

The Emerging World's Five Most Crucial Words: “To Move Money, Press Pound”

RAM MENON, TIBCO Software Inc.

Perched 4,000 feet above sea level—up in thin air, where marathoners like to train—Embu is a town nestled in the foothills of Mount Kenya. Each September, much of this land blazes with colors of the Jacaranda—a tree that blooms in clusters of lush blue corollas. But not every square mile is so blessed. In 2010, a shortfall of rain northeast of Nairobi left farmers with fields of young crops destroyed. Fortunately, their balance sheets escaped a similar fate. Although the drought wrecked investments in quality seeds, costly fertilizers, and other high-grade inputs, insurance payouts came faster than “fast.” They came in *real time*, on an as-needed basis, through a remarkable initiative called M-PESA.

A joint venture between Vodafone and Kenyan mobile-operator Safaricom, M-PESA is one of many mobile-money programs surfacing in Africa and Asia to cure the root of financial hardship across the emerging world: the challenge of moving money from sender to receiver.¹ With mobile money—funds transferred with a touch on a keypad—rising supplies of cash are now reaching these financially starved areas, where they are fueling consumption, sustaining businesses, and strengthening nations by tightening their weakest links: fragile rural economies.

It is no stretch to say that sending cash to the countryside can lift the fortunes of an entire nation—a cause and effect embodied by the Kenyan town of Embu. It works like this: reimburse rural farmers for lost investments in farm inputs and you demonstrate a capacity to provide swift financial protection, the kind that will encourage farmers *across Kenya* to make bold investments of their own. As for “swift financial protection,” Safaricom defines it well: “The efficiency of any economy relies on how quickly resources can move from ‘point A’ to where they are needed most and will be put to best use. It continues: “Since money is the engine that powers trade, its efficient movement is vital to supporting evolving economies. This is especially true in emerging nations where formal money-movement infrastructures like banking are just beginning to take shape.”²

Just beginning, indeed. Consider this: when residents of the Maldives lost their savings in the tsunami of 1994—a storm that ravaged the island nation—it was not because they had sunk them into assets later destroyed in the flood. Instead, the losses involved cash: funds Maldivians had stuffed into mattresses because they lacked access to banks. When the tsunami hit, a people’s life savings were literally washed away.

There is an urgent need to extend the reach of financial services worldwide, where, by the World Bank’s count, some 2.7 billion people lack access to banking. Take Kenya’s case: although it is the financial hub of eastern and central Africa, at least a third of its population remains beyond banking’s reach.³ Some do not qualify for accounts. Others—the literacy-challenged, for example—rarely want them. Even in South Africa—

a middle-income nation with a strong financial system—only 60 percent of adults use banking services.⁴ But a mobile phone is a different story. Nearly 100 percent of all South African adults own a mobile phone, a group that includes many who are unbanked.⁵ Could mobile phones hold the key to democratizing access to financial services?

Here is a strong clue: in the developing world, no instrument is of greater value. Over 2.2 billion mobile phones are now in use across the emerging world⁶—a number that will skyrocket as developing nations drive over 80 percent of all new subscriptions worldwide.⁷ The economic effect is dramatic. Waverman et al. show that in a typical emerging nation, adding an additional 10 mobile phones per 100 population boosts per capita GDP growth by 0.59 percent.⁸

Little wonder, then, that home-grown mobile operators in China, India, Africa, and the Middle East now meet or exceed their Western counterparts in size. Their influence will only grow; led by India, they will accelerate their push to turn developing nations into hotbeds of mobile telecommunications. Indeed, they are paradigms of disruptive innovation, delivering robust service to low-spending customers eschewed by Western carriers.

All of which begs the question: what makes emerging markets so ripe for mobile penetration? The Nielsen Company sheds light on this question by accounting for the difference between Internet adoption and mobile phone adoption. “Internet penetration for established economies follows a fairly typical pattern,” claims a posting to *nielsenwire*, “rising with income levels, and requiring a threshold of around \$20,000 of per capita GDP to achieve 50% penetration. Not so for mobile communication. First, mobile penetration often exceeds 100% because people own multiple mobile phones. Second, while mobile phone penetration also rises with per capita GDP, it happens earlier, and faster, than Internet adoption. Instead of a \$20,000 threshold, in many countries mobile phone penetration exceeds 50% percent with a per capita GDP as low as \$5,000.”⁹

Nielsen estimates that over the next five to ten years, mobile penetration will rise to some 140 phones per 100 inhabitants—even in nations of very low per capita GDP—and then rise gradually with income. “At that point,” anticipates Nielsen, “the gap in mobile communication between developed and emerging economies will have largely disappeared, although some differences in technological sophistication will remain. In fact, within emerging markets, mobile communication may actually foster greater business and GDP growth, creating a feedback loop which will further boost mobile penetration.”¹⁰ The upshot is clear: in emerging markets, mobile technology is a means of disruptive growth by which mobile banking will leapfrog online financial activity. Moreover, by bringing the unbanked into banking, it will enable

real-time money management and encourage the growth of savings.

