

Implementing a Biometric Payment System: The Andhra Pradesh Experience



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AP Smartcard Impact Evaluation Project
Policy Report
May 2013

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ACKNOWLEDGMENTS

We are grateful to officials of the Department of Rural Development, Government of Andhra Pradesh including Reddy Subrahmanyam, Koppula Raju, Shamsher Singh Rawat, G Vijaya Laxmi, AVV Prasad, Kuberan Selvaraj, Sanju, Kalyan Rao, and Madhavi Rani for their continuous support of the Andhra Pradesh Smartcard Study.

We are also grateful to officials of the Unique Identification Authority of India (UIDAI) including Nandan Nilekani, Ram Sevak Sharma, and R Srikar for their support and for regular communications about the wider applicability of the AP Smartcard Project to the progress of Aadhar-enabled payments.

We also thank the officials from Andhra Pradesh Grameena Vikas Bank (APGVB) Axis Bank, Corporation Bank, ICICI, and State Bank of Hyderabad (SBH) as well as those from A Little World (ALW), APOnline, HCL, and Integra who shared their insights on the partnership and implementation process with us. We gratefully acknowledge Tata Consultancy Services (TCS) and Ravi Marri, Ramanna, Shubra Dixit and others from TCS for their help in providing us with administrative data.

This report would not have been possible without the continuous efforts and inputs of the J-PAL (Jameel – Poverty Action Lab) project team including Kshitij Batra, Raghu Kishore Chowdhary, Surili Sheth and Pratibha Shrestha.

Finally, we thank the Omidyar Network (especially Jayant Sinha, Surya Mantha, Ashu Sikri, and Dhawal Kothari) for the financial support that made this study possible, and for their long-term commitment to careful research on the process and impact of biometric authentication on improving both financial inclusion and government transparency.

I. EXECUTIVE SUMMARY

State-sponsored welfare programs in India have, in many cases, been hamstrung by corruption and inefficiency (Planning Commission of India 2005, Niehaus and Sukhtankar 2012). Both the government and target poor have paid a high cost for the persistence of weak delivery systems, with the benefits received by the poor typically being much lower than the fiscal outlay on them. Technological solutions, specifically electronic benefit transfers (EBT) coupled with biometric authentication, have gained traction both as a means of improving the status quo, as well as a means of facilitating the expansion of financial inclusion (FI). In the Indian context, the state of Andhra Pradesh (AP) has pioneered the use of EBT systems, having launched the oldest biometric initiative in the country: the Andhra Pradesh Smartcard program. Given the proliferation of similar projects, including the Government of India's ambitious project to provide all Indian residents with a biometrically-authenticated unique identification number (UID/Aadhar), it would be useful for policy-makers to study various aspects of the Smartcard implementation process. As part of the Andhra Pradesh Smartcard Impact Evaluation Study, conducted by the Jameel Poverty Action Lab (J-PAL) in collaboration with the Government of Andhra Pradesh (GoAP), this report seeks to describe key facets of the Smartcard roll-out, as well as to summarize major implementation lessons from the AP experience. A full set of results based on the randomized impact evaluation of the Smartcard program will be available by late 2013.

The AP Smartcard program has been implemented through a bank-led, business correspondent (BC) approach, within the structure of a "one-district-one-bank" model (the exception being three districts where GoAP has contracted the Post Office to issue biometric payments). The payment delivery system relies upon customer service providers (CSPs) to transact last-mile payments on behalf of contracted banks, using point of service (PoS) devices for authentication. Since the Smartcard program roll out was led by the Department of Rural Development (DRD) of the GoAP, the program was linked to two large social welfare schemes run by the DRD: the Mahatma Gandhi National Rural Employment Scheme (MGNREGS) and the state-sponsored social security pension (SSP) program.

Achievements

The state of Andhra Pradesh has made impressive progress in advancing its biometric payment progress, well beyond that of any other state. In terms of coverage, GoAP has overcome sizeable operational barriers to initiate payments in approximately 76 % (NREGS) and 82% (SSP) of study district *gram panchayats* (GPs) as of March 2012¹. A key enabling factor has been the commitment of top-ranking government officials to develop, monitor, and improve the Smartcard program on an on-going basis. Indeed, the degree of high-level support in AP has proven essential in generating strong program outcomes. In addition, GoAP has shown unparalleled commitment to creating a transparent and accountable roll-out process. The government, in partnership with TCS, has established complex management information systems to track and publish (via a public website) information on enrolment of beneficiaries, conversion to Smartcard-enabled payments, and other operational metrics. Hence, AP also stands out as a true leader in terms of its innovative use and prioritization of IT tools to improve program administration.

While the program has not reached full maturation, survey data collected by J-PAL in the eight study districts of AP show that the overwhelming majority of beneficiaries perceive it positively. Over 90% of beneficiaries report that they prefer the biometric payment system to the previous system of having to

¹ GoAP website http://nrega.ap.gov.in/Nregs/Home_eng.jsp

travel to the post office to collect payments. Evidence from household surveys suggests that a carded system is associated with substantial time-savings, which may partially explain the strong preference for the Smartcard program among beneficiaries.

Challenges

Throughout the implementation process, a number of operational challenges and key implementation themes have arisen. We summarize major findings that have emerged from our observations of the roll-out and our interviews with key stake-holders:

(1) Operational Challenges

- The process of enrolling beneficiaries in the Smartcard program has been held back by various factors including inadequate coordination between service providers and government agencies, insufficient mobilization of beneficiaries and technical problems. In particular, GoAP's decision to deem GPs "converted" at the low rate of 40% enrolment has left banks with few incentives to saturate enrolment, given that they receive a commission for all payments - carded *and* manual - in "converted" areas.
- The process of CSP Selection has become heavily politicized in some areas, leading to delays in roll-out. There are also challenges, especially in tribal areas, with finding candidates who meet GoAP's demographic and education requirements for CSP selection. GoAP responded to these needs and eventually modified selection criteria, but these issues still remain in certain areas.
- GoAP and its partner providers have faced a number of operational challenges with respect to the provision of payments, including printing and distributing Smartcards in a timely way; devising secure and efficient cash management systems; closing the gap on manual overrides (*i.e.* unauthenticated payments made to carded beneficiaries); and creating a robust and systematic de-duplication strategy. In particular, the lack of system data on transaction level authentication have made it difficult to know the extent to which the potential authentication benefits of the Smartcards are being over-ridden in the field.

(2) Key Implementation Themes

- The incentive structure with respect to banks may have been misaligned in that some banks entered the project as a result of top-down pressure rather than enthusiasm for a perceived business opportunity. Moreover, not all banks may view the 2% commission as a sufficiently high reward for their investments. Finally, in GPs that have converted to the carded system, providers have faced weak incentives to saturate enrolment (since they receive the full commission on conversion of the GP) and have therefore allowed the practice of manual payments to continue.
- The roll-out has, at times, been impeded by inadequate involvement of local officials. One explanation is that they have resisted because of a perceived loss of power and/or rents stemming from the transition to biometric payments. Alternatively, officials may have few incentives to deliver high-quality implementation due to weak oversight and the difficulty of holding them responsible in a setting with distributed accountability and responsibility for the project's success at the local level across various stake holders with their own interests.
- GoAP's decision to roll-out Smartcards through multiple banks and providers has created a heterogeneous implementation landscape. The lack of uniformity has been positive in that it has

created space for experimentation and innovation; however, the absence of a standardized approach has also led to coordination challenges.

- While GoAP has made impressive progress in the development of management information systems, obtaining data from banks, particularly critical transaction-level data, has been challenging and subject to substantial delays. Delays associated with the provision of transaction-level authentication data by banks have made it difficult for GoAP to monitor the prevalence of manual override-enabled ‘carded’ payments. The persistence of non-authenticated payments, in combination with the lack of a robust de-duplication protocol, implies that not all loopholes for leakage have been closed.
- Despite initial expectations, implementation agents have largely failed to leverage Smartcards for the delivery of other financial services and products. Progress has been hindered by several factors including the lack of coordination between EBT/FI programming and various challenges with the overall BC model, including inadequate compensation of and capacity among CSPs.
- It appears that the efforts of Banks/TSP’s under the FI mandate of the Reserve Bank of India (RBI) are limited to meeting regulatory requirements as opposed to achieving deep financial inclusion. The volume of business guaranteed by the EBT has the potential to cover the fixed cost of operating cash management systems in the last mile, and can be a key enabler of financial inclusion.

Recommendations for the Integration of Aadhar with NREGS Payments

- The results of the midline and endline surveys conducted by J-PAL show that beneficiaries strongly support carded payments. Moreover, preliminary analysis suggests that even without calculating the benefits from lower leakage of benefits, simply monetizing the time saved by beneficiaries in accessing payments under the Smartcard-based system (valuing the time saved at the equivalent of NREGS wages) would pay for the costs of implementing the Smartcard-based payment system within one to two years. Hence, it would be well worth the effort to implement a linkage between Aadhar and specific programs such as NREGS payments.
- It is important for policymakers to resist the temptation to “scale up” too soon, before perfecting implementation, operation and incentive issues in reaching 100% coverage in a few districts in each state. Teething troubles are inevitable in such an ambitious roll-out, and the AP experience suggests that it may be best to master procedures in a few districts over a nine to twelve month time-frame, and building and pressure-testing systems for scale up before doing so.
- A dedicated and empowered team of officials must be built in each state and each district to drive the integration and to ensure buy-in at all levels, without which implementation becomes difficult. It is also essential to design plans to anticipate and tackle each of the following challenges, any of which can become a limiting constraint:
 - 1) Logistical issues (e.g. enrolment and cash management)
 - 2) Technological issues (e.g. authentication and communications) and
 - 3) Political issues (e.g. changing local power structures).
- There should be a viable plan for steady-state enrolment rather than just a one-time campaign mode. A majority of the enrolment problems in the current model (e.g. when to convert a GP, an inability to stop disbursing un-carded payments) were due to the lack of an enrolment process at the panchayat level. While it is fine for the first wave of enrolments to be done in ‘campaign’ mode,

it is also essential to set up procedures for continuous enrolment in a steady state. This is essential to minimize the justification for manual over rides of the authentication system.

- Banks and TSPs should be paid to make it incentive compatible for them to invest in a high-quality beneficiary experience, as approaches based on top-down pressure (which is often used by governments) are less likely to be successful. The value to beneficiaries from a seamless payment system at the panchayat-level is likely to be high enough to justify commissions that are higher than 2%, at least for the first few years when the volume of transactions is low.
- However, it is essential to structure the payments to Banks and TSP's in a way that rewards performance and penalizes delays and non-delivery of Service Level Agreements (SLAs). It is also essential that transaction-level authentication data be available in order to hold banks and TSPs accountable for executing authentication of payments made.

II. PROJECT OVERVIEW

A. Social Welfare Schemes in India

Since India gained its independence, policy-makers have targeted the persistent and widespread challenge of poverty with a number of ambitious state-sponsored schemes. Over the last decade, the ruling United Progressive Alliance (UPA) has enacted several expansive welfare programs in the service of its “inclusive growth” agenda. However, leakage throughout the state’s implementation structure has restricted the ability of Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) and other social programs to reach target populations, resulting in a substantial volume of un-delivered benefits (Niehaus & Sukhtankar, 2012). Beyond the issue of graft, payment delivery systems are afflicted by inefficiencies and delays that impose costs on the state and the poor themselves. The massive scale of transfer programs in a country like India and the millions of households that rely upon them, underscore the need for policy-makers to move beyond the status quo.

B. Electronic Payment Systems

Integrating technology into the delivery of government benefits has emerged as a potential means of addressing key challenges. Technological interventions can simplify complex procedures, engender greater transparency, and reduce the scope for rent-seeking behavior. Indian policy-makers have devoted increasing attention to the disbursement of state-issued pensions and wages through electronic benefit transfer (EBT) systems, coupled with point-of-transaction (service?) (PoS) biometric authentication (confirmation of a user’s identity through fingerprint reading or retinal scanning).

Beyond the delivery of government benefits, EBT systems sit at an important intersection of technology and financial inclusion (FI). The achievement of financial inclusion has become an increasingly important policy priority, with the Reserve Bank of India (RBI) promoting the expansion of branches in unbanked areas, as well as the exploration of branchless banking through strategies such as the business correspondent (BC) model. The latter refers to a payment model in which banks hire local agents to create banking outposts in areas where the cost of establishing brick-and-mortar structures is high. As described in a report by the Consultative Group to Assist the Poor (CGAP), “Electronic delivery itself does not advance financial inclusion, but it does create the basis to deliver financial services to recipients via branchless banking channels” (Pickens et al, 2009)

The institutions tasked with expanding FI confront a daunting last-mile delivery challenge. Technology, whether in the form of biometrics, Smartcards, or mobile platforms has an important role to play in overcoming this complex problem, but is by no means sufficient. As we explore throughout this report, numerous components beyond the deployment of technological solutions are required for robust payment systems to take hold and financial services to be rolled out.

C. Biometric Programs at the National and Sub-national Level

While the concept of biometrically-enabled EBT is relatively new, policy makers in both the Central and State governments have undertaken several initiatives in recent years. In 2009, the Central government established the hugely ambitious *Aadhar* initiative with a mandate to issue a biometric-based unique identification (UID) to all adult residents. Designers of the program envisage UID as a tool for enabling easier access to government benefits and for closing common channels of leakage. Many individual states, including Andhra Pradesh, Tamil Nadu, Uttar Pradesh, Bihar, and Maharashtra have followed suit and begun integrating biometric authentication into their own payment systems.

The state of Andhra Pradesh (AP), in particular, has distinguished itself as a pioneer in the realm of EBT and biometrics. As early as 2007, the state government launched India's first and now longest-running biometric initiative: the Andhra Pradesh Smartcard program. The Smartcard program represents a large-scale policy experiment not only in biometrics, but also in the viability of the BC payment model. As a de facto pilot for the entire nation, the Smartcard program presents researchers and stake-holders with a unique opportunity to evaluate the precursor to a larger set of policy interventions. With EBT and biometric programs proliferating throughout the country and *Aadhar* in the early stages of roll-out, insights from the AP case have tremendous potential to impact how policy-makers conceive of and design these far-reaching and resource-intensive programs.

D. AP Smartcard Program Background

Since 2007, the government of AP (GoAP) has been rolling out Smartcard-enabled payments for two major social schemes: MGNREGS and the Social Security Pension (SSP) program. MGNREGS, launched in 2006, is a landmark national employment scheme that guarantees 100 days of paid manual labor per year to all rural households. The scheme is designed to induce self-selection by the poor, given the physically-intensive nature of the work and payment of minimum wages. As per the law, any individual seeking work is entitled to an employment opportunity within 15 days of requesting it, or paid an unemployment allowance. MGNREGS workers are overseen by locally-hired field assistants and paid on the basis of either a daily wage or piece rate, the latter being the dominant model in AP.



(MGNREGS laborers at a worksite in AP)

SSP is an AP-sponsored pension program that was launched in 2006-2007. The program entitles various categories of individuals living below the poverty line – the elderly, widows, the disabled, weavers, and toddy tappers – to a monthly pension, typically 200 rupees. Prior to the introduction of Smartcards, MGNREGS workers collected wages from the nearest branch post office and pensioners from a local pension disbursement officer.

The Smartcard program exists against the back-drop of a larger set of anti-corruption initiatives spearheaded by GoAP. Perhaps the most prominent example is the government's pioneering use of social audits. During a social audit, local village auditors verify official MGNREGS records against work reported by actual beneficiaries. Any identified discrepancies or grievances are presented at a public hearing, where implicated officials are confronted and appropriate punitive action is taken. Though the

Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) calls upon all state governments to use social audits as a tool for monitoring MGNREGS, AP is one of the few states that has implemented a large-scale and systematic auditing program. In addition, GoAP also rolled out the electronic muster and measurement system (eMMS) initiative throughout the state as a means of reducing fraud at the worksite level. Specifically, the government provides field assistants with cell phones that contain customized software enabling the entry and upload of attendance and worksite measurement information. The program is not fully operationalized throughout AP.

E. AP Smartcard Program Design

GoAP has opted to roll out Smartcards via a bank-led approach in which biometric payments are routed through no-frills savings accounts. The initial decision to employ this strategy was motivated, in large part, by the government's desire to expand financial inclusion and deliver banking services to the rural poor. In the chosen implementation model, banks enter into Memorandum of Understandings (MoU) with GoAP and are allocated geographic areas in which to implement Smartcards. Banks cover the costs of establishing the infrastructure, while GoAP guarantees payment volumes and provides a 2% commission on all disbursed amounts. The model is premised on the idea that once a structure has been put in place, banks will have the opportunity to deliver a range of financial products (e.g. savings, credit, remittances) to a large, rural customer base.

The program centers upon issuing all MGNREGS/SSP beneficiaries Smartcards, or physical identity cards with encoded fingerprint information (except in a few districts following a 'cardless' model – see Section VI, Sub-section C for more details). Banks must open savings accounts for all beneficiaries and regularly remit funds from the state by electronically crediting these accounts. For a program that targets a largely rural population, the challenge lies in designing the appropriate payment delivery structure. While the Post Office has achieved substantial penetration in rural areas through its network of branch post offices, the presence of bank branches is far more limited.² Indeed, the low transaction volumes, high costs, and logistical hurdles associated with establishing branches in rural areas typically present substantial barriers to entry for banks. In short, delivering actual payments in the hands of beneficiaries represents a major programmatic obstacle.

