Mobile banking and economic development: Linking adoption, impact, and use

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Abstract

Around the globe, various initiatives use the mobile phone to provide financial services to those without access to traditional banks. Yet relatively little scholarly research explores the use of these m-banking/m-payments systems. This paper calls attention to this gap in the research literature, emphasizing the need for research focusing on the context(s) of m-banking/m-payments use. Presenting illustrative data from exploratory work with small enterprises in urban India, it argues that contextual research is a critical input to effective "adoption" or "impact" research. Further, it suggests that the challenges of linking studies of use to those of adoption and impact reflect established dynamics within the Information and Communication Technologies and Development (ICTD) research community. The paper identifies three crosscutting themes from the broader literature—amplification vs. change, simultaneous causality, and a multi-dimensional definition of trust—each of which can offer increased theoretical clarity to future research on m-banking/m-payments systems.

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The spread of mobile phones across the developing world is one of the most remarkable technology stories of the past decade. Buoyed by prepay cards and inexpensive handsets, hundreds of millions of first-time telephone owners have made voice calls and text messages part of their daily lives. However, many of these same new mobile users live in informal and/or cash economies, without access to financial services that others take for granted. Indeed, across the developing world, there are probably more people with mobile handsets than with bank accounts (Porteous, 2006). Various initiatives use mobile phones to provide financial services to "the unbanked." These services take a variety of forms—including long-distance remittances, micropayments, and informal airtime bartering schemes—and go by various names, including mobile banking, mobile transfers, and mobile payments. Taken together, they are no longer merely pilots; in the Philippines, South Africa, Kenya, and elsewhere, these services are broadly available and increasingly popular.

Scholarly research on the adoption and socioeconomic impacts of m-banking/m-payments systems in the developing world is scarce (Maurer, 2008). Even less attention has been paid to the social, economic, and cultural contexts surrounding the use of these systems. This paper's goals are threefold: first, it calls attention to this gap in the research literature and emphasizes the need for research focusing on the context(s) in which m-banking/m-payments systems are used. Second, it argues that, to the extent it helps reveal the myriad social, technological, and economic influences on use, this contextual research is not simply a complement but rather a critical input to effective "adoption" or "impact" research. Finally, the paper argues that the challenges of generating interdisciplinary dialogue about m-banking in the developing world are illustrative of long-running dynamics within the community of scholars and practitioners concerned with Information and Communication Technologies and Development (ICTD). The m-banking case adds new wrinkles to broader discussions about technology and development, and about mobiles in society.

M-Banking and M-Payments Systems in the Developing World

The terms *m-banking*, *m-payments*, *m-transfers*, *m-payments*, and *m-finance* refer collectively to a set of applications that enable people to use their mobile telephones to manipulate their bank accounts, store value in an account linked to their handsets, transfer funds,

or even access credit or insurance products. This paper uses the compound term *m-banking/m-payments systems* to refer to the most common features.

The first targets for these applications were consumers in the developed world. By complementing services offered by the banking system, such as checkbooks, ATMs, voicemail/landline interfaces, smart cards, point-of-sale networks, and internet resources, the mobile platform offers a convenient additional method for managing money without handling cash (Karjaluoto, 2002). For users in the developing world, on the other hand, the appeal of these m-banking/m-payments systems may be less about convenience and more about accessibility and affordability (Cracknell, 2004; infoDEV, 2006). An exploration is underway—between banks, mobile operators, hardware and software providers, regulatory agencies, donors, and users—to determine the shape of m-banking/m-payments services in the developing world (infoDEV, 2006; Ivatury, 2004; Ivatury & Pickens, 2006; Porteous, 2006). Mobile phone operators have identified m-banking/m-payments systems as a potential service to offer customers, increasing loyalty while generating fees and messaging charges (infoDEV, 2006). Financial institutions, which have had difficulty providing profitable services through traditional channels to poor clients, see m-banking/m-payments as a form of "branchless banking" (Ivatury & Mas, 2008), which lowers the costs of serving low-income customers. Government regulators see a similar appeal but are working out the legal implications of the technologies, particularly concerning security and taxation.