What follows is a brief but vivid look at mobile money across the emerging world, with particular emphasis on its transformative power, the key challenges that must be tackled to fully leverage its potential, and the next transformational waves of this undeniable sea change.

Mobile money: Big potential from a small handset

By all measures—financial, social, and even cultural—the mobile phone has become the Trojan horse for change in the emerging world: it is inexpensive, personal, connected, and ubiquitous. Here, a handset offers more than voice and text and music and gaming. It offers *sustenance*: mobile agricultural advice, healthcare support, and money transfer. The latter is especially compelling. Mobile telephony has spawned mobile money, turning small, local retailers into the equivalent of bank branches. In bringing banking services to those who have never seen the inside of a bank, it creates a stepping stone to formal financial services for billions of people with no accounts, credit, or insurance.

M-PESA (*pesa* is Swahili for *money*) is mobile money’s gold standard: a Kenyan service enabling those with no bank account to move money, receive cash, and pay bills (utilities and others) through a mobile phone. By making it possible for Nairobi’s migrant laborers to send money back home, for instance, it serves technology’s new imperative to reach beyond original intent; in this case, creating *banking for the unbanked*—an application of mobile telephony more tectonic than first imagined. There is a name for the financial, commercial, and societal sea changes spawned by audacious new applications of information technologies: *Transformation 2.0*. Its champions know that in operating enterprises large and small, in nations fully developed and newly emerging, success means managing a new reality; one limned by three tenets:

1. In the 21st century, opportunities and threats come with exponentially more data and must be managed in exponentially less time than ever before.
2. Seizing the opportunities and dismantling the threats is best done pre-emptively, in the most malleable moments before they emerge.
3. The capacity to strike pre-emptively requires a 21st century data infrastructure—one that is agile and operates in real time, and thus is capable of operating in context.

Context is at the heart of Transformation 2.0, and for good reason: if raw data show what is, contextual data show what is next. When the right information

finds the right place at the right time, managers can act pre-emptively to solve the toughest problems across the board—from operating a complex business to advancing global security or enabling the sustainability of Kenyan farmers. This would account for what happened in Kenya's Embu on September 21, 2010. Armed with contextual data in the form of real-time rainfall reports from local weather stations, local microinsurer Kilimo Salama approved compensation for struggling farmers the moment precipitation levels dropped below average. It did not wait for the crops to die because it knew what was coming. The result: with instant financial protection, Kilimo Salama did more than pre-empt crippling losses for many Kenyan farmers. It enabled them—and emboldened them—to invest moving forward.

By every measure, M-PESA is a transformative wave. Launched in 2007, it is the world's first commercial mobile money transfer system, developed to meet the banking needs of people outside the formal financial system. The technology consists of a service platform that integrates a mobile wallet with Safaricom's rating, billing, and provisioning systems. Subscribers of Safaricom register for the service by completing a simple form and showing identification. Once registered, the carrier replaces the mobile customer's SIM card with an M-PESA-enabled SIM and links the phone number to an electronic account—the e-wallet. To load money on the wallet, the user visits the nearest M-PESA agent—17,652 small retailers fill the role—and deposits cash there, which is stored as “e-float.” Backed 100 percent by liquid deposits held by Safaricom in fully regulated commercial banks, e-float is the virtual currency used to move money to other people, pay bills, or purchase airtime, via an encrypted SMS. A deposit, or *cash-in transaction*, entails a real-time transfer of e-float from the M-PESA agent to the customer in exchange for cash given to the agent. A withdrawal, or *cash-out transaction*, requires that the customer transfer e-float to the agent and receive cash in exchange. Those on the receiving end of a mobile-money transfer do not need to own a mobile phone to cash out. As an alternative to cashing out, they may use e-float to pay bills, purchase healthcare, buy groceries, and more.