GoAP addresses this last mile problem by using a BC model. Simply put, a BC is an umbrella term referring to either an individual or organization that acts on behalf of a bank. Through a system of branchless banking stations, BCs extend financial services at a local level, including the management of small value deposits, collection of interest on loans, sale of micro-insurance products, and in the case of the Smartcard program, provision of EBT services. The model, propounded by the RBI in 2006 as a means of achieving greater FI, allows banks to appoint non-governmental organizations, micro-finance institutions, and as of a 2010 decision, for-profit companies³

With respect to the Smartcard program, banks use BCs to execute the bulk of their front-end operations. This includes managing local agents known as customer service providers (CSPs) who disburse wages

² RBI estimates that among the 600,000 villages in India, there are only 33,495 bank branches (presentation by Dr. K. C. Chakrabarty, Deputy Governor, RBI; September 6, 2011)

³ "RBI allows corporates to act as BCs, bars NBFCs," *Times of India*, September 29, 2010

http://articles.timesofindia.indiatimes.com/2010-09-29/india-business/28260579_1_bcs-business-correspondents-banking-services⁴ As one example, in 2007, FINO formed and incorporated FINO Fintech Foundation, a Section 25 company capable of operating as a BC.

and pensions in the *gram panchayats* (GPs) in which they reside. Indeed, the notion that beneficiaries need not travel long distances to receive payments is central to the Smartcard model. In order to execute a transaction, a CSP swipes a user's Smartcard in a PoS device that contains downloaded payment data. The CSP scans the user's fingerprint on the PoS reader in order to confirm a match and then disburses the cash payment with a receipt. The availability of relatively low-cost and user-friendly authentication technology has been essential in making the BC model more viable for banks.

F. Major Actors in Smartcard Roll-out

The roll-out of Smartcards on a large scale has been accomplished through a complex set of partnerships between GoAP, banks, technology service providers (TSPs), and BCs:

- GoAP contracts banks to implement the Smartcard program in specific areas. Later in the report, we describe the different strategies that GoAP has employed to allocate banks to particular geographic areas.
- Banks contract TSPs to handle all technical components of the implementation, including the development of software for the PoS machines, back-end management of data systems, and provision of technical support in the field.
- Contracted TSPs hire either NGOs or companies to act as BCs (though TSPs typically also play a role in executing certain components of the front-end operation). Some TSPs have established separate organizations to serve as BCs, primarily to circumvent earlier legal restrictions on the types of entities that can conduct BC activities.⁴

Notably, in three districts (Nalgonda, Nizamabad, and Chittoor), GoAP has contracted the Post Office to manage the roll-out of biometric payments. In these districts, branch post masters issue biometrically authenticated payments at the GP level.⁵ The post office has hired the service provider, APOne, to assist with the implementation process.

G. Perceived Advantages and Disadvantages of Smartcards

(1) Advantages

Proponents of the biometric EBT model expect the program to have a positive impact in four major areas: 1) increased efficiency, 2) reduced leakage, 3) greater transparency, and 4) financial inclusion expansion.

- The delivery of payments through local, village-based CSPs can enable more timely and convenient payments, thus reducing the time costs (and associated wage losses) incurred by beneficiaries.
- Biometric technology can reduce leakage such that a greater fraction of benefits reaches the intended beneficiaries. Research suggests that the most common source of graft in MGNREGS is over-reporting of work (Niehaus & Sukhtankar, 2009).⁶ In the manual payment system, field

⁴ As one example, in 2007, FINO formed and incorporated FINO Fintech Foundation, a Section 25 company capable of operating as a BC.

⁵ In Nalgonda and Nizamabad, CSPs have also been appointed to operate in GPs that lack a branch post office facility.

⁶

assistants can over-report work on attendance rolls and then collude with post masters to claim extra wages (without the knowledge of the beneficiary). Biometric authentication, however, requires the presence of the individual who is receiving the payment and also allows for the generation of a transaction-level receipt. These features can lead to a reduction in over-reporting and in “ghost” payments (*i.e.* payments collected on behalf of people who did not exist).

- An electronic system can improve program administration by creating greater transparency. Specifically, policy-makers can more easily track payment information and thus develop a superior capacity for identifying cases of fraud and delay.
- Smartcards can serve as a platform for advancing financial inclusion. In rural areas where access to the formal banking system is limited, the combination of a local CSP to mediate transactions and simple authentication technology has the potential to be transformative. (2) Disadvantages

Critics of the Smartcard program point to three main areas of concern: 1) the feasibility of implementing the system properly, 2) potential negative effects of Smartcards, and 3) the extent to which the program’s benefits justify its costs.

- A number of people have expressed concern about the feasibility of carrying out a robust de-duplication exercise. The UID Authority of India itself notes in a report that, “fingerprint quality, the most important variable for determining de-duplication accuracy, has not been studied in depth in the Indian context.” (Ramkumar, 2011)⁷ Aside from de-duplication, the leakage-reducing benefits of a biometric system are not fully realized until manual payments are entirely phased out. The persistence of non-authenticated payments creates loopholes that enable corrupt practices to continue. From this perspective, a partial implementation of the program may yield limited benefits.
- On the second point, the phase-in of a carded payment system runs the risk of denying a fraction of legitimate beneficiaries access to their benefits. These errors may result from incomplete enrolment or technical problems with the biometric reader. In addition, though Smartcards may serve as an effective tool for reducing particular kinds of leakage, there may be a displacement effect such that other kinds of theft increase (*e.g.* the reduced scope for pilfering from the labor budget may result in greater theft from the materials budget)
- Finally, even if the program is effectively rolled out and a biometric payment system takes root, the question remains as to whether the benefits associated with Smartcards justify the costs – financial and otherwise - of implementing them.

H. The J-PAL Andhra Pradesh Smartcard Impact Evaluation Study

Though policy-makers in India and elsewhere have developed a growing interest in the adoption of biometric technology, no rigorous evaluation has been conducted of such a program. At present, more than 12 million households avail MGNREGS and more than 7 million individuals receive pensions in the state of Andhra Pradesh. The Smartcard program, thus, presents a unique opportunity to evaluate the effects of a large-scale biometric initiative, as well as to understand the complex process of operationalizing it across the state. The latter brings to bear a number of policy-relevant issues including, but not limited to, the dynamics and incentives of public-private partnership models, the role of data management in shaping program administration, and the operational constraints of scaling up

technology interventions. Below we outline activities undertaken by Jameel-Poverty Action Lab (J-PAL) to evaluate the impact of Smartcards, as well as to explore the larger process-related questions that surround the program's roll-out.

(1) Impact Evaluation

The Andhra Pradesh Smartcard Impact Evaluation Study seeks to measure the impact of AP's Smartcard program using a randomized evaluation design, which is widely considered to be the "gold standard" of impact evaluation. The study is being carried out in close collaboration with the government through a formal MoU between GoAP and J-PAL South Asia. Indeed, GoAP's high degree of involvement represents both an essential and unique feature of the project and reflects substantial levels of buy-in from top policy-makers. The study aims to assess the effect of Smartcards on a number of key outcomes, including reduced corruption and leakage, decreased time and transaction costs incurred by beneficiaries accessing payments, and improved welfare indicators for beneficiaries.

Traditionally, non-experimental designs have been used to conduct impact evaluations. Two of the most widely used non-experimental designs for evaluating the effect of a change in policy are 1) comparing before and after outcomes in the same area (Pre-Post methodology), and 2) comparing carded and un-carded areas (Simple difference methodology). With a Pre-Post test, we are required to assume that the Smartcard program is the only factor influencing any changes in the measured outcome over time; this is certainly not the case, as there are many unobservable factors that may cause changes in our variables of interest over time. With the simple difference methodology, we are required to assume that un-carded areas are identical to carded areas, with the exception of the fact that carded areas are carded, and the un-carded areas were equally likely to get Smartcards before the implementation occurred. This is a problematic assumption, as various political and economic factors influence the areas in which GoAP chooses to implement Smartcards first.

The AP Smartcards study undertaken by J-PAL employs a randomized design, which is the gold standard in impact evaluation and a huge improvement over the non-experimental designs described above. In the AP Smartcards study, areas are randomly assigned to either a treatment (Smartcards) or control (no Smartcards) group. The two groups differ only in their exposure to the treatment, allowing a causal relationship to be established between the treatment (Smartcards program) and variables of interest (*e.g.* leakage). The Randomized Control Trial (RCT) was conducted in eight districts across AP, none of which had received Smartcards at the time the study began. The research team randomly assigned a subset of *mandals* (sub-districts) within these districts to treatment and control categories (see Figure 1). Subsequently, the Smartcard roll-out was initiated in treatment *mandals*. Control *mandals* were to receive the intervention only after the treatment group was fully saturated, thus providing a valid comparison group.

To date, J-PAL has conducted three large-scale household surveys in the eight study districts: 1) a baseline study conducted in August – September 2010, prior to the initiation of any Smartcard payments and 2) a midline study conducted in September-October 2011, at a time when Smartcards had been partially rolled out in treatment *mandals* and 3) an endline study conducted in August – September 2012 conducted after the treatment *mandals* were close to being fully carded, but before any control *mandals* received Smartcards.

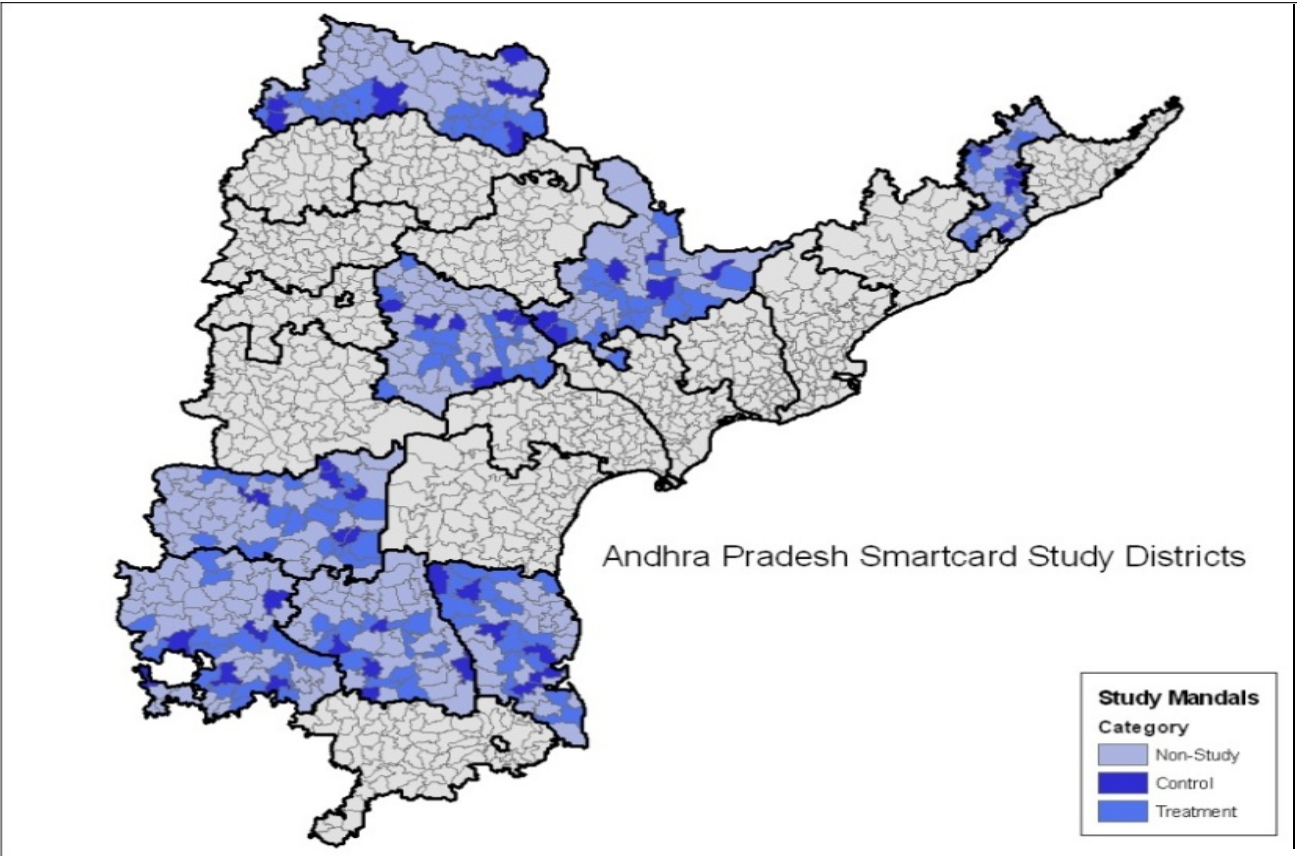


Figure 1: Allocation of treatment and control mandals in J-PAL study districts

(2) Process Study

In addition to implementing the formal randomized evaluation described above, the research team has engaged in a number of activities to understand process-related components of the Smartcard roll-out. These activities include:

- Conducting small-scale surveys (both at the household level and with various officials) in non-study districts that have established Smartcard programs
- Conducting in-depth interviews with key officials from banks, TSPs, BCs, and GoAP to understand the historical evolution of the Smartcard project, the implementation strategy, and the key challenges that have arisen during the roll-out process
- Monitoring the progress of the Smartcard roll-out on a regular basis through communication with district-level coordinators and GoAP’s web-based reports

Overall, the AP Smartcard study aims not only to evaluate the degree of impact that Smartcards are having, but also to understand the complexities of a large-scale, public sector implementation process. Insights generated through this research can critically inform the academic literature on corruption and public service delivery, as well as the real-world execution of *Aadhar* and other similar programs. Table 1 below contains the banks, service providers, and BCs operating within the eight J-PAL study districts.

Table 1: Banks, TSPs, and BCs Operating in Study Districts

Study District	Bank	Technology Service Provider	Business Correspondent
Anantapur	Axis Bank	FINO	FINO Fintech Foundation
Kurnool	Axis Bank	FINO	FINO Fintech Foundation
Kadapa	ICICI	FINO	FINO Fintech Foundation
Nellore	SBH	TCS	SEED
Adilabad	SBH	HCL	Interact
Khammam	APGVB	ALW	Zero Mass Foundation
Vizianagaram	Corporation Bank	Integra	i25
Nalgonda	Post Office	APOnline	-----

III. DESCRIPTION OF OPERATIONAL MODEL

The Smartcard payment model requires a series of steps to be carried out by banks, TSPs, BCs, and government. Because different banks and service providers operate across the state, the implementation process has not been fully uniform. We highlight important aspects of this variation later in the report; in this section, we outline the general implementation model as it is designed to function.

A. Enrolment in the Smartcard System

The technical and logistical aspects of Smartcard enrolment is managed by the TSP/BC. Beneficiaries are targeted through a campaign mode approach, which involves focused, GP-level enrolment camps. As a first step, GoAP provides a list of all program beneficiaries – SSP and MGNREGS - to the responsible bank. Local officials (primarily district-level Project Directors⁸) help to formulate *mandal* and GP-wise enrolment schedules, while village-level authorities conduct *tomkas*⁹ to inform beneficiaries of up-coming camps.

A cadre of operators are hired and deployed, sometimes up to 100 at a time, either by the BC/TSP itself or by a contracted vendor. Typically, a team of two operators spends 3-4 days covering a particular GP (100-150 enrolments per day).

Operators generally travel with a specialized kit that contains a netbook with an attached finger-print reader and camera.^{10 11} Operators capture a photograph of each beneficiary as well as personal details¹² and 8-10 finger-prints. Once a particular GP has crossed the threshold of 40% enrolment, GoAP can approve its conversion to the carded system. After this point, payments are exclusively disbursed through the CSP-mediated model.



(Netbook for Smartcard enrolment)

B. Authorization and Opening of Bank Accounts

Enrolment details are uploaded to the TSP's central server, where the data are cleaned and subsequently transferred to the partnering bank. At that stage, bank officials authorize opening of a zero-balance, no-frills savings account. In some cases, a bank branch officer must approve a hard copy of the application form before authorization occurs. Depending on the bank, the processes of uploading enrolment data and authorizing account opening can take between one and two weeks to complete. The bank must also ensure that data on each beneficiary are run through a "de-duplication" process to verify that the individual is not already in the system.

⁸At the district level, the Project Director, District Water Management Agency oversees MGNREGS implementation. The Project Director, Department of Rural Development is similarly responsible for overseeing SSP implementation.

⁹ Practice in which officials travel through village, beating drums and making announcements

¹⁰ The established norm is for the TSP to procure one kit per 1000 beneficiaries

¹¹ In Section VI, we discuss ALW's enrollment system, which relies on a near-field communication phone and fingerprint reader

¹² Banks are required by RBI to fill out "know your customer" or KYC forms.

C. Printing of Smartcards and Supplying of PoS Machines

Once enrolment data are cleaned, individual Smartcards are “personalized” either by the TSP or an outside vendor. Cards are then printed and distributed locally. For the purpose of making payments, each GP is supplied with a Smartcard reader, also referred to as a PoS device. The device has several key features: a slot for swiping a Smartcard, a fingerprint reader, a display screen, and a printer for generating receipts. A beneficiary must be physically present to activate his/her Smartcard via biometric authentication. After Smartcards are issued, banks upload a personalization or ‘perso’ file containing account information to a GoAP server.¹³

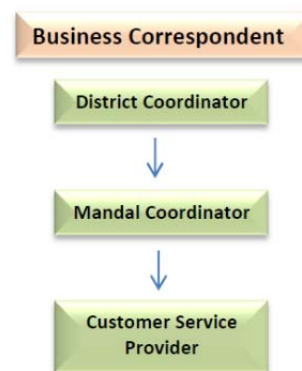


(PoS device in Nizamabad)

D. Selection and Training of CSPs

The Smartcard program relies on a local agent, or CSP, to make last-mile payments. In 2010 GoAP issued the following set of selection criteria:¹⁴(GoAP & RDD, 2010)

- CSP should be a permanent resident of the village
- CSP should be a member of a self-help group
- Preference should be given to CSP candidates from scheduled castes/ scheduled tribes
- CSP should be equipped with a 10th class education
- CSP should not be related to the *sarpanch*, branch post master, field assistant, or village organization executive committee member



Project Directors (predominantly the PD, DRD) construct lists of candidates, with input from Village Organizations, and submit these lists to the responsible BC/TSP. Generally, candidates undergo testing and interviews, after which the BC/TSP makes a hiring decision, with final approval from the bank. The newly appointed CSP undergoes training for a few days¹⁵ and is instructed on how to operate the Smartcard reader, download and update data, manage cash for disbursement, and maintain records. At the field level CSPs are supervised by *mandal* coordinators (MCs), who in turn report to district coordinators (DCs).

