

CAPTURING THE GAINS



*economic and social upgrading
in global production networks*

Developmental uses of mobile phones in Kenya and Uganda

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Abstract

It is common cause that the advent of mobile telecommunications, particularly the mobile phone, has been immensely beneficial to developing countries. Not only has it facilitated and improved communication between individuals, but also it has enabled economies to grow faster. This paper explores an additional benefit that derives from having access to a mobile phone. It examines the developmental uses of mobile phones in two East African countries: Kenya and Uganda. It focuses on the relationship between the economic upgrading and the social upgrading or downgrading that result from the developmental uses of mobile phones. It is done by means of case studies. In Kenya, the paper looks at three developmental projects making use of the M-Pesa platform, as well as two hubs in Nairobi where original ideas are incubated. In Uganda, it explores two uses of MTN's mobile money facility and two innovative rural agricultural projects. It finds that all the cases and projects result in economic and social upgrading, although there is also some social downgrading. The study also extends and broadens the conceptualization of economic and social upgrading as formulated by Capturing the Gains thus far. Finally, the paper shows how it differs from most other studies on the developmental uses of mobile phones in Sub-Saharan Africa – by focusing on social entrepreneurship, which, unlike private entrepreneurship, seeks primarily to create social value. With one exception, all the cases studied in this paper enhance the capacity of users of mobile phones to upgrade themselves economically and socially.

Keywords: mobile phones, development, Kenya, Uganda, economic and social upgrading and downgrading, social entrepreneurship, M-Pesa, KickStart, Musoni, Bridge International Academies, MTN MobileMoney, Social Assistance Grants for Empowerment (SAGE), Women of Uganda Network (WOUGNET), Enhancing Access to Agricultural Information (EAAI), AppLab Uganda, Community Knowledge Workers

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Abbreviations

BIA	Bridge International Academies
BMI	Business Monitor International
BOU	Bank of Uganda
CCK	Communications Commission Kenya
CIA	Central Intelligence Agency
CPRC	Chronic Poverty Research Centre
DFID	Department for International Development
EAAI	Enhancing Access to Agricultural Information
ESP	Expanding Social Protection
ESRC	Economic and Social Research Council
FAO	Food and Agriculture Organization
CKW	Community Knowledge Workers
GDP	Gross Domestic Product
GPN	Global Production Network
ICT	Information and Communication Technology
ILO	International Labour Organization
ITU	International Telecommunication Union
KIC	Kubere Information Centre
MFI	Microfinance Institution
MFS	Money Financial Services
MNO	Mobile Network Operator
MP	Money Payment
MT	Money Transfer
MTN MM	MTN MobileMoney
NWSC	National Water and Sewerage Corporation
SAGE	Social Assistance Grants for Empowerment
SCI	Sustainable Consumption Institute
UCC	Uganda Communications Commission
UGX	Ugandan Shillings
UK	United Kingdom
UN	United Nations
UNICEF	UN Children's Fund
US	United States
WOUGNET	Women of Uganda Network

Introduction

Unlike most other end products, the end product in the mobile telecommunications industry, namely, the mobile phone, is used extensively in Sub-Saharan Africa by people with access¹ to mobile phones to upgrade themselves economically and socially in a remarkably wide variety of ways. These ways range from starting up enterprises in which mobile phones play a crucial role, to utilizing mobile phone applications and the platforms constructed by mobile network operators (MNOs). These economic and social upgrading initiatives are mostly developmental in nature in that they raise the human and productive capacity of the economies in which they are embedded.

Capturing the Gains therefore decided to research the developmental uses of mobile phones in Kenya and Uganda as an aspect of economic and social upgrading in the mobile phone value chain. This paper presents the outcome of that research. Unlike the Capturing the Gains Working Paper by Lee and Gereffi (2013), which has a global focus on mobile phones' value chains, this paper has a local focus and is based on case studies.

The paper commences with an outline of the Capturing the Gains framework for understanding economic and social upgrading, as well as how the paper uses the concept of 'development'. We next present the research methods used in producing this paper.

The paper then turns its focus to the spread of mobile phones across Africa and the emergence and expansion of M-Pesa in Kenya. M-Pesa is the original and highly successful system designed by Safaricom that transfers money by means of mobile phones. The developmental uses of mobile phones based on the M-Pesa platform are then elucidated through three case studies, namely, of KickStart, Musoni and Bridge International Academies (BIA). This is followed by a description of an innovative development in Kenya: the emergence of hubs and labs that incubate mobile phone applications that contribute to economic development and social upgrading.

The paper then examines the developmental uses of mobile phones in Uganda. After a brief overview of Uganda, it commences with an exposition of MTN MobileMoney (MM) services. These consist of three divisions: M-Transfer, M-Payments and M-Financial Services, which, between them, contain an extensive range of services that enable social upgrading to take place. However, as the exposition shows, M-Payments services are also leading to social downgrading.

The paper moves on to look at the developmental uses of mobile phones in agriculture in rural Uganda. It does so by means of two case studies, of the Enhancing Access to Agricultural Information (EAAI) project run by the Women of Uganda Network (WOUGNET), and the Community Knowledge Workers (CKW) project of the Grameen Foundation's AppLab Uganda.

After a brief summary of the main findings, the paper moves on to analyse the relationship between the developmental uses of mobile phones on the one hand and economic upgrading and social upgrading and downgrading on the other hand. It shows that these concepts, as well as their relationship, can be broadened from the way Capturing the Gains has understood them thus far.

Before drawing its final conclusion, the paper explains what differentiates it from most other publications that have dealt with the developmental uses of mobile phones in Sub-Saharan Africa.

¹ Access to mobile phones means being able to use a mobile phone without necessarily owning it. This is different from how James and Versteeg (2007: 119) understand access. They define it as 'the percentage of people that potentially could use a mobile phone as they are within range of a mobile network'.

Key concepts: economic and social upgrading, development

Economic and social upgrading

Capturing the Gains has developed a framework for analysing economic and social upgrading in global production networks (GPNs).

Following Gereffi (2005: 171), it defines economic upgrading as ‘the process by which economic actors – firms and workers – move from low-value to relatively high-value activities in GPNs’. It distinguishes between four types of economic upgrading. They are (i) process upgrading, whereby the production process is made more efficient; (ii) ‘product upgrading, where more advanced product types are introduced’; (iii) functional upgrading involving the performance of higher value-added tasks; and, finally, (iv) chain upgrading, which entails ‘shifting to more technologically advanced production’ (Barrientos et al. 2010: 6).

It is worth noting that economic upgrading of workers can also take place. This can happen when worker skillsets are upgraded and when labour productivity increases (Barrientos et al. 2010: 6).

Social upgrading is broadly defined as ‘the process of improvement in the rights and entitlements of workers as social actors, and enhances the quality of their employment’ (Barrientos et al. 2010: 7). It involves enhancing the working conditions, protection and rights of workers as well as access to better work. The concept is framed by the International Labour Organization (ILO) Decent Work concept, which is based on four pillars: (i) employment; (ii) standards and rights at work; (iii) social protection; and (iv) social dialogue or voice for workers (ibid.).

Social upgrading can be subdivided into two components: measurable standards and enabling rights. Measurable standards are more easily observed and quantified. They include wage levels, working hours and social benefits. Enabling rights are qualitative and harder to observe. They comprise freedom of association and the right to collective bargaining and to strike. These all add up to giving workers more strength or voice at work. Access to enabling rights can empower workers to improve their measurable standards (Barrientos et al. 2010: 7).

A central aim for Capturing the Gains is ‘to understand the causal relationship between economic upgrading and social upgrading’ (Barrientos et al. 2010: 14). Capturing the Gains thus strives through its research to explore the relationship between economic and social upgrading, and specifically to understand under which conditions economic upgrading leads to social upgrading or downgrading (ibid.).

William Milberg has put forward two different ways in which economic and social upgrading can be conceptualized in order to measure and compare the two concepts across a wide range of countries (Bernhardt and Milberg 2011; Milberg and Winkler 2010). In both of them, economic upgrading is linked to export performance. In Milberg and Winkler, economic upgrading is considered to have taken place if there has been growth in value-added per person and in the exports of a country. If the rate of growth in value-added per person is greater than the rate of growth of exports, this is described as ‘strong absolute upgrading’ (Winkler and Milberg 2010: 11). The authors have only one measure for social upgrading in a country, namely, employment growth (ibid.: 13-16).

