“The Paper Slip Should be There!”
Perceptions of Transaction Receipts in Branchless Banking

Saurabh Panjwani
Bell Labs Research, India
saurabh.panjwani@alcatel-lucent.com
Mohona Ghosh, Ponnurangam K, Soumya Vardhan Singh
IIIT Delhi, India
{mohona1011.pk,soumya10086}@iiitd.ac.in

ABSTRACT
Mobile-based branchless banking has become a key mechanism for enabling financial inclusion in the developing world. A key component of all branchless banking systems is a mechanism to provide receipts to users after each transaction as evidence for successful transaction completion. In this paper, we present results from a field study that explores user perceptions of different receipt delivery mechanisms in the context of a branchless banking system in India. Our study shows that users have an affinity for paper receipts: despite the provision of an SMS receipt functionality by the system developers and their discouragement of the use of paper, users have pro-actively initiated a practice of issuing and accepting paper receipts. Several users are aware of the security limitations of paper receipts but continue to use them because of their usability benefits. We conclude with design recommendations for receipt delivery systems in branchless banking.

Author Keywords
Branchless banking; mobile; receipts; security; user study

ACM Classification Keywords
H.5.2 Information Interfaces and Presentation: Miscellaneous

General Terms
Human Factors; Security

INTRODUCTION
Branchless banking systems are becoming prevalent in the developing regions of the world as a mechanism to extend financial services to the economically deprived populations. Instead of setting up formal bank branches and ATM outlets, these systems use a network of human agents to facilitate banking transactions, thereby reducing the cost of banking for people with small cash holdings. Today, over 50 million people in the developing world rely on branchless banking services to meet their financial needs and together they transact more than $100 million on a daily basis [3].

Mobile phones play a central role in branchless banking, owing to their low cost and deep penetration in the developing world. Transactions typically involve a bank customer and an agent meeting in one location, exchanging messages with a remote server (operated by the bank) using their mobile phones and giving cash to, or taking cash from, the other user. At the end of each transaction, users normally receive a confirmation or a “receipt” which serves as evidence of transaction completion and can be used in situations of disputes later on. In many systems, receipts are sent by the bank server in the form of an SMS to the transacting parties’ mobile phones and these SMS’es contain critical information like the amount transacted and the affected account number. Other systems use the more traditional paper receipts which are printed using custom networked devices operated by agents.

In this paper, we present results from a field study around users’ perceptions of different receipt delivery mechanisms in an active branchless banking service in India named Eko [1]. Eko is in a unique position to conduct such a study with: even though the system providers implemented a purely SMS-based receipt functionality in the initial deployment, a parallel system of delivering paper receipts has organically evolved and is currently widespread amongst its users. The use of paper receipts brings in new threats to the system (which we discuss within) and there is a prevalent perception that the SMS receipts are safer than those given on paper. Eko’s providers, too, have tried to curtail the usage of paper receipts for security reasons. Still, users continue with the practice, primarily for the usability advantages that paper affords them.

The introduction of paper receipts into Eko’s system and their co-existence with the original SMS form enabled us to deeply understand user perceptions with respect to the two mediums. Our findings paint a mixed picture: on the one hand, customers perceive paper as being a more reliable, accessible and tangible medium for carrying receipts and for these reasons, demand continuance of the new practice; on the other, they view some benefits to SMS as well, which make them reluctant to see SMS receipts replaced by paper. Based on these findings, we synthesize design recommendations for secure and usable receipt systems in branchless banking.

BACKGROUND AND RELATED WORK
Using mobiles for commerce is becoming widespread in the world, both in developed and developing societies. Our focus in this work is on a specific type of mobile banking, called branchless banking, which is unique to developing regions. Characteristic to these systems is the notion of a human agent who is usually a member of the target community tasked with facilitating transactions for customers the way ATM machines and tellers do for regular bank users. For example, the system might enable customers to visit an agent, open a bank account and to deposit money into the same account or another account by paying the agent in cash. Agents facilitate...
transactions using a networked device which is either a simple mobile phone or a custom point-of-sale device with mobile connectivity. The cost of providing banking services through agents in this manner is often lower than that of setting up brick-and-mortar offices in the developing world, which is why branchless banking is gaining prominence here [3].