This bears repeating: M-PESA and platforms like it attack the root cause of economic hardship across much of the developing world. It is not a shortage of funds that limits emerging populations from buying goods, paying bills, and receiving government or employer payments. Rather, it is the inability to move money promptly and reliably from sender to receiver, especially when receivers inhabit remote areas, as many do. In markets where infrastructures are poorly developed—where moving cash by couriers is risky, expensive, and inefficient—the problem is more the “velocity” of money than its supply. Enter telecommunications network operators, whose adaptations of

mobile technology can deliver financial services quickly, securely, and at low cost.

Safaricom says it this way: “Traditionally, most money never reached its destination with the same level of frequency and efficiency as it does now with M-PESA. Given the high costs and risks involved in money-transfer methods used before—like bus couriers or informal messenger systems—one had to lump the cash, often by month, before it could be sent home. With the advent of M-PESA, this money can be remitted in real-time on an as-needed basis. Also, it is much cheaper and less risky compared to bus couriers prone to pilferage. The end result is that more money is getting into rural economies, fueling consumption and giving a new lease of life to small businesses in these areas. The sum total of these gains fuels the national economy.”¹¹

As M-PESA grows, and its counterparts emerge elsewhere in the developing world, their success will be assured only to the extent that their operations are transparent and protected from abuse. Entrenched banking interests, often loathe to see their physical branches and ATMs rendered moot by mobile money, will likely do all they can to slow the march of this initiative. To remain viable, mobile-money systems must stay sufficiently liquid and demonstrably transparent. This is no easy feat.

Liquidity: The core challenge

“De-materializing” cash into mobile e-float offers a life-changing benefit—money that moves in real time at reduced risk—but not without steep challenges. The first of these challenges involves the economics of liquidity: keeping agents stocked with cash and e-float so that they can meet customers' needs for deposits and withdrawals. Cash-in transactions cause agents to pay out e-float, while cash-out transactions cause them to accumulate e-float. The trick is to maintain balance: if agents perform too many cash-in transactions (deposits) they will eventually run out of e-float. If they perform too many cash-out transactions (redemptions of e-float) they will run out of cash. In either case, the agent must rebalance liquidity: convert the excess e-float into cash or vice versa. To buy or sell e-float, agents must deposit or collect the appropriate amount of money in (or from) the telecommunications network's account at any of the custodial banks supporting the mobile-money system. It normally takes one or two days for such transactions to settle. This imposes a high working-capital cost on agents, who must maintain a sufficient balance of e-float to accommodate their potential liquidity needs for up to two days.

For poor people operating in a cash economy, whose income comes in the form of small lumps of cash, being able to cash in and out easily is a precondition for participating in a mobile-money system. A keen perspective on this challenge comes from the Bill &

Melinda Gates Foundation, which supports mobile-money programs through its initiative called Financial Services for the Poor. It says, “[Mobile money] retail [agent] outlets are bridges between the entrenched cash-based exchange system and the new electronic payments cloud. This network of bridges needs to be sufficiently dense geographically to offer the necessary convenience to all customers, and sufficiently resilient [liquid] to meet whatever cash or e-float needs customers may have at any time.”¹²

The International Finance Corporation agrees. This investment advisory, a member of the World Bank Group, explores mobile-money liquidity in its report, *Bridges to Cash: The Retail End of M-PESA*. It asserts: “Proper liquidity management of the retail [agent] network goes to the heart of the usefulness and trustworthiness of the [mobile-money] proposition. For the retailers, keeping customers supplied with e-float and cash is central to their business.”¹³

What headway is being made to meet this critical challenge of balancing liquidity? In Tanzania, where Vodacom Tanzania, a joint venture between Vodafone and Telkom South Africa, launched mobile money in 2008, the system taps aggregators (which they call *master-agents*) to recruit agents and manage their floats, transporting cash for the agent if necessary. The master-agent receives a flat fee for each new agent and a percentage of each agent’s commissions, giving him or her an incentive to sign up high-quality agents who will actively transact. To overcome the time lag in settling account-to-account transfers at Tanzanian banks—lag that undermines the prompt replenishment of electronic value—Vodacom Tanzania has accelerated the process by establishing a line of credit for master-agents. Under this system, master-agents can draw on a pool of interest-free electronic value to refill the e-float of an agent once they are satisfied that the agent has transferred value back to the master-agent’s account. Master-agents repay the loan once they have converted the agent’s cash into electronic value.