Bernhardt and Milberg put forward what they call a 'parsimonious approach' to economic and social upgrading. The definition of economic upgrading is different from that of the earlier paper by Winkler and Milberg. Economic upgrading in a given sector is considered to have taken place 'when the following two necessary conditions are fulfilled:

1. 'An increase (or at least no decrease) in the world export market share (i.e. its exports are internationally competitive);
2. 'An increase in the export unit value, implying the production of higher-value products in the sector concerned' (Bernhardt and Milberg 2011: 5).

The authors define social upgrading as occurring in a given sector 'when the following two necessary conditions are fulfilled:

1. 'An increase (or at least no decrease) in employment;
2. 'An increase in real wages (and/or an improvement of labour standards)' (Bernhardt and Milberg 2011: 6-7).

In this study, economic upgrading or downgrading is considered within a broader scope, given that, in many of the cases researched, economic changes in livelihoods inevitably have a social impact. For instance, in agriculture, an increase in crop yield for a household is referred to as 'economic upgrading', whereas further outcomes, such as higher wages, better food and schooling, constitute social upgrading.

Development

The term 'development' has vast a range of definitions. A starting point is the idea set forth by Amartya Sen (1999) in his Capabilities Approach, that development constitutes the 'process of expanding the real freedoms that people enjoy' and expanding people's capabilities to 'lead the kind of life they value' (3, 18). While Sen considers development to be achieved when individuals experience freedom to choose and pursue their own opportunities, this research also emphasizes resource access, an element the Capabilities Approach underplays. Without first having an opportunity to access the necessary resources, no individual or community can reach a level to pursue freedoms in the manner Sen puts forth. Our approach is closer to that of Ndung'u and Waema (2011), who regard the developmental importance of information and communication technology (ICT), and specifically mobile phones, as enabling 'knowledge access, accumulation, and dissemination' (Ndung'u and Waema 2011: 120) in communities so that this access enables development to take place.

Research methods

Research for this paper adopted both quantitative and qualitative techniques of data collection. For research related to the developmental uses of mobile money in Kenya and Uganda, data were derived from primary sources using interviews and observations. The instruments to collect data in Uganda included semi-structured interviews, key informant interviews, documentation and a checklist. Interviews were conducted with various key individuals, such as Stanbic Bank, which provided information on financial institutions. In addition, mobile money stakeholders, employees of MTN Uganda, consumers, users, outlets, franchisees and street vendors of MTN Uganda products and services were interviewed. This was complemented by a desk review to gather data from a variety of websites.

For research on the use of mobile phones in agriculture in rural Uganda, respondents included representatives and stakeholders of the organizations researched. For the EAAI project in Apac, the researcher spent the first two days observing the operations of the Kubere Information Centre (KIC), the physical hub of information and training for the project. The remainder of the week focused on interviews with women farmers in individual or group settings. The final total of participants in the individual and group interviews was 49, with only five of them male. The interviews were conducted in either English or Luo depending on the interviewee's preference.

In the case of the CKW project, the interviews were formal and individual, with the farmer at the farm or in the nearby trading centre. Fifteen interviews were conducted in all, in English, Lukonjo or a combination of both.

The research samples were too small to be representative. However, they do provide an indication of the economic and social impact of the EAAI and CKW projects on the interviewees and their households.

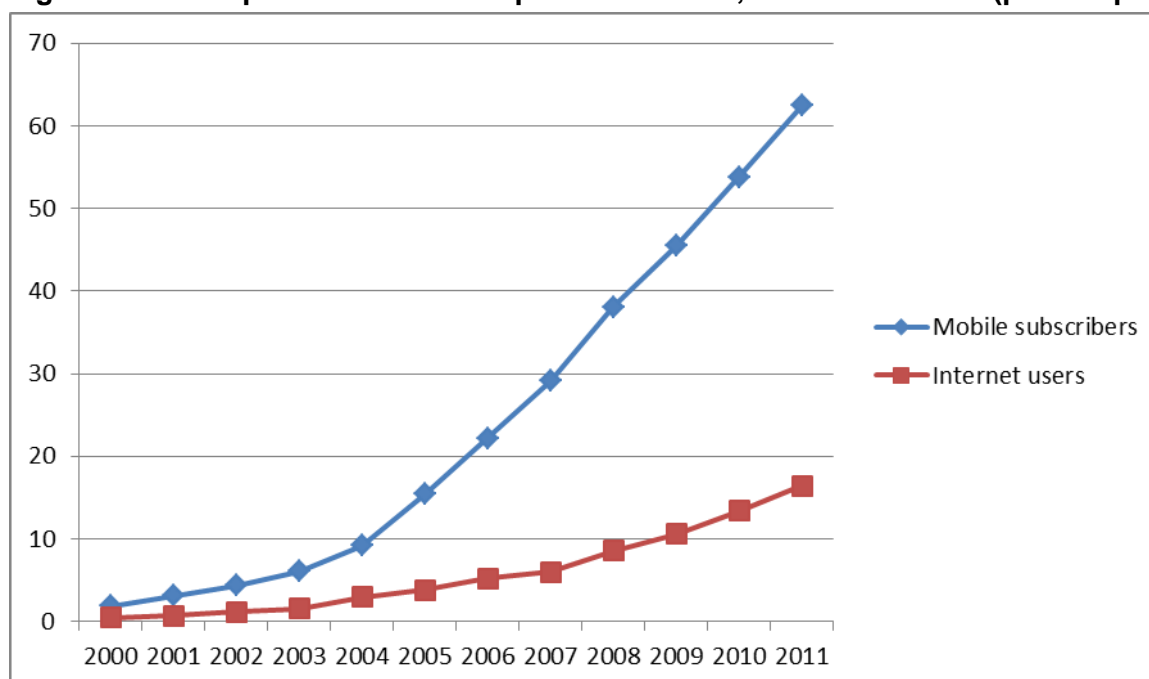
The research for this paper was conducted by all the authors. Each author was responsible for a specific part of the project and drafted a report on the findings. Tonny Omwansa and Kamotho Njenga together researched the developmental uses of M-Pesa and initiatives of hubs and labs in Kenya. Isaac Shinyekwa researched MTN's mobile money services in Uganda, while Rachel Piontak investigated the use of mobile phones in agriculture in rural Uganda. She also drafted the section on the spread of mobile phones in Africa and formulated part of the section on key concepts. Johann Maree coordinated the whole research project and conducted some research in both Kenya and Uganda. He synthesized all the research reports into this Working Paper and added analysis and material where necessary.

The spread of mobile phones across Africa

While the development and use of ICTs have increased in every corner of the African continent, mobile phones in particular have been sweeping across the landscape at a remarkable rate. Figure 1 below displays this recent swell of mobile phones on the continent.

The figure demonstrates the meteoric rise in the penetration rate of mobile phones in Africa between 2000 and 2011. During this period, the mobile phone penetration rate shot up from 1.9 percent in 2000 to 62.4 percent in 2011. In Sub-Saharan Africa specifically, Aker states that 'less than 10 per cent of the population had mobile phone coverage in 1999, increasing to over 60 per cent of the population in 2008' (Aker and Mbiti 2010, as quoted in Aker 2011: 6). In actual figures, mobile phone subscribers multiplied from 16 million to 376 million between 2000 and 2008 (Aker 2011). Yet even these illustrations of teledensity (number of telephones per 100 population) do not paint the complete picture (Kanellopoulus 2011: 11). In rural communities especially, it is very common to informally share a mobile device between families, partners, friends or neighbours (James and Versteeg 2007: 121). This emphasizes the importance of access over personal ownership, a vital component in determining the effectiveness of mobile phone usage for the purposes of social and economic development.

Figure 1: Mobile phone and internet penetration rate, Africa 2000-2011 (per 100 population)



Source: World Bank (2013).

