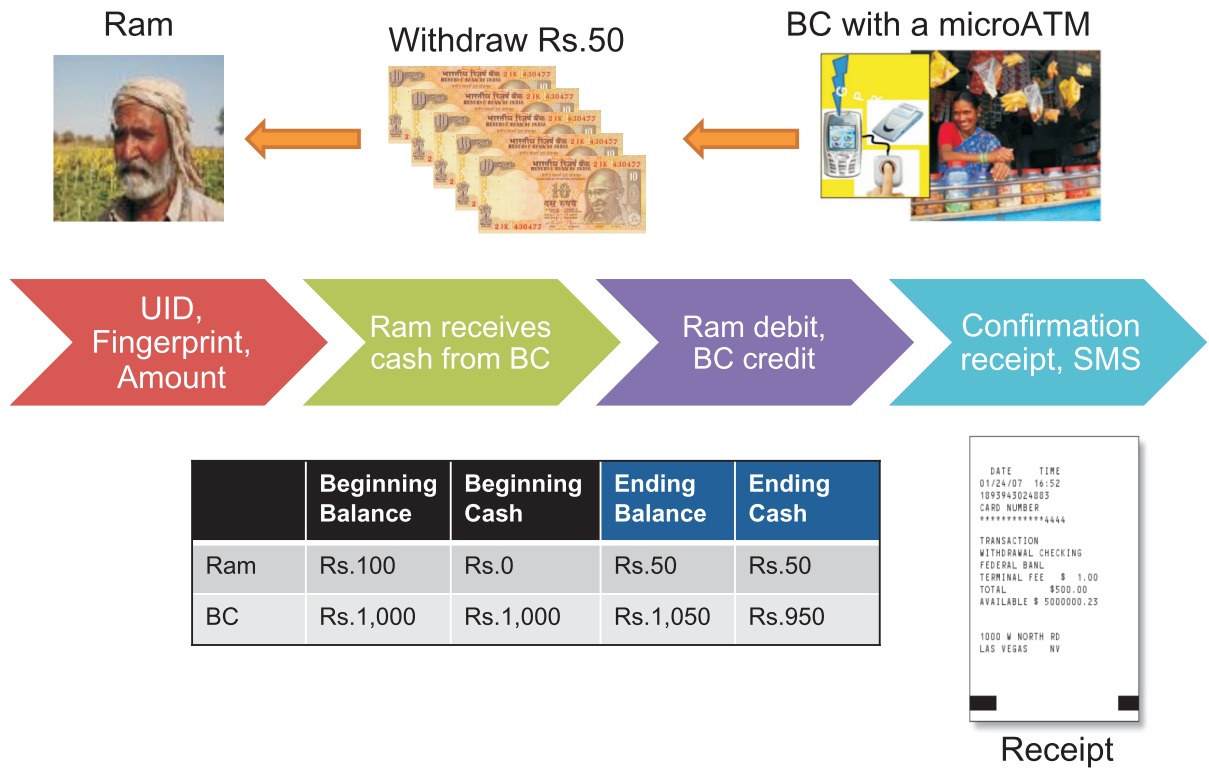
Addressing Challenges for Customers

Identity Verification: Residents will be able to verify their identity to banking institutions easily, in real-time and at low-cost, using UID authentication, which will be available even in rural areas through telecom networks.

Access to Finance: Remote verification of identity will enable local agencies, including self-help groups and kirana stores equipped with mobile bank devices, to act as BCs. This solves the last mile problem for the rural poor in financial access, while simultaneously giving residents choice and mobility. They will have choice among local service providers, and can operate their bank account anywhere through any BC.

Using the Bank Account: With UID-enabled bank accounts, government can deliver Electronic Benefit Transfers (EBTs) to the resident's account. This in turn, will encourage poor residents to get bank accounts in order to receive EBTs and remittances. Having banking facilities at the doorstep will encourage more transactions on the account, rather than withdrawing the full amount, as is observed in many cases today.

Figure 4.2: The process flow for a withdrawal transaction. When a customer withdraws money with a BC, an electronic transfer is made from the customer's account to the BC's account.



