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# Mobile Phones and Financial Services in Developing Countries: a review of concepts, methods, issues, evidence and future research directions

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## Abstract

Research concerning mobile phones and financial services in developing countries has undergone rapid growth in recent years. This paper seeks to improve understanding of the current state of knowledge by reviewing the content of 43 research articles. A framework is developed that differentiates research activity according to a lifecycle model that incorporates financial needs, design, adoption and impact. The review finds that research to date has resulted in a high level of practitioner involvement, providing valuable links from the mobile phone industry to the research community but, as a consequence, research has become too narrowly defined. Thus, issues of assessing financial need and the measurement of impact have been comparatively

neglected, while application design and adoption studies have received greater attention. This paper suggests a future direction for research and practice within the

mainstream of micro-financial services and finance for the poor, correcting this imbalance, and contributing towards the mobiles-in-development-research agenda.

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## Notes

1 Consultative Group to Assist the Poor (CGAP), Banking on Mobiles: Why, How, for Whom?, Focus Note 48, Washington, DC: CGAP, 2008, at http://www.cgap.org, accessed 6 August 2008 [10].

2 The most recent International Telecommunication Union (ITU) data show that in the case of the poorest continent—Africa—mobile penetration for individual countries has increased from an average of 2% of total population in 2000 to an average of 25% in 2007. This impressive growth masks extreme variations between countries, but overall mobile cellular networks have now extended coverage to over 60% of the total African population, creating network access potential for previously un-served communities in some of the poorest countries. Many sub-Saharan African countries with a GDP per capita of less than US$500 (in 2007) are fast approaching near universal mobile network coverage. For example, Ghana stands at 68%, Rwanda at 80%, Sierra Leone at 70% and Uganda at 80% coverage of the total population. ITU, ICT Statistics Database, Geneva: International Telecommunication Union, 2008, at http://www.itu.int/ITU-D/icteye/Indicators/Indicators.aspx, accessed 27 November 2008.

3 J Donner, ‘M-banking and m-payments services in the developing world: complements or substitutes for trust and social capital?’, Working Paper 1, Most Mobiles, 29 June 2007, at http://www.jonathandonner.com, accessed 1 April 2008.

4 See M Shahrokhi, ‘E-finance: status, innovations, resources and future challenges’, Managerial Finance, 34 (6), 2008, pp 365–398; and T Dahlberg, N Mallat, J Ondrus & A Zmijewska, ‘Past, present and future of mobile payments research—a literature review’, Electronic Commerce Research and Applications, 7 (2), 2008, pp 165–181.

5 Donner & Tellez classify these three functions of m-finance as the ability to: 1) store value in a remote account accessible by a handset; 2) convert cash in and out of the stored value account by visiting a bank branch or a retail agent that may be located

locally in a kiosk; and 3) transfer the stored value between accounts of individual account holders by means of text message or menu-driven commands and PIN

numbers. J Donner & CA Tellez, ‘Mobile banking and economic development: linking adoption, impact and use’, pre-publication draft for Asian Journal of Communication, at http://www.jonathandonner.com/donner_tellez_mbanking_use.pdf, accessed 20 September 2008 [17].

6 Porteous defines ‘mobile payments’ as financial transactions undertaken using mobile devices such as a mobile phone. Mobile banking (m-banking) includes m-payments but involves access by mobile devices to the broader range of banking services, such as account-based savings or transaction products offered by banks. M-payments and m-banking are themselves subsets of the broader domains of e-payments and e-banking respectively. D Porteous, The Enabling Environment for Mobile Banking in Africa, report commissioned by the UK Department for International Development (DFID), Somerville, MA: Bankable Frontier Associates, July 2006, p 3, at http://www.bankablefrontier.com, accessed 4 April 2008 [31].

7 Research carried out by James & Versteeg distinguishes between mobile phone subscribers, owners and users and points to some of the methodological problems of defining access to mobile phone services, and the difficulties in relying on data from published sources (eg the ITU) that define mobile phone penetration according to the number of subscriptions per head of population. J James & M Versteeg, ‘Mobile phones in Africa: how much do we really know?’, Social Indicators Research, 84, 2007, pp 117–126.