In nearly every mobile-money market, operators stipulate minimum values of cash and e-float that agents must maintain. Mobile Money Exchange, GSMA’s online community for those interested in mobile money, asks the requisite question: How can operators assess whether a potential agent has the means to maintain the required amount of e-float? Discovery often begins with the mobile carrier: do the agent’s airtime sales reflect a retail operation that is healthy and liquid? In turn, carriers offering mobile-money services in partnership with banks can leverage their banking partner’s skills in evaluating merchants who are seeking to become mobile-money agents. “And in cases where the retailer [agent] is a current client of the bank,” says GSMA in its 2010 Annual Report, “operators can make use of the data gathered over the course of the relationship between the bank and the retailer. For instance, MTN

Mobile Money in Ghana works with nine bank partners, each of which leverages its knowledge of existing clients to help identify suitable agent candidates.”¹⁴

How does Safaricom help M-PESA agents strike the crucial balance of cash and e-float? To safeguard liquidity, the mobile carrier has appointed a number of super-agent banks with branch networks throughout Kenya, so that agents can get consistent access to e-float. These include the Commercial Bank of Africa (Kenya’s largest privately owned bank) and Kenya Commercial Bank (one of the three largest commercial banks in Kenya). And to ensure transparency—to safeguard against money laundering and other risks—all transactions are recorded, customers are required to produce original forms of personal ID, and transactions are executed only with the agreement of both parties. Says Safaricom of its dedication to transparency: “Working with regulators like the Central Bank of Kenya and the Communications Commission of Kenya, we ensure that M-PESA operates at the highest levels; that we are in synch with global best practices in Anti-Money-Laundering and Know-Your-Customer banking regulations. Our first priority is to operate at the highest level of integrity and efficiency.”¹⁵

Efficiency will be key as Safaricom strives to meet soaring demand—demand that has exceeded even the company’s own expectations. And for good reason: in a nation of 38 million people, only 4 million of whom have a bank account, over 13 million Kenyans now belong to M-PESA, and their collective cash transfers equal 11 percent of the nation’s GDP.¹⁶ Even more impressive is this: M-PESA’s reach down Kenya’s socioeconomic ladder is extensive and growing; in short, the program is getting better at reaching those who need it most. Evidence comes from a recent study: “While the representation of all segments of the income distribution in profile of users has grown, the proportional growth has been highest among those at the bottom. For example, the bottom quartile of the income distribution accounted for just 10 percent of users in 2008, but 14 percent in 2009. [At the same time] the share of users from the richest 25 percent of households accounted for 34 percent of users in 2009, down from 37 percent in 2008.” Also significant is the fact that M-PESA is reaching women. “While only 38 percent of users were female in 2008,” report Jack and Suri, “that number grew to 44 percent by 2009.”¹⁷ But what of the ultimate litmus test: is there evidence that M-PESA is actually boosting the financial health of Kenyan households? The answer is “Yes,” says their study. “It appears that households with access to M-PESA are better able to protect themselves against the downside risks associated with job loss, harvest or business failure and poor health.”¹⁸

Other markets and mobile carriers have taken notice. MTN, Africa’s largest mobile operator, has launched a mobile-money service in Uganda in conjunction with Standard Bank. It is fine-tuning the service before rolling it out across the continent. And in South Africa,

after having launched the initiative in Tanzania and Afghanistan, Vodacom has teamed up with a local financial institution to target the 26 million people with no access to banking.

To India and beyond

Perhaps no one has captured the ethos of mobile money better than Arun Sarin, former CEO of Britain's Vodafone Group Plc. "When [people] have access to money to do basic things," he said of Vodafone's work to enfranchise the unbanked, "they become economic engines in their own right."¹⁹ Perhaps no market demonstrates this ideal more dramatically than Sarin's native India, where in less than five years the market for value-added mobile services has skyrocketed from Rs 2,850 crore to Rs 11,860 crore, approximately US\$2.6 billion.²⁰ It is no wonder, then, that India should find itself in the mix where the mobile phone has become a medium for financial transactions.

Actually, it might be more apt to say that India leads the mix where the mobile phone has become a medium for financial transactions. Consider this: in India alone, there were 670 million mobile customers by August 2010; a number that is growing rapidly by 10 million a month.²¹ Much of the growth in Indian mobile money will come from the Interbank Mobile Payment Service, which was launched in November 2010 by the National Payment Corporation of India along with seven banks that comprise some of the nation's largest: the State Bank of India, the ICICI Bank, the Union Bank of India, the Bank of India, the Yes Bank, the Axis Bank, and the HDFC Bank.