Developmental uses of mobile phones and mobile money in Kenya

Background on Kenya

Kenya has a population of 44 million people, of whom 18.9 million are in the labour force. The overwhelming majority work in agriculture, 75 percent; the remaining 25 percent is in industry and services. The labour productivity of the sectors differs enormously, with agriculture producing the lowest revenue per worker and services the highest. This is demonstrated by the fact that gross domestic product (GDP) by sector is as follows: agriculture 24 percent, industry 15 percent and services 61 percent (2012 estimate). Unemployment is very high: in 2008 an estimated 40 percent of the labour force was unemployed (CIA 2013).

In terms of communication, the fixed line system in Kenya has remained small and inefficient, and has been completely surpassed by mobile phones. In fact, there has been a steep decline in the number of landline subscribers, from 442,950 in March 2011 to 272,100 exactly a year later (CCK 2012: 19). Over the commensurate period, the number of mobile phone clients increased by no less than 4 million, from 25.2 million to 29.2 million (ibid.).

Table 1: Mobile network operators in Kenya as at March 2012

Rank	Operator	Technology	Subscribers (millions)	Ownership with country of headquarters
1	Safaricom	GSM	19.1	Vodafone – UK (40%), Government of Kenya (35%), Free Float (25%)
2	Airtel	GSM	4.5	Bharti Airtel – India (80%)
3	Orange	GSM	3.1	Orange – France (51%), Telkom Kenya (49%)
4	Yu (Essar Telecom Kenya)	GSM	2.6	Essar Group – India (80%)

Source: CCK (2012: 9, Table 2).

Table 1 provides details of the four MNOs. Safaricom is by far the largest, followed by Airtel then Orange.

Launch and rapid growth of M-Pesa

M-Pesa is an innovation developed by the MNO Safaricom in Kenya. It was a path-breaking invention. It introduced the world to mobile money – the ability to transfer money directly from one mobile phone to another. The underlying infrastructure that enables this to happen is a digital platform designed and developed by Safaricom. It links up with thousands of M-Pesa stores dotted around the country, including in urban slums and poor rural areas. In September 2010 there were 18,000 stores (Nxele 2010), a number that increased to 40,000 by June 2013 (Safaricom 2013). M-Pesa subscribers can deposit and withdraw money at M-Pesa stores using their mobile phones, with neither the sender nor the receiver needing to have a bank account.

M-Pesa was initially intended to provide microfinance institutions (MFIs) with an efficient way of collecting customer loan repayments. However, it was discovered during the pilot phase of the project that there was an immense need to find a cheap and safe way for migrant workers to send remittances to their relatives and dependants in rural areas. Hence, Safaricom shifted its focus to the provision of such a service, which it called M-Pesa (Morawczynski 2008; 2009). Once the application was launched in March 2007, it grew extremely rapidly. By November 2007, it had over a million active users (Safaricom 2012).

M-Pesa's availability was extended in May 2008 when Safaricom signed an agreement with Chevron Kenya Ltd, which set up a partnership that allowed customers to access M-Pesa at selected Caltex service stations countrywide. This was soon followed by agreements with PesaPoint and PostBank, which allowed M-Pesa users to withdraw money from PesaPoint ATMs directly without ATM cards and at all PostBank branches (Safaricom 2012). However, there were fewer than 1,500 ATMs all told in Kenya at the time (Nxele 2010). M-Pesa subscribers shot up by more than 1 million over the subsequent four months to reach over 4 million active users by September 2008 (ibid.).

M-Pesa provided services not only to the poor but also to the middle class. In October 2008, it became possible for investors to top up their Old Mutual Unit Trusts using M-Pesa. M-Pesa also went international. In December 2008, Safaricom and Western Union signed an agreement that allowed M-Pesa's 5 million customers to receive money from the UK. In March 2011, this was extended considerably when an agreement was signed that allowed M-Pesa's 13.5 million customers to receive international money transfers from 45 countries and territories including the US, Canada, Italy and the UK (Safaricom 2012).

The services provided by M-Pesa keep on expanding. As from end of April 2009, Kenya Power (then known as KPLC) customers were able to pay their electricity bills via M-Pesa. In October 2010, Safaricom partnered with several leading supermarkets to enable customers to pay for their goods at supermarkets using M-Pesa. From December 2010, M-Pesa customers could book and pay for tickets to concerts, events, galas and even sports activities on their mobile phones. The following month it became possible for learning institutions to receive school fees via M-Pesa (Safaricom 2012).

M-Pesa's remarkable success is reflected in its growing subscriber base. On its fifth anniversary, 1 March 2012, it had no less than 14,652,593 active users, a third of Kenya's population of 44 million people (Safaricom 2012).

When Capturing the Gains embarked on its programme to research the developmental uses of mobile phones in Kenya, M-Pesa had already been researched and published extensively (Mas and Radcliffe 2011; Mbogo 2010; Morawczynski 2007, 2008, 2009; Nxele 2010; Omwansa and Sullivan 2012). In order to advance the research, it was decided to focus on developmental uses of mobile phones operating on the M-Pesa platform. Three case studies were researched: KickStart, Musoni and Bridge International Academies (BIA). They are each discussed in turn.

Developmental uses of M-Pesa platform

KickStart

KickStart International is a non-profit organization whose mission is to get millions of people based in agriculture out of poverty quickly, cost effectively and sustainably. Its 'flagship' product to achieve this is an irrigation pump, the 'pata pump', which is human powered, either by pumping it manually or by pedalling it. The pump is the heart and soul of KickStart.² In order to facilitate the purchase of the pump by poor rural farmers, KickStart designed a mobile money product called 'Mobile Layaway', which enables farmers to make payments of any amount and any frequency through M-Pesa by using their mobile phones.

KickStart's human-powered MoneyMaker irrigation pumps, as the pata pumps are also called, enable poor farmers to grow crops all year round, and to transform from rain-dependent subsistence farming to commercial agriculture. Farmers in Kenya using MoneyMaker pumps see a 190 to 200 percent increase in household income (Sijali and Mwago 2011: 322). They use their new purchasing power to meet basic needs, including medicine, education, food and shelter.

From when KickStart started in 1991, up to March 2012, 200,447 pumps had been sold, mostly in Kenya, Tanzania and Malawi (KickStart 2012; Sijali and Mwago 2011: 325). KickStart claims that, by 1 February 2013, its pata pump had facilitated the start of 140,800 new businesses and lifted 704,000 people out of poverty (KickStart 2013).



KickStart's hip pump, a lower cost and lighter pata pump on sale since 2008 (KickStart 2013).

The mobile money product designed and implemented by KickStart has yielded three key impacts. First, it shortened the time to purchase a MoneyMaker pump. Many Mobile Layaway customers

² Interview with C. Chen, Product Manager at KickStart International, Nairobi, September 2011.

indicated that they could have eventually paid for the pump in cash, but it would have taken them a much longer time period. It used to take a MoneyMaker customer an average of 12 months to purchase a MoneyMaker pump, but using the Mobile Layaway service, customers take an average of only 2.5 months to complete full payment.³

A further impact is that the mobile money product enabled KickStart to reach an even poorer income segment. In comparison with customers who pay for their KickStart products in cash, the average Mobile Layaway customer generates less annual income and owns less land, livestock and household assets.

The final impact relates to women empowerment. The mobile money product enabled KickStart to reach more women than did using other methods of purchasing the asset. The study shows that only 18 percent of customers who purchased pumps in cash were women, yet 31 percent of the customers who had registered for Mobile Layaway were women.⁴

The Mobile Layaway scheme of KickStart facilitated by M-Pesa has thus helped poorer and more women farmers to upgrade themselves economically. Their increased production and income in turn has enabled them to upgrade themselves socially by improving their living conditions and education.

Musoni

Musoni is an MFI based in Nairobi. It might look like a typical agency operating at the base of the pyramid, but it declares itself to be the 'Next Generation Microfinance' institution. There is much about it that is like any other MFI, such as group members guaranteeing one another as the prime line for collateral, but its financial system is different from that of other MFIs. This is because it is a cashless mobile money-based MFI. All its disbursements and repayments are made through mobile phones operating through the M-Pesa platform.