There is no universal form of m-banking; rather, purposes and structures vary from country to country. The systems offer a variety of financial functions, including micropayments to merchants, bill-payments to utilities, P2P transfers between individuals, and long-distance remittances. Currently, different institutional and business models deliver these systems. Some are offered entirely by banks, others entirely by telecommunications providers, and still others involve a partnership between a bank and a telecommunications provider (Porteous, 2006). Regulatory factors, which can vary dramatically from country to country, play a strong role in determining which services can be delivered via which institutional arrangements (Mortimer-Schutts, 2007).[i]

Most m-banking/m-payments systems in the developing world enable users to do three things: (a) Store value (currency) in an account accessible via the handset. If the user already has

a bank account, this is generally a question of linking to a bank account. If the user does not have an account, then the process creates a bank account for her or creates a pseudo bank account, held by a third party or the user's mobile operator. (b) Convert cash in and out of the stored value account.[ii] If the account is linked to a bank account, then users can visit banks to cash-in and cash-out. In many cases, users can also visit the GSM providers' retail stores. In the most flexible services, a user can visit a corner kiosk or grocery store—perhaps the same one where he or she purchases airtime—and transact with an independent retailer working as an agent for the transaction system. (c) Transfer stored value between accounts. Users can generally transfer funds between accounts linked to two mobile phones, by using a set of SMS messages (or menu commands) and PIN numbers.

The new services offer a way to move money from place to place and present an alternative to the payment systems offered by banks, remittance firms, pawn shops, etc.. The uptake of m-banking/m-payments systems has been particularly strong in the Philippines, where three million customers use systems offered by mobile operators Smart and Globe (infoDEV, 2006); in South Africa, where 450,000 people use Wizzit ("the bank in your pocket") (Ivatury & Pickens, 2006) or one of two other national systems (Porteous, 2007); and in Kenya, where nearly two million users registered with Safaricom M-Pesa system within a year of its nationwide rollout (Ivatury & Mas, 2008; Vaughan, 2007).

Current Research

The practitioner community may frame the discussion as being about "Transformational" M-payments (Gamos, 2008); the popular press describes a "leap from the world of cash to cellular banking" (The Economist, 2006); and researchers speak about the potential of m-commerce to "close the digital divide" (Dholakia & Kshetri, 2004). There are a variety of perspectives from which to view the technology, and as Maurer (2008), illustrates the assumptions associated with an embrace of an "empowerment" or "market share story" (pp. 8-9), for example, will impact the claims and research programs of those interested in the technology.

The current research literature can be classified into three types of studies: (a) those that explain or predict the adoption of m-banking/m-payments systems; (b) those that assess the systems' impact on people and on economies; and (c) a relative few that try to understand the use

of such systems in social, economic, and cultural contexts. Variants of this trichotomy, which distinguishes adoption studies from impact studies and from "use" studies, have been documented before (Fischer, 1992; Markus & Robey, 1988; Orlikowski & Iacono, 2001; Sein & Harindranath, 2004) and are a reflection of the disciplines that take an interest in communication technologies. Donner (2008) applied the trichotomy in a review of the research literature on mobile telephony in the developing world.

M-banking/m-payments systems have all the markers of an "innovation" waiting to be "diffused" to or adopted by a subset of mobile users in the developing world (e.g., Rogers, 1983). Brown, Cajee, Davies, and Stroebel (2003) used a statistical model combining elements of the theories of diffusion of innovation (Rogers, 1983) and of planned behavior (Taylor & Todd, 1995) to predict mobile banking take-up in South Africa, finding high levels of perceived risk to be a major barrier to further adoption. To date, it is one of the few evaluations of an m-banking/m-payments system in the developing world explicitly applying a theoretical lens. Two studies from the economic development/practitioner literature (Ivatury & Pickens, 2006; Porteous, 2007) suggested that mobile banking users in South Africa are wealthier and better educated than the average South African with a bank account, let alone the average unbanked South African. Porteous suggests that the profile of the typical m-banking user in South Africa still resembles that of the "early adopter" (see also, Ivatury & Mas, 2008). Drawing on representative survey data, Porteous cites mistrust and unawareness among the primary reasons South Africans might choose not to adopt m-banking.

Studies of the impact of m-banking/m-payments systems in the developing world are also scarce because the systems are so new. The best impact assessment to date is (Porteous, 2007), in which impact is operationalized using an "access frontier," which divides those who have the wherewithal—a monthly income from a formal source—to open the most basic of conventional bank accounts. Those below the frontier who use m-banking/m-payments systems do so as an alternative or addition to other choices. Those from above the frontier have done so by necessity. Porteous concludes that the "transformational" impact of m-banking/m-payments services in South Africa has been small (so far) because virtually all of the users are from below the frontier.