In terms of CSP compensation, there is some variation across banks/BCs:

- A number of BCs pay a 1% commission on all payments disbursed.¹⁶
- FINO pays a 0.25% commission as well as a fixed monthly salary of Rs.300.

¹³ Earlier in the project, these data were uploaded at the *mandal* level; however, in 2010, GoAP established a system by which banks could directly transfer “perso” data via a web log-in.

¹⁴ Memo No:398/RD-SHG/EBT/2010, Government of Andhra Pradesh Panchayat Raj and Rural Development Department, December 27, 2010¹⁵ In interviews conducted with CSPs, reports of training duration ranged from 2-3 days to 1 week

¹⁵ In interviews conducted with CSPs, reports of training duration ranged from 2-3 days to 1 week

¹⁶ In 2010, GoAP decided to subsidize the purchase of PoS machines in cases where an SHG member was selected as the CSP; all banks that receive this subsidy are required to pay the CSP a commission of 1% on disbursed payments.

- The BC i25 pays a fixed salary of Rs.1,000 per month, as well as a travel allowance (no commission).

E. Execution of Payment Cycle

Once the programmatic components described above are in place, biometrically authenticated payments can commence. Below we outline the key steps involved in the MGNREGS payment cycle. As will be discussed in Section VI, various factors can hinder the proper implementation of these steps; below we present the system as it is designed to function:

Step 1: On a weekly basis, muster rolls are submitted to the *mandal* computing center, either in hard-copy form or electronically via the eMMS program. A computer operator enters the information into a management information system (MIS), which in turn generates an e-pay order that contains information on the wage amount due to each beneficiary. The operator then uploads the e-pay order to the main MGNREGS server in Hyderabad.

Step 2: The *mandal* development office also generates an acquittance form, or hard-copy document that displays the amount due to each beneficiary. Acquittance forms are delivered to the CSP, generally by the MC, prior to the initiation of payments.¹⁷

Step 3: Once the e-pay order is uploaded from the *mandal* office, TCS pushes the data to the concerned bank server. During the initial stages of the project, *mandal parishad* development officers (MPDOs) and Project Directors were responsible for sending e-pay order information to banks via CD. However, GoAP's push for server integration has resulted in a centralized system in which e-pay order information is uploaded from the *mandal* level and transferred to banks on a regular basis.¹⁸

Step 4: The government transfers corresponding funds to the bank through a nodal bank account. GoAP also credits the first 1% of commission to the bank along with the e-pay order. Earlier in the program, funds were transferred to banks through an account held by the MPDO. However, the establishment of a Central Fund Management System and nodal bank network has enabled direct online fund transfers.

Step 5: The e-pay order and accompanying funds are transferred online from the bank to the partnering TSP/BC. Back-end management of beneficiary accounts is usually handled by the TSP. The TSP reconciles the e-pay order with the received funds and subsequently credits individual accounts on-line. .

Step 6: Depending on the service provider, either the MC or the CSP withdraws money from a bank and conveys it to the GP.

Step 7: In order to make payments, the CSP must access the electronic payment file by syncing her PoS machine with the main server. Most commonly, the CSP syncs the PoS machine using general packet radio services (GPRS) technology, though in some cases a phone line is used to download data (typically, when connectivity in the area is low).

Step 8: SSP payments are made on a regular schedule, typically the first five days of the month. The frequency with which MGNREGS payments occurs is largely a function of seasonality and the volume of work happening. At the time of payment, the CSP swipes the beneficiary's Smartcard, scans his/her

¹⁷ At various points the government has considered eliminating manual acquittances due to delays associated with their printing and delivery; however, to date, they remain a component of the programmatic model.

¹⁸ Delays in processing caused TCS to switch to a policy of pushing e-pay order information to banks servers on a daily basis.

fingerprint for verification, disburses the payment amount that appears on the screen, and prints two copies of a receipt, one for the beneficiary and one for record-keeping. The beneficiary must also sign the acquittance form after the transaction is completed. Every 1-3 days the CSP syncs her PoS so as to upload accumulated transaction data to the TSP server.

Step 9: The TSP passes on the disbursement file to the bank, which in turn sends it to GoAP.¹⁹ Upon receiving the disbursement file, the bank is credited with an additional 1% commission based on payments made.

Step 10: Once the payment cycle is complete, the MC, with assistance from the CSP, engages in a reconciliation process. The MC reviews acquittance forms to ensure that the correct amount of money has been disbursed and that all cash is accounted for. He or she then returns undisbursed funds to the BC/TSP via bank deposit, after which the funds are transferred to the concerned bank and returned to GoAP. Undisbursed SSP funds are returned after approximately one week and NREGS funds after 30 days.

¹⁹ Tata Consultancy Services has been hired to manage all back-end services for GoAP.

IV. KEY IMPLEMENTATION STEPS

The Smartcard program has undergone significant development since its starting point five years ago. In this section, we outline major decisions and processes that have shaped the evolution of the project, starting with the initiation of a pilot program.

A. Motivation for Smartcard Program

The initial concept of Smartcards gained traction, in large part because the policy environment strongly favored expansion of financial inclusion. RBI had attempted to advance this goal for several decades, with the introduction of a series of measures such as the lead bank scheme²⁰, service area approach²¹, regional rural bank formation, and business correspondent/business facilitator model. In 2006, AP's then-Principal Secretary for Rural Development saw the routing of government benefits through bank accounts as a way to strengthen the interface between the formal banking sector and the largely un-banked rural population. More broadly, the then-Commissioner for Rural Development (CRD) viewed transitioning to an electronic payment system as an essential step towards achieving "total financial inclusion" and thus perceived the Smartcard program to be an important launching point. Critically, the emergence of the BC model, along with the availability of authentication technology, provided the necessary ingredients for overcoming the last-mile problem. This scenario is clearly described in the Smartcard project MoU between Union Bank of India and GoAP:

"...recent policy decision of RBI about intermediaries (Business Facilitator and Business Correspondent model) coupled with availability of smartcards, mobile technologies, connectivity, along with focus on FI and concept of setting up a common infrastructure to reduce transaction costs, provide the right environment and good economic viability of taking banking to the populations which have remained under-banked or un-banked so far."²²

Officials also viewed Smartcards as a vehicle for developing, in the words of the then-Commissioner, a "credible payment system."²³ Frustrated with the inefficiencies and corruption reported in the post office model, policy-makers perceived Smartcards as a means of controlling leakage and delivering payments in a more timely and convenient fashion.(GoAP & RDD, 2006)²⁴

²⁰ This scheme, introduced in 1969, involved the assignment of banks to particular districts, such that these banks could serve as the, "...key instruments of local development by ... locating growth centres, assessing deposit potential, identifying credit gaps and evolving a co-ordinated approach to credit deployment in each district, in concert with other banks and credit agencies." (Draft Report of the High Level Committee to Review Lead Bank Scheme, RBI)

²¹ In 1989, RBI introduced the service area approach by assigning the provision of financial services in villages to particular banks. Banks were not able to provide services outside of their designated service areas, nor were borrowers allowed to seek services from other banks. The rigidity of the system was eventually called into question, and in 2004, RBI decided that the restrictions would no longer apply, except with respect to government-sponsored schemes.

²² Memorandum of Understanding between Rural Development Department, Government of Andhra Pradesh and Union Bank of India (2009)

²³ From interview with former Commission Santi Kumari, September 29, 2011

²⁴ G.O. MS. No 556, Government of Andhra Pradesh Abstract, Panchayat Raj and Rural Development (RD II) Department (2006)²⁵ The total cost of a device was estimated to be 20,000 rupees.

B. Implementation of Pilot Program

GoAP initiated discussions about a pilot program in August 2006, after which an operational plan was formed. The formal MoU was drawn up between the banks, the Department of Rural Development, and the Institute for Development and Research in Banking Technology (IDRBT). GoAP began disbursing biometrically-authenticated payments in May 2007. The pilot was conducted in six *mandals* of Warangal district and involved the participation of six banks - Union Bank of India, Axis Bank, Andhra Bank, Andhra Pradesh Grameen Vikas Bank (APGVB), State Bank of India, and State Bank of Hyderabad - in a “one-*mandal*-one-bank” model. GoAP subsidized the operation by funding half of the cost of each PoS device²⁵ and by providing 60 rupees towards the provision of each Smartcard. The state additionally agreed to pay the banks a monthly commission of 2% on the total amount of funds disbursed.

The banks were required to open accounts for all MGNREGS/SSP beneficiaries, hire BCs, and establish all necessary MIS and cash management protocols. In Warangal, the banks contracted the TSP A Little World (ALW) to assist with management of these tasks. The pilot proposal called for an active role of local government officials and government officials, who were expected to assist with enrolment, facilitate identification of CSPs, and monitor payments on an on-going basis.²⁶ Officials perceived the pilot to produce promising results, in terms of reductions in fraudulent payments, thus prompting GoAP to expand the program to two *mandals* in Karimnagar district. The government directly contracted FINO to manage the implementation in Karimnagar (*i.e.* with no involvement of banks).

C. Findings from Pilot Program

GoAP commissioned the National Institute for Smart Government (NISG) to evaluate the pilot program in Warangal and Karimnagar. NISG’s report focused on the activities of ALW and FINO and included the following key findings:²⁷

- The use of biometrics shortened the pension disbursement period by one week
- The technology models applied by the two service providers were scalable
- The enrolment process was time-consuming, expensive, and not adequately secure
- A formal protocol was lacking for dealing with manual overrides
- The providers’ management information systems (MIS) were not adequate
- ALW’s organizational and technical support capacity was not sufficiently robust
- The provision of EBT alone did not represent a viable business opportunity for providers

Overall, NISG recommended that GoAP and its implementing partners take the following steps:

- Follow a “multi-vendor, multi-zonal, phased approach” for scale-up
- Improve the enrolment process
- Regularly generate the following MIS reports: 1) List of pending enrolments, 2) List of rejected or incomplete enrolments, 3) Date-wise CSP transaction details
- Develop policies for handling contingencies like manual overrides
- Layer other financial services onto the EBT platform

²⁵ The total cost of a device was estimated to be 20,000 rupees.

²⁶ G.O. MS. No 556, Government of Andhra Pradesh Abstract, Panchayat Raj and Rural Development (RD II) Department (2006)

²⁷ “Detailed Project Report on Evaluation of Smartcard Pilot Project for Pensions and APREGS Disbursements in AP”, National Institute of Smart Government (available at: http://www.nisg.org/knowledgecenter_docs/B02020008.pdf).

Notably, many of the critiques raised by NISG foreshadowed operational challenges that would persist throughout the roll-out.

D. Scale-up and “Service Area” Model:

After GoAP’s experience with the 8-*mandal* pilot, policy-makers looked towards expansion of the program in six districts. Some government officials believed that departing from a bank-led model could accelerate the pace of the roll-out and wanted to explore scale-up options involving public private partnerships (PPPs).²⁸ GoAP floated a request for proposals in early 2008 and received responses from more than 50 firms. Opposition from the State Level Bankers’ Committee (SLBC) and RBI, however, prevented GoAP from pursuing this approach. RBI cited in a report that a PPP model:

“...involves reputational, operational, counterparty, solvency, liquidity and legal risks. Moreover, this model is untested and until issues relating to various risks are resolved and such partnership is authorized we may not be able to work towards adopting PPP model.”²⁹

GoAP proposed adopting a “one-*mandal*-one-bank” implementation strategy as an alternative. However, the SLBC exerted substantial pressure to expand the Smartcard program through the “service area” model. As mentioned above, a “service area” model translates to a piecemeal implementation strategy, in which districts and *mandals* are split among different implementing banks, based on a pre-existing allocation. Both RBI and SLBC favored this approach, which was consistent with RBI’s existing financial inclusion strategy. In January 2008, the central government’s new mandate that all MGNREGS payments be made through bank accounts further eased the path for adopting a “service area” model. (Johnson, 2008)

In 2008, the first major scale-up phase of the program occurred in 6 districts - Warangal, Medak, Mehaboobnagar, Karimnagar, Chittoor, and East Godavari - with 27 different banks tasked with rolling out Smartcards in their respective “service areas.” Participating banks contracted either FINO or ALW as their service providers. GoAP continued to pay a 2% commission to banks, with the latter typically passing on 1.75% of the commission to contracted TSPs.

E. Challenges with “Service Area” Model

Though 27 banks bore implementation responsibility across the six districts, only a small fraction of banks actually contracted TSPs and initiated the roll-out process. A GoAP update written at the time reflects a significant level of frustration with the state of progress: “There is no news yet from remaining banks...As a result, in each district there are several isolated pockets where project is being implemented. Progress is slow and sizeable area is not saturated.” (GoAP, 2010) In the areas where banks did take up the project, a number of operational issues arose:

- The process of selecting BCs in different areas proved to be onerous for the banks. An RBI report on the topic describes this bottleneck: “Each bank having to undergo an elaborate process of selection of business correspondent for a specific district/ area is extremely time-consuming”³⁰

²⁸ In a PPP model (an example of which was the pilot in Karimnagar conducted by FINO), GoAP would not route payments through banks and would simply contract a private vendor to manage implementation.

²⁹ Report for the Sub-Committee (Business Issues) of the Committee for suggesting a framework of Electronic Benefit Transfer (EBT), RBI (available at: <http://www.rd.ap.gov.in/SmartCard/Final%20Report%20of%20EBT%20Sub%20Committee-RBI.pdf>).

- Local officials such as MPDOs often had to interface with multiple banks and payment systems, all of which were operating simultaneously in the same *mandal*. An RBI report describes, “...serious problems in coordinating and organizing enrolment, issue of cards, payments, MIS...”³¹
- Because BCs/TSPs operated in small clusters of villages spread out across *mandals* and districts, their ability to achieve economies of scale was impaired.

F. Transition to “One-District-One-Bank” Model

In 2008, top-ranking GoAP government officials approached RBI with a set of grievances about the failing “service area” model. In response, RBI established the Barman Committee, headed by an RBI Executive Director, Dr. R.B. Barman, to conduct a review. While the committee did not abandon its support for a bank-led model in favour of a PPP approach, its recommendations considerably altered the course of the roll-out. Most significantly, RBI authorized the “one-district-one-bank” model, which stipulated that for future implementation of the Smartcard program, GoAP could hire one bank to manage all EBT functions for a given district. Frustrated by the lack of interest among banks, GoAP officials also lobbied RBI to elicit greater participation among the banks by providing an incentive. For the period of July 2008 to June 2009, RBI agreed to give the banks a 50 rupee subsidy for the opening of every Smartcard account.

The transition to a “one-district-one-bank” model ushered in the second phase of the roll-out. In August 2008, expansion began in nine districts: Visakhapatnam, Kadapa, Vizianagaram, Prakasam, Krishna, West Godavari, Rangareddy, Nellore, and Srikakulam. By the summer of 2010, biometric payments had been initiated in at least a fraction of *mandals* in all but eight districts throughout AP.

With respect to the assignment of districts under the “one-district-one-bank” model, GoAP gave the pre-determined “lead bank”³² first right of refusal in every district. A number of banks were slow to respond to GoAP’s RFP, which resulted in the re-allocation of districts to banks that demonstrated a larger measure of interest. For example, though Syndicate Bank was the designated “lead bank” in Anantapur and Kurnool, the bank had not submitted a proposal after nearly one year. GoAP eventually responded by re-allocating both districts to Axis Bank. In other cases, problems between banks and service providers necessitated re-assignment of districts. In Nalgonda, the “lead bank” SBI enrolled nearly 500,000 beneficiaries before GoAP transferred responsibility to the Post Office due to internal conflicts between SBI and APOne (the contracted TSP). In Section VII, we further explore how reluctance on the part of banks to take up the project reflects a more fundamental weakness in the program’s incentive structure.

³⁰ Report of the Committee on Suggesting a Framework for Electronic Benefit Transfer, RBI (2008) (available at: <http://rbidocs.rbi.org.in/rdocs/Content/PDFs/84147.pdf>)

³¹ Report for the Sub-Committee (Business Issues) of the Committee for suggesting a framework of Electronic Benefit Transfer (EBT), RBI (available at: <http://www.rd.ap.gov.in/SmartCard/Final%20Report%20of%20EBT%20Sub%20Committee-RBI.pdf>)

³² The RBI Nariman Committee, under the chairmanship of Shri F. K. F. Nariman, endorsed the idea of a “Lead Bank Approach” in its report in November 1969; this approach was adopted in December 1969. This scheme “emphasized making specific banks [‘Lead Banks’] in each district the key instruments of local development by entrusting them with the responsibility of locating growth centers, assessing deposit potential, identifying credit gaps and evolving a co-ordinated approach to credit deployment in each district, in concert with other banks and credit agencies.” (Report of the High Level Committee to Review the Lead Bank Scheme, RBI, 2009)

V. PROGRESS WITH ROLL-OUT

The Barman Committee’s report stipulated that the “one-district-one-bank” implementation phase should be completed in all remaining districts of Andhra Pradesh by December 2008.³³ In reality, the rate of progress was far slower than what was forecasted. In the past year alone, the Principal Secretary and CRD set multiple deadlines for converting all GPs to the Smartcard system. While incremental progress was made, banks and TSPs had difficulty meeting these deadlines. Figure 2 indicates the percentage of biometric payment coverage for NREGS in a sample of non-study districts, as of December 2011.^{34 35} Figure 3 illustrates the progression in percentage of biometric payment coverage for NREGS in the study districts from June 2011 to March 2012.