While the use of transaction receipts is common in financial transactions, their study is particularly relevant in the context of branchless banking. Unlike retail transactions or ATM withdrawals, here, a transaction receipt may symbolize an account credit for real cash that has been transferred to another, potentially-untrusted human and is the primary evidence that the credit has been recorded by the bank. Still, questions around usability of receipts in these systems remain under-explored. Kumar et al. [2] present an ethnographic study on payment practices in India and provide design guidelines for mobile-based payment and banking systems. While this study brings out the potential value that digital receipts can bring to transactions in developing countries, it does not address the issue of user perceptions of different receipt forms. Panjwani [5] studies the problem of SMS spoofing in branchless banking and proposes a simple protocol to prevent spoofing of SMS receipts. Our work complements [5] by building a deeper understanding of receipt usability in branchless banking and our design recommendations address the security issues studied in that work.

User perceptions of paper versus digital forms of communication have been studied in numerous works and it is not uncommon to find applications, even today, where users prefer the use of paper to the digital equivalents. Two domains with recent examples are education [4] and microfinance [6]. Like in other applications, we find user preferences to be mixed in our context as well: some prefer paper, some digital. Unlike other works, though, we uncover some new influencers for user preferences e.g., reliability being a reason for favoring paper and security for favoring digital.

STUDY CONTEXT AND METHOD

Our work is situated in the context of Eko [1], one of the most actively-used branchless banking services in India. Eko is a business correspondent of State Bank of India (SBI), the largest bank in the country, and two private banks and through its network of more than 1500 agents, serves nearly 2 million people in eight Indian states. Eko’s primary service offering is money transfer (amongst other services like creation of small savings accounts), and is intended to work as follows: A customer approaches an Eko agent (usually a small shop owner) with the money to be transferred in cash and the agent sends a text message using his phone to an Eko-operated server with relevant details like the amount, the target account number and some information necessary to authenticate the agent to Eko. Once the transaction is recorded at the server, both the agent and the customer receive an SMS confirming transaction completion. Upon seeing the confirmation, the customer submits the cash to the agent, along with a fee. The service is targeted at low-income migrant workers in urban India who regularly need to send money to distant relatives but due to domicile requirements, are unable to acquire a personal bank account to do this. Such people, who would earlier either rely on expensive methods like money orders, or spend numerous hours standing in queues at bank branches, can now use branchless banking services to meet their needs. Eko reports a daily transaction volume of more than Rs.50 million ($1 million) in its money transfer offering.

For a successful transaction, the SMS receipt sent to the customer has a form depicted in figure 1(a). It first shows the amount deposited and the recipient’s account number, which is followed by other fields like the transaction fee and the transaction ID (TID). The content is in English, which is not the first language for users but easier to implement on SMS. Eko reports that it has tried to stay away from the use of printed paper receipts in their system in order to reduce costs and ease deployment. To assist users in situations of SMS failures, it provides phone-based customer care service, information about which is displayed on posters inside agent shops. There are several other branchless banking systems which use SMS receipts and follow a method similar to Eko’s: M-Pesa, the leading branchless banking service in the world, falls into this category and its user interface for transactions is very similar to the Eko interface1. GCash, another popular branchless banking service, also relies on SMS alone for communicating receipts2.

Method. Our study was qualitative in nature and we used a combination of one-on-one, semi-structured interviews and physical observations to gather data on user perceptions. The research took place in the peri-urban areas of Delhi, where Eko actively operates. We sampled users in two steps. First, we selected 15 agents from a long list of agents provided to us by Eko, ensuring a broad geographic spread in the city (8 locales of Delhi were covered, each at least 5 km apart from the others). We visited these agents, most of whom operated a mobile service shop in the heart of a slum, and interviewed them while they conducted their daily affairs. When Eko customers visited, we observed them conduct transactions (where feasible) and later, based upon customer consent, interviewed them as well. A few customers were approached via phone calls. Interviews were conducted in Hindi, the common language across all users, and responses recorded on paper. We followed a standard informed consent protocol and did not query subjects about sensitive details like their account balances. Observations were made from a distance ensuring that no private credentials were leaked but still allowing us to notice customer actions. We spoke to 67 users in all (15 agents, 52 customers) and observed 87 transactions. All users were compensated for their time.