Addressing Challenges for Banks

Traditionally, banks provide a variety of free services to their customers. The bank bears the cost of customer acquisition, the cost of account maintenance, and the cost of all transactions. This is possible because the bank enjoys the float in the customer’s deposit account, which covers the cost of these services. No-frills accounts, however, offer very little float to the bank. Thus, a scalable model for financial inclusion must be built on a low-cost infrastructure, with a transparent per-transaction pricing model. Banks will need to address the following major challenges to achieve large-scale financial inclusion.

Customer Acquisition Costs: Banks bear an estimated cost of Rs.100 for customer acquisition for a no-frills account. The cost of account maintenance is estimated at Rs.100 every year.

Aligning reduced KYC requirements of no-frills bank accounts with UID Know Your Resident (KYR) standards and authentication can ensure that anyone with a UID number is eligible for a UID-enabled bank account. Customer acquisition costs can come down substantially by leveraging the UID enrollment and saving the costs of biometric devices and labour.

Additionally, UID authentication ensures that only the eligible beneficiary can operate the UID-enabled bank account. This simplifies and strengthens the security of transactions, both for the banks and the customer.

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Fixed Costs of IT: The existing banking infrastructure is not suited for no-frills banking. For example, Core Banking Systems (CBS) at banks today, which are required for electronic transactions, provide for accounts with a wide range of features, and have formidable fixed and marginal costs for no-frills accounts.

Given the diversity of core banking platforms and IT capabilities of banks, adding hundreds of millions of no-frills accounts to existing core banking systems may be infeasible. A fresh look at hosting no-frills accounts on new platforms that either the banks implement or outsource may be necessary to achieve the desired transactions costs. The cost can possibly be brought down by hosting no-frills accounts on the bank's existing CBS, or on a separate dedicated system. Alternatively, banks may outsource the hosting to a low-cost depository (much like a stock depository).

Transactions Costs: Transaction costs are also high — it costs a bank roughly Rs.40 for each teller transaction, and Rs.10 for each ATM transaction. Passbook updates take time, and increase the cost of labour per transaction. Technology can be used to bring down the cost of transactions. For instance, mobile, phone, and internet banking are much cheaper than traditional channels.

Further, costs will fall substantially with volumes, as fixed costs get shared over a large number of transactions, as has been observed in mobile telephony. A technology infrastructure that enables a Rs.10 transaction for a cost of say, 10 paise can help build a high-volume, low-cost model, which is beneficial for all stakeholders.

5

The Role of Technology

Technology is a central part of the micropayments infrastructure, and essential to a cost-effective solution. The [Report of the Committee on Financial Inclusion chaired by Dr. C. Rangarajan](#), released in January 2008 made two important observations with regard to the technology for low-cost financial access:

1. Technology has to enable the bank to go where the customer is present, instead of the other way around
2. Technology should allow interoperability among the different systems adopted by different banks.

Technology cannot be an end goal by itself, but a means to an end. Any technology solution that is deployed for micropayments, must have the following features:

Interoperability Among Banks: Today, with the ATM network, customers of any bank can withdraw funds from any other bank. Similarly, customers banking through a BC must be able to access their UID-enabled bank account at any bank, and operate it.

Cost-effective BC Network: It must be profitable to create and maintain a BC network for banks. Thus, the devices deployed and the networks created must be cost-effective.

Leveraging Existing Systems: Today, a significant investment in payment networks has been made by banks. The National Payments Corporation of India has been set up to run a pan-India payments, clearing, and settlement network. To the extent possible, existing technology can be used to minimize time to market and bring down costs.¹

Connectivity: UID-enabled micropayments depends on having online connectivity. This connectivity can be in the form of mobile, fixed line, or internet connectivity. Mobile connectivity is already improving by leaps and bounds. Further, recent Department of Telecom initiatives to connect every Common Service Center (CSC) and gram panchayat with a high speed fibre optic network over the next few years will make internet access ubiquitous, making micropayments and other UID applications feasible across the country.

Keeping the above desirable goals in mind, the following technology solutions have been proposed. Some of them have been standardized and adopted, whereas others are still in the conception phase.