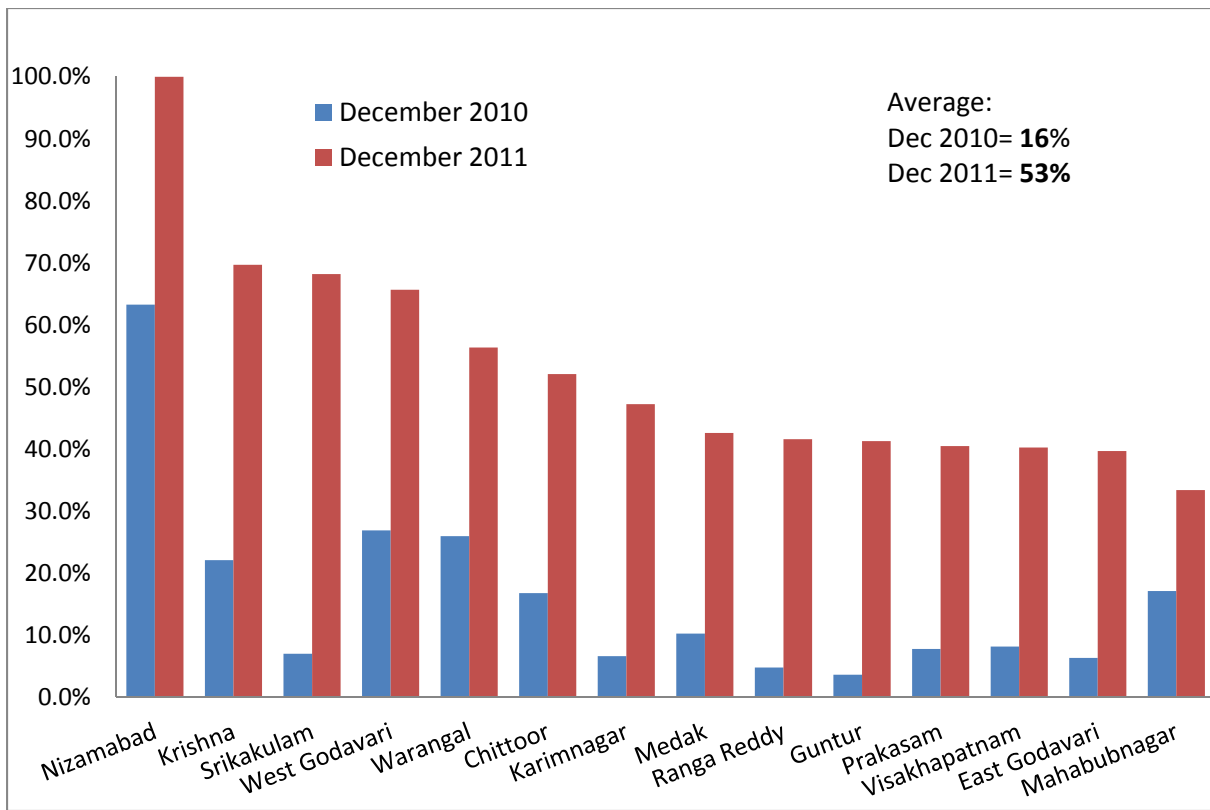


Figure 2: NREGS Roll-out Progress in Non-Study Districts

³³ Report of the Committee on Suggesting a Framework for Electronic Benefit Transfer, RBI (2008) (available at: <http://rbidocs.rbi.org.in/rdocs/Content/PDFs/84147.pdf>)

³⁴ The 8 districts used in the baseline study are referred to as “study districts”. We refer to the other 14 districts in AP as non-study districts.

³⁵ Due to the lack of transaction-level data, the best available proxy for carded payments is the number of payments made to “carded” (enrolled) beneficiaries. Since this figure does not include manual overrides, it represents the upper limit for the percentage of payments that are carded within a converted GP. The cumulative roll-out progress is calculated as this percentage multiplied by the fraction of GPs that are carded within a particular district.

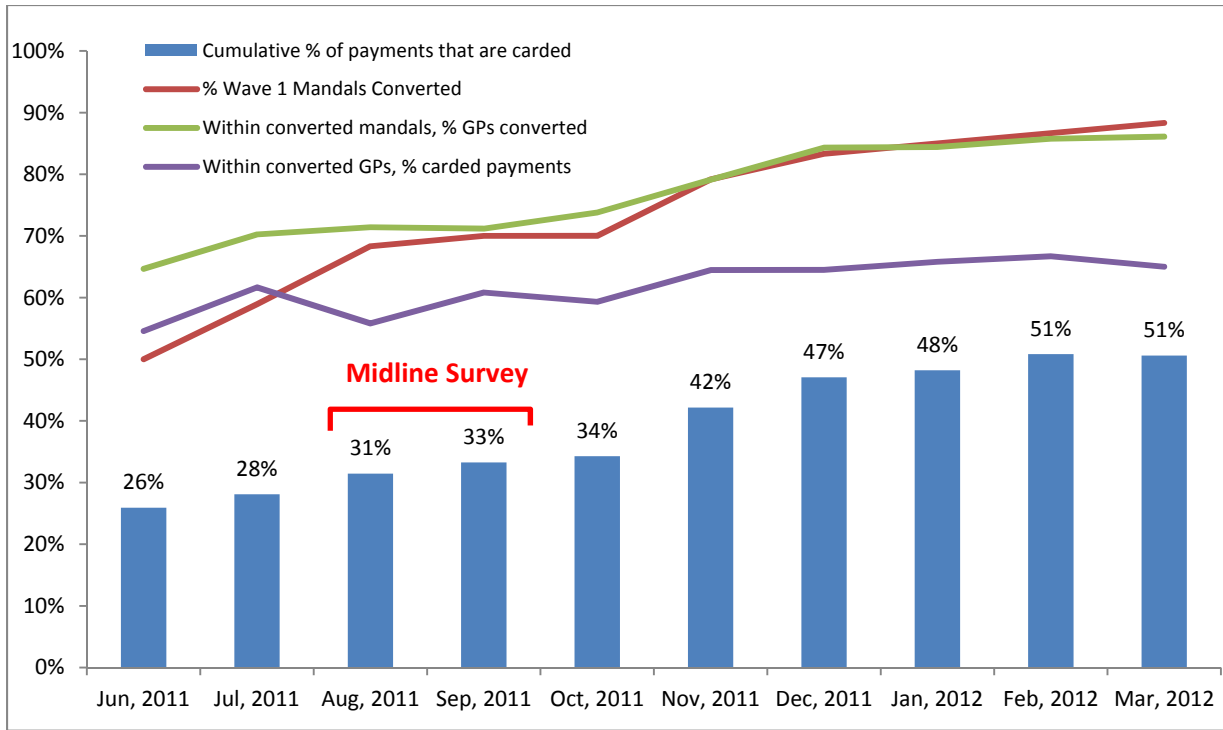


Figure 3: NREGS Roll-out Progress in Study Districts

VI. ON-GOING OPERATIONAL CHALLENGES

As the data presented in Section V suggest, GoAP has made progress in scaling up the Smartcard intervention, but at a substantially slower pace than was anticipated. The obvious question that arises is what factors have hindered migration towards a 100% carded system. Unfortunately, this question fails to produce easy answers given the complexity of the implementation process and the many actors and dynamic components embedded within it. One useful approach is to examine key segments of the implementation chain and distill the major barriers to progress that have arisen. In this section, we draw upon interviews with senior officials and our own observations in the field to outline a core set of operational challenges that have influenced the roll-out trajectory.

A. Enrolment

Beneficiary enrolment represents the first and one of the most resource-intensive steps in the implementation chain. The task of reaching millions of individuals across the state has, not surprisingly, thrown up a number of operational challenges. Ultimately, set-backs in the process have had two main effects: 1) Banks have been delayed in achieving the requisite enrolment threshold to convert GPs (see Section III, Sub-Section A) and 2) After GPs have been converted, the challenge of how to manage un-enrolled beneficiaries has persisted, often resulting in the execution of manual (*i.e.* non-biometric) payments.

(1) Campaign Enrolment

Successful campaign enrolment requires proper equipment, well-organized schedules, and effective local publicity. These conditions have not materialized in a subset of GPs for the following reasons:

- In some *mandals*, TSPs/BCs and government officials have failed to properly coordinate on enrolment schedules.
- In some cases, inadequate education and/or mobilization of beneficiaries have resulted in poor turn-out. One bank representative described how over the course of a 40-day campaign in Adilabad district, the TSP managed to enroll a mere 10% of targeted beneficiaries. Notably, the existence of *benami* or fake beneficiaries in the system naturally implies that a fraction of officially-listed individuals will not be enrolled simply because they do not exist. Fake beneficiaries are not a problem if no work is claimed on their jobcards; however, if work is being claimed, then the leakage reduction benefits of Smartcards may not materialize, as these beneficiaries would not be enrolled.

Box 1: CSP-led Enrolment under ZMF

ALW and its partner BC, Zero Mass Foundation, initially contracted private vendors to execute campaign enrolment. However, 4-5 months into the process, ZMF transitioned to a strategy in which CSPs themselves were agents of enrolment. Officials estimate that CSPs can complete 50-60 enrolments per day using near field communication phones and attached fingerprint readers.

The assignment of dual roles – enrolment and payment agent – to CSPs carries several advantages. Most obviously, beneficiaries are provided with a convenient option for enrolment, one that does not require them to travel to *mandal* headquarters or wait for an operator. That said, the introduction of enrolment duties places extra demands and greater responsibility upon CSPs. Some ZMF representatives have expressed concern about the ability of CSPs to shoulder these responsibilities, particularly in high-pressure payment situations involving large crowds of beneficiaries. Under these circumstances, CSPs may be tempted to provide manual payments to un-enrolled individuals, simply in the interest of speed and crowd control.

Ideally, systems would be established such that CSPs disburse payments to enrolled beneficiaries at one time (perhaps on a given day of the week), while disbursing payments to un-enrolled beneficiaries at another time (while simultaneously enrolling them). Implementing such a strategy would require proper planning and organization at the community level.

- For certain TSPs, the availability of enrolment kits has been a constraint [see Section III, Sub-section A for more details on enrolment]. In Box 1, we describe how one BC, Zero Mass Foundation, has devised a different model of enrolment that obviates the need for both operators and laptops.
- Technical challenges such as software glitches, errors in beneficiary lists supplied by GoAP, and malfunctioning fingerprint readers have, at times, impeded the enrolment process. TSP representatives tend to describe these problems as being more heavily concentrated in the first few months of the roll-out when the model was being tested in the field.
- In locations where hamlets are highly dispersed, operators have had to travel long distances to find beneficiaries; this problem has largely arisen in agency areas (which are the areas with a large tribal population).

(2) On-going Enrolment

Initially, GoAP set the enrolment threshold for conversion significantly higher than it is currently (80% as opposed to 40%). The government has progressively reduced this number in the interest of expediting the roll-out. (GoAP & RDD, 2010)³⁶ With a lower threshold has come an obvious trade-off: a larger balance of un-enrolled beneficiaries at

the time of conversion. Figure 4 displays the average percentage of MGNREGS payments in *converted* GPs that were made to *enrolled* beneficiaries in November 2011. Enrolment rates among active workers (*i.e.* those receiving payments) for the majority of districts are fairly low, falling between 40% and 60%. One district, Nalgonda, clearly stands out; in Box 2, we describe the enrolment strategy employed by the Post Office in Nalgonda.

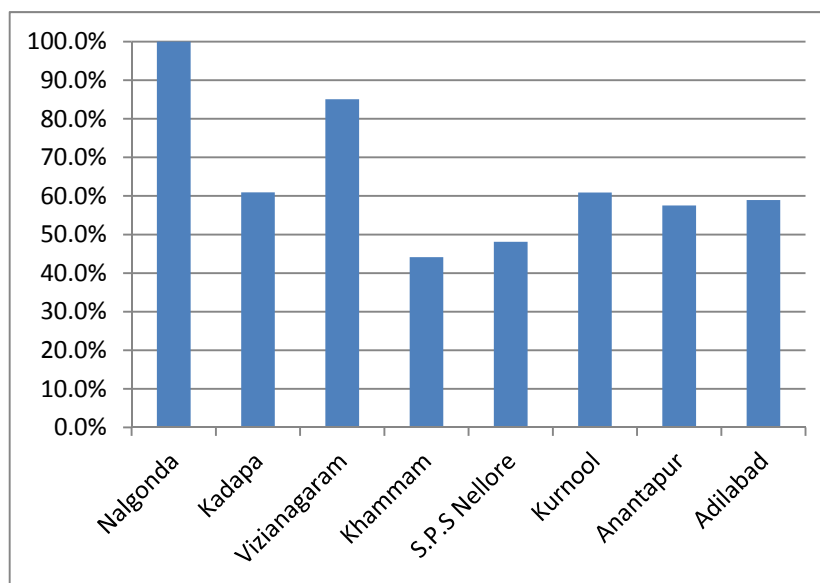


Figure 4: Average % of MGNREGS payments made to enrolled beneficiaries in converted GPs

The sizeable number of un-enrolled beneficiaries begs the question of how to manage their payments once carded payments commence. Government officials, understandably, fear that permitting manual payments for some people will create a loophole for others to circumvent authentication. As such, the Principal Secretary initially ordered that payments for un-enrolled beneficiaries be placed in so-called “suspended accounts” until enrolment had been completed. This policy proved intractable when providers were unable to rapidly enroll beneficiaries, and some beneficiaries remained unpaid for

³⁶GoAP Memo No. 146342/RD II/A1/200, Government of Andhra Pradesh Abstract, Panchayat Raj and Rural Development (RD II) Department (2010) ³⁷ Circular No. 1417.RD-SHG/EBT/2010/Vol II, Government of Andhra Pradesh, Office of the Commissioner of Rural Development, AP, Hyderabad (2010)³⁸ In some cases cards have been printed and sent to the GPs, but remain in *panchayat* offices, undistributed, for months due to lack of an appointed CSP.

several months. Officials subsequently modified their stance, deeming it permissible for un-enrolled beneficiaries to receive manual payments, as long as they simultaneously enrolled (GoAP, 2010).³⁷

Box 2: The Post Office Enrollment Model

The Post Office, in partnership with the service provider APOne, has achieved an impressive level of success with enrolment. At the outset, the post office applied a saturation model, which involved concentrating all available resources (*i.e.* 30 enrolment kits) in a particular *mandal* until the entire *mandal* was ready for conversion. As per interviews with the AP Post Master General, this process took approximately one week per *mandal*. The Post Office covered approximately 70% of MGNREGS beneficiaries in the initial round of enrolment (which lasted roughly three months). Two subsequent enrolment campaigns succeeded in reaching an additional 22% of beneficiaries. In an interview, the Post Master General outlined key factors that enabled rapid and effective enrolment:

- Extensive preparatory work, including 4-6 months of planning before the project was initiated
- Drafting of a detailed MoU with APOne that carefully enumerated the responsibilities of each party as well as specific programmatic protocols
- Comprehensive planning of enrolment operations/schedules in partnership with field units and APOne (even taking into account factors such as when power cuts would take place)
- Engagement on the part of district-level post office staff with Project Directors and other government officials (*e.g.* the post office requested the Commissioner to write a letter to the District Collector outlining what support was required for the project)

Notably, because all MGNREGS workers possess post office accounts to begin with, enrolment in the post office model only requires the capturing of biometrics. The Post Office has also opted for a “cardless” system (biometrics are stored locally in the PoS device instead of in Smartcards). These factors have simplified enrolment procedures and eased the path towards GP conversion with close to universal coverage.

In practice, the lack of resolution on “mop-up” enrolment has continued to afflict the implementation process, as reflected by the enrolment gaps in Figure 3. The problem is compounded by the fact that beneficiary lists are dynamic, with new workers and pensioners being added on an on-going basis. Below we outline some of the strategies employed by TSPs/BCs to saturate enrolment:

1. FINO has stationed two permanent operators in each *mandal* head-quarters with the expectation that beneficiaries will travel there to be enrolled.
2. HCL has conducted additional rounds of campaign enrolment.
3. ALW has trained and equipped CSPs to conduct enrolment (Box 1).
4. In the Post Office model, field assistants accompany un-enrolled wage-seekers to an enrolment center (located at the sub-post office) on a specified enrolment day. There, the field assistant confirms the beneficiary’s identity while a post office official provides a savings bank account number and APOne technical support staff capture fingerprint information and a photograph.

GoAP originally recommended that FINO’s strategy be followed by all providers; however, a subsequent circular noted the lack of success with this approach and instead requested TSPs to adopt dual purpose kits capable of supporting both payment and enrolment. A 2011 circular recommended that beneficiary data be uploaded to the PoS and CSPs be supplied with the appropriate paper-work to enable “on-the-spot enrolment.” (GoAP, 2011)

³⁷ Circular No. 1417.RD-SHG/EBT/2010/Vol II, Government of Andhra Pradesh, Office of the Commissioner of Rural Development, AP, Hyderabad (2010)³⁸ In some cases cards have been printed and sent to the GPs, but remain in *panchayat* offices, undistributed, for months due to lack of an appointed CSP.