Beyond India, mobile money programs are also expanding rapidly. In June 2010, Vodafone announced the launch in Fiji of M-PAiSA Mobile Money Transfer service. Initially, M-PAiSA will serve mainly as a vehicle for loan disbursements and repayments from microfinance institutions, with customers being able to receive loans and make payments through their mobile phones. "But in time," says Vodafone spokesman Shalendra Prasad, "people will be able to pay for utilities such as electricity, water or television using the M-PAiSA service." Fiji's Prime Minister, Commodore Voreqe Bainimarama, offers an endorsement of this own: "With the use of mobile-phone technology, M-PAiSA will enable unbanked, non-saving and geographically isolated Fijians to participate in the mainstream financial sector of the country."²²

More than a trend, mobile money is a juggernaut. In November 2010, both Vodafone and the Norwegian telecommunication company Telenor announced plans to expand their mobile-money menus in emerging markets to include new services such as savings accounts, micro-credit lending, insurance, and international remittances. Vodafone has been enabling international mobile-money remittances since 2009, when, in conjunction

with Qatar's Doha Bank, it gave thousands of Filipinos living in Qatar the capacity to send money to remote areas of their country of origin.²³ Over 200,000 Filipinos now live and work in Qatar. By the close of 2009, their remittances home exceeded US\$185 million.²⁴

In Haiti, a collaborative effort by Scotiabank and Digicel—the Caribbean's largest mobile telecommunications operator—has spawned Tcho Tcho Mobile, a mobile-money program launched in November 2010 to an initial market of 20,000 users. After a three-month pilot, the service will be expanded nationwide.²⁵

In Cambodia, WING Cambodia is taking flight as among the newest mobile-money services in the world. Of the nation's 15 million people, only half a million have bank accounts while three million own mobile phones. Turning this device into a fiscal pipeline to Cambodia's rural economy is what WING looks to achieve through mobile money. "Urban to rural corridors are essential to us," said WING Cambodia Managing Director Brad Jones. "We started out targeting Cambodia's 350,000 garment industry workers in 300 or so factories, focusing on a simple payroll product."²⁶ Customers are mainly blue-collar urban workers who send money to rural family members.

And back in Kenya, Safaricom is making more news, expanding M-PESA to work as a savings account as well. Over 20 percent of M-PESA users now employ the service simply to store money and earn interest.²⁷ The savings service—named *M-KESHO* and established in partnership with Kenya's Equity Bank—has effectively opened 750,000 new bank accounts in Kenya since launching in May, 2010, with deposits totaling nearly US\$11 million.²⁸

The next waves of this sea change

Micro-savings, micro-payments, micro-credit, and micro-insurance: these are the next transformational waves of mobile money. They are washing ashore nowhere more forcefully than in India and Brazil. In India—a cash economy where credit cards are confined to a fraction of the population, debit cards are used to withdraw cash from ATMs, and Internet payments have yet to gain traction—mobile-based micro-payments have transformative value. Micro-payments are mobile-to-mobile transactions: payments for anything from a trip to the cinema to the remuneration of school fees. All one needs is the mobile number and the Mobile Money Identifier (MMID) of the payee, and sums as small as US\$1.00 can be transferred in an instant from the payer's account to that of the payee. "In the not too distant future, one could envisage that a taxi would have its mobile number and MMID painted on the vehicle and a customer could pay the fare through a mobile phone, avoiding any cash"; this from Dr. Ashok Jhunjhunwala, a Professor in the Department of Electrical Engineering at the Indian Institute of

Technology. “Similarly,” he writes, “small and large shops would have their mobile numbers and MMIDs displayed and a customer could make mobile payment. It will be great to see the day when vegetable vendors can be paid in this manner.”²⁹

The same may be said of Brazil, where shoppers do not yet have the capacity to “press pound” for a pound of onions. The use of mobile money remains relatively low in Brazil, where only 5 percent of users make payments via a mobile phone. Still, there is a reason that the annual Mobile Money Summit took place in Rio de Janeiro in May 2010: Brazil is a very promising market for mobile money. Revenues from value-added mobile services tallied R\$8 billion (US\$3.6 billion) there in 2009, reports Acision—a world leader in mobile data—producing a growth rate of 40 percent for the year. Only one Latin American market came in higher: Venezuela, at 52 percent.³⁰