MicroATM Standardization

The microATM is a device that will be used by a multitude of Business Correspondents to deliver basic banking

¹The report of the Committee on Financial Sector Reforms, *A Hundred Small Steps*, Aug 2008 recommends that a Nationwide Electronic Financial Inclusion System (NEFIS) be created to link bank accounts and allow funds to be transferred into them electronically.

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services at the last mile. A committee consisting of representatives of IBA, UIDAI, NPCI, IDRBT, RBI and various banks was created to define the specifications and use cases of this device.

The costs of failing to standardize a device like the microATM are quite high as large sections of Indian society will continue to be left out of the country's financial system. The telecom industry is widely regarded for relentlessly driving down costs and bringing coverage to large parts of the Indian population. Similar success is possible in the payments industry. The microATM is a first step towards providing an online, interoperable, low-cost payments platform to everyone in the country (See Box 5.1).

The microATM device design and system architecture are influenced by the design of debit/credit card processing on point-of-service (PoS) terminals, combined with authentication services that UIDAI will provide. The microATM is deployed by banks either directly, or through service providers.

Box 5.1: Efforts in financial access—where can the UID help?

In the village of Kothlapur, Medak, the villager Rebka disburses money for a bank, authenticating the fingerprints of villagers to disburse pension payments and MGNREGS money. The facility allows villagers to avoid a 5 km trek to the post office in Sangareddy to collect their wages.

However, the black box that Rebka carries around, containing the mobile phone for photographs and the biometric device, costs Rs.22,000. Additionally, these initiatives by banks across India, while laudable, are independent efforts, which include proprietary systems. They cannot be applied to achieve the large scale inclusion that is envisioned.

Source: Mint, March 30, 2009.

The MicroATM standards are broad-based, standards-based, and generic. They are based on a bank-led model for financial inclusion, where the UID infrastructure is an overlay on the existing banking infrastructure.

The basic transaction types that the microATM will support are:

1. Deposits
2. Withdrawals
3. Funds transfer
4. Balance enquiry and mini-statement

The objectives of these specifications are to:

- Bring down transaction costs
- Ensure interoperability
- Ensure security and transparency of transactions
- Bring down the cost by being compatible with existing systems
- Provide a uniform customer experience
- Reduce agent training needs

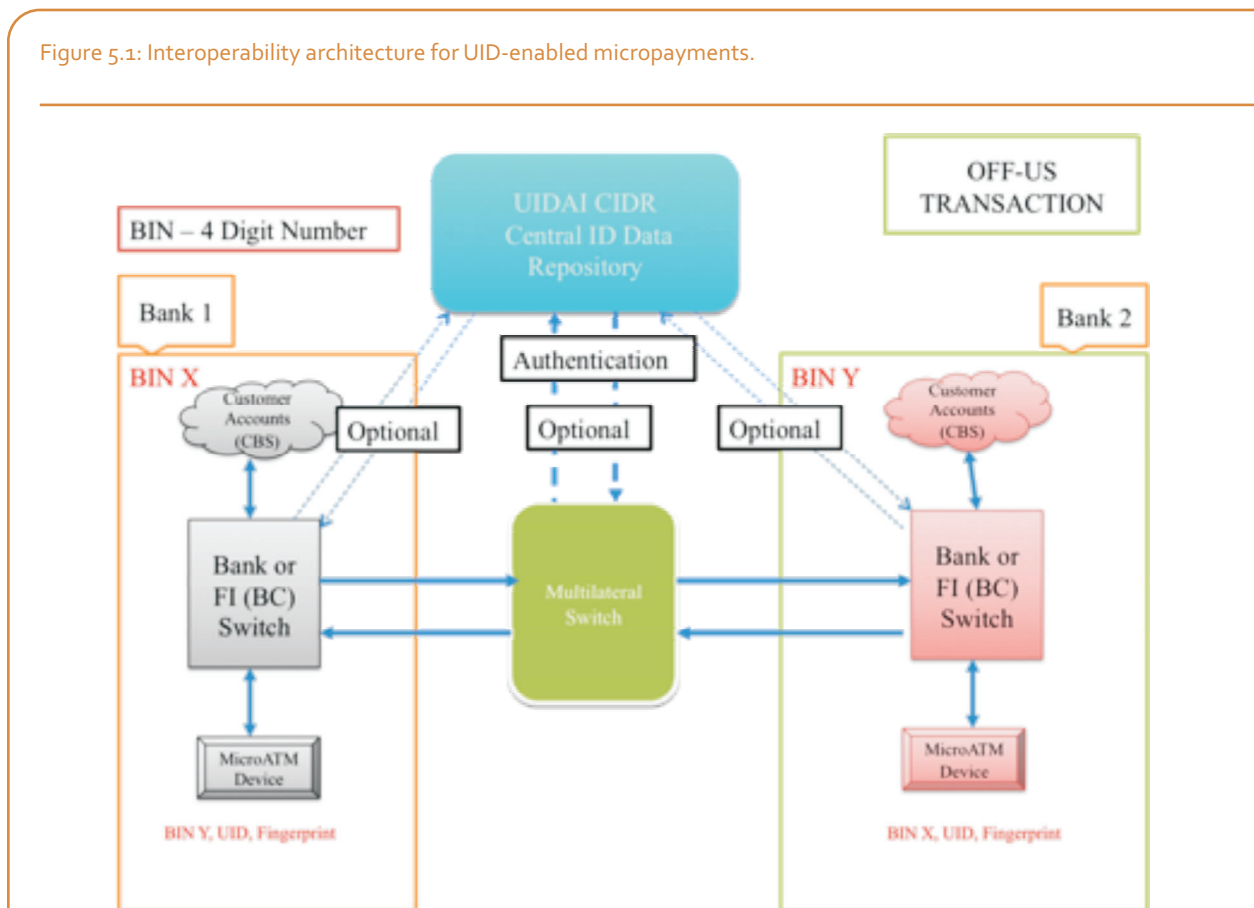
A UID-enabled interoperable payments switch