User profiles. Our respondents had limited education, twenty (about 30%) not having made it past 8th grade and a majority (75%) not having made it to college. Agents were consistently better-educated than their customers, although we found one agent who studied only till 6th grade and was without a less-educated customer. Less than half of the users have monthly incomes greater than Rs.10,000 ($200). There was only one female agent and 3 female customers in our sample, which is reasonable given that less than 5% (resp. 10%) of

1http://mpesa.vodafone.in/faqs.html
similar problems have been reported by users of M-Pesa delays and shutdowns does not seem to be unique to Eko; first-time customers during this period. The problem of SMS fixed, agents were dissatisfied by it, being forced to turn away and its partner banks. Even though the shutdown period was evenings which was used to synchronize data between Eko and its partner banks. Even though the shutdown period was fixed, agents were dissatisfied by it, being forced to turn away first-time customers during this period. The problem of SMS delays and shutdowns does not seem to be unique to Eko; similar problems have been reported by users of M-Pesa.

The Paper Receipt Phenomenon. The use of paper receipts seemed to have emerged as a response to these problems. Out of the 15 agents we spoke to, 11 had pro-actively initiated a practice of giving out hand-written paper receipts to customers as a way to supplement SMS and they all justified it as a mechanism to compensate for SMS failures: “Even if the SMS is late, this serves as proof that they made the deposit.” Paper receipts were also being used as a strategy for convenience: some agents would collect cash from customers, provide a paper receipt but postpone transaction processing for later when they would be idle. This not only increased operational efficiency (agents could process transactions in batches) but also improved availability (they could accept transaction requests from customers during shutdowns). Up to 9% of an agent’s income from Eko was reportedly spent on buying receipt paper.

Agents seemed to be experimenting with different techniques and formats of paper receipts to maximize customer confidence and minimize service time. In most shops, the practice seemed to have started by writing down transaction details on a piece of scratch paper and giving it to the customer to use in case of future disputes (figure 1(b)). Some agents maintained this practice at the time of our visits, but more than half had transitioned to a system of structured, pre-printed sheaves of paper which were filled out as transaction requests came in. The sheaves were designed to mimic receipt booklets commonly seen in bank branches in India and often contained a few fields not included in the SMS’es (like the customer’s signature). A logo of SBI was almost always present (figure 1(c)). Some agents had started using custom-made rubber stamps to stamp each receipt, to increase customer acceptance. A step further in the evolution of the paper receipts was to delegate the receipt-filling activity to the customers, which we observed in four of the shops we visited. Delegating receipt filling to customers saved agent effort and also reduced errors during data entry on the phone (figure 1(d)).

The use of paper receipts, as done by Eko agents, reduces traceability of transactions, and opens up new possibilities of agent abuse. We heard of multiple cases in which an Eko agent had maliciously given out paper receipts in exchange for cash deposited by his customers, not implemented the electronic protocol and instead attempted to fleece with his cash collection. Eko disallows the use of paper receipts to defer transaction execution (as done by many agents) and emphasizes the importance of viewing SMS’es and calling customer care on its posters at the shops. Still, the practice persists in several sites, and reflects the tight relationship of trust that customers and agents share with each other.

SMS vs. Paper. The introduction of paper receipts into the system was clearly disrupting the use of SMS’es by customers. In the shops where paper receipts were not provided, we observed that customers made eye-contact with the SMS receipt within the shop’s premises in 86% of the transactions (12 out of 14 transactions observed); in the remaining shops, this figure was down to 38% (28 out of 73). We noted 8 transactions in the latter category (11%) where the customer did not even bring his or her phone to the shop.

Customers varied in their views on paper and SMS but, in general, we heard several advantages of paper being reported. As expected, reliability was a key perceived benefit: “The

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paper receipt should be there; whenever the SMS does not come, it would be of use.” We witnessed three events during our visits wherein an SMS receipt was delayed, the customer complained about it and the agent was able to persuade him to accept the paper receipt as an alternate arrangement.