8 Based on a schema used by RB Heeks (ed), ‘Theorizing ICT4D research’, Information and Communication Technologies and International Development (special issue), 3 (3), 2006, pp 1–4, at http://www.mitpressjournals.org/toc/itid/3/3, accessed 8 August 2008.

9 Search criteria cross-referenced key words linked to mobile technologies (eg mobile networks, cell phones, mobile phones) with those linked to finance (eg financial services, finance, payments, remittances, banking, transfers) and those linked with the developing country contexts (eg developing countries, the poor, the unbanked).

10 On-line searches were conducted accessing a broad range of databases from within the social sciences—incorporating a broad range of disciplines—economics, banking and finance, development studies, business and management studies, as

well as more specialised disciplines that cross into the socio-technical and technical domains: computer science, informatics, information systems and information and

communication technologies for development (ICT4D). Databases searched were: ABI-Inform (ProQuest), EBSCO Business Source Premier, Emerald Fulltext and Science Direct, as well as more general searches using both Google and Google Scholar. Additionally, a number of websites specialising in the dissemination of research concerning mobile phones and development were searched (kiwanja.net/ dgroups.org/; mobileactive.org).

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12 N Hughes & S Lonie, 'M-PESA: mobile money for the "unbanked": turning cellphones into 24-hour tellers in Kenya', Innovations: Technology, Governance, Globalization, 2 (1–2), 2007, pp 63–81 [19].

13 S Aminuzzaman, H Baldersheim & I Jamil, 'Talking back: empowerment and mobile phones in rural Bangladesh—a study of the village pay phone of the Grameen Bank', Contemporary South Asia, 12 (3), pp 327–348 [1].

14 CGAP, Use of Agents in Branchless Banking for the Poor: Rewards, Risks and Regulation, Focus Note 38, Washington, DC: CGAP, 2006, at http://www.cgap.org, accessed 2 April 2008 [8]; and Porteous, 'The enabling environment for mobile banking in Africa'[31]. See also CGAP, Regulating Transformational Branchless Banking: Mobile Phones and Other Technology to Increase Access to Finance, Focus Note 43, Washington, DC: CGAP, 2008, at http://www.cgap.org, accessed 6 August 2008 [9]; and CGAP, Banking on Mobiles[10].

15 Hughes & Lonie, 'M-PESA'; P Vaughan, 'Early lessons from the deployment of M-PESA, Vodafone's own mobile transactions service', in D Coyle (ed), The Transformational Potential of m-Transactions, Policy Paper Series 6, London: Vodafone, 2007, at http://www.vodafone.com/m-tranactions, accessed 4 April 2008 [36]; and M Kapoor, J Morduch & S Ravi, 'From microfinance to m-finance—innovations case discussion: M-PESA', Innovations: Technology, Governance, Globalization, 2 (1–2), pp 82–90 [24].

16 InfoDev, Micro-payment Systems and their Application to Mobile Networks: An InfoDev Report, Washington, DC: World Bank, January 2006, at http://www.infodev.org,

accessed 2 April 2008 [20]; and H Williams & M Torma, ‘Trust and fidelity: from under the mattress to the mobile phone’, in Coyle, The Transformational Potential of m-Transactions[42].

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23 A Bayes, ‘Infrastructure and rural development: insights from a Grameen Bank village phone initiative in Bangladesh’, Agricultural Economics, 25, 2001, pp 261–272 [5].

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section 4, at http://www.vodafone.com/m-tranJ sactions, accessed 4 April 2008 [18].

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26 Ivatury & Pickens, Mobile Phone Banking and Low Income Customers.

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31 Donner & Tellez, ‘Mobile banking and economic development’; and J Benamati & MA Serva, ‘Trust and distrust in online banking: their role in developing countries’, Information Technology for Development, 13 (2), 2007, pp 161–175 [6].