Choice and mobility are key to the success of UID-enabled micropayments. A customer should thus be able to go to any BC with a microATM device, and access his account, much the same way as an ATM. It should not matter if the BC is appointed by his own bank or by a different bank. Thus, a payments switch that makes this model interoperable is essential.

The National Payments Corporation of India (NPCI) has been formed to switch all the retail payments and fund transfer transactions in India to a central Infrastructure. NPCI has defined business lines to process inter-bank transactions for ATM, PoS, 24x7 remittance, and set up an Automatic Clearing House (ACH). NPCI will also offer UID authentication on its switches, and has defined message formats for interoperability.

All inter-bank payment messages will be routed using the architecture showed in Figure 5.1. This architecture is similar to what already exists for ATM and PoS switching, and is used by several banks. Most transactions in villages are expected to be ON-US transactions, where both the customer and the BC are from the same bank. In urban areas, and when customers travel, the inter-bank OFF-US transactions make it possible for them to access their bank accounts through any BC with a microATM. UID-enabled micropayments will only require minor modifications to carry a biometric payload in the messages, and the ability to authenticate from a central location. The rest of the banking infrastructure remains unmodified.

Figure 5.1: Interoperability architecture for UID-enabled micropayments.



From Exclusion To Inclusion With Micropayments

UID-enabled Deposit of Government Benefits

A critical part of the UID-enabled micropayments architecture is the direct deposit of government benefits into the accounts of the beneficiaries. A government department should be able to disburse benefits by simply generating a list that contains a UID in one column, and the amount in another column.