(3) Lessons Learned

The task of closing the enrolment gap is challenging from both an operational and an ethical perspective. If the government bans manual payments before banks have established accessible and reliable paths to enrolment, it runs the risk of preventing legitimate beneficiaries from receiving payments. Without strong action, however, a suboptimal hybrid system may persist in which only a portion of beneficiaries receive authenticated payments. We can extract the following lessons from the Smartcard enrolment experience to date:

- Due to implementation delays, GoAP has been forced to accept a relatively low enrolment threshold for conversion. The operational challenges associated with managing non-enrolled beneficiaries are compounded by the fact that banks receive commission irrespective of whether payments are authenticated; thus, they have a limited incentive to push for enrolment once a GP has been converted to the carded system. We return to this problem in Section VII, Sub-Section A.
- The Post Office has made impressive strides in the area of enrolment. Communication and advance planning between providers and government officials have been essential for delivering positive outcomes. The Post Office has also created a streamlined and well-supported system into which un-enrolled beneficiaries can be placed. When considering the model's success, however, it is important to note that the Post Office has benefitted from pre-existing infrastructure, access to trained personnel, and the pre-existence of individual accounts.
- In steady-state, the Smartcard payment system must be capable of handling a dynamic beneficiary population. Training CSPs to execute a dual enrolment-payment function may end up being the most sensible strategy. However, in addition to the technical hurdles that are preventing some TSPs from adopting this approach, there are other important caveats. CSPs currently shoulder a fair amount of responsibility and often lack adequate oversight. Without focused support, their motivation and capacity levels may hinder their ability to execute additional tasks, a reality which of which implementing agents must be cognizant.

B. Card Printing/Distribution

In a set-up where biometric data are stored in the Smartcard, delivery of the physical card can become the rate-limiting step for initiating authenticated transactions. In June 2011, the Principal Secretary announced that 3.3 million beneficiaries were enrolled but waiting to receive cards (and thus being denied access to the biometric system). The monetary cost of a Smartcard is also non-trivial, generally in the range of 50 to 60 rupees per card. Indeed, debate has arisen over the extent to which a physical card is even necessary or worth the associated cost.

(1) Printing of Cards

TSPs either print physical Smartcards in-house or outsource the task to a private vendor. While most representatives claim that beneficiaries receive Smartcards approximately one month after accounts are opened (*i.e.* approximately 40 days from the time of enrolment), beneficiaries in some districts report

wait times of several months.³⁸ In Adilabad, for example, the responsible TSP has faced immense challenges with issuing Smartcards in a timely fashion (over the course of four months, only 40,000 cards were printed³⁹). It is important to note that even after cards are issued and distributed to beneficiaries, there are potential stumbling blocks such as printing errors and activation problems.

(2) Cardless/Virtual Payments

The TSP-BC pair, ALW and Zero Mass Foundation (ZMF), was the first to experiment with cardless or “virtual” payments. In the ZMF model, beneficiaries are provided, at the time of enrolment, with a temporary card that contains a serial number. Once the beneficiary’s account has been opened, the CSP can enter the serial number in the PoS device and provide an authenticated payment. This system obviously relies on the local storage of biometric data, a feature that ALW has designed its devices to support. Following ZMF’s example, a number of TSPs have modified their technology to accommodate the local storage of biometrics (typically data for the population of one GP). In 2011, GoAP officials requested that all TSPs develop this capacity so as to reduce delays in the initiation of biometric payments (See Box 3 for TSP-wise details).

Box 3: Cardless Payments across Service Providers

TSP	Biometrics stored in PoS device?	Gap between Enrollment and Access to Biometric Payments
HCL	Yes	Minimum of 10 days required post-enrollment before biometric payments can be made to beneficiary
ALW	Yes	Minimum of 3 days required post-enrollment before biometric payments can be made to beneficiary (for APGVB)
Integra	Yes	Minimum of 10 days required post-enrollment before biometric payments can be made to beneficiary
Atyathi	Yes	Minimum of 7 days required post-enrollment before biometric payments can be made to beneficiary
FINO	No	PoS does not support local storage of biometrics; beneficiaries must wait for physical Smartcards

(3) Lessons Learned

The process of printing, distributing, and activating a Smartcard comes at a non-trivial operational and monetary cost. Indeed, one bank official expressed his opinion that using cards was a “complete waste.” A number of TSPs have demonstrated the efficacy of storing biometrics in the PoS machine. The Post Office and its partner, APOne, have chosen to eliminate cards entirely and have, by various measures, achieved a high level of success. However, it is important to also consider the disadvantages of a non-carded system. Perhaps most importantly, the local storage of biometrics implies that beneficiaries cannot access the system from any GP other than where they enrolled. This constraint is most salient for migrant workers who spend substantial time away from their homes. Though MGNREGS does not allow individuals to work on projects outside of their villages, if other FI services come on-line, the mobility afforded by a physical card may become more important. Overall we can draw several key lessons:

³⁸ In some cases cards have been printed and sent to the GPs, but remain in *panchayat* offices, undistributed, for months due to lack of an appointed CSP.

³⁹ As per GoAP’s MGNREGS website, more than 1 million individuals in Adilabad have jobcards.

- Developing the capacity to store biometrics locally can help mitigate against delays associated with printing and distributing cards. As such, service providers should continue devoting resources towards achieving this goal.
- While the current payment system does not necessarily require a physical Smartcard to function, with sufficient planning and the introduction of second generation services and products, the portability of physical cards may become far more salient. It is, therefore, in the best interest of implementing agents to continue identifying cheap and efficient means of printing and distributing Smartcards.

C. CSP Selection

GoAP's adoption of the business correspondent model for payment delivery has led to the creation of a powerful, new position: a CSP responsible for mediating village-level transactions on a regular basis. While the concerned bank is charged with making the final decision on CSP appointment, GoAP has played an important role in the process by: 1) issuing selection criteria and 2) relying on local government officials to generate CSP candidate lists. These and other features of the selection process have led to a number of ground-level challenges that we explore below.

(1) Challenges with CSP Appointment

Politicization of Selection: The process of CSP selection has become heavily politicized in a number of GPs across the state, resulting in vacant posts and delayed implementation. In these areas, politicians, ranging from *sarpanch's* to MLAs, have aggressively vied for their own candidates while attempting to block the advancement of others. Indeed, several representatives from banks, TSPs, and BCs describe being directly pressured by politicians to reject or promote particular applicants. The degree to which political meddling has hindered the Smartcard roll-out varies across locations. In some districts, CSP appointments have proceeded smoothly, while in others, such as Kurnool and Anantapur, they have been impeded (see Box 4).

By early 2011, despite GoAP's efforts to resolve this problem by engaging district officials, the selection process remained stalled in a number of GPs. Frustrated with protracted delays, government officials issued a circular mandating that pension disbursement officers assume biometric payment responsibilities in all GPs where there was no appointed CSP. (GoAP, 2011) Unfortunately, this alternative has brought its own set of challenges; many officers have been reluctant to take up additional NREGS payment responsibilities, given weak monetary incentives.

Challenges with Selection Criteria: In some districts, challenges with CSP appointment have stemmed from the actual selection criteria imposed by GoAP. At the start of the project, government officials required that CSPs be drawn exclusively from scheduled caste/scheduled tribe communities and that they have a minimum 10th class education. In certain parts of the state, finding "qualified" candidates proved difficult.

Box 4: CSP Selection in Kurnool/Anantapur

Axis Bank faced severe problems with CSP selection in Kurnool and Anantapur districts. Though two rounds of enrolment were completed in August and October 2010, as of July 2011 payments had yet to commence in a large fraction of GPs. Specifically, **280 GPs** in Anantapur and **149 GPs** in Kurnool had CSP vacancies, nearly one year after the first round of enrolment was completed. A senior-ranking official in Axis Bank commented that he "never anticipated so many political issues" would arise during the implementation process.

Representatives from ZMF (the contracted BC) expressed frustration at the Project Director's insistence that only scheduled tribe members be appointed in Khammam district, despite their poor qualifications and ZMF's preference for more educated candidates. In Adilabad, a heavily tribal area, TSP officials described the reluctance displayed by some lower-caste women to even come forward, due to their fear of reprisals from other community members. Some evidence suggests that these fears were not unfounded; during a pilot conducted in several villages in Adilabad, an appointed CSP quit within a matter of days when higher-caste community members refused to accept payments from her. Notably, the involvement of State Bank of Hyderabad (the contracted bank in Adilabad) helped to resolve some of the district's CSP-related issues. Unlike the majority of other banks, SBH branch managers took an active role in the selection process and were able to offer important backing and support.

Following a January 2011 review meeting in which bankers complained of "undue interference in the selection process," GoAP issued a revised set of guidelines.(GoAP & RDD, 2011) The modified circular requires that only one of the proposed CSP candidates for a given GP come from a scheduled caste or tribe. If that individual meets the necessary qualifications, she should be selected; otherwise, it is permissible for another candidate to be appointed.

(2) Lessons Learned

A number of providers and even some members of the GoAP Smartcard team have asserted that the government should not have interfered in the CSP appointment process. These individuals argue that the imposition of selection criteria, as well as the involvement of MPDOs and Project Directors, likely exposed the process to unnecessary politicization. In addition, several implementing agents voiced frustration that they were prevented from applying their own selection metrics, but simultaneously expected to manage the consequences of appointment decisions and ensure that CSPs executed their responsibilities. One BC representative complained about his inability to fire low-performing CSPs due to the potential political fall-out. While these grievances are valid, it is important to acknowledge that the motivations underlying GoAP's selection criteria – empowerment of marginalized women, prevention of elite capture of the position, and minimization of leakage –reflect important ground-level realities. Overall, several lessons emerge from the CSP selection experience:

- At the outset, GoAP and its partners could have been more aware that the process of creating a new, influential position at the grassroots level would be vulnerable to politicization and therefore a likely source of implementation delay.
- The government's selection criteria had the potential to positively shape the appointment process, both through the promotion of certain individuals and the imposition of important checks. However, officials could have allowed for some measure of flexibility, particularly in cases where identifying "qualified" candidates was a challenge.
- Banks that took a more active role in CSP selection were in a better position to manage ground-level challenges. The act of taking ownership also represented an important step (and one overlooked by many banks) towards establishing a link between CSPs and bank branches.
- Looking forward, strong measures should be taken to properly educate community members and local officials on the role and authority of CSPs. Sensitization is especially critical when socially marginalized individuals are being thrust into positions of power through a model that is largely foreign to most communities.

D. Cash Management

Pay-outs for MGNREGS and SSP require large volumes of cash, particularly during the peak work season. Because the BC approach is predicated upon a branchless banking model, funds must be safely and reliably delivered to rural areas on a regular basis. Moreover, the localized nature of the payment structure necessitates that each individual GP be furnished with funds at the start of every new payment cycle.

(1) MC-Centered Approach

At the outset, banks and TSPs were understandably concerned about the security risks associated with transporting cash. This apprehension, among other factors, motivated many of them to design cash management models that relied upon *mandal* coordinators. In these models, MCs withdraw funds at either the *mandal* or district headquarters and subsequently hand off the cash to individual CSPs (at the *mandal* development office or the GP itself). While the incidence of theft has been low, this system has been revealed to have a number of drawbacks:

- MCs end up spending a large amount of time waiting at banks and conveying money to GPs. One official said that during MGNREGS peak season, his MCs travel to the bank on a daily basis. This time-intensive approach detracts from the ability of MCs to execute other important tasks such as monitoring payments and supervising CSPs.
- TSPs typically place limits on the amount of cash that MCs can carry at any given time, which can drive up transportation costs if multiple trips are required.
- FINO continues to employ an inefficient model in which District Coordinators issue checks, which are then collected and deposited by MCs. Relying upon checks, as opposed to online transfers, unnecessarily, lengthens processing time.

(2) CSP-Centered Approach

A system that centers upon *mandal*-level officers collecting and distributing cash can be impractical, inefficient, and risky in and of itself. An alternate model involves CSPs themselves opening bank accounts and withdrawing funds on a regular basis. Indeed, GoAP officials have advocated for transitioning to a CSP-based model. In 2010, the government issued a circular mandating that all banks open accounts for CSPs in nearby branches, irrespective of which bank the branch belongs to. GoAP justified the decision with the following logic: “As large amounts are being handled by MCs...for delivering the cash to the CSPs, the process is fraught with risk and is also resulting in severe delay in some cases.”⁴⁰

A number of banks have expressed an interest in adopting this approach, but have cited as a barrier their own limited branch networks. The GoAP-recommended alternative of opening CSP accounts with other banks has seen low uptake, primarily because of fee requirements and concerns about the willingness of other banks to ensure proper cash availability (see Box 5 for more information on State Bank of Hyderabad and Corporation Bank’s experience with opening CSP accounts).

⁴⁰ AP Smartcard Project Advisory – Number III (2010)

Box 5: Opening of CSP Accounts

Corporation Bank:

Corporation Bank and its partner BC, i25, have been contracted to implement Smartcards in Vizianagaram district. i25 has sought to design a model in which CSPs maintain regular contact with the bank and develop, in the words of the CEO, “a strong relationship with the branch.” i25 officials view empowering CSPs through a link with the bank as the only means of establishing a well-functioning BC model. CSPs are paid a fixed salary and travel allowance instead of a commission and have accounts with Corporation Bank to enable direct withdrawal of funds.

Initially, Corporation Bank only had one branch in the entire district of Vizianagaram. All CSPs had to travel to this branch on a regular basis, which placed a large strain on the system, logistically. GoAP officials also expressed concerns about the safety and security of the set-up and delayed approving conversion in a number of GPs. Though Corporation Bank has since opened a number of other branches (now with 400+ CSPs in the district), challenges with long wait times and crowd control persist. One Corporation Bank official commented that, given these problems, the bank and TSP are looking for alternate solutions.

State Bank of Hyderabad:

SBH, the lead bank in Adilabad and the designated Smartcard implementer, has extensive branch coverage throughout the district. As in the i25 model, all CSPs open linked SBH accounts and withdraw funds on a regular basis. Most CSPs do not have to travel more than 5 kilometers to reach a branch. In Nellore, where SBH has a much more limited network, bank officials are making arrangements with the State Bank of India to open CSP accounts.

(3) Post Office Approach

The Post Office has benefited from its ability to leverage existing cash management systems to service the new biometric payment program. In the Post Office set-up, a large amount of control lies with the Head Post Master (HPM) at the district level. When the HPM receives funds from GoAP in an SBI or SBH account, he or she acknowledges receipt of these funds through a web monitoring report. Amounts are then automatically credited to individual wage-seeker accounts.

Once the HPM provides approval, the data hit the APOnline server and PoS machines get automatically updated. Sub-post and branch post officials can monitor the cash amounts that will be sent to a particular post office via a web platform. The actual cash for making payments is delivered from the head post office to the sub post office, where the branch post master collects it. A statement of accounts flows from the branch post office, up the chain, on a daily basis. While large volumes of cash are sometimes difficult to transport, the Post Master General noted in an interview that there had only been one case involving a physical attack on a branch post master.

Prior to initiation of the biometric payment program, the post office had established a number of other guidelines to govern the movement of cash. For example, every sub and branch post office has an “authorized balance” (*i.e.* a minimum amount of funds required to sustain daily operations). There are also established “line limits” or amounts of cash that are permitted to move from one office to another. The Post Office has made these limits more dynamic to accommodate requirements of the EBT program.

(4) Lessons Learned

Cash management represents a complex operational issue that does not lend itself to simple solutions. Given the large volumes of money that circulate through a fairly disaggregated system, the security concerns of banks are understandable. The Post Office approached the project from the position of

having a well-designed cash management infrastructure already in place. As new entrants, banks and TSPs have had to set up systems from scratch, taking various factors into account including cost, security, and efficiency. We can draw the following lessons from the experience to date:

- MCs have a critical role to fill as the key intermediaries between CSPs and district/sub-district level officials. A system in which MCs spend the bulk of their time delivering cash is inefficient and can carry security risks of its own. A superior alternative is likely one in which CSPs, with careful monitoring and support from MCs, directly withdraw funds from a nearby bank branch. This model is also more aligned with GoAP's long-term vision of establishing CSPs as empowered local banking agents, responsible for the provision of multiple financial services.
- To date, banks have not come together to create an established set of guidelines for CSP account opening, despite repeated requests from the government. As a result, they have failed to put measures in place to ensure adequate cash flow and mitigate against logistical bottlenecks. Given that TSPs (and not banks) primarily deal with cash management and GoAP has not yet imposed a penalty on late payments, banks may not feel sufficiently incentivized to tackle this issue.

E. De-Duplication and Authentication

A biometric de-duplication check ensures that a beneficiary does not enroll more than once in the system by checking his or her fingerprints against the database of existing fingerprints. The effectiveness of any biometric payment system rests upon a robust de-duplication check and strict adherence to authentication on the part of the payment agent. Achieving success in both areas requires banks and TSPs to overcome substantial technical and operational hurdles. To date, GoAP and its implementing partners have made limited progress in the realm of de-duplication. Though government officials have consistently pushed for the elimination of manual payments, a number of factors have slowed the transition to a 100% authenticated system.

(1) De-Duplication

As per MoUs signed with GoAP, banks are responsible for ensuring that biometric data for all enrolled beneficiaries are subject to a de-duplication check. However, discussions with various officials indicate that TSPs are, at best, conducting a GP-level text de-duplication. At present, GoAP has engaged multiple vendors to develop de-duplication software; however, conversations with government officials suggest that the project remains in an early stage of development.