Studies on Use (would be useful)

Additional adoption and impact studies are sure to follow, but the research community should also pursue studies of the context and use of m-banking/m-payments systems in the developing world. This section presents three important examples of non-technical (social and economic) contextual factors: comfort with electronic money, the availability of alternatives, and the social context of transactions. Each influences the dynamics of m-banking/m-payments' adoption and impact, currently unfolding around the world.

Conceptualizing Electronic Money

Even the simplest handsets have features buried deep in menu structures. If navigating an m-banking/m-payments interface is difficult for experienced mobile users with bank accounts, even greater is the difficulty for first-time users in the developing world, many of whom will have only been using a mobile for a year or two (Cracknell, 2004; Peevers, Douglas, & Jack, 2008). However, the challenges may run deeper than interface design. People coming to banking for the first time via the mobile handset require a command of abstract concepts about invisible/virtual money. Consider the lack of ways to wrap or "gift" a digital money transfer (Singh, 2007). Beliefs, misunderstandings, habits, and concerns must be addressed if people who are used to storing money in cash are asked to store it "in" a handset; the analogy remains strained—the mobile is not yet a wallet (Chipchase, Persson, Piippo, Aarras, & Yamamoto, 2005).

Existing Payment Mechanisms

The role of existing mediated transfers and other financial services also deserves scrutiny. A large proportion of the volume of m-transactions may reflect existing transactional relationships, shifted over to the new channels. This is not to say that a shift is not itself valuable—there are significant benefits of cost, reliability, safety, flexibility, and immediacy associated with m-banking/m-payments systems. However, it is important for industry, researchers, and policymakers to understand the transactional networks and behaviors that already exist. An antecedent to this argument comes from the microfinance sector. Arguing that "it is no longer acceptable for prospective providers not to inform themselves of what their future clients are already doing and what services they appear to need," Ruthven (2002, p. 269) identified a broad array of "money mosaics" operating in a Delhi slum. These "financial relations

are frequently embedded in other social relations which reflect the diversity of social, security, and economic needs which people have. It highlights the relatively small role of commercial transactions in people's financial lives, and the importance, extent and diversity of personal networks" (2002, p. 267).

In the case of m-banking/m-payments channels, pawn shops, bus companies, the post office, hand carrying by friends and family, underground money transfer mechanisms—such as China's *fei ch'ien* ('flying money,' a network of affiliates allowing users to put money into the network in one city and have it available in another without the actual banknotes making the trip) (Maurer, 2008)—and formal transfer services like Western Union all have their adherents, and the list is longer when one includes alternative savings and credit mechanisms like chit funds and moneylenders. There are communication issues, as well: transfers are exchanges at a distance, and as Ruthven points out, there is an implicit or explicit network of communication and information exchange embedded into almost every transaction. Remittances,[iii] in particular, are a context in which it is difficult to separate financial transactions from symbolic meaning and social bonding (Hart, 2000; Singh, 2007).[iv]

The Social Embeddedness of Economic Transactions

There is a litany of social/contextual influences on m-banking/m-payments use. Both macro-level cultural factors and micro-level, locally-negotiated norms in families and among peers—particularly about money—are at play (Zelizer, 1994). For example, respondents in focus groups we conducted in Manila (Donner, 2007b) explained that, while they would certainly transfer money to a family member (a gift), they would not do so to an acquaintance (a loan). Technically, the actions are the same. Socially, they are miles apart.

Practitioners and policymakers are already concerned about validating m-transactions under conditions of sharing behavior (infoDEV, 2006), in which two people use the same handset. On the other hand, others suggest that m-banking/m-payments systems may alter patterns of money sharing within families by giving women greater autonomy and control over household savings (von Reijswoud, 2007).

Cross-Cutting Themes in Studies of M-Banking/M-Payments Use

The use questions described above (skills and mental models, alternatives, and social norms) each represent fruitful paths for future research. When such studies of m-banking/m-transactions use in the developing world appear, it is likely that they will touch, implicitly or explicitly, on crosscutting themes shared by studies of other mediated communication technologies. There is little need for a new "theory of m-banking." Rather, our existing toolkit of theories of technology use—and particularly technology use in the service of economic and social development (ICTD)—is sufficiently robust to handle the introduction of this new technology (e.g., Sandvig & Sawhney, 2006). Rather, the task at hand for communication researchers is to find ways to have the existing theory inform and strengthen the assessments of impact and diffusion, of design and policy, which are occurring at this time as diverse stakeholders are establishing the mobile payments landscape. While some periods of alternating exuberance and introspection are to be expected in the realm of new technology development and policy, the opportunity exists at this time for theory to temper some of the more dramatic swings, at least as far as m-banking/m-payments as an "ICT4D" is concerned.