Besides reliability, customers reported three other benefits to paper—accessibility, tangibility and storability. Since paper receipts often had local-language content and SMS viewing was constrained by screen size, several customers found paper receipts more accessible than SMS. Customers also seemed to appreciate the idea that a paper receipt was a physical entity that could be stored outside a phone: “The [paper] slip should definitely be there. The SMS is only on the phone. If, tomorrow, I need to show the bank that I have deposited the money, how can I show my phone?” Interestingly, a few customers (about 30%) also perceived paper receipts to be easier to store than SMS, attributing this to limited phone capacities: “My phone can store only 20 messages. I delete old [receipts] when it is full.” At least 11 customers claimed to be deleting SMS receipts only due to space limits on their phones.

These perceptions were naturally driving customer demand for paper receipts which, in turn, was encouraging agents to continue to use them. But customers were conscious of the advantages of SMS’es as well and did not wish to see them replaced. Twice as many customers found SMS easier to manage as did paper, making statements like: “The paper receipt gets lost. How do I take care of it?” “I don’t need to store SMS separately. It’s always in my pocket.” A larger number of customers reported SMS receipts to be more secure than paper receipts, perceiving them as the true indicator of transaction completion: “I have more trust in SMS. Even if I get a paper receipt, it does not mean that the money has reached.” Finally, when asked about their overall preferences, 22 out of 36 (61%) customers who had transacted paper receipts stated an overall preference for SMS for reasons of security and ease of storage. Still, many of these users continued to use paper receipts during transactions.

CONCLUSION
From our user study, it is clear that reliability and security are key features that users of branchless banking systems seek in transaction receipts and that it is difficult to ensure both using a fragile medium like SMS. It is also clear that a customer care service alone is not a solution to the problem of unreliable receipts—fewer than 20% of the customers in our study had called customer care in situations of SMS failures and even amongst these, there were reports of frustration caused by the long resolution process this entailed.

Our primary design recommendation is to improve the reliability of SMS-based receipts used by systems like Eko and we argue that this is possible without a significant loss in usability and without network modifications. For example, a mechanism which enables customers to pull transaction receipts from the Eko’s servers (as opposed to relying solely on push-based receipts) would help: when an SMS receipt is delayed, the customer sends a pull message to the server (say, using a missed call) and the server simply re-transmits the receipt. Re-transmission in the form of SMS may itself increase receipt arrival rate (although this requires more research) and further improvement may be achieved by varying either the mode of re-transmission (e.g., sending a receipt in an automated voice call) or the transmission path (e.g., transmitting via a different operator). From the user’s perspective, sending a pull message or two to the bank is likely to be less of a burden than engaging in a conversation with a busy customer-care call center. Furthermore, appropriate use of pull messages can also enhance security of the transaction receipts (thwarting trivial receipt spoofing attacks) as described in [5]. We do not know of any branchless banking system which uses this technique to improve receipt reliability. Some systems (like M-Pesa in Kenya), which are managed entirely by network operators, are in a position to increase reliability by using network-layer techniques (e.g., by fortifying the SMSC’s), and are conceivably applying these techniques in practice. But such techniques are not scalable and will not work for systems like Eko, which are operator-agnostic.4

Second, it is important to note that reliability was just one factor that was driving users towards the use of paper and attributes like accessibility and tangibility are hard to achieve in digital receipts, in general. From a pragmatic perspective, a combination of paper and digital is likely to work better than digital alone. One approach would be to provide an option of obtaining printed paper receipts to customers via custom devices held by agents but, for security, require a pull message from the customer to trigger receipt printing. Modern-day SMS printers are now available at a price point of less than $100 which is affordable for many agents, given they are already spending extensively on printing receipt booklets.

Finally, a key intervention needed in a branchless banking system like Eko’s is that of customer education. Building a more robust transaction receipt mechanism will have no effect if customers are easily persuaded into accepting handwritten receipts from agents in place of what is prescribed by the system. It is important to ensure that all rules are effectively communicated to customers, leaving little room for agent manipulation. Whether this objective can be realized in a consistent and cost-effective manner is a tremendous challenge that will need to be addressed in future work.

REFERENCES
1. Eko India Financial Services Pvt. Ltd. http://www.eko.co.in

4As more developing-world users use data-enabled phones, it may become possible to send receipts on the data channel, which is more reliable than SMS. But this still a bit futuristic: in our study sample, less than half of the customers possessed data-enabled phones.