(CSP authenticating beneficiary's fingerprint)

(2) Manual Overrides

CSPs can issue manual payments in two forms: 1) un-carded payments, or payments made to un-enrolled beneficiaries/ beneficiaries waiting to receive Smartcards⁴¹ and 2) manual overrides, or un-

⁴¹ In implementation models where biometric data are stored in the PoS, payments that are made to beneficiaries who do not have physical Smartcards are not considered to be "un-carded" if they are authenticated.

authenticated payments made to beneficiaries who possess Smartcards. Here, we focus on the latter since enrolment challenges have already been discussed in Sub-Section A. In a real-world implementation scenario, a number of factors may force CSPs to perform manual overrides:

- Pressure to make payments quickly due to the presence of large crowds and/or influence from local officials
- Inability of PoS reader to recognize fingerprints of older beneficiaries or manual laborers (in both cases, fingerprints may be significantly worn down)
- Technical problems affecting the PoS device such as power cuts (one FINO official reported that in some GPs power is only available for 4 hours daily)
- Existence of multiple jobcards ⁴²

Government officials have consistently expressed concerns about the existence of manual overrides. In early 2010, GoAP announced that banks would not receive a full commission for payments delivered in this manner (*i.e.* “invalid” payments would be made at the cost of the banks). Enforcing this policy, however, requires government officials to regularly monitor the bank-wise prevalence of manual overrides and thus have access to transaction-level data.⁴³ In short, the government has been caught in the difficult position of having to rely on banks to provide the data that are required to enact a penalty on the very same banks. Perhaps not surprisingly, banks and TSPs have been slow to respond despite repeated requests from top-ranking officials. To date, GoAP has yet to enforce the ban on manual overrides.

The government has also pushed implementing agents to establish strict protocols for dealing with cases in which authentication is not possible. For example, officials have mandated that an MC be summoned if the PoS device is not reading a beneficiary’s fingerprint after multiple attempts. While most providers claim to have such policies in place, the extent to which they are enforceable is not clear.

(3) Lessons Learned

If de-duplication and point-of-transaction authentication are not reliably occurring, the biometric payment system will remain quasi-functional, potentially defeating the entire purpose of the Smartcard exercise. GoAP’s failure to establish a robust de-duplication check represents a weakness in the overall program structure. The complexity of the implementation landscape inevitably results in scenarios in which CSPs must execute manual overrides. While it is important to allow banks to submit exception reports and avoid incurring unfair penalties, a portion of manual overrides undoubtedly stem from tractable problems. We can distill the following lessons from the experience to date:

- GoAP’s most critical monitoring tool remains accurate and up-to-date transaction-level data. Without these data, GoAP cannot have proper visibility on the roll-out and therefore cannot penalize banks for perpetuating the practice of manual overrides.
- Beneficiaries must understand the rationale behind closing loopholes for manual overrides. Strong lines of communication between BCs and district/*mandal* authorities can enable more rapid resolution of ground-level problems. If, for example, MCs have well-established relationships with

⁴² If a household has multiple jobcards, an individual may have enrolled for a Smartcard on one particular jobcard but be reporting work on another jobcard.

⁴³ Transaction-level data refers to data taken directly from the PoS device after transactions are completed

MPDOs/Project Directors, the latter can more easily be called upon to assist with public awareness-raising and disciplining of obstructive village officials.

- Simple structural solutions such as staggered payment schedules can help to address logistical problems like crowd control; though, again, these interventions require basic cooperation from local authorities including field assistants and *sarpanch*'s.
- While some technical problems, such as fingerprint reader sensitivity may require more involved responses⁴⁴, others such as a dearth of battery back-ups have more straight-forward solutions. Several BC representatives have complained about the lack of available technical support when malfunctions do occur, an issue which must be addressed by the responsible service providers.

⁴⁴ The post office's service provider, APOne, replaced their fingerprint readers with a more sensitive version of the device in order to minimize technical problems with fingerprint reading.

VII. KEY IMPLEMENTATION THEMES

In the previous section, we presented a number of specific operational issues that have challenged the implementation process. These issues are embedded within several broader themes that have shaped the trajectory of the roll-out. In this section, we elaborate upon these themes, which include the incentives of implementing institutions; degrees of political cooperation; heterogeneity in the implementation landscape; and data collection as a tool for promoting transparency and accountability.

A. Incentives

Given the operational complexity and large scale of the Smartcard roll-out, it is essential to consider the incentives governing those institutions charged with implementation. Based on our discussions with GoAP officials and bank/service provider representatives, we present key insights below.

(1) Incentives to Participate

When conceiving of the Smartcard project, policy-makers envisioned a model in which banks would shoulder the cost of setting up the system while GoAP would guarantee volumes of transactions and the incentive of a 2% commission on these volumes. Though the architects of the program expected banks to view the overall proposition as a business opportunity, the initial contracting process (described in Section IV) revealed wide-spread reluctance on the part of banks to take up the project. In both the “service area” and “one-district-one-bank” model, GoAP was confronted by a lack of initiative among many banks and was consequently forced to re-allocate a number of districts.

Notably, there was some degree of heterogeneity in how banks responded to GoAP’s proposals. As per discussions with GoAP, certain private banks with limited rural branch networks (*e.g.* Axis Bank and ICICI) displayed a larger amount of interest. One explanation for this outcome is put forth in a report by C-GAP: “For banks, the primary motivation for paying EBT beneficiaries, aside from the government mandate itself, is not the potential revenue or the access to a new client base, but rather the possibility of future business with the government.” (Breloff & Retman, 2011) Because public sector banks are often the recipients of government contracts, it is not surprising that some private banks would apply a “foot in the door” approach. In addition, officials from banks like Axis reported an interest in experimenting with the BC model and gaining a foothold in the rural sector.

In contrast, a high-ranking official from a state-owned bank stated that EBT programming may have been appealing to banks with limited rural coverage, but did not represent a compelling business opportunity for banks with existing branch networks. He went so far as to say that his bank’s involvement stemmed, not from an economic interest, but from a “duty to support government.” Top-down pressure likely resulted in a number of banks getting involved in the Smartcard program despite their uncertainty about its profitability; thus, incentives may have been misaligned for these banks from the outset.

From this perspective, the Post Office’s incentive structure is worth considering. The emergence of EBT programming may have represented an opportunity for the Post Office to reclaim relevance at a time when it was experiencing a diminution in its overall role. Certainly, the careful planning and attention that has been devoted to the roll-out in Nalgonda and Nizamabad suggest that the Post Office has perceived the delivery of successful outcomes to be in its best interest.

(2) Incentives to Perform

The banks that are currently contracted by GoAP to implement Smartcards receive an on-going commission. States have a significant amount of discretion in terms of how to spend the MGNREGS administrative funds that are allocated by the central government. A number of states do not pay any commission to banks for establishing EBT channels and instead, “believe this to be a public service obligation by banks.”(Bretloff & Retman, 2011) Though GoAP made the decision to pay a 2% commission, the majority of banks pass on 1.75 % to service providers, keeping only 0.25%.⁴⁵ Moreover, as of October 2011, banks still had not received the full 2% commission due to a TCS software problem.

While some government officials describe the 2% figure as generous, other GoAP authorities echo sentiments expressed by bankers, namely that banks have not broken even on the project and will continue to struggle as they shoulder the Rs. 50 cost of account opening (note: RBI’s subsidy expired in June 2009). A reasonable hypothesis is that banks do not view the commission as a sufficiently large incentive to truly invest in the project. Indeed, banks have allocated few human resources to the internal management of the EBT project. Instead of creating a dedicated Smartcard-focused position, most have simply added oversight responsibilities to the portfolios of existing officials. Moreover, the majority of banks, with the exception of SBH, have failed to engage their branch managers in the roll-out.

Another key misalignment of incentives involves the actual implementation design. Though GoAP originally specified that banks would have to achieve at least 80% enrolment before they could convert a GP, the figure was lowered over time in the interest of accelerating the roll-out. In the current set-up [discussed in Section VI, Sub-section A] banks have few incentives to saturate enrolment once conversion has been achieved. Indeed, this concern is borne out by the evidence described in Section VI. An important take-away is that major decisions about program design cannot be made without a thorough consideration of the attendant incentives. The fact that banks, and in turn service providers, have effectively no financial motivation to continue enrolling beneficiaries beyond a point represents a flaw in the implementation design.

(3) Incentives for Expansion

In the business model that GoAP conceived of, banks would establish the last-mile infrastructure and then cross-sell products and services to the newly-accessible market. The scope for profit in this area was meant to serve as an incentive for banks to enter the space. Indeed, a large literature exists on the potential for government transfer programs to act as a vehicle for financial inclusion expansion. Experts point to three factors that can help to facilitate such a transition: 1) cost-effective delivery mechanisms, 2) large scale, and 3) appropriate products for low income users.(Pickens et al, 2009) While there is potential for these conditions to materialize in AP, in reality the implementation of branchless banking on the ground has been slow and rife with challenges. Banks have struggled to effectively implement the BC model in a manner that both effectively delivers financial services and generates profits.(Nandakumar, 2011) Given this, the prospect of rolling out FI products to beneficiaries may not represent a realistic or sufficiently compelling incentive for banks.

(4) Alternate Models

Given some of the issues described above, policy-makers may question the degree to which a bank-led Smartcard implementation model makes sense. Below we discuss alternative implementation strategies:

⁴⁵ In the case of at least one bank, they retain 0.3%

PPP Model: During the pilot phase, GoAP experimented with a PPP model in Karimnagar, in partnership with FINO. Generally, a PPP model involves service providers competitively bidding for contracts in a “one-provider-one-district” system, eliminating the role of banks. In reality, regulatory barriers have restricted the ability of GoAP to experiment with this approach and will likely continue to do so in the future. However, it is worth considering what the real trade-offs are with respect to abandoning a bank-led model. As per a document published by RBI itself, the potential advantages of PPP model include lower costs, greater efficiency, elimination of problems relating to inter-operability between multiple banks/vendors, and scope for “convergence of other public service.”⁴⁶ In the same document, RBI outlines the disadvantages, largely pointing to regulatory barriers:

“Even if it is presumed that this model may bring efficiency and will deliver the desired results with speed, the process of amending various statutes or putting in place required regulations to create the enabling environment itself will defeat the very purpose for which the PPP model is being proposed.”

And furthermore that, “The EBT framework under PPP model...would be treated as a payment system outside the banking system and regulatory overload may not make the system viable.” Finally, RBI cites reputational risks to RBI and GoAP if a third party vendor is deemed responsible for the leaking of funds. Another critique of a provider-based model is that it does not afford the same opportunities as banks in terms of FI expansion. If beneficiaries were to open accounts with FINO, for example, FINO would not be able to provide financial services, without linking up with a bank.

Post Office Model: Though part of the impetus for the Smartcard project was to move away from the inefficiencies and corruption of the Post Office, the very same institution has emerged as an unexpected implementation leader. Post Office officials have demonstrated a commitment to the project and an ability to deliver impressive results, ranging from enrolment to cash management and authentication. Indeed, top-ranking government officials have consistently pointed to the model’s success. This naturally begs the question of whether issuing biometric payments through a Post Office-based system is a preferable option. Ultimately, there are important disadvantages to consider:

- A key motivation for adopting the BC model was that payments could be delivered “at the doorstep” of the beneficiary. Because not all GPs have a post office branch, beneficiaries would be inconvenienced by having to travel to the Post Office, incur transportation costs, and wait in long lines.
- Providing payments through a Post Office model may limit the scope for FI expansion if the institution is less equipped to roll out other services/products. That said, policy-makers have already begun discussing using branch post offices effectively as banks, in order to advance the financial inclusion agenda. (“Government Eyes Set”, 2012)
- While one benefit of the Post Office set-up is that an institutional structure is already in place, the downside of this feature is the existence of entrenched interests. For example, personnel such as branch post masters are typically local power-holders who may have pre-existing ties to other village-level authorities (in contrast to a newly appointed CSP).

⁴⁶ Report of the Committee on Suggesting a Framework for Electronic Benefit Transfer, RBI (2008) (available at: <http://rbidocs.rbi.org.in/rdocs/Content/PDFs/84147.pdf>)

Ultimately, a scenario in which banks pro-actively take up EBT/FI projects may yield more success than one in which the driving force is top-down government pressure. In practice, this may mean proceeding with fewer banks. A more effective approach may also require increasing the commission paid to banks in the early years of the roll-out to make the project more profitable. Given our findings on time savings associated with carded systems [Section VIII, Sub-Section A], the benefits of such a model should be well-worth the additional cost.

B. Political Buy-in

An important theme that cuts across many of the operational issues described in Section VI is that of political buy-in. On one hand, the Smartcard program has progressed as a result of strong support from senior government officials and the generous allocation of resources to the project (in particular, time of high-ranking officials). On the other hand, the program's progress has been stymied by insufficient cooperation at the local level. Participation from district and sub-district level authorities has been weak in several areas, including enrolment, payments, and monitoring.

(1) Top-down Support

Sustained Involvement: From its inception, the Smartcard program has benefited from a number of hands-on advocates within the upper echelons of GoAP's bureaucracy. Early on, the pro-active role assumed by both the Principal Secretary and CRD were instrumental in generating the political will necessary to jump-start the pilot. Furthermore, the CRD sustained a high level of involvement during the critical early stages of the project, meeting with banks and TSPs on a weekly basis, communicating regularly with RBI and SLBC representatives, and attending multiple awareness-raising events across districts. From the beginning, GoAP established the practice of holding a mandatory monthly meeting, chaired by the Principal Secretary and attended by the CRD and representatives from all banks and TSPs. These review meetings have served as a critical opportunity for the Principal Secretary to examine district-wise roll-out data and directly communicate with representatives about factors that are hindering progress.

In general, the high degree of engagement maintained by top government officials has had the following important implications: 1) it has signalled to major stake-holders that GoAP considers the Smartcard program to be a priority, 2) it has allowed GoAP to develop relationships with the main agents of implementation, the banks and TSPs, and 3) it has helped to establish a regular discourse on how to resolve programmatic and operational challenges.

Effective Trouble-shooting: The ability of senior government officials to identify key barriers to the roll-out and actively search for solutions has enabled the program to maintain a largely positive trajectory. For example, persistent lobbying by the Principal Secretary and CRD has brought about critical changes such as RBI's willingness to allow GoAP to shift to a "one-district-one-bank" model and RBI's subsidization of account-opening. Through the determined effort of the Commissioner, GoAP has also secured important gains such as the reduction in paper-work requirements for opening accounts (which decreased the burden on operators and beneficiaries) and RBI's accession that Smartcard accounts could be treated as normal savings bank accounts. Even the government's willingness to re-allocate districts where banks were failing to deliver results demonstrates a capacity on the part of GoAP to identify bottlenecks and take decisive action. Not surprisingly, officials from participating banks and TSPs repeatedly cite the unparalleled degree of leadership and initiative demonstrated by GoAP as compared to other state administrations.

Allocation of Resources: Top officials have shown an on-going commitment to allocate resources to the Smartcard program. One example is GoAP’s decision to establish a competent and experienced project management unit in Hyderabad, tasked with steering the program’s implementation. The unit includes several outside consultants with both technical knowledge and a thorough understanding of the banking sector. GoAP’s decision to create a team responsible for monitoring progress, regularly interacting with banks and TSPs, and flagging key issues has allowed the state to maintain a relatively high degree of visibility on the roll-out. As will be discussed in Sub-Section D, officials have also devoted substantial resources to developing robust MIS and data collection systems. Building capacity in this realm has played an important role in promoting transparency and laying the ground-work for a more accountable implementation process.

(2) Bottom-up Resistance

At an early stage in the project, high-level government officials recognized the importance of integrating district and sub-district level officials into the Smartcard implementation structure. As such, the CRD and staff members conducted multiple workshops with district and *mandal* authorities, in order to educate them about the Smartcard project and their role in the implementation chain. As outlined in Table 2, GoAP has also issued a number of official orders outlining the specific responsibilities of various functionaries.

Despite these efforts, a number of TSPs, bank, and government representatives have described inadequate local cooperation as a limiting factor in the roll-out. GoAP formally recognized this problem in a 2011 circular that called for a heightened level of coordination at the sub-district level. The circular reads: “Though the policy guidelines are given by this office and necessary support is extended by the district administration, due to inadequate coordination by the *mandal* level, GP level functionaries, the project implementation and the time lines fixed are suffering.” Below we outline some of the specific areas in which local engagement has been lacking.

Table 2: Roles and Responsibilities of Local Authorities as Described in Official GoAP Documents

Government Order	Project Directors (DRDA and DWMA)	Mandal Parishad Development Officer	Sarpanch/village organization leader
May 2008 Circular	-PD, DRDA responsible for facilitating CSP selection by providing candidate list to BC/TSP - DRDA responsible for orienting Additional Program Officers and bankers on Smartcard program -DWMA responsible for orienting MPDOs, Assistant Project Directors, and technical assistants on	- Orient <i>sarpanch’s</i> and <i>panchayat</i> secretaries on Smartcard program -Conduct awareness campaigns at village level to educate public on Smartcard program (CRD provided materials)	-Be present during all enrolment camps to assist with coordination and identification of beneficiaries

	Smartcard program		
UBI-GoAP MoU			-Provide support for enrolment, training, disbursement
April 2010 GoAP memo		-Mobilize beneficiaries for mop-up enrolment	
April 2010 GoAP letter	-PD, DWMA requested to conduct weekly review meetings at district level with bank and TSP representatives to ensure smooth functioning of new direct 'perso' upload system		
May 2011 circular	-PDs requested to conduct monthly review meetings with MPDOs	-Conduct weekly meetings with <i>mandal</i> coordinators and field assistants -Conduct monthly meetings with CSPs and bank representatives -Send PDs fortnightly progress reports	

Enrolment/Community Education: Interviews with representatives from banks and TSPs/BCs suggest that enrolment in a number of GPs has been encumbered by poor coordination and inadequate effort on the part of local officials. In certain cases, MPDOs have delayed sending enrolment schedules, thus stalling the entire process. In other cases, weak communication between *mandal* officers and *sarpanch*'s has resulted in operators being denied proper food and accommodation. Finally, some bank representatives cite the failure of local officials to sufficiently educate and mobilize beneficiaries, resulting in downstream challenges like poor enrolment attendance.