Latin America is ripe for mobile money. While 80 percent of Latin Americans carry a mobile phone, only 30 percent have access to basic financial services.³¹ In Brazil, interest in mobile services is particularly high: 71 percent of those interviewed in a recent survey say they would use their mobile phone as a credit or debit card.³² The services that intrigue them include making payments via mobile, mobile ticketing, mobile banking, and transferring money through mobile telephony. The following driver of usage is also acknowledged by industry resource Mobile Money for the Unbanked: “Latin American migration to the United States has been the most dynamic migration pattern in the world. As the largest recipients of cross-border remittances, unbanked customers in nations such as Mexico and Brazil are in a strategic position to take advantage of mobile-money services combined with branchless banking.”³³

Conclusion

“We keep our promises and pay out fast.” These are the words of James Wambugu of African micro-insurer UAP, whose M-PESA payments covered Embu’s farmers when drought struck their fields in October 2010.³⁴ “Fast” is the operative word, one that not only characterizes the relative speed of payment, but also describes the rate at which transformative technologies such as mobile money will revolutionize the emerging world. Indeed, the pace of transformation is expected to be so quick that Safaricom discounts the luxury of time. Safaricom puts it this way: “The developing world has emerged as a major consumer of high-tech solutions. Demand is so great that these nations may not have the luxury of experiencing what the developed world has enjoyed: a phased approach to massive technological change.”³⁵ Their learning curve will clearly be steep.

Mobile money is transformative technology that turns the unbanked into the bankable, the uninsured into the insurable, and the unlendable into the

loan-worthy. In the process, it serves the 21st century’s greatest imperative for business and technology: to seize opportunities and address threats in context. In the case of mobile money, the context is clear: it is about insuring farmers *before* droughts cripple them, sending money to villages *before* cupboards go bare, and extending credit so that emerging entrepreneurs can strike while the iron is hot. Across developing nations, this mobile message beckons: press pound to move money and change the world.

Notes

- 1 It is widely acknowledged that the leading pathology of developing economies is money’s impaired velocity: the inability to move it quickly and safely into areas where financial institutions typically do not exist.
- 2 Emailed comments from Washington Onyango Akumu, Public Relations Manager, Safaricom; November 17, 2010.
- 3 CGAP 2009.
- 4 FinScope South Africa 2009 consumer survey; underwritten by FinMark Trust, South Africa.
- 5 Smith 2009.
- 6 Terry Kramer, Strategy Director, Vodafone Group Plc, speaking at the Mobile World Congress, Barcelona, Spain, September 2009.
- 7 In 2000, developing nations accounted for a quarter of the world’s 700 million mobile phones. By the start of 2009, their share had exploded to three-quarters of a world total that, by then, exceeded 4 billion handsets. Juniper Research 2010.
- 8 Waverman et al. 2005.
- 9 Bala 2010.
- 10 Bala 2010.
- 11 Emailed comments from Washington Onyango Akumu, Public Relations Manager, Safaricom; November 17, 2010.
- 12 Eijkman et al. 2009.
- 13 Eijkman et al. 2009.
- 14 GSMA 2010.
- 15 Emailed comments from Washington Onyango Akumu, Public Relations Manager, Safaricom; November 17, 2010.
- 16 Microfinance Africa 2010.
- 17 Jack and Suri 2010.
- 18 Jack and Suri 2010.
- 19 Sarin 2008.
- 20 Kohli 2010.
- 21 Pahwa 2010.
- 22 See <http://www.microcapital.org/microcapital-brief-vodafone-launches-m-paisa-mobile-money-transfer-service-in-fiji/>.
- 23 mobithinking.com, December 2010.
- 24 mobithinking.com, December 2010.
- 25 TeleGeography 2010.
- 26 See http://www.mobile-money-transfer.com/mmt_global/mmtex12?phpMyAdmin=513c4b9414a6t38cff6f1
- 27 Mas and Radcliffe 2010.
- 28 Mas 2010.
- 29 Jhunjunwala 2010.
- 30 See <http://www.acision.com>.
- 31 Mobile Industry Review 2010.

- 32 TelecomPaper 2010.
- 33 See <http://mmublog.org/?s=Mobile+Money+Spotlight+on+Latin+America>.
- 34 Omondi 2010.
- 35 Emailed comments from Washington Onyango Akumu, Public Relations Manager, Safaricom; November 17, 2010.

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