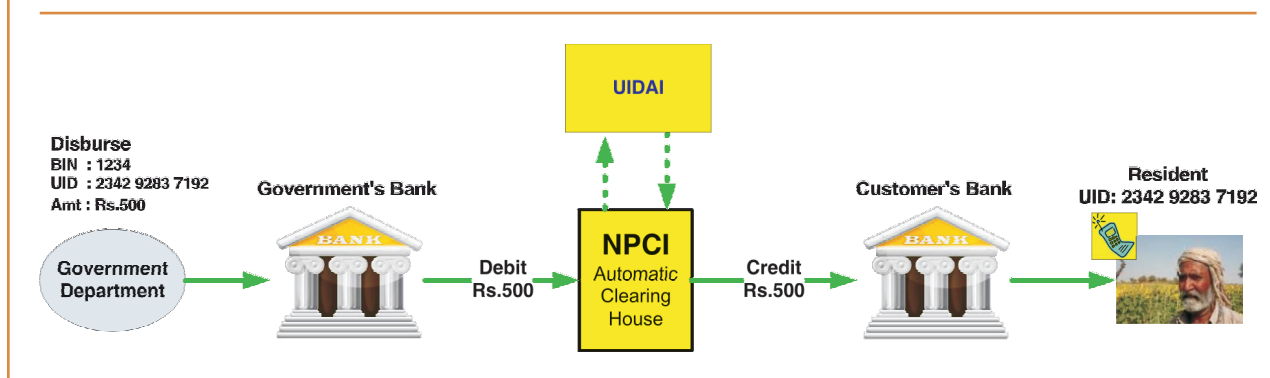
At a certain level, this is no different than the payroll of a firm, where on a given day, money is transferred directly from a firm's account to its employee's accounts. However, what makes this process challenging is the scale and complexity. Government benefits programs are typically funded by the Central Government, but implemented by the states. Different state and local governments park their funds in different banks. The beneficiaries, for reasons of convenience and access, have their accounts spread across a number of banks.

Two critical pieces of infrastructure are required to implement UID-enabled disbursement of government benefits:

1. Government departments must have IT systems that maintain a list of beneficiaries by UID, and track any program specific information required for disbursing the benefit. At the time of disbursement, a list of UIDs and amounts are generated and sent to the bank servicing the concerned government department.
2. A nation-wide payments infrastructure can then distribute payments into beneficiary's accounts using their UIDs.

The entire transaction flow is shown in Figure 5.2. The first piece of the infrastructure, where the government generates the payment instruction needs to be put in place in various government departments. The second piece of the infrastructure, which is the actual payment, can be handled by a UID-aware Automated Clearing House (ACH) that is being put in place at NPCI.

Figure 5.2: Interoperability architecture for UID-enabled micropayments.



Bridging The Last Mile with Mobile Connectivity

A million local groups and agencies acting as BCs will put the process of financial inclusion into high gear across the country. Further gains are possible by letting customers access their UID-enabled bank accounts through mobile phones owned either by them or the BC. Mobile phones are fast becoming a ubiquitous

phenomenon across the country, including in rural India, and can offer people far away from the closest branch of the banking institution affordable access to financial services.² They can serve as simple, secure and reliable links for transactions — their utility can range from basic information alerts to more advanced cashless person-to-person transactions.

The advantages of such infrastructure are significant:

1. Mobile phones can instantly notify customers of cash transfers from the customer account to the BC account and vice versa, via SMS. If the customer doesn't own a mobile phone, they can make an IVRS call through any available phone to check if the transaction has been made. Governments can also use the mobile SMS platform or IVRS to inform beneficiaries whenever money has been credited into their accounts.
2. A voice-activated system can be used to let customers control every transaction and be aware of each step in the transaction process. An interactive voice menu activated either by the mobile phone's handset keys or by the customer's voice can provide users simplified access to informed banking.
3. A mobile phone will also allow customers to place a complaint against any BC who they think has tampered with the transaction or has short-changed them, and the transaction can be put on hold.
4. The UID-based mobile transaction will offer real time online verification and authentication.
5. By combining the ubiquity of mobile phones with a high volume, low-cost payments network, we will eventually be able to reach a stage of effortless person-to-person cashless transactions.

²India's telecom subscriber base reached 479 million in July 2009, according to TRAI, and the overall teledensity crossed 41%.

6

Pricing of Services

Economic resources are used up in running the banking infrastructure, and in ensuring the safety of customer deposits. Eventually, indirectly, a customer always bears all the costs. A seemingly innocuous payment is actually a complex operation. For cash payments, costs include cash management, security, and foregone interest, among others. Electronic payments are run by a complex network of service and infrastructure providers, each of which provides value and adds to the transactions cost.

The central emphasis of the UID-enabled micropayment solution is that there must be an incentive for every stakeholder to participate; participation must not be just a social obligation. The pricing structure plays an important role in setting up these incentives. Unlike regular banking, the costs of no-frills banking cannot be recovered by banks through interest income on customer deposits. A transparent transactions based pricing model is necessary for viability and scalability.