(CSP administering payments to crowd of beneficiaries)

Assisting CSPs with Payment Process: Interviews with providers reveal low levels of support for CSPs in certain locations. Examples include: 1) the failure of authorities to provide CSPs with a space to disburse payments; 2) the lack of assistance with crowd control when large volumes of beneficiaries present for payments; 3) the exertion of pressure by authorities to make payments quickly and/or provide manual payments; and 4) in extreme cases, outright antagonism on the part of *sarpanch*'s and other village officials towards CSPs, MCs, or other BC representatives.

In accordance with the government's selection criteria, CSPs are women, typically chosen from low-caste groups. As reflected in the Adilabad cases mentioned earlier, the feudal nature of many village societies can make it difficult for these individuals to exercise authority. When CSPs are not even provided with a proper space to disburse payments, as happens in some villages, they may be vulnerable to intimidation and pressure from beneficiaries and/or members of the public. Existing socio-cultural dynamics necessitate that village officials provide a certain level of backing to lend CSPs legitimacy. This is especially important in cases where beneficiaries are frustrated with the authentication process or in situations where payments are delayed and CSPs become easy targets for

public anger. The absence of adequate support from local authorities, and taken one step further, outright opposition to the payment process can place CSPs in unfair, stressful positions, while also hampering program implementation.

On-going Monitoring/Reporting: GoAP clearly envisioned a system in which robust communication links would exist between TSP/BC representatives and district and sub-district level officials. Discussions with Hyderabad officials indicate that, despite the issuance of numerous government orders, many local authorities have not adequately taken up their responsibilities. As one example, members of the GoAP Smartcard team report that they virtually never receive progress updates from district-level administrators. A large portion of the monitoring and reporting onus falls, instead, on over-burdened district EBT Coordinators. These Coordinators are hired on short-term government contracts and are therefore handicapped by their comparative lack of familiarity with and clout within the local governance structure.

Though the meeting schedules recommended in Table 2 may have been overly ambitious, some form of regular communication between the GP, *mandal*, and district level is critical. *Mandal* and district officials need not be engaged in the day-to-day mechanics of the payment process; however, it is important that they be in regular contact with MCs and that they remain cognizant of key operational constraints. Where project directors and MPDOs are more engaged, they are more likely to take corrective action on the ground and to help reinforce the support structure required for CSPs to function well.

(3) Potential Explanations

The obvious question that arises is why certain officials have resisted participating fully in the implementation process. The origin of opposition may lie in a perceived loss of power and/or rents due to the transition to biometric payments. Specifically, if a subset of local authorities was exploiting channels of leakage in the previous manual payment system, those individuals have an obvious incentive to obstruct biometric payments. Cases of active resistance on the part of *sarpanch's* and other officials may be suggestive of such an explanation. Alternatively, the lack of cooperation may stem from a classic principal-agent problem in which the decentralized nature of the roll-out, coupled with weak oversight from officials in Hyderabad, leads to low levels of accountability. Local authorities, tasked with carrying out a number of duties, may feel no incentive to take on additional Smartcard-related responsibilities, given that poor implementation on their part carries few repercussions.

An interesting case to examine is that of Krishna, which is considered to be a model district for Smartcard implementation. There, the presence of a strong District Collector, who took an active role in coordinating sub-district level officials, banks, and TSPs to ensure rapid enrolment and conversion, seems to have played an important role in delivering successful program outcomes. GoAP officials have also highlighted the example of Kurnool, where the Project Director, DWMA chose to be heavily involved in managing the logistics of Smartcard enrolment for MGNREGS beneficiaries. In the same district, the Project Director, DRD was substantially less engaged, as reflected by poorer outcomes for SSP enrolment. These examples suggest the potential for leadership and organization at the district-level to engender more effective implementation. District Collectors and Project Directors, in particular, appear to be crucial links between *mandal* authorities, Hyderabad-based officials and representatives of the banks and TSPs.

GoAP's ability to collect and leverage particular kinds of monitoring data may also help to address the issue of local accountability. The government has already initiated the process of collecting transaction-

level data from a subset of banks. Greater access to and utilization of this kind of information will allow officials to more easily identify implementation trouble spots (e.g. GPs with a high prevalence of manual overrides) and directly engage the responsible local authorities.

C. Heterogeneity in Implementation

GoAP's decision to contract different banks, TSPs, and BCs to manage the roll-out has resulted in a heterogeneous implementation landscape. The state's core objective of delivering electronic, biometrically authenticated benefits through a BC model is uniform throughout AP; however, many features of the actual operational model, including enrolment, cash management, and compensation of CSPs, vary across different providers. As will be discussed below, this diversity has carried both advantages and disadvantages.

(1) Advantages of Heterogeneity

One major advantage of having multiple implementation models is the scope for experimentation. In the "one-district-one-bank" approach, each district effectively serves as a separate laboratory for program implementation. While there is variation in the performance of different bank-TSP pairs, every model generates useful insights.

From GoAP's perspective, the heterogeneity across districts brings various "best practices" into relief, while also revealing ineffective strategies. The monthly review meetings provide an opportunity for stake-holders to share key lessons, as well as for GoAP officials to examine a range of implementation approaches and draw from those that appear to be working best. It is not uncommon for the Principal Secretary to request a representative to discuss with the rest of the group how his/her bank or TSP has gone about implementing a successful strategy.

The presence of multiple banks and TSPs may also incite healthy competition. The monthly review forum enables GoAP to openly highlight the successes and failures of providers. On several occasions, the Principal Secretary has threatened to re-assign districts from poor to high performers. Indeed, these dynamics may serve as an incentive for banks and TSPs to streamline their own operations and improve performance.

(2) Disadvantages of Heterogeneity

A heterogeneous implementation model can generate innovative ideas and a positive sense of competition, but can also lead to coordination problems. Currently, 11 different banks and 11 TSPs/BCs are contracted to work across 23 districts in AP. Given the lack of a standardized approach to core functions like enrolment and cash management, officials must keep track of and coordinate across multiple models. In addition, regular communication is essential for the project management unit to maintain visibility and control over the roll-out process. To achieve this, GoAP must interact with a large number of personnel on a frequent basis. This heavy communication burden can drain valuable human resources within the government.

Introducing programmatic changes or modifying existing protocols can also be challenging in the presence of multiple implementing agents. To provide one example, in 2011, GoAP officials mandated that biometric information be stored in the PoS devices. While some TSPs were able to modify the technology to accommodate this request, others (such as FINO) faced technical constraints, resulting in

an uneven adoption of the recommendation. Had one TSP been awarded the contract for the state, the process of introducing a uniform, large-scale change would have likely been simplified.

GoAP may have pre-empted some of the challenges associated with heterogeneity by introducing standard protocols or guidelines for core implementation functions. One GoAP official expressed regret that the government was not more involved in the drafting of MoUs between banks and service providers. Had the government played a role in that process, it could have done more to ensure that certain standards and requirements were in place.

D. Data Collection and Management

From the outset, GoAP has endeavoured to collect and report data in a manner that introduces greater accountability to the roll-out and improves the quality of biometric payments in steady-state. Officials have demonstrated a unique commitment to a transparent and data-driven implementation process, in part by allocating substantial resources to this objective (this has been true of NREGS implementation in AP more generally and not just the Smartcard Program). While the government has made impressive headway in setting up robust management information systems, it has also faced a number of obstacles. In reality, the process of gathering information from banks and service providers has been lengthy, laborious and, at times, unsuccessful.

(1) Allocation of Resources for MIS

The AP government's commitment to a data-driven approach has been reflected in its allocation of both funds and human capital. In 2006, GoAP contracted a private vendor, TCS, to design and manage the back-end operation and public website for the MGNREGS program. Over time, the state has devoted significant resources to this operation, allowing TCS to maintain a data-base with work-spell/payment information for millions of beneficiaries and to ensure that the website is accessible and reliable. With respect to the Smartcard program, GoAP has strategically hired individuals with strong IT backgrounds, ensuring that at least some members of the project management team have the capacity to understand and operationalize technical processes.

(2) The Role of MIS

Using Data to Improve the Roll-out: TCS, under the direction of state officials, utilizes the MGNREGS web platform to regularly post data on a range of Smartcard program indicators. These web reports have a high level of granularity and enable users to retrieve information at the district, *mandal*, and GP level. One particularly useful report features two key metrics: 1) a break-down of which GPs have converted to the Smartcard system in a given month (across all districts) and 2) the number of MGNREGS payments that have been made to Smartcard-*enrolled* beneficiaries within *converted* GPs. These data allow the public, members of the project management unit, and top-ranking government officials to easily track the progress of what would otherwise be a highly opaque roll-out process.

The availability of organized, up-to-date, and location-specific data provides GoAP with ammunition to hold implementing agents and local government officials to account. From a practical standpoint, the monthly meetings serve as an effective forum for the Principal Secretary and CRD to review detailed information on the progress of the roll-out, identify low-performing areas, and directly discuss those areas with the responsible banks and providers.



R14.1 Smart Card Analysis Report

Report during the Financial Year '2011-2012' upto the Month of 'November'
Report as on Date : 29/11/2011

[Since Inception](#) | [Financial Year](#)

State : Andhra Pradesh

S.No	District	Payments upto previous month					Payments during the month							Total Payments				
		Benf.	Benf. in each transaction			Amount (Lakhs)	Benf.		Fresh Benf.	Benf. in each transaction			Amount (Lakhs)	Benf.	Benf. in each transaction			Amount (Lakhs)
			Regd.	Non Acct	Total		With Acct	Non Acct		Regd.	Non Acct	Total			Regd.	Non Acct	Total	
1	Adilabad	43050	58067	58748	116815	617.92	658	349	243	343	366	709	3.11	43293	58410	59114	117524	621.03
2	Anantapur	81094	195757	203375	399132	2065.73	29006	13634	8313	30626	25819	56445	279.39	89407	226383	229194	455577	2345.12
3	Chittoor	87377	331026	142225	473251	2006.29	29657	5683	10643	42190	9837	52027	226.97	98020	373216	152062	525278	2233.26
4	East Godavari	195562	683137	338055	1021192	3991.16	53790	18460	9015	59509	29438	88947	304.63	204577	742646	367493	1110139	4295.79
5	Guntur	163052	399715	357139	756854	3388.77	11818	4129	2208	11998	5847	17845	66.57	165260	411713	362986	774699	3455.34
6	Kadapa	135075	283973	462141	746114	3001.82	29664	12802	7341	30549	21768	52317	185.53	142416	314522	483909	798431	3187.36
7	Karimnagar	115030	182793	164750	347543	1292.65	27200	13466	15162	19589	18781	38370	152.58	130192	202382	183531	385913	1445.23
8	Khammam	77045	199358	89594	288952	1049.15	20754	11026	12922	14670	17233	31903	124.25	89967	214028	106827	320855	1173.4
9	Krishna	279701	982524	327011	1309535	4842.88	32995	8291	3486	37399	12180	49579	156.65	283187	1019923	339191	1359114	4999.53
10	Kurnool	107668	325105	264646	589751	2617.39	29128	9647	4627	34382	16575	50957	196.49	112295	359487	281221	640708	2813.88
11	Mahabubnagar	202169	464038	422475	886513	3892.45	16183	7753	3958	12307	11268	23575	90.39	206127	476345	433743	910088	3982.83
12	Medak	168575	428954	280972	709926	2846.71	8152	3808	2996	5552	5346	10898	44.54	171571	434506	286318	720824	2891.25
13	Nalgonda	260433	736996	0	736996	3077.95	0	0	0	0	0	0	0	260433	736996	0	736996	3077.95
14	Nizamabad	198570	673237	0	673237	2856.91	0	0	0	0	0	0	0	198570	673237	0	673237	2856.91

(Screenshot of web-based Smartcard update report, broken down by district)

Using Data to Improve Payments: GoAP has designed and operationalized a number of MIS reports to follow the movement of funds and monitor the disbursement process. Below we highlight two such reports that are regularly updated on the MGNREGS website:

- In 2011, after months of applying pressure to banks and TSPs, GoAP introduced a delay analysis report. The report presents data on the number of days each bank takes to achieve six main implementation steps:
 - Funds Transfer Order (FTO) generation → e-pay order generation
 - e-pay order generation → e-pay order web upload
 - e-pay order web upload → transfer of e-pay order to banks
 - transfer of e-pay order to banks → account crediting
 - account crediting → PoS download
 - PoS download → disbursement.

This report and the government's persistent efforts to make it a reality reflect GoAP's strong interest in using data to identify weaknesses in the implementation chain. The government is in the process of introducing a compensation scheme through which banks will be financially penalized if the above-outlined steps exceed four days (with a portion of the penalty credited directly to beneficiaries).

- GoAP has begun posting a report that contains bank-wise transaction-level data, though its coverage is still limited. Though the process of attaining this data has been challenging, its availability is essential for determining the prevalence of manual overrides and un-carded payments. Indeed, this

report is the government's most critical tool for monitoring the degree to which providers are achieving the envisioned goal of 100% biometric payments.

Overall, GoAP's willingness to integrate data into programming is commendable, not only because it drives improvements in efficiency and quality, but also because it represents a commitment to making the end-to-end payment delivery process more transparent. In the national context, AP stands out as a true pioneer in terms of its prioritization of information technology and the innovative ways in which it has used IT tools to improve program administration.

(3) MIS-Related Challenges

While GoAP has embraced a data-driven approach from the beginning, the practical execution of specific goals has been fairly challenging. Many banks and providers have displayed low levels of cooperation and have delayed sharing critical programmatic data with the government. On top of these challenges, government officials have had to deal with a range of data quality issues that inevitably arise in such a complex, dynamic system.

Cooperation of Bank: On the whole, banks and TSPs have followed up on GoAP's data requests at a sluggish pace. Securing transaction-level data, in particular, has required constant lobbying on the part of high-level officials such as the Principal Secretary and CRD. Though some banks have started providing this data, others (including some large payment agents) have still not done so. Moreover, those banks that are providing PoS-generated data are not doing so in a uniform way. In a number of districts, banks are only providing data on "carded" payments, while in others both carded and non-carded data are available. Only three districts (managed by UBI and Corporation Bank) are sharing numbers on "carded manual" (e.g. manual override) payments.

Overall, it is critical that banks provide regular transaction data for all three categories of payment: carded, non-carded, and carded manual. A robust MIS that tracks these quantities is essential for determining enrolment and authentication gaps that exist within the system. GoAP's challenges with obtaining these data may be the result of several factors:

- Some banks, including SBI, have expressed privacy concerns with respect to sharing individual beneficiary information
- A number of service providers have cited technical problems, including unreliable connectivity at the GP level, as barriers to sharing complete transaction-level data.
- The delay compensation scheme and GoAP's stated (though yet to be enforced) policy of withholding commission for all manual overrides may create incentives for banks and TSPs to deliberately avoid sharing data.

Some of the above-outlined issues tie back to the challenge of rolling out the Smartcard program through multiple implementing agents. The variation in technological capabilities and data management systems has made it difficult for GoAP to enact a uniform solution. Government officials may have erred in not laying out specific data sharing requirements in the original MoUs.⁴⁷ Had it been made explicit that no bank would receive a full commission until it provided appropriate transaction-level data, GoAP may have faced fewer challenges.

⁴⁷ MoU with UBI states, "The Government of Andhra Pradesh shall have unrestricted ownership to all the information, in any form obtained and processed under this MoU"

Data Accuracy: In a system where data are used to monitor performance and to inform programming, the accuracy of information flowing through the system is of paramount importance. The following challenges have arisen around the issue of data quality:

- Banks and/or TSPs may have incentives to present incomplete or distorted information in certain cases (*e.g.* when reporting the prevalence of manual overrides). Overall, it is essential that GoAP understand the process by which implementing agents are collecting and presenting information.
- In a similar vein, GoAP officials run the risk of losing credibility by not being fully transparent about their own progress statistics. The source of all such information should be clearly documented and communicated.
- Given the large volume of information and the many steps that occur in the handling of this information, errors are inevitable. Even at the field level, mistakes made by CSPs or factors like poor connectivity can lead to the loss and/or alteration of data. While all efforts must be undertaken to preserve data integrity and to build robust checks into the system, GoAP should not become overly reliant on MIS-generated statistics, at the cost of real-time updates from field staff and, to the extent possible, beneficiaries.

VIII. PERFORMANCE OF SMARTCARDS

Thus far, this report has outlined the historical developments, operational constraints, and key implementation themes of the AP Smartcard program. Beyond these facets of the project, the critical question remains as to what impact Smartcards are actually having on ground. Are they easing the payment process for beneficiaries? Are they reducing leakage or unexpectedly creating new sources of corruption? Are they having a positive impact on household welfare? Generating an unbiased estimate of the intervention's impact on these and other key indicators will require completion of J-PAL's full research program.⁴⁸ However, in this section, we present preliminary data on the functioning of the Smartcard program and discuss the extent to which Smartcards have delivered on the FI agenda.

A. Results from Survey Data

Below, we present descriptive data from four sources of household survey data:

- A baseline survey conducted in 8 study districts where Smartcards had yet to be rolled out (August – September 2010)
- A small-scale household survey conducted in 16 *mandals* of Krishna district (February 2011)
- A small-scale household survey conducted in 15 *mandals* of West Godavari district (May 2011)
- A Small-scale household survey conducted in 16 *mandals* of Nizamabad (June 2011)

Krishna and West Godavari initiated Smartcard payments in 2008 under Axis Bank/FINO and Union Bank of India/FINO, respectively. Nizamabad launched biometric payments under the Post Office system and APOne in 2010. At the time the data were collected, the Post Office was issuing only MGNREGS biometric payments; additionally, these districts were three of the best implementing districts. **The data presented below do not reflect experimental comparisons and therefore cannot be used to generate causal claims;** however, they do provide a useful snap-shot of the functioning of several biometric models, as compared to the previous post office system.