In this section, we introduce three crosscutting themes, each drawing on the existing body of research on technology use, which illustrate social structures underlying m-banking/m-payments and can guide decision-makers and practitioners as they build and evaluate these systems over time. These themes are the bi-directionality of influence, amplification versus change, and the multi-dimensionality of trust. As possible themes and theoretical perspectives, these three are neither mutually exclusive nor collectively exhaustive. However, they do help contextualize issues encountered in these early days of the technology. These three themes are sufficient to illustrate this paper's primary argument: the importance of "use studies" as input to the evaluation of adoption and impact of m-banking/ m-payments systems.

A willingness to examine the bi-directionality of influence between communication technologies and the social structures in which they exist—a focus on the "dynamic interactions between people and technology" (Orlikowski & Iacono, 2001)—is a hallmark of many studies applying a "use heuristic" (Latour, 1987) or "ensemble" view (Orlikowski & Iacono, 2001). Within the communication research tradition, two prominent examples of these approaches are adaptive structuration theory (Poole & DeSanctis, 1990), usually applied to organizational

settings, and domestication theory (Silverstone & Hirsch, 1992), usually applied unsurprisingly, to domestic settings. Mobile telephones have also been the subjects of a wide range of studies complicating the directionality of influence, from technological affordances to user choices to social structures and back again (Donner, 2008; Haddon, 2003).

Studies that take "ensemble" approaches to assessing the spread of m-banking/m-payments systems are sorely needed. Like text messaging (Ling, 2004), multimedia messaging (Ling & Julsrud, 2005), and simple missed calls (Donner, 2007c), the set of social norms and expected behaviors surrounding mobile-enabled financial services will evolve over time and probably will differ from place to place. For example, respondents in the Manila focus groups reported a norm of "gifts not loans," based partially on their family structures and partially on their experience with the m-banking/m-payments system. Wholly different norms might emerge within another system, where perhaps early adopters were not dispersed families seeking a channel for cost-effective remittances but rather traders looking for a way to protect money from theft on deserted roads (as in, perhaps, Northern Kenya). In that case, transfers to near-strangers might be perfectly acceptable, even expected.

A second crosscutting theme involves the capacity of a communication technology to amplify existing relational and social structures as well as to alter them. When we speak of the "impact" of a technology on a social structure—a particularly common frame within the ICTD perspective—, we often seek insight into how technologies change social structures, but the reverse can also be true (Harper, 2003). If we look with this lens, we may find that m-banking/m-payments systems may increase the volume or frequency of existing transactional patterns rather than alter the target of those transactions. For example, in the Manila focus group, of the 10 people using the system, only one had used it to trade with somebody that they had not previously traded with using another channel—a women who had used the service to start her own informal money lending business (Donner, 2007b). Additional findings of this kind may qualify some of the "transformational" language used concerning mobile banking to this point.

A final crosscutting issue involves the introduction of "trust" as a factor in the analysis of m-banking/m-payments use. Early evidence and intuition alike suggests that "trust" plays a role in use (Ivatury, 2004; Porteous, 2007). For example. users feel more comfortable with at least some face-to-face contact and assistance while using an m-banking/m-payments system like

Wizzit (Ivatury & Pickens, 2006). Luarna and Lin (2005) proposed a modified technology acceptance model that included a trust variable—perceived credibility—to predict m-banking adoption in Taiwan. Yet their modification also included another variable, self-efficacy, a form of trusting one's self.

Indeed, trust itself is a multifaceted concept, which must be handled carefully in any analysis of m-banking/m-payments use (Benamati & Serva, 2007). Trust is a crosscutting concept in that people can trust (or mistrust) their own skills. They can trust the interface, the network across which their funds travel, the representatives of the institutions (channels) who control their money, and/or trust the institutions themselves (Maurer, 2008). And, of course, they can differentially trust various people in their networks: some might be eligible as exchange partners using m-banking/m-payments systems while others might not. These forms of trust may change over time with use of the system. People might become more or less trusting along any of these dimensions as their experience of the system changes, relative to friends, family, and others in the community.