For a given transaction, the transactions cost must be borne by someone. Typically, the cost is borne by the participant that derives the greatest utility from that transaction. The cost may also be shared across participants, if more than one participant derives significant utility from the transaction. The cost of a payment transaction includes the following components:

Fixed Cost of Transactions: There is a fixed cost to setting up a payments infrastructure — retail networks, devices, servers, communications networks etc. Similar to most IT infrastructure, the fixed costs go down dramatically with volumes; the total cost gets spread across a larger number of transactions as utilization of existing infrastructure increases. IT costs also typically do not increase linearly with increased volumes, making larger volumes more economical to support.

Marginal Cost of Transactions: The payments infrastructure is indifferent to the ticket size of a transaction; the IT costs of a Rs.10 transaction are no different from a Rs.100 transaction. On the other hand, certain transactions may create externalities. For example, if the cost of withdrawing Rs.10 and Rs.1000 from a BC is the same, some customers may withdraw large sums and put the BC at a disadvantage. In such cases, *ad-valorem* pricing, which takes the BC's liquidity into account, can align incentives for both, the customer and the BC.

Loss from Fraudulent Transactions: Electronic transactions often attract fraud. One benefit of the UID is that it can dramatically cut down on identity fraud and reduce the losses from fraudulent transactions. The UID number is thus a public good that helps drive down transaction costs throughout the financial system.

A possible pricing structure

Based on an understanding of the cost of transactions and BC economics, a possible pricing structure¹ may be as follows:

1. No fees for account creation and maintenance. Fees are only charged for transactions. Thus, customers receive the benefit of safekeeping of deposits without paying exorbitant fees.
2. Transactions performed through mobile phones or the internet should have fixed transaction fees. In these cases, the customer also bears the cost of accessing the mobile network.
3. A transaction fee can be charged for cash withdrawals performed through BCs.² This fee can be split between the BC and the bank.
4. Cash deposits can be free.³
5. Remittances and payments performed through a BC should be fixed price as it does not affect the BC's liquidity. The BC, however, must be compensated for services rendered (such as for labour and operating costs).
6. Remittances and payments can be delivered to the payee after subtracting the fixed transaction fee.

¹The pricing structure here is not prescriptive. Eventual pricing should be determined by market forces.

²In the telecom model, the transaction fee paid to local retailers is around 2–4%. This fee may have a fixed and a variable component — such as Rs.2 + 2%.

³This is comparable to free incoming calls. Upon the introduction of free incoming calls, volumes increased dramatically. Cash deposits actually increase the BC's liquidity and are thus preferable.

7

Benefits for Stakeholders

Besides pricing, a significant consideration for the micropayments solution to work effectively is that there must be clear, tangible benefits to all stakeholders in the system. There are significant potential benefits for each stakeholder within the micropayments solution. The stakeholders — central and state governments, banks, BCs and residents — all stand to gain by coming together and forming a collaborative ecosystem.

Benefits for Residents

An individual can benefit from the UID-enabled Bank Account (UEBA) in a number of ways (Box 7.1):

1. Residents will be able to access payments, as well as withdraw and deposit money through any bank or any BC across the country.
2. The UEBA will make it possible for residents to make micro-transactions in a cost effective manner.
3. The UEBA will enable the delivery of benefits and subsidies through a single channel to residents in a manner that is faster, more convenient and transparent.
4. The UEBA allows individuals to send and receive remittances cheaper, faster, more securely and in small amounts.
5. A UEBA may include a small, initial deposit from the government to the resident as an added incentive to sign up for the UID.
6. Today, residents moving from their home village or town find it difficult to access financial services such as loans, because they have no way of establishing their credit worthiness. With the UEBA, residents will be able to establish their financial history to banks and agencies, regardless of where they live.

Box 7.1: What changes for Ram, under the UID-enabled micropayments approach?

For Ram of Atariya village, the universal micropayment infrastructure will allow him to easily collect his MGNREGS payment, without travel and the loss of a day's wages. Here, Ram will have already registered for a UID number and received it along with a UID-enabled Bank Account (UEBA). The MGNREGS process will work as before, with the muster rolls travelling from the panchayat level, to the block level, all the way to the state. However, unlike the previous scenario, where a cheque may be issued, an electronic payment is made directly to Ram's account. If Ram has a mobile phone, he receives an SMS when his pay is credited to his account.