(1) Performance of Smartcard System

The enrolment process seems to have been largely effective across the three districts. The majority of respondents report having received Smartcards in Krishna/West Godavari and having interfaced with the biometric payment system at least once across all three districts.

Table 2: Smartcard/Biometric Coverage as Reported in Krishna, West Godavari, and Nizamabad

Metric	Krishna	W. Godavari	Nizamabad
% of households in which at least one household member reported having a physical Smartcard	90.87	89.47	N/A
% of households in which at least one household member reported either having used a Smartcard or biometric reader to collect APREGS/SSP payment	84.65	84.21	96.27

Table 3 shows that a large percentage of beneficiaries are aware of when payment agents are available, suggesting a relatively high degree of reliability in the system. On average, beneficiaries find the CSP/BPM to be unavailable only 2% and 7% of the time in West Godavari and Nizamabad, respectively.

⁴⁸ The final endline study was conducted in August-September 2012 and results are expected by summer 2013.

The fact that the CSP resides within the village where she makes payments may lead to greater accountability, as reflected in the very low rate of reported absenteeism in West Godavari.

Table 3: Variables on CSPs/BPMs as Reported in West Godavari and Nizamabad⁴⁹

Metric	W. Godavari	Nizamabad
Of those who responded, % of respondents who said they know when CSP/BPM is available to disburse payments	84.34	78.97
Average number of visits that respondents reported having made to CSP/BPM	10.06	11.44
Average number of visits for which respondents reported visiting CSP/BPM and CSP/BPM not being available	0.25	0.85

An effective biometric payment model requires that 100% of payments are authenticated. Deviation from this principle leaves the system vulnerable to various forms of leakage and reduces the effectiveness of the biometric check. In Table 4, we present reports on authentication from SSP and MGNREGS beneficiaries. As discussed earlier in this report, districts managed by the Post Office have been able to achieve impressive rates of biometric authentication. This reality is reflected in our survey data, with close to 100% of MGNREGS beneficiaries reporting a fingerprint scan on their last payment.

Overall, a larger percentage of SSP respondents in West Godavari and Krishna report receiving scans, as compared to MGNREGS respondents. The higher volume of payments associated with the latter program may result in a greater incidence of manual overrides (due to pressure on CSPs to make payments quickly etc.). However, the fact that less than 70% of MGNREGS respondents in West Godavari report having received an authenticated payment on their last visit is a troubling indicator of suboptimal program implementation.

Table 4: Variables on Payment and Authentication as Reported in West Godavari and Nizamabad

Metric	Krishna		W. Godavari		Nizamabad
	MGNREGS	SSP	APREGS	SSP	MGNREGS
Of those who responded, % of respondents who said they needed a Smartcard to collect last payment	77.0	88.9	66.8	78.0	N/A
Of those who responded, % of respondents who said they had to scan finger to collect last payment	79.6	95.1	64.6	76.9	96.2

(2) Benefits for Users

Tables 5 and 6 present a number of metrics related to the MGNREGS/SSP payment process. Perhaps the most striking result is the sizeable time savings incurred by MGNREGS beneficiaries who are accessing CSP-mediated payment models. As compared to the baseline, beneficiaries save roughly 1.5 hours collecting their wages in Krishna and West Godavari –per wage-seeking episode. While Nizamabad has adopted a biometric system, the fact that individuals still have to visit the nearest branch post office (versus the local CSP) is reflected in the round trip travel time of 150 minutes. The contrast is less striking for SSP respondents, most likely because pensioners previously collected payments from local PDOs (in the same village), not from a post office.

⁴⁹ Krishna district not included because these questions were not included in the first iteration of the survey.

The percentage of beneficiaries who report having to pay a fee to collect payments is overall low for both MGNREGS and SSP; however, reports are more prevalent among baseline respondents and those in Nizamabad (*i.e.* people receiving payments through the post office). The percentage of workers that report being paid an incorrect amount is higher among baseline respondents than among respondents in districts with biometric systems. The dual check of authentication and a printed receipt may be responsible for this reduction.

Table 5: Variables on MGNREGS Payment as Reported in Baseline, Krishna, West Godavari, and Nizamabad

Metric	Baseline ⁵⁰	Krishna	W. Godavari	Nizamabad
Average time taken to collect earnings (in minutes)	161.02	66.54	77.99	150.38
Of those who responded, % of respondents who reported having to pay a fee to collect earnings	4.86	0.31	0.00	5.26
For those who reported having to pay, average amount (in rupees)	15.92	4.00	N/A	6.48
% of respondents who reported not getting paid the right amount for at least one week of work	6.40	0.54	0.00	1.16
For those who do not receive the correct amount, average discrepancy between entitled amount and amount actually received (in rupees)	144.62	20.00	N/A	N/A

Table 6: Variables on Pension Payment as Reported in Baseline, Krishna, and West Godavari

	Baseline	Krishna	W. Godavari
Average time taken to collect pension (in minutes)	99.30	83.22	81.40
Of those who responded, % of respondents who report having to pay to collect pension	4.75	0.00	0.78

(3) Perceptions of Users

Our survey data indicate very high levels of beneficiary support for biometric payments, as compared to the previous post office model. Across the three districts, an impressive 94% of beneficiaries state their preference for the new system. Given that the BC concept has only been recently introduced and that beneficiaries in rural areas may have varying levels of familiarity with technology, it was not obvious from the outset that communities would receive the intervention positively. **The figures below represent a powerful endorsement of the biometric payment option.**

Metric	Krishna	W. Godavari	Nizamabad
% of respondents who said they preferred Smartcards/biometric payments to the previous system	96.42	90.40	96.24

We asked beneficiaries more detailed questions to better understand their perceptions of the Smartcard system. The figures in Table 7 reflect the percentage of beneficiaries that agree or strongly agree with a given statement. Not surprisingly, the majority of respondents agree that biometric payments save time. A sizeable portion of beneficiaries think they are more likely to receive their entitled payment, and the majority of respondents find the receipt to be helpful. A much larger percentage of respondents in

⁵⁰ The Baseline survey was conducted in the eight study districts – Adilabad, Anantapur, Kurnool, Kadapa, Vizianagaram, Nalgonda, Khammam, and Nellore - from August-September 2010 and October-November 2010. These districts were non-carded at the time of the survey.

Nizamabad agree that biometrics prevent others from collecting their payments, than in Krishna or West Godavari. This may be a result of weaker adherence to authentication in the latter two districts.

Table 7: Beneficiary Perceptions of the Biometric as Reported in Krishna, West Godavari, and Nizamabad

Metric	Krishna	W. Godavari	Nizamabad
Increased speed of payments	92.1%	73.7%	70.6%
Fear of losing Smartcard and being denied payment	30.1%	37.0%	N/A
Fewer trips to receive payments	31.0%	50.6%	56.2%
Better chance of getting entitled amount	48.7%	70.0%	74.3%
Preventing others from collecting payment on beneficiary's behalf	4.4%	11.5%	81.9%
Helpful to receive a receipt for every payment	73.1%	84.4%	64.9%

B. Delivery on FI Agenda

The architects of the Smartcards program hoped that establishing a viable carded payment system would enable various financial inclusion activities. In reality, the majority of banks have yet to leverage Smartcard accounts for the delivery of non-EBT products. Below we explore several potential explanations for why this goal remains unrealized.

(1) Lack of Coordination between EBT and FIP Programs

One structural factor that has hindered progress is the lack of harmonization between RBI's FI plan (rolled out through the "service area" approach) and GoAP's EBT program (implemented through a "one-district-one-bank" approach). In 2011, RBI decided to address this issue with an integrated approach known as the "one district-many banks-one leader bank" model. An official report, in which the new guidelines are laid out, describes the problem in the following manner:⁵¹

"The experience gained so far suggests that the 'One District – One Bank' Model has not been able to achieve the objective of financial inclusion. Allocation of villages amongst banks under the Financial Inclusion Plan (FIP), i.e. roadmap for providing banking services to villages with population above 2000, has been generally on the basis of the Service Area Approach. This has led to a situation wherein the designated bank for EBT and FIP in the same village differed."

RBI's new recommendations include:

- All banks present in the district will begin providing EBT services, though the state government will only interact with one designated "lead bank" (the lead bank will coordinate various EBT-related processes within the district)
- All EBT accounts (*i.e.* Smartcard accounts) will be required to provide standard banking services, including deposits, overdraft, remittance, and "entrepreneurial credit products." These accounts will be subject to regulatory guidelines pertaining to regular, no-frills savings account.
- The same report specifies that "The State Government should not stipulate any condition that prevents EBT accounts from being used for other banking transactions."

⁵¹ RPCD.CO.BC.FID.No. 16 Operational Guidelines on implementation of Electronic Benefit Transfer (EBT) and its Convergence with Financial Inclusion Plan (FIP), RBI (2011)

RBI's acknowledgment of the lack of integration between FI and EBT programming is a positive step, as is the official sanctioning of expanded services via EBT accounts. However, the new proposal effectively represents a return to the "service area" approach in that all banks present in the district are required to participate in the EBT program. Given how challenging AP's previous experience with the "service area" proved to be, a shift back would not bode well for the implementation process.

(2) Barriers from GoAP Side

A number of banks have complained about the government's unwillingness to allow beneficiaries to utilize their Smartcard accounts for basic savings purposes (*i.e.* to conduct partial withdrawals). From its perspective, GoAP is reluctant to permit undisbursed funds to remain in accounts due to the practice of under-payment and the existence of "ghost" beneficiaries. C-GAP describes this policy stance in a recent report: "When payments are credited to beneficiaries' no-frills accounts only to be fully disbursed within a few days by the banks at the request of the governments, there is little potential for increased usage." (Breloff & Retman, 2011) Individuals receiving EBT should, at minimum, have access to a basic savings facility. GoAP should determine alternate strategies for identifying fake, dead, or migrated beneficiaries and lift restrictions on partial withdrawals.

(3) General Challenges with BC Model

From a broader perspective, agent-based strategies have been widely promoted by RBI (nearly 90,000 BCs have been appointed)⁵²; however, the overall effectiveness of these models remains an open question. Members of the banking community and government officials have spoken about slow implementation progress and various ground-level challenges, some of which we highlight below:

- The Chairman of the Economic Advisory Council, C. Rangarajan has pointed to the BC compensation model as one contributing factor to slow implementation. A number of officials that we interviewed for the Smartcard project also stated that CSPs expressed dissatisfaction with their level of remuneration. While this has not necessarily resulted in a large number of resignations, it may result in low motivation levels and reluctance among CSPs to take on additional responsibilities.
- A number of officials have highlighted deficits in CSP training and have called for greater effort on the part of banks and providers.
- A large percentage of no frills accounts that have been opened appear to be dormant. ("Financial Inclusion Plan", 2011) As RBI Governor D. Subbarao pointed out, "The financial inclusion programme through BCs has not picked up at the required level as they are yet to win confidence among the micro borrowers." ("Train Business Correspondents:RBI", 2012) Banks must focus on developing appropriate products for which demand exists, as well as establishing levels of trust among the public vis-a-vis the BC model.

Overall, banks have a substantial way to go in terms of developing a profitable business model for the delivery of services through branchless banking. Irrespective of mandates and targets set by RBI, the difficulty of this task should not be under-estimated. In the words of the CIO of HDFC bank:

"It is no secret that most accounts, opened in their current form, are not financially viable...Banks need to find innovative ways to at least not lose money and then work towards

⁵² http://www.thehindubusinessline.com/industry-andeconomy/banking/article2761287.ece?homepage=true&ref=wl_home

making a reasonable financial gain, failing which, this (financial inclusion) will never become a mainstream activity.”

Indeed, banks are experimenting with a number of different approaches. For example, ICICI has decided to substitute away from the BC model and towards one of ultra-small ATMs.(Sokhi and Chakraborty, 2012) Many large banks have also recently linked up with telecom companies to explore mobile banking platforms. In short, the question of what model will prove most effective at meeting social objectives while also remaining viable from a business perspective remains an open one. Keeping this in mind, it is not entirely surprising that the Smartcard providers in AP have struggled to deliver on their FI agenda.

IX. CONCLUSION

The state of Andhra Pradesh has forged the way in developing technological systems to better assist service delivery to beneficiaries of government welfare programs. Since the AP biometric initiative serves as a critical precursor to India's UID initiative and various biometric-based benefit implementation programs in other states, the processes surrounding its Smartcard program provide critical insights for policymaking and implementing institutions to learn from. GoAP has made a sustained and impressive effort to implement the Smartcard program and AP has achieved much higher success in rolling it out than any other state in India. However, as the oldest biometric program in the nation, several challenges – including logistical, technological, political, bureaucratic, and managerial - have cropped up during implementation of the program. These successes and challenges have been investigated in detail in this report.

In 2007, GoAP started rolling out Smartcards via a bank-led, partnership model. A number of key themes emerged in the process of implementation, including incentives of implementing institutions, degrees of political cooperation, an operational model with complex partnerships between implementing institutions, and the role of data collection and management as accountability and transparency mechanisms. Key challenges faced throughout the implementation process include addressing the enrolment gap, high costs associated with physical Smartcards, adhering to CSP appointment criteria, dealing with cash management and circulating large volumes of money, and creating strong de-duplication and point-of-transaction authentication systems. The insights from each of these themes and the attempts to resolve these challenges are presented in this report and can provide helpful road maps for future program design – especially for the ambitious nationwide attempt to integrate payments in various social sector programs with Aadhar-based authentication.

The J-PAL AP Smartcard impact evaluation and process study has also yielded promising results for the larger project of building an infrastructure for financial inclusion, and portable benefits using biometric authentication. Beneficiaries report high satisfaction (greater than 90%) with carded payments. Even without estimating impacts on leakage, we see substantial benefits from just the time that beneficiaries save in accessing payments – in fact, purely monetizing these time savings would pay for the program in one to two years. The promising process-related insights revealed by our study demonstrate that a linkage between biometric NREGS payments with a larger scheme like Aadhar would be well worth the effort to implement – there are substantial benefits seen both through increased beneficiary satisfaction and system efficiency.

The AP experience, however, also illustrates the dangers of scaling up too soon – the various operational and incentives issues in reaching 100% coverage of biometric payments that exist make it important to evaluate and create models to address these issues before expanding any such program to a larger scale. Additionally, the current Smartcards program model has seen substantial barriers and hold-ups to delivering on the financial inclusion agenda. Part of dealing with these issues involves building a dedicated and empowered team that can drive such integration by following an action plan that aims to tackle all of the logistical, technological, political, bureaucratic, and managerial challenges detailed in this report.

One of the most important hurdles faced in the AP Smartcard experience has been that of creating a sustainable model for steady state enrolment rather than a one-time campaign mode. Most of the major challenges (including determining when to convert a GP and an inability to stop un-carded

payments) have been due to the lack of an enrolment process at the PoS. In order for a viable model of this type to be created, transaction-level authentication data also must be provided so that banks and TSPs can be held accountable for authentication.

To better address operational and incentive issues in integration, systems should be set up to both measure beneficiary experiences and to pay banks and/or TSPs to make it incentive compatible for them to invest in a high-quality beneficiary experience. Rather than exerting top-down pressure to enforce such incentives, systems and contracts that reward banks/TSP's for performance and penalize them for not delivering on SLAs, if properly designed, are likely to lead to more effective implementation. Finally, the AP experience shows that physical smartcards may not be necessary for first-generation applications that are not portable (like NREGS payments) – and a cardless model may in fact be more efficient.

Overall, the AP Smartcards program provides a plethora of lessons for designing and implementing biometric programs in India. Though several key challenges have arisen during the implementation process, GoAP's strong commitment to strengthening the system for beneficiaries and willingness to adapt its current model to process and operational insights that have emerged from the field, provide a relevant roadmap for similar efforts in the future across India and the world.

GLOSSARY

ALW	A Little World
AP	Andhra Pradesh
APGVB	Andhra Pradesh Grameen Vikas Bank
APOnline	Andhra Pradesh Online
BC	Business Correspondent
BPM	Branch Post Master
CGAP	Consultative Group to Assist the Poor
CRD	Commissioner of Rural Development
CSP	Customer Service Provider
DC	District Coordinator
DRD	Department of Rural Development
DRDA	District Rural Development Agency
DWMA	District Water Management Agency
EBT	Electronic Benefit Transfers
eMMS	Electronic Muster and Measurement System
FI	Financial Inclusion
FIP	Financial Inclusion Plan
FTO	Funds Transfer Order
G2P	Government-to-Person
GoAP	Government of Andhra Pradesh
GP	Gram Panchayat
GPRS	General Packet Radio Services
HPM	Head Post Master
IDRBT	Institute for Development and Research in Banking Technology
JPAL	Jameel Poverty Action Lab
MC	Mandal Coordinator
MGNREGS	Mahatma Gandhi National Rural Employment Guarantee Scheme - aka NREGS
MIS	Management Information System
MLA	Member, Legislative Assembly
MoU	Memorandum of Understanding
MPDO	Mandal Parishad Development Officer
NGO	Non-Governmental Organization
NISG	National Institute for Smart Government
NREGS	National Rural Employment Guarantee Scheme
PD	Project Director
PDO	Pension Disbursement Officer
PoS	Point of Service
PPP	Public-Private Partnership
PSRD	Principal Secretary of Rural development
RBI	Reserve Bank of India
RBI	Reserve Bank of India

RCT	Randomized Controlled Trial
SBH	State Bank of Hyderabad
SBI	State Bank of India
SHG	Self-Help Group
SLA	Service Level Agreements
SLBC	State Level Bankers' Committee
SSP	Social Security Pension
TSP	Technology Service Provider
UID	Universal Identification
ZMF	Zero Mass Foundation

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