The role of trust is a crosscutting issue because multiple research traditions examine economic transactions in their social context—not as discrete acts but as markers and reinforcements of a set of interrelated responsibilities, roles, and transactional networks in which trust plays a central role (Burt, 1992; Geertz, 1978; Granovetter, 1985). Often these transactions are seen as either being structured by or creating a form of "social capital" (Coleman, 1988). These transactions need not be face-to-face; researchers have used social-capital/social-networks lenses to explore how the information technologies generate and reinforce social/economic relationships in ways that provide "returns" to actors (Huysman & Wulf, 2004; Sawyer, Crowston, Wigand, & Allbritton, 2003). For example, Horst and Miller (2006) described the practice of "link up" in Jamaica, where mobiles are used quite strategically to build and maintain networks of resources for future assistance or loans.

Initial reports from an ongoing ethnographic project in Kenya elaborate these dimensions, distinguishing the complexities of trust in the local m-banking middleman from trust in the telco that runs it and from the government that (presumably for many users) controls the whole operation (Morawczynski & Miscione, 2008). However, there is room for more work that

assesses which forms of trust support or are supported by m-banking/m-payments use, particularly among low-income users.

Mediating Informal Credit Mechanisms in Urban India

Using the three crosscutting themes identified above, we will now present and analyze the results of an exploratory study we conducted in urban India. This case study focuses on the importance of informal credit mechanisms amongst small enterprises in developing countries and explores some issues associated with using m-banking/m-payments systems to mediate those mechanisms.

Despite India's growing role as an international hub for IT services and innovation, the majority of enterprises in India (agricultural and non-agricultural alike) are not participants in the IT boom. Most are small, with ten or fewer employees, and most are informal, operating in cash-only environments without formal books, bank accounts, or regular tax payments. For many small and informal firms, access to affordable credit is a constant struggle. In recent years, microfinance institutions have stepped into the gaps left by banks and have begun to provide affordable alternatives to moneylenders and other informal sources. However, surveys we conducted in Hyderabad (Donner, 2007a) suggested that, for many smaller firms, extending credit informally to customers was as big a challenge as securing credit for the enterprise from lending sources (see also, Financial Diaries, 2006). Credit cards and formal financing sources are scarce; informal credit relationships between customers and suppliers resemble those detailed by Geertz (1963) so long ago. These ongoing credit relationships are both a blessing and a curse—although they bind customers to certain suppliers, they strain suppliers' cash flows. If an enterprise is to prosper, these informal credit relationships must be skillfully managed.

Thus, we decided to explore how an m-banking/m-payments system might be used within the context of the supplier/client relationship. There are some efforts to use the mobile channel to service formal credit from banks or microfinance institutions, but these are not nearly as prevalent as stored-value or transaction and transfer facilities (Ivatury & Mas, 2008). Indeed, at the time of our study in mid-2007, there were no m-banking/m-transfers services available to "unbanked" mobile users in India. As an exploratory study, we did not test formal hypotheses about the attributes of m-banking; nevertheless, the line of questioning was similar to the crosscutting themes identified above.

Methodology[v]

In July and August 2007, we conducted on-site interviews with owners of small enterprises in one of India's largest cities, Bangalore. We recruited participants via face-to-face requests and visits. In choosing the sample for the qualitative interviews, we made efforts to ensure variety by interviewing enterprise operators from different communities within Bangalore, taking into consideration various economic sectors. A total of 20 businesses were interviewed for the analysis with a sector distribution of 30% manufacturing, 40% retail, and 30% services. The average number of employees was 4.4, with 70% having five or fewer employees.[vi] The interactions consisted of a mix of structured closed-ended questions and open-ended, semi-structured interview questions.

Findings

Face-to-face interactions dominate customer interactions, even among those with relatively complex ICT behaviors (see also, Donner, 2007a; Duncombe & Heeks, 2002; Molony, 2006). While mobiles were valued by businesses for some types of transactions—and specifically for their perceived ability to allow business owners to work with clients outside their proximity—most respondents reported that their day-to-day communication needs were best met by face-to-face interactions. The majority of respondents did not accept credit cards and relied for the most part on a cash-and-carry business scheme.

Against this background of face-to-face and cash-based interactions, the majority of participants did extend informal credit to at least some of their clients, some of the time. Sixteen of 20 did so at the time of the interview; another 3 of 20 had done so in the past. Decisions about whom to lend to and on what terms depended on the type of relationship and on mutual trust. Trust had a dyadic component—did the entrepreneur trust the client?—and also a network component. Clients embedded in an overlapping social network of friends and business partners were generally more trustworthy than isolates (Granovetter, 1985).