Benefits for Government

The inability of the poor to clearly verify their identities to public and private agencies has prevented central and state governments from delivering benefits effectively. The proposed micropayments infrastructure can provide several benefits to the government:

1. The introduction of UID-based verification and authentication will make electronic benefit transfers faster, cheaper and more effective for governments.
2. Benefits can be transferred in smaller and more frequent installments if necessary, to allow residents to build savings and also enforce conditions within benefits. For example, the Janani Suraksha Yojana (JSY) program provides a conditional cash benefit to pregnant women if they accept proper care. At present, the benefit is delivered in a single amount, at the end of the mother's participation in the scheme. With the UEBA, the benefit can be delivered directly to the beneficiary's bank account in small amounts, each time she fulfils a condition for ante-natal or neo-natal care within the JSY scheme.
3. If the micropayments infrastructure makes access to a bank account universal, governments can not only transfer benefits directly to the individual's bank account, but also tailor different forms of benefits for residents across the country. This can include 'restricted cash' conditional benefits such as JSY, as well as digital vouchers, including education vouchers for children to attend the school of their choice, and health vouchers that buy basic forms of health insurance.

Benefits for Banks

Taking banking to rural areas has long been considered an expensive proposition. The high customer acquisition costs, the risks of handling and moving cash, as well as the large volumes of low value transactions make the option of setting up rural branches a social responsibility rather than a business opportunity. The proposed micropayments ecosystem can enable banking institutions to overcome these challenges as described below:

1. Banks can rely on BCs to reach the country's unbanked population, eliminating the need for a physical bank branch in remote areas.
2. ATMs, as they are currently operated by banks require a sophisticated cash management operation. The BC operation is closer to the lower cost, retail distribution model for mobile prepaid subscriptions.
3. The introduction of the micropayments solution and the use of a central switch to make payments electronically will dramatically cut down on the cost of cash management in the system.
4. The KYC costs for banks can be significantly reduced, bringing down the customer acquisition cost, as a resident with a UID may require no further identification to get a UEBA.
5. Every micropayment, remittance and government transfer can be an additional source of revenue for banks. At high volumes, the transaction fees generated can offset the marginal cost of hosting UEBA's.

From Exclusion To Inclusion With Micropayments

Benefits for BCs

Despite being identified by the regulator as an important route in achieving mass financial inclusion, the BC model faces various challenges that limit its scale and commercial viability. Cash management — the logistics involved in handling large volumes of cash and the operational risks associated with it — remains one of the biggest problems. Non-operational accounts and difficulties in retaining customers after the initial transaction, as well as inadequate commissions from banks are also major setbacks, preventing BCs from recovering their costs. A majority of BCs as a result, have reported losses and some have even suspended their operations.¹

To function effectively, BCs will need to see clear benefits from participating in banking services, which is an important outcome of the micropayments model:

1. BCs should receive a commission for every transaction.
2. The commission for providing physical cash to the resident can be of the order of 2% of all withdrawals. In the case of government benefits, government can consider bearing the cost so that the beneficiaries receive the full benefit.
3. This is extra income for the BC, who may often run a kirana shop, a petrol pump or is a SHG.
4. Increased footfalls as a result of providing banking services can also translate into more business for the BC.
5. Banks can team up with FMCG firms, telcos and other firms with retail networks to provide logistics support to the BCs, and build a solution that scales.

Benefits for the Regulator

The online UID-enabled micropayments model offers several benefits to the regulator:

1. Widespread financial inclusion is a target that the regulator has set for itself, and UID-enabled micropayments is a scalable model that can help achieve it.
2. All transactions are done online and they are reflected in the bank's systems in real-time. This makes all transactions transparent to the regulator and reduces systemic risk.
3. All UID-enabled micropayments have a UID tagged to them, where the UIDAI will have performed KYR verification before issuing the UID. The UID issued is also unique because of biometric de-duplication. Thus, strong compliance with anti-money laundering laws is assured.
4. The real-time online nature of UID-enabled micropayments mean that anomalies are detected quickly. Customer complaints can also be dealt with promptly due to electronic audit trails. The secure biometric authentication provided by UIDAI can greatly reduce fraud, which reduces the reputational risk for banks and the regulator as compared with offline alternatives.