Musoni was started in 2010, and by mid-2012 it had five branches, three located within the environs of the capital city, Nairobi, and two in other cities within an hour's drive from Nairobi.⁵ The branches are located in the poor areas of the city, which are characterized by high populations and low penetration of banking services. This choice of locations was very deliberate because Musoni wanted to test the ground where there was not too much competition as well as an obvious need (Musoni 2012).

Musoni claimed to be serving over 5,000 clients in September 2011. It targeted low-income people who had to be in an enterprise or starting one up in order to enable them to pay back the loan. It errs on the side of caution by telling customers that their loans will be approved within 72 hours (three days), which is better than other MFIs' performance. For the most part, however, customers actually get their money within 24 hours. Comparing this with conventional microfinance, whereby transfers can take up to 10 days, Musoni is transforming the microfinance industry.

Many benefits derive from using purely mobile financial services. One is the security that comes with the operations, because money in M-Pesa is safe. Musoni also affirms that the use of mobile money prevents fraud, especially by staff members and clients. In addition, customers have the flexibility of withdrawing their money in small sums as they can retain the rest on their mobile

³ Interview with C. Chen, Product Manager at KickStart International, Nairobi, September 2011.

⁴ Interview with C. Chen, Product Manager at KickStart International, Nairobi, July 2011.

⁵ Interview with G. Maina, Chief Executive Officer, Musoni, Nairobi, July 2011.

phones. Convenience is another advantage, not only that of receiving money on their phones but also when it comes to repayment. Customers make repayments from their phones, which operate like a 24-hour bank.

Musoni's system is integrated with the M-Pesa website. This enables Musoni administrators to actually see the payments coming in online, a feature that gives Musoni a very strong position in managing loan repayments. A typical MFI will have to wait for statements from the bank to know that a customer has actually paid money, whereas Musoni receives a complete reconciliation statement at the end of every day showing exactly whose repayments are up to date and who is falling behind.⁶

Musoni was relatively young in 2012, and it remains unclear at the time of writing how sustainable the model is. There is no reliable research as yet to assess the impact of Musoni among consumers. What we can fairly safely assume, though, is that this far more efficient and cost-effective way of handling loans and repayments will contribute to economic upgrading of the enterprises securing loans, and hence to social upgrading by enabling more life choices.

Bridge International Academies

It is not only in agriculture and industry where the M-Pesa platform is being used to good effect. The platform is also being used in providing a key public good, namely, education. BIA is an exemplar of such social upgrading that depends on M-Pesa for its financial success.

As background, it is worth noting that in Kenya in 2010 18 percent of children of primary school age were out of school (Rangan and Lee 2010: 7). In Kibera, a 'slum' adjoining Nairobi with an estimated population of 750,000 inhabitants, there were only three public schools (ibid.: 5).

In the light of this, BIA has set up low-cost primary schools in very poor communities. Parents and guardians pay less than US\$4 per child per month. Ninety percent of the parents who live in the slums of Nairobi and poor communities all over the country could afford to send their children to BIA schools (Omwansa and Sullivan 2012).

BIA is a for-profit business whose core mission is to provide high-quality education that is affordable for parents who live in the poor communities all over the continent, beginning with Nairobi, Kenya. It was conceptualized in 2007 and opened its first school in January 2009 in the Mukuru slum of Nairobi. As of December 2011, BIA was running 26 schools in Kenya, and by the end of 2012 there was a total of 83 schools with 25,472 pupils. In January 2013, it opened 51 new schools, bringing the total enrolment figure up to 46,911 as of June 2013 (BIA 2013).

⁶ Interview with G. Maina, Chief Executive Officer, Musoni, Nairobi, September 2011.



Students at Kingston School in Nairobi (Cull 2010).

BIA had found that, in other schools, many school managers spent upwards of 50 percent of their time being a 'cash register'. That is, they spent their time collecting tuition payments, paying teachers, paying vendors etc. BIA decided to centralize these functions in an effort to better utilize the manager's time as well as to make the financial management of the schools more efficient.

As a result, all schools have been made 'cash-less'. No money is exchanged in the schools. Parents can make tuition payments either by using M-Pesa, which enables them to make a payment using their mobile phone, or at an Equity Bank branch (Rangan and Lee 2010: 12). Between 80 and 85 percent of parents choose to use M-Pesa. They use the pay-bill function on the M-Pesa menu, making BIA one of the largest single clients of Safaricom's M-Pesa.⁷ The use of M-Pesa also eliminates opportunities for corruption or theft and guarantees parents that, when they pay, the right amount of the fee is credited in their account.

Tuition payments are tracked via SMS messages. Information from the bank and from Safaricom, the operator of M-Pesa, is downloaded into a BIA database daily. The database tracks all fees due for each student, the fees paid and so on. Using a specially designed Master Roster form, the school manager can then quickly and efficiently update his/her records (Rangan and Lee 2010: 12). BIA confirms that schools run profitably.

As regards the quality of the education provided, research studies found that students who attended low-cost private schools targeted at the poor outperformed students attending government schools in both English and mathematics. One study (Tooley and Dixon 2005: 2), for example, found that students attending registered private schools outperformed students attending government schools 22 percentage points in mathematics; for English the difference was even more marked (Rangan and Lee 2010: 5).

According to BIA's own research, pupils in Class 2 at BIA schools have a reading fluency that is up to 205 percent better than that of their peers at neighbourhood schools, while reading comprehension is 37 percent better, addition 24 percent better and subtraction 37 percent better (BIA 2013).

Although this research is not from a neutral source, it is reasonable to conclude that BIA provides a valuable educational service, one which relies on the M-Pesa platform for its viability. This service is one that unmistakably contributes to both economic and social upgrading in that the pupils'

⁷ Interview with J. Kimmelman, Managing Director, Bridge International, Nairobi, July 2011.

knowledge and skills are being developed and their opportunities to raise the future quality of their lives are being enhanced.

Hubs, labs and incubators serving Kenya

Kenya has seen an upsurge in the number of technology-related hubs (also called labs or incubators) in the past few years. The strong belief that mobile phones form the basis for the future of the country has attracted academics, venture capitalists, researchers, entrepreneurs and policymakers alike. Four of the most notable hubs are m:Lab, iHub, Nailab and iLab Africa. All these hubs are located in Nairobi. What is more, they are all in the same building, the Bishop Magua Centre, which enables greater cooperation and synergies to develop between them.

By and large, all the hubs are aimed at nurturing and expanding young technology companies. The nurturing, which varies from one hub to another, involves providing mentorship, funding and networking as well as other resources. By July 2012, only m:Lab and iHub had managed to incubate firms that became relatively independent. These two hubs are discussed in more detail below.

m:Lab East Africa and iHub

m:Lab East Africa focuses on identifying, nurturing and creating sustainable enterprises in the knowledge economy.⁸ The mission of the lab is to facilitate demand-driven innovation by regional entrepreneurs, ensuring that breakthrough low-cost, high-value mobile solutions can be developed and scaled up into sustainable businesses that address social needs (m:Lab 2012). One way it does so is by acting as an incubator to enable entrepreneurs to develop mobile applications.⁹

The lab was established early in 2011 and officially launched in June 2011 by a consortium of four organizations providing a variety of inputs. The consortium organizations are:

- eMobilis, which provides education, training, accreditation and certification;
- The World Wide Web Foundation, which provides curriculum and content, training and education;
- The University of Nairobi School of Computing and Informatics, which engages in academic research; and
- iHub, which provides a platform for community interaction, development space, events and access to capital and markets (m:Lab 2012).

iHub, the last-mentioned member of the consortium, is the oldest of the Nairobi's innovation hubs servicing the technological community. It was established in March 2010. It is an open space for technologists, investors and tech companies, among others. This space is a tech community facility with a focus on young entrepreneurs, web and mobile phone programmers, designers and researchers (iHub 2012). About a year after its establishment, the hub established iHub Research. The mandate of the new initiative is to conduct research relevant to the local market.¹⁰

iHub does not directly incubate small tech businesses; rather, it creates an environment for young businesses to meet investors, value-adding partners and mentors. Being a part of iHub could thus facilitate social upgrading through knowledge sharing and forming partnerships. Businesses or

⁸ Interviews with J. Kieti, Manager, m:Lab, Nairobi, November 2011 and April 2012, and with J. Colaço, Research Leader, iHub Research, Nairobi, June 2012.