Broadly speaking, our interviews helped distinguish between three kinds of businesses according to their attitudes towards credit, the location of their customers, and the degree of formality. Each had a different take on the appeal of using SMS to keep in touch with clients and, particularly, to bill them or update them on credit outstanding.

Relational businesses were the most insular; their owners refrained from extending credit to people they did not know or who were not in their close business network. These informal businesses had simpler and more straightforward needs that might be better met by "organic" information systems instead of more complex ICTs. Although most participants in this category communicated their desire to have a mobile phone, those without a mobile stressed the issue of affordability. *Locational* enterprises were more likely than relational enterprises to negotiate and track credit without formal arrangements between parties. Their method of ensuring compliance was based on knowledge of the location of the client's residence. Those "in the neighborhood" could receive informal credit; those outside, generally, could not. Finally, the five *formal* enterprises with which we spoke were mostly engaged in manufacturing, were larger than the other enterprises, and were more active users of information technology (Duncombe & Heeks, 2002), including accounting software. All of the formal businesses extended credit to clients and were more open to the idea of giving credit to people outside their business network. Members of this group, nevertheless, reported frequent reliance on oral arrangements for credit terms with both customers and suppliers/partners.

Across all the groups, respondents were more open to the idea of using a mediated message to stay in touch with clients, but the majority of respondents (95%) expressed varying degrees of concern about using an SMS to discuss money matters, particularly credit. A respondent reported, "It is not right to use SMS to remind customers about payments because it is too impersonal. . . . It is just not polite to when it comes to monetary matters." Another had already abandoned mobile-mediated reminders of this sort, blaming the caller ID feature, which gave debtors who were trying to avoid him the ability to avoid his calls. Of course, we should not dismiss the idea of mobile-mediated informal credit relationships based on only 20 interviews. However, the basic results echo recent work (Molony, 2006) that illustrates the importance of nuanced face-to-face conversation in the maintenance of an oral, non-secured agreement to extend credit between supplier and client. Moreover, the results of this case study illustrate each of the crosscutting themes described in the earlier sections.

A juxtaposition of two comments from respondents illustrates the likely bi-directionality of influence between m-banking systems and their users. One respondent offered this assessment: "On the one hand, it gives you instant connectivity, and on the other, it eats away at your personal time." Another explained, "I use SMS to keep my clients informed about little

things in order to not disturb them." The first comment illustrates a sensitivity to the way the mobile alters one's availability to others and the management of one's personal time—a phenomenon described as "perpetual contact" (Katz & Aakhus, 2002). The second comment puts the locus of action with the user, not the technology. The second respondent's actions, calibrated so as not to disturb another person, are part of an ongoing process of normative formation, as users evaluate which kinds of mobile behaviors are appropriate, with whom, and at what time. As m-banking systems spread, they will alter the payments landscape, but in so doing, they (a) will have to be understood and deployed by people in light of their existing expectations about what is appropriate when it comes to money and to telecommunications and (b) will prompt the development of a specific set of norms about how much to send, to whom, and at what time.

The differences between assessing impact as amplification-vs.-change were also apparent. When businesses with mobiles discussed their utility, it was in terms of expanding client networks as well as improving relationships with existing clients. One user reported that mobile use had helped him expand his clientele; he was now able to "communicate long distance through it." On the other hand, the owner of a simple retail establishment said nothing about new customers, rather that he used mobiles to "keep up with the pace of his clients and life in the city" (e.g., Townsend, 2000).

Finally, the multi-dimensionality of the notion of trust was clear. One participant reported, "I do not use SMS because a lot of my customers are not educated enough to understand how it works. . . . When it comes to credit, I just only give it to people I know and trust." This statement contains an assessment of the skills of the client, as well as his or her trustworthiness. Another participant cited her own experience and ability to judge a person's creditworthiness: "When I extend credit, I can judge the customer's objective and their trustworthiness because I have been in the business for so long." Trustworthiness is in the eyes of the lender and is not a single attribute (but rather a set of properties). Face-to-face interactions give lenders the best opportunity to assess that trustworthiness.