¹The Report of the Working Group to Review the Business Correspondent Model, August 2009

Other Beneficiaries

Ministry of Finance: A bank account linked to every UID number will enable the Finance Ministry to significantly improve the formulation and monitoring of budgets, subsidies and expenditures. The ability to monitor the movement of cash can also curb money laundering, and an electronic trail for transactions will enable both AML and FATF compliance.

MFIs: One of the challenges that MFIs face is in ensuring that the money collected by their field staff is deposited in banks in a timely and safe manner. With very limited bank branches in rural areas, MFIs have had to deal with substantial theft risks. The presence of a BC network and mobile-based, cashless transactions will avert such risks and increase safety for loan officers. It will also add to the local cash circulation and increase transaction revenues for MFI BCs.

CSCs: 100,000+ Common Service Centres are being set up across the country to act as front-end delivery points for Government, private and social sector services to rural citizens. Each of these centres is run by village level entrepreneurs, who can become BCs and gain additional visibility and income opportunities.

Post Offices: Post Offices can provide their own unique value by either acting as 'Post Office Banks' that perform regular banking functions, or be appointed as BCs. Both options will allow Post Offices to increase their customer base and revenues, and technologically upgrade their operations.

Telecom Companies: If the mobile based transaction model is adopted, telecom firms will benefit from the increased customer base, additional demand and data traffic. The mobile phone companies can also be BC aggregators.

There are many other positive network externalities that come out of the micropayments solution. We have only outlined the broad benefits here.

8

Recommendations

This report makes the following recommendations for steps to be taken towards achieving an inclusive, high volume, low-cost micropayments solution:

1. The UID-enabled micropayments plan calls for funding the initial fixed costs of infrastructure to help jumpstart financial inclusion with budgetary help from the relevant government ministries. The initial infrastructure costs may include:
 - (a) Funding for central payment switches and gateways
 - (b) Initial costs of microATMs in rural areas
 - (c) Funding the creation of a depository for no-frills accounts, if necessary
2. Funding of start-up costs for the UID and UID-enabled bank account by government or other agencies. This may include a small cash incentive for opening the account and an additional amount for the state as a Registrar to cover the costs of enrolment hardware and labour.
3. The RBI already offers a Rs.50 incentive for no-frills accounts operated with biometric smart-cards. This incentive may be extended to the UID-enabled bank account, which would also be a biometric-enabled no-frills bank account.
4. Define the means to host no-frills accounts in conjunction with a consortium of banks, if necessary.
5. Define device standards and communication standards for transactions within the microATM network in consultation with IBA, NPCI and the larger ecosystem.
6. Amend rules so that the UID is sufficient to get a no-frills UID-enabled bank account. This activity may be co-ordinated for pro-poor products across all regulators viz. RBI, PFRDA, IRDA, SEBI etc.
7. Consider the balance enquiry printout from a microATM as sufficient substitute for a copy of the bank statement/passbook.
8. All agencies and ministries that disburse subsidies should begin evaluating the process of converting their subsidies into electronic benefit transfers that can be directed to UID-enabled bank accounts. States should also be encouraged to adopt the UID-enabled micropayments network for distribution of social welfare benefits. The government may also bear the cost of transactions so that the beneficiaries receive the full amount of the benefit.

9

Conclusion

A UID-enabled micropayments solution can help bridge the existing divide across India in financial services. Today, thanks to the increased focus on financial inclusion in public policy, financial services in most parts of the country have become convenient, accessible and well-networked, particularly for urban, non-poor residents. However, the poor today still face high costs in opening and accessing a bank account, in making transactions and in receiving payments. The result for them is lost income and opportunity — a day's trip to reach a bank, for example, is a day's wages lost and expenses on travel that they can ill-afford.

UID-enabled micropayments can fill a large gap within existing systems of financial access for the poor. The coordination and support this approach will require from our central institutions, the UIDAI and the central and state governments is significant. However, if successfully done, the result will be a well-functioning, truly accessible micropayments system. Access to finance for all — that cherished long-held objective, and a turning point for India as it makes developmental strides — is well within reach.

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