⁹ Interview with J. Kieti, Manager, m:Lab, Nairobi, October 2011.

¹⁰ Interview with J. Colaço, Research Leader, iHub Research, Nairobi, June 2012.

individuals join by paying a fee that gives them access to certain services at the facility; researchers present findings; start-ups pitch for funding; entrepreneurs develop their ideas by exchanging ideas with others; and so on.¹¹

The greatest achievement of iHub has been to establish a huge strong network where participants support each other. Young technology entrepreneurs want to be associated with iHub because they hope that, besides bouncing off their ideas other people to help build them, they meet possible partners and investors. Most individuals who have a small business indicated that their greatest value obtained from the Hub was a growing network.¹²

Most of the businesses that have been incubated revolve around ICT and more particularly mobile phone-based applications. In general, it is estimated that about 70 companies were incubated by the iHub and m:Lab in Nairobi over a two-and-a-half-year period up to June 2012. Of these incubates, about 30 had been in existence for over one and a half years, while five were employing between two and 15 employees and serving between four and nine clients.¹³ Furthermore, m:Lab has successfully nurtured six incubates to self-reliance (iHub 2012).¹⁴ They are Kopo Kopo, mFarm, MTL Systems, Space Kenya Networks, Uhasibu and Zege Technologies (m:Lab 2012).¹⁵

iHub and m:Lab have thus enabled many participants to upgrade themselves economically and socially. The participants, in turn, are upgrading other people they are employing and servicing.

Conclusion on Kenya's developmental uses of mobile phones

The research findings on Kenya have highlighted two distinct ways in which mobile phones have been used for developmental purposes. The first has been by designing innovative applications of the M-Pesa platform to assist poor farmers to raise their income level and start-up entrepreneurs to obtain finance for their projects. The second has been by setting up hubs and labs where mobile applications have been developed to incubate new enterprises.

Both strategies demonstrate how the end product in the mobile technology value network, namely, the mobile phone, is being used to start new cycles of economic and social upgrading in entirely different industries in Kenya.

The same process has been taking place in Uganda, but in markedly different ways, as the case studies below reveal.

Developmental uses of mobile phones and mobile money in Uganda

Uganda

Uganda is a country of 33,425,000 citizens (2010 estimate), nestled between its five neighbouring countries of Kenya, Tanzania, Rwanda, the Democratic Republic of Congo and South Sudan (Uganda 2011). Given the tropical climate and abundant water resources, it comes as no surprise that 68.9 percent of its 241,550 km² land mass is considered agricultural land (ibid.).

Uganda is a country driven predominantly by its rural agriculture sector, demonstrated by the fact that 80 percent of the population depends on agriculture as their source of livelihood (Okello 2011).

¹¹ Interview with J. Colaço, Research Leader, iHub Research, Nairobi, June 2012.

¹² Interview with J. Colaço, Research Leader, iHub Research, Nairobi, June 2012.

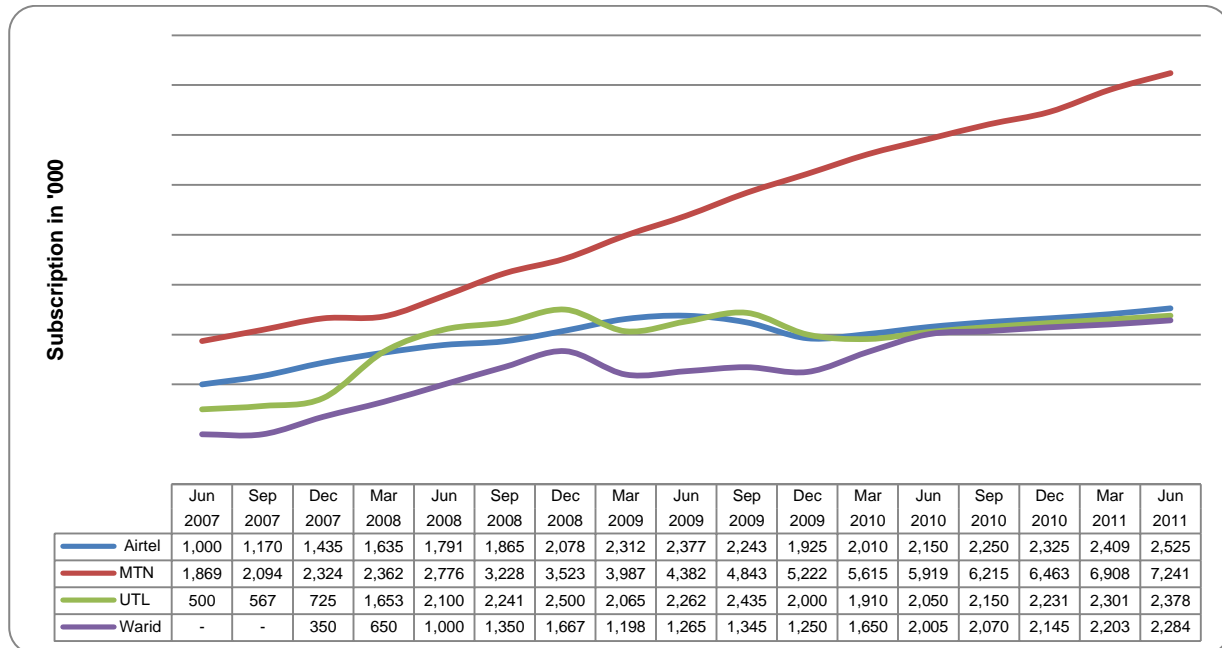
¹³ Interview with J. Kieti, Manager, m:Lab, Nairobi, April 2012.

¹⁴ Also, interview with J. Kieti, Manager, m:Lab, Nairobi, April 2012.

¹⁵ Also, interview with J. Kieti, Manager, m:Lab, Nairobi, April 2012.

Furthermore, with 86.7 percent of Ugandans living in rural areas, it is the main income generator for the majority of the country (Rural Poverty Portal 2010). This is largely the result of their strongest export crops comprising coffee, tea, cotton and tobacco (Uganda Exports 2011). Within the country's borders, many small-scale and subsistence farmers generate necessary foodstuffs to feed their families and sell in local markets. Given that 18 percent of the land mass is covered by lakes, fisheries and livestock make up a significant portion of the agriculture scope as well (Fisheries Resources 2012). The Food and Agriculture Organization (FAO) values Uganda's agricultural export value at US\$878 million (Uganda 2011).

Figure 2: Growth in subscription of customers among the MNOs, 2007-2011



Source: BMI (2012).

Especially striking is the telephony landscape prior to the introduction of mobile telecommunications. According to a study by Burrell and Matovu (2008), phone service of any sort was essentially non-existent in rural Ugandan villages before the mobile phone. As a result, when mobile phones became available, they spread quickly. However, penetration has not yet reached the same magnitude as that of its African neighbours.

Statistics released by the UN reveal that Uganda has lower mobile phone penetration than the rest of Sub-Saharan Africa (Gyory 2010). Despite its slow rate, the expansion-to-time ratio is highly noteworthy. In just eight years, mobile phone subscriptions increased from 0.5 per 100 people to 26.8 by 2008, according to the 2009 International Telecommunication Union (ITU) (ibid.: 4-5).

MTN Uganda holds the largest customer subscription among MNOs in Uganda, as illustrated in Figure 2. Its subscriptions have grown from fewer than 2 million in 1996 to over 7.2 million in 2011 (BMI 2012). Airtel, which is the second largest in customer subscription, has had challenges owing to frequent changes in management and ownership (from Celtel to Zain and now Airtel). The most impressive growth in subscription among MNOs in Uganda has been by Warid Uganda, which only started operations in 2007. The company had increased subscription to over 2 million by June 2011, close to what Airtel and UTL hold.

This paper focuses specifically on the role of the South African-owned mobile network operator MTN. Following the example of Safaricom and M-Pesa in Kenya, it has placed considerable emphasis on the developmental uses of mobile money.