It is clear that a technology's being able to mediate a relationship does not mean it will do so. Nineteen of the 20 businesses owners we spoke to appeared likely to stick with face-to-face modes for credit account maintenance, at least for the time being. Perhaps, if norms evolve over time and they can observe early adopters (including perhaps the one enthusiast in our sample),

they may change their assessments and elect to use an m-banking/m-payments application as part of their informal credit relationships. But for now, like the Manila focus group respondents who distinguish between "gifts" and "loans," these microenterprise owners will put mediated interactions concerning money matters in a different category from other SMS and mobile-based activities. This tale is small and preliminary but cautionary nevertheless.

Linking Adoption, Impact, and Use

The previous section outlined the results of a small exploratory study of one element of m-banking; we used the findings to illustrate the utility of viewing m-banking use through the lens of some crosscutting themes from the broader research literature on information technologies in society. There is also an additional rationale; the final section of this article will argue that closer examinations of *use* (perhaps via these themes) can inform and strengthen future studies of m-banking/m-payments adoption or impact, making them more likely to inform policy or to lead to the development of better products and services.

Studies from the adoption perspective are sometimes criticized for requiring theoretical models that reduce use/nonuse to a binary condition. Nevertheless, complementary research on use can help refine both the independent and dependent variables in such models. Pedersen and Ling (2003) made a similar point, arguing that concepts or findings from domestication, uses and gratifications, and diffusion models can all be applied to inform traditional adoption models for advanced mobile services.

A better understanding of the daily practice, norms, and use patterns of m-banking/m-payments will allow the construction of a better, more valid, dependent variable: Is use simply registering for the system? Engaging with it once every two weeks? Everyday? More advanced models could distinguish between people who simply utilize an m-banking/m-payments system for occasional transfers and. those people who begin to actually treat their mobile as a wallet, storing value for everyday needs, or as a method for long-term savings.

In terms of independent variables for an adoption model, Luarna and Lin's (2005) expansion of the technology acceptance model to include a trust variable illustrated how close observation of "use" may improve models predicting adoption. Certainly, standard adoption models will come into play—some attributes will make the system easier to use, some people will be more likely to experiment with the systems than others, some configurations of features

will offer greater relative advantage than others, and so on—but the application of an "ensemble lens" or "use heuristic" may identify social and social network factors which belong in the adoption equation (Valente, 1995). And, almost certainly, the application of such lenses could help explicate and disaggregate trust into sub-concepts that can be measured and used as predictive factors (e.g., trust in system, trust in institutions, trust in self, and trust in sender/receiver).

Policymakers and the development community have expressed enthusiasm about m-banking/m-payments systems, presumably because they expect that widespread use of such systems would be a desirable outcome for the unbanked in the developing world. Indeed, some forms of impact are already evident: To transfer funds at a distance, particularly small amounts of money, m-banking/m-payments methods are generally less expensive than many of the alternatives available to poor households. Even if behaviors do not change at all and m-banking users send the same amount of money to the same people with the same frequency, the fact that households would retain a higher proportion of the money by paying lower fees is a positive impact.

Beyond cost-savings, however, the choice of the word *unbanked* is evidence of an assumption underpinning much of the policymakers' and development communities' interest in the technology. The assumption is that households that currently do not have access to financial services will benefit from having a way to access them. In such cases, further use studies, of the kinds outlined in the previous section, could identify what the further "impacts" of having a mobile-enabled bank account might be. Active use of m-banking/m-payments services may lead to indirect impacts, such as increased family savings rates, increased incomes, and resilience to financial shocks. It could change the family dynamics concerning saving and sharing (von Reijswoud, 2007). It could lead to people staying away longer to make more money to send home in the form of remittance. The systems might reduce loss of money to petty theft and could increase people's sense of security in their communities. At a broader level, it could bring more money into the formal banking system, improve taxation, and encourage reinvestment of money that is currently not in effective circulation (infoDEV, 2006).

The list of such possible impacts is quite lengthy. Sein and Harindranath (2004, p. 19) suggested a hierarchy of impacts of the ICTs: first order effects are simply counts of the actual

number of ICTs in a population (penetration rates); second-order effects are direct increases in the phenomena associated with the technologies (more mobile phones lead to more phone calls, more m-banking leads to more banking); tertiary effects are systemic or social and are not very easily observed without careful analysis. An application of the use or ensemble perspective might uncover these tertiary impacts in a way that will strengthen our understanding of the role of m-banking/m-payments services in the developing world.