32 F Shamin, ‘The ICT environment, financial sector and economic growth: a cross country analysis’, Journal of Economic Studies, 34 (4), 2007, pp 352–370 [37].

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Banking: A Knowledge Map, Washington, DC: World Bank, 2006, at http://www.infodev.org/en/publication.169.html, accessed 3 April 2008 [30]; Bankable Frontiers Assocaites, Scoping Report on the Payment of Social Transfers through the Financial System, Somerville, MA: Bankable Frontier Associates, July 2006, at http://www.bankablefrontier.com, accessed 4 April 2008 [16]; and T Tsiakis & G Sthephanides, 'The concept of security and trust in electronic payments', Computers and Security, 24 (1), pp 10–15 [38].

36 Batchelor et al, Senegal Household Survey M-Payments Analysis; CGAP, Banking on Mobiles; and CGAP, Regulation of Transformational Branchless Banking.

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42 TS Parikh & ED Lazowska, 'Designing an architecture for delivering mobile information services to the rural developing world', in Proceedings of the 15th International Conference on the World Wide Web (Edinburgh, 23–26 May 2006), New York: ACM Press, at http://doi.acm.org/10.1145/1135777.1135897, accessed 25 March 2008 [29].

43 This model focuses specifically on mobile phone applications, but links into a broader avenue of research that falls outside the remit of this review. This includes a growing number of studies that investigate the adoption and use of ICTs by micro-finance institutions. These include use of ICTs for upgrading internal information systems as well as externally facing systems linking with micro-finance clients. See,

for example, N Magnette & D Lock, What Works: Scaling Microfinance with the Remote Transaction System—Increasing Productivity and Scale in Rural Microfinance,

Washington, DC: World Resources Institute, 2005, at http://www.digitaldividend.org/pdf/rts.pdf, accessed 22 July 2008.

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47 Action research is a reflective process of problem solving led by individuals or teams or as part of a 'community of practice' to address issues and solve problems. Action research can also be undertaken by organisations, assisted or guided by professional researchers, with the aim of improving their strategies, practices and knowledge of the environments within which they practise. See, for example, DJ Greenwood & M Levin, Introduction to Action Research: Social Research for Social Change, Thousand Oaks, CA: Sage, 1998.

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electronic payment systems for value transfers in the developing world', Department of Anthropology, University of California, Irvine, 2008, at http://www.anthro.uci.edu/faculty_bios/maurer/Maurer-Electronic_payment_systems.pdf, accessed 20 September 2008 [26].

52 Since 2000 there has been an unprecedented growth in the outreach of Brazil's banking system. The most striking has been the huge expansion in 'correspondent banking outlets', with 32 000 new outlets created between 2000 and 2004. The correspondent outlets focus mostly on transaction and payment services, including government benefits and payment receipts, as well sale of pre-paid cell phone cards and SIM cards. Correspondent outlets have been particularly successful in reaching poor clients, thanks to the considerable reduction in variable and fixed costs of providing services. See A Kumar, A Nair, A Parsons & E Urdapilleta, 'Expanding bank outreach through retail partnerships: correspondent banking in Brazil', World Bank Working Paper 85, Washington, DC: World Bank, 2006.

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56 See G Walsham & S Sahay, 'Research on information systems in developing countries: current landscape and future prospects', Information Technology for Development, 12 (1), 2005, pp 7–24.

57 James & Versteeg, 'Mobile phones in Africa'.

58 The methodology of the review has sought to search out a comprehensive range of literature concerning m-finance in developing countries and apply an objective and balanced analysis, but some limitations to the review are also noted: First, there are gaps in the literature coverage as a result of coverage being limited to peer-reviewed

journals and other non-peer-reviewed sources printed in the English language. Coverage is also biased towards those countries where m-finance initiatives are underway, with a particular focus on African English speaking countries such as South Africa and Kenya. Second, the review included available published sources only, which may have excluded ‘grey literature’ and other reports or studies compiled in developing countries that have not been disseminated via established networks.