MTN MobileMoney in Uganda

Mobile money can loosely be referred to as electronic or virtual money held by individuals electronically. It has demonstrated ground-breaking possibilities to make financial services more inclusive, especially for unbanked populations. In this section, we present and discuss the dynamics of mobile money in Uganda, with an emphasis on MTN Uganda, an MNO that has been innovative by setting up MTN MobileMoney (MTN MM). Particularly emphasis is put on the developmental aspects of the innovation.

The mobile money services in Uganda are largely partnerships between MNOs like MTN, WARID, UTL and Airtel. Commercial banks act as guarantors of the safety of the money. Although the models slightly differ among the MNOs, they offer the same service and use similar platforms. According to BMI (2012), the Bank of Uganda (BOU) recorded UGX1 trillion (about US\$400 million) that went through the mobile money transfer service in 2010. During the same period, MTN Uganda recorded transfers through its network of UGX550 billion (about US\$220 million), which is 55 percent of all the cash transferred in 2010, showing the dominance of MTN in the mobile money market.

The MTN MM platform is run by a number of key actors. As outlined in Jenkins (2008), they include the following:

1. MTN Uganda, which provides the mobile infrastructure (platform) and customer base already using its communication services. MTN Uganda benefits from MM by increasing and maintaining the number of customers, reducing the cost of airtime distribution and generating extra revenue;
2. Stanbic Bank, which has the infrastructure that enables the exchange of money between different parties. The bank also provides oversight and regulatory compliance with BOU regulations and policy;
3. The regulatory institutions, which include the BOU and the Uganda Communications Commission (UCC), which have national development interests to protect;
4. An army of agents (network), which facilitates cash-in (converting cash into MM) and cash-out (issuing cash on demand) to enable convertibility between MM and cash. In April 2013, MTN Uganda had an extensive agent network of over 3,000 countrywide involved in MM (MTN 2013);
5. Merchants and retailers, who accept MM payments in exchange for products and services;
6. Businesses, which utilize MM as a means to deliver their services, mainly utility companies;
7. The hardware and software providers, who include mobile phone makers, network equipment and vendors as well as application providers;
8. MM users who are subscribers of MTN Uganda. They derive benefits by getting cheaper and more efficient means of transferring or paying money to other people or businesses within the network.

Mobile money services

MTN MM has evolved into many services, which can be categorized into three major groups: Money Transfer (MT), Money Payment (MP) and Money Financial Services (MFS). MT is where money is transferred from one user to another, and does not accompany exchange of goods or

services. By contrast, MP is where money is exchanged between two users with an accompanying exchange of goods or services. Finally, MFS is where MM is linked to a bank account to provide the user with a whole range of transactions (savings and credits) that they would ordinarily access at a bank branch. Table 2 illustrates the three categories and what MTN Uganda is currently offering on the market for its customers.

Table 2: Categories of different MM services offered by MTN Uganda

Category	Service
M-transfers	<ol style="list-style-type: none"> 1. Domestic money transfers 2. Churches and non-governmental organizations (contributions) 3. International mobile money from Western Union international transfers
M-payments	<ol style="list-style-type: none"> 1. Buy airtime (on-network) 2. Pay post-paid phone bills 3. Educational institutions (school fees) 4. Utility providers (monthly bills for electricity, water, sewage, Pay TV) 5. Businesses (customer to business, i.e. payments) 6. Bulk payments (business to customer, i.e. salaries, cash payment to the elderly)
M-financial services	<ol style="list-style-type: none"> 1. Micro loans and repayments 2. Payment of old aged and vulnerable persons

Source: www.mtn.co.ug and interviews.

Money transfer

The MTN MM domestic m-transfer still dominates among mobile money services, mainly occurring between urban and rural areas, as customers in urban areas remit money to rural areas to support their extended families.

Western Union and MTN Group have launched a mobile money transfer service in Uganda, which enables over 3 million MTN customers to send and receive money across borders using their mobile phones. The partnership is a mobile money functionality that allows subscribers in Uganda to send and receive money to and from countries where Western Union operates using their mobile phone. They have the option to upload the money into their MTN MM account or withdraw it at an authorized agent. This enables MTN money transfer customers to access the 450,000 Western Union agent locations in 200 countries and territories (MTN 2012).

Money payment

MTN MM has broadened its services to include a range of m-payments that span from government to private entities. MTN started out by targeting entities that receive recurrent payments from diverse customers, like utility companies such as National Water and Sewerage Corporation (NWSC), and those that make bulk payments (old age remittance and school fees). It is interesting to note that some utility companies have chosen to meet the cost for their customers remitting dues via MTN MM because it affords them a cheaper avenue to collect dues from customers on a regular basis. This has actually led to the closure of some due collection offices, thus cutting operational costs. As an example, NWSC has scrapped some of its cash collection centres and resorted to using banks and MTN MM as the way for users to pay their dues (NWSC 2012). As a consequence, these companies have drastically cut operational costs,¹⁶ although this comes with loss of jobs, which presents a social downgrading situation.

¹⁶ NWSC has not conducted a study to estimate the savings made, but argued that costs had been reduced in terms of salaries, office rent, phone bills, paper and stationery, among others.

NWSC is an autonomous public corporation wholly owned by the Government of Uganda. Its mandate is to operate and provide water and sewerage services in areas entrusted to it. It is fully operational in 22 main towns, including large urban centres within Uganda. MTN Uganda and NWSC entered into arrangements for an e-mobile water utility payments service that enables about 300,000 customers of the national water utility company to pay their bills using MTN MM.¹⁷ The service is convenient and eliminates delays in updating customer accounts as well as the need to physically move to pay one's bill or check the account balance. As a consequence, customers have found making payment simplified to the extent that they keep their accounts up to date and therefore do not get disconnected, as was the case in the past.

Money financial services

In 2010, the Government of Uganda approved the implementation of a programme called Expanding Social Protection (ESP).¹⁸ An aspect of the ESP called the Social Assistance Grants for Empowerment (SAGE) has been implemented in 14 districts. SAGE is a social transfer project and is led by the Ministry of Gender, Labour and Social Development. It reports to a Steering Committee comprising the Ministries of Finance, Local Government, Health and Education, the Office of the Prime Minister, the National Planning Authority and development partners.

During its initial five years, the programme is being supported by international partners, in particular the UK Department for International Development (DFID), Irish Aid and the UN Children's Fund (UNICEF). Overall funding of £39 million has been agreed for the programme. The aim of SAGE is to tackle chronic poverty in Uganda and to test a range of implementation modalities for efficient and cost-effective delivery as a pilot project in order to scale it up. The SAGE is planned to reach about 600,000 people in about 95,000 households over a period of four years (April 2011-February 2015), which is approximately 15 percent of households in the targeted districts. The methodology has identified two groups of beneficiaries: vulnerable families and the aged. The latter group comprises persons above 65 years who nationally constitute 3.2 percent of the population and are represented in around 14 percent of households. The initial size of the monthly grant was UGX23,000 (about US\$10 in 2011) per beneficiary. It was envisaged that this money would be necessary to increase the income of the average household in the lowest decile.

A financial service provider has been contracted to transfer the cash to beneficiaries using the electronic transfer system of the mobile platform managed by MTN Uganda. This was the first service of its kind on the continent. It was realized that, among the beneficiaries, there were those with phones and those without phones. In this financial service, those with phones have their money sent to their phones at the end of every month. All they need to do is to look for an MTN MM agent to receive their money. Beneficiaries without mobile phones were given SIM cards, and their money is sent directly to the cards. They in turn insert their SIM cards into the Yellow Easy Talk Machines (Payphones) and receive money from MTN MM agents stationed in those locations.

It is important to mention that this project was just at its inception at the time of writing and therefore had not yet been evaluated. Nevertheless, it has the potential to make a profound impact on the beneficiaries and reduce the transaction costs involved in paying many persons scattered all over the country. In a country where it is common to hear about corruption and financial scandals, this scheme has extensively eliminated the embezzlement of funds meant for the elderly and vulnerable.

¹⁷ Not all clients are MTN MM subscribers. MTN Uganda competes with other MNOs for the same clientele.