Conclusion

The emergence of m-banking/m-payments systems has implications for the more general set of discussions about mobile telephony in the developing world. For example, it underscores the way the device blurs the domestic and the productive spheres, the social and the transactional. Each transaction is influenced by (and reinforces) the structural position of people in broader informational networks (Castells, 1996). The latest case of m-banking/m-payments systems is a reminder that an understanding of the role of the mobile in developing societies must include its role in mediating both social and economic transactions, sometimes simultaneously.

Existing theory about the significance of mobile communications in the developing world has focused on voice and text messaging (Donner, 2008). This focus is appropriate, but the emergence of mobile banking also underscores how, occasionally, innovations emerge from unexpected places and have the capability of reconfiguring the significance of a technology to its users. Mobile theory must keep pace, accounting for m-banking/m-payments systems along with other capabilities enabled by this increasingly flexible technology.

A possible critique of this paper is that, while it calls for additional studies from the use perspective, it offers only a brief case study of that kind. Nevertheless, the case study and the paper may be of value to researchers considering further inquiries into the m-banking/m-payments space at this early stage. It illustrates how communication research can improve understanding of the m-banking/m-payments phenomena by providing detailed studies of everyday and how communication research can use the same phenomena as a new setting for the testing of various theories. The particular properties of m-banking/m-payments systems in the developing world—merging mediated communication and financial transactions, unwritten

norms and technological affordances (Hart, 2000)—should make them appealing to researchers more interested in social capital or domestication or diffusion than in m-banking per se.

In no way is this paper supposed to be an admonition against additional adoption or impact research; it argues only that those forms of research can be made stronger by a scan of the complementary literature that apply the ensemble or use perspectives. Adoption studies can benefit from stronger articulation of what is being adopted (occasional transfers vs. virtual wallets, stored value vs. credit, and so on) to augment or replace which existing behaviors (remittances to family, loans to friends, or payments to institutions). Impact studies can benefit from a stronger articulation of a myriad of possible primary, secondary, and tertiary effects—not all of them necessarily positive.

Offering a way to lower the costs of moving money from place to place and offering a way to bring more users into contact with formal financial systems, m-banking/m-payments systems may prove to be an important innovation for the developing world. However, the true measure of that importance will require multiple studies using multiple methodologies and multiple theoretical perspectives before our questions about adoption and impact will be answered.

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[i] Even in places without commercial m-banking/m-payments systems, many mobile networks allow users to transfer airtime between accounts. Traders in Nigeria have been seen using airtime as part of a barter process (Ray, 2007). Chipchase and Tulusan (2007) describe the "Sente" system of airtime exchange in Uganda, where would-be senders can top-off the airtime accounts of middlemen (prepaid airtime resellers), who will take rather sizable commissions to provide cash-out services to other would-be receivers. However, the extent to which these informal systems have spread is a matter of some debate (Porteous, 2006). Indeed, in Egypt, Goodman and Walia (2007) argue that minutes are not a barter currency and are exchanged primarily between friends and family.

[ii] One can argue that cash-in and cash-out functions are an adaptation of a technology developed for a different purpose. In the Philippines, Smart Telecom had created a "smart load" system, which removed the need for vendors to sell physical prepay cards; instead, Smart's infrastructure allowed merchants to take cash and directly convert it into airtime on the account. With thousands of participating merchants, it was relatively easy for Smart to facilitate a second stored-value system denominated in pesos (infoDEV, 2006).

[iii] Remittance flows from the world's diasporas back to developing countries are second only to Foreign Direct Investment as a source of economic transfer between the rich and poor worlds. The GSM association argues they currently total $320 billion, involving 200 million diaspora workers (GSM Association, 2007).

[iv] Nor is it easy to draw a bright line between mobile-enabled transfers and non-mobile enabled transfers. Tall (2004) describes how many handsets in Senegalese villages were gifted by the people living abroad and now are used to help coordinate the transfer of remittances. Similarly, in focus groups we recently convened in the Philippines (Donner, 2007b), respondents described putting money into the hands of bus drivers, who could be trusted to drive the funds out to the villages on their normal routes. Family members in the villages knew when to wait for the proper bus, thanks to a text message.

[v] Thanks to Sharanya Venkatesh, the research assistant for the project

[vi] The smallest enterprises in the sample fit the definition of a microenterprise (Mead & Leidholm, 1998), however, since some of the enterprises had more than five employees, and/or showed some indications of 'formality' (keeping books, paying taxes, etc), we use a broader term "small enterprise" throughout this case study