¹⁸ This is a programme of the Ministry of Gender Labour and Social Development.

Economic upgrading resulting in social downgrading

However, not all m-payments of MTN Uganda result only in social upgrading. One of its innovations could actually be leading to social downgrading. This innovation is the targeting of large entities with multiple outlets such as supermarkets like Uchumi to sell airtime or credit directly to consumers without using agents, thereby cutting operational costs. This avenue to sell airtime is helping MTN Uganda make significant savings by bypassing the traditional distribution system of scratch-cards. It thus saves expenses by avoiding printing new cards and paying commission to dealers and their agents (Kumar and Mino 2011).

This implies that the margins of many small mobile sector enterprises (airtime vendors) that thrive on the distribution of airtime could come under increasing pressure as MTN Uganda increases the sale of airtime through this virtual channel. This is an example of economic upgrading on the side of MTN Uganda that presents a social downgrading situation for the vendors and the companies that print scratch-cards, as there is loss of employment and income.

Developmental use of mobile phones in rural agriculture in Uganda

The influx and uses of mobile phones in agriculture

The influx of mobile phones in rural agricultural areas represents 'one of the most profound changes in rural Uganda and many other developing countries in the past decade' (Martin and Abbott 2010: 1). This operates from the fact that prior to mobile phones there was little or no infrastructure in place for telecommunications whatsoever (Martin and Abbott, 2010). With the now unavoidable presence of mobile phones, even in the most remote villages of Uganda, the potential to improve access to agricultural information has been made a reality (Aker 2011; Mesiku 2011).

Moreover, rural farmers themselves have reported a number of benefits resulting from mobile phone use in their agriculture businesses. Of these, elimination of travel costs, saving of time and market access rise to the top positions (Martin and Abbott 2010: 8). With the option to call ahead and prearrange meetings for seed and buyer collection, farmers are able to avoid unnecessary trips to trading centres or faraway markets (ibid.: 5-6).

Thanks to the mobile, opportunities for increased communication and information sharing with other farmers are also now possible. This, according to Martin and Abbott (2010: 8), leads to the perceived increases in 'contacts and opportunities', 'market access' and increases in 'efficiency resulting in greater output'.

A further component to consider with mobile use in agriculture is the popularity of mobile money applications (Hughes and Lonie 2007). This is especially evident in Sub-Saharan Africa for small-scale farming communities. These opportunities include, but are not limited to, the mobile payment system (like MTN MM or Safaricom's M-Pesa), the micro-insurance system and the micro-lending platform (Accenture 2011: 15). All of these services, when used by smallholder farmers, have the potential to improve outputs and decrease the risk of 'losing it all' when crops fail. This tool, combined with increased information availability, delivers nearly '40% of the total estimated increase in agricultural income' (ibid.: 7). Such a dynamic cooperation between financial and informational services 'unlocks productivity potential' as never before (ibid.: 8).

Furthermore, an element to note when discussing potential factors for improved agricultural outputs relies on information sharing among farmers. This is best seen through the countless farming groups and cooperatives across Uganda. Farmers often join these farming groups or cooperatives in order to pool resources, share best practices or participate in micro-lending.

Recent studies propose a positive correlation between group membership and mobile phone usage, specifically in agriculture. This discovery suggests that 'farm group membership is associated with knowledge transfer' (Martin and Abbott 2010: 5). The report further states that 82 percent of survey respondents used mobiles for farmer mobilization, such as meeting and training coordination, and for 'agricultural inputs' from suppliers, agriculture-based organizations and other local farmers (ibid.: 5-6).

As a result, farmers reported that they 'no longer missed meetings or trainings, because they were always available through the mobile phone' (Martin and Abbott 2010: 5-6). In addition to the benefits of farm group membership in conjunction with mobile phone usage, the report found that members were 'significantly more likely' to consult agricultural experts through the phone than their non-member counterparts, with the staggering comparative figures of 51 percent to 19 percent (ibid.: 6). With such findings in mind, it may be concluded that farm group involvement combined with access to and use of a mobile phone may lead to greater outputs, decrease risks and improve the overall agricultural business of the farmer.

In addition to farming groups, mobile phones have been adopted within agriculture extension programmes as well. According to Aker (2011: 2), 'there has been a proliferation of mobile phone-based applications and services in the agricultural sector' since 2007. Although Aker does not specifically pinpoint Uganda, the country has witnessed this rise first-hand through ICT-focused organizations like Grameen AppLab and I-Network (Accenture 2011).

These broad findings have been confirmed and deepened by the two case studies that Capturing the Gains conducted in rural Uganda.

Two case studies of developmental use of mobile phones in agriculture in Uganda

Enhancing Access to Agricultural Information

The first case study focuses on the EAAI project, one of several agriculture extension programmes piloted through the Women of Uganda Network (WOUGNET) organization. This extension project is distinct because of its twofold focus on both ICTs and rural women farmers in Uganda.

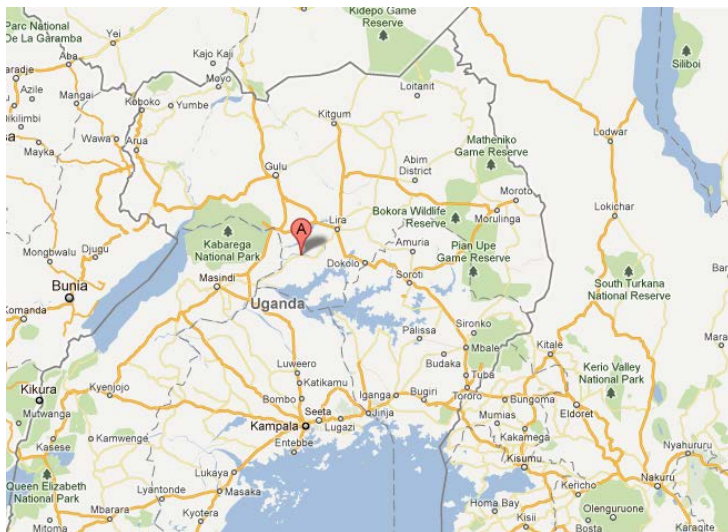
WOUGNET was founded in May 2000 by Dr Dorothe Okello, Lecturer in the Department of Electrical and Computer Engineering at the University of Makerere, as a result of a growing need to house the numerous women's organizations under one overarching network. Its goal is reflective of its mission statement, which strives to 'promote and support the use of ICTs by women and women organizations in Uganda, so that they can take advantage of the opportunities presented by ICTs in order to effectively address national and local problems of sustainable development' (WOUGNET 2009a).

In order to do so, WOUGNET endeavours to combine traditional forms of ICT like radio with more modern technologies in order to increase their potential range of impact. While the organization places a strong emphasis on the internet as a means of information dissemination, it also incorporates mobile phones, print media, radio and television (WOUGNET 2009a). However, in rural areas it tends to rely more heavily on radio as a means of communication.

This report focuses on one of its projects called Enhancing Access to Agricultural Information using Information and Communication Technologies in Apac District, more commonly known as the EAAI project (WOUGNET 2009b). This project began in 2005 with the intent to make relevant agricultural information available to women farmers in Apac district of Northern Uganda

(WOUGNET 2009c). By incorporating mobile phones, radio and internet technologies within new and pre-existing women's farming groups, EAAI attempts to streamline relevant agricultural information from an often complex web of information and resources. The map below (Figure 3) locates Apac town within the Ugandan landscape.

Figure 3: Map of Uganda locating Apac district (A)



Source: Google Maps (accessed 21 November 2011).

During a key informant interview, Rural Project Officer Brenda Otika explained that the EAAI project's purpose is to provide knowledge to the women farmers. She noted its importance by stating:

Knowledge is power, when the farmers are well informed, they are in a better position to make informed choices on how to cultivate and what to grow in their land, when to harvest, how to store, when and where to market, what prices to charge thus helping them to obtain high profit margins and avoid being cheated by middle men (WOUGNET 2011).



Apac District, Uganda – women farmers listen intently to WOUGNET staff during a farm group meeting (photo taken by researcher, November 2011).

The heartbeat of this project is Kubere Information Centre (KIC), located in the centre of Apac town. In the local language of Luo, *kubere* means 'coming together'. This 'multidimensional-information centre' exists for local women farmers to find answers to their agricultural enquiries

(WOUGNET 2009c). It disseminates the majority of its information through a weekly radio programme called Radio Apac. Although mobile phones are just one of the many methods it uses to disseminate information, it is growing in popularity.

Research findings on EAAI

1. Ability to access a mobile phone handset was not reported as the most pressing need. In fact, nearly all women claimed they could access a handset, even if they did not personally own one. Most of the women said that their options for borrowing included family members, neighbours or other members of the women's group, and they did not seem worried about accessing it when necessary.
2. All of the women, whether individually or as a group, had called in to the Radio Apac agriculture programme at least once to pose a question.
3. The experience of spending time with several women's farming groups revealed a strong sense of sharing and networking among them.
4. Even when access to information is achieved through the mobile phone, it is not a mutually exclusive contributor towards social upgrading. External factors also play a role in bringing about changes in livelihood. In extremely rural and less rural areas alike, groups expressed gratitude for receiving information alongside woes of inaccessible markets in the same breath.
5. Another contributing factor is the climate. Many women talked about the discrepancy between the amount of labour and capital that goes into the crops and the yield that results (Orib Cing 2011).¹⁹ They referred to natural causes like rain, drought and other seasonal changes. While no technology can change the weather, advanced warning systems and weather updates through the mobile phone may improve farmers' situation.
6. The patriarchal culture is infrequently addressed yet remains an undercurrent in overall mobile phone usability and access. The existence of patriarchy has been confirmed by numerous scholars who have studied the digital gap between genders and share conclusions that, although women are the primary breadwinners, males continue to have the upper hand in technology access and use (Bakesha et al. 2009: 143; Ekine 2011; Primo 2005: 144; Wamala 2010). However, the evidence for this in the fieldwork was scarce, as men were present in every interview except the first, during which one woman stated that some women are not allowed to own mobile phones because their husbands alleged it would 'break balance in the house'. Okello (2012) confirmed that male domination does exist in some farming households and that access to and use of mobile phones reflect the gender relationship existing within each household.
7. Social and economic upgrading may be attributed to the benefits associated with group membership in addition to mobile telecommunications. As the interviews progressed, it became clear that group membership, and the social network formed therein, was a support to the women farmers both economically and socially, providing them with a space to learn and collaborate together.

Community Knowledge Workers

The second case study is based on the CKW project, which connects Ugandan farmers with expert farming advice. It is a project of the Grameen Foundation's AppLab Uganda, hereafter referred to as AppLab. AppLab was launched in June 2009, but its founding partners, MTN, Google and the Grameen Foundation, had been building it up behind the scenes since 2007 (AppLab Uganda 2011).

¹⁹ Interview with O. Cing, women's group, Oumi parish, November 2011.

The CKW project has a similar aim to that of the EEAI project, but its operation and technology are distinct. The technology behind the CKW project consists of a mobile application that captures a variety of agricultural data, including GPS, photo, video and audio, and compiles it into a user-friendly database for the CKWs to access from their smart phones. The project works through the MTN network in Uganda, which helps ensure broad coverage for farmers (AppLab Uganda 2011).

Figure 4: Map of Uganda indicating distribution of CKWs



Source: AppLab Dashboard (accessed 10 January 2012).

CKWs are chosen at the community level by AppLab staff with assistance from local farming groups and cooperatives.²⁰ By working through pre-existing organizations and farmer networks, AppLab gains access to the farmers who are already connected and committed to the local community.²¹

Once the CKWs are chosen, they undergo rigorous training to learn about the features and applications loaded on the smart phones. Since the phones are on loan from AppLab until CKWs can fully purchase them, CKWs are required to pay a certain amount from each pay-checke toward the phone's cost. Although this means their pay is marginally deducted, they are provided with several solar chargers and encouraged to start a small enterprise in their community to generate additional income.²²

A CKW has three primary tasks: register new farmers for the service, conduct phone-based surveys and answer local farmers' questions. Each CKW is responsible for approximately 500-800 households in the surrounding area, so they often have to travel outside of their home villages in order to reach them.

The CKW project has expanded extensively over Uganda, as demonstrated by the density map above (Figure 4).

Research findings on CKW

1. Reports of improved quality and quantity of agricultural products were emphasized equally by the farmers. Although the mention of higher yields was undeniably present, a large

²⁰ Interview with L. Namubiru, Monitoring and Evaluation Head, November 2011.

²¹ Interview with L. Namubiru, Monitoring and Evaluation Head, November 2011.

²² Interview with L. Namubiru, Monitoring and Evaluation Head, November 2011.

- number of farmers, unprompted, commented on the improved quality of their products as well. This may owe to the 'crop doctor' role of the CKW, who is called upon in times of plant disease, near crop failures and animal illnesses.
2. For instance, Masereka Ezra reported that, although he is not producing a higher volume of coffee than before, he now produces 5 kg of clean, and therefore sellable, coffee for every 15 kg, as opposed to the 3 kg previously. He attributed this success to 'knowing the information'.²³ Examples of quality improvement like these were plentiful throughout the interviews.
 3. An improvement in the quality of work and life was a common theme among the interviewees. Items such as paying school fees, moving children to a better school if possible, having sufficient food to eat, getting money to treat illness and the ability to purchase various farming and household resources like poultry, pigs, goats, ploughs or chairs were the most commonly reported.
 4. Information and knowledge in isolation were not enough to lead to economic upgrading. The necessary inputs also had to be available. Knowledge is power, but knowledge alone does not increase crop yield. While the quality of information is vital, it cannot replace the tangible inputs needed to solve an agricultural problem or prevent it from recurring. For the interviewees, the most commonly cited input needs were ploughs, oxen and raw materials.
 5. Membership in a farming group or cooperative positively influences information gathering and dissemination. Fourteen of the 15 interviewees were quick to include the farming group as the prominent group from which they derive additional farming information outside of the CKW project.
 6. The ease with which the mobile phones provide answers was a very common theme among interviewees. As Eliza Mugisa said, 'instead of moving very far to make a communication, you just call'. The phone, then, 'can help you get to know what you wouldn't have known otherwise'.²⁴
 7. Much like access to a mobile phone, ease of access to the CKW was a highly important element for these farmers. Unlike many other extension workers, CKWs are integrated into the communities in which they serve, providing ready access for pressing needs.
 8. Of the 15 interviews, eight reported calling the CKW as common practice to obtain answers to their agriculture needs. This means over half of the participants regularly contact their CKW through a personal or shared mobile phone. For five of those who do not use their phone to contact the CKW, their CKWs either 'come around' or live close enough, so they have never needed to go out of their way to contact them.²⁵ As Eliza Mugisa said, she does not need to call them because they are 'always here'.²⁶

²³ Interview with M. Ezra, farmer served by CKW, Nyabirongo Central, Kasese district, November 2011.

²⁴ Interview with E. Mugisa, farmer served by CKW, Musasa, Kasese district, November 2011.

²⁵ Interview with G. Marahi, farmer served by CKW, Musasa, Kasese district, November 2011.

²⁶ Interview with E. Mugisa, farmer served by CKW, Musasa, Kasese district, November 2011.



Kasese District, Uganda – a female farmer demonstrates her new method of mulching (photo taken by researcher, November 2011).

Common themes in two case studies

The first commonality is the presence of perceived changes in livelihood as a result of these agricultural extension projects. In every interview, there was a reference to new or increased life opportunities as a result of agricultural information gathered through the project.

The second shared theme related directly to mobile phones. Many of the interviewees cited ‘ease of communication’ as a direct factor. They commented on its usefulness to ‘simplify their work’. Many others, like farmer Eliza Mugisa, highlighted how much time and travel were saved because of the mobile phone.²⁷

Throughout each of these, the researcher found a strong undercurrent of increased access to information as a major component of the reported livelihood improvements. But other interviews revealed a host of obstacles. Among these, airtime, electricity for charging mobile phone batteries and network access were the most commonly cited.

External to mobile phones a number of elements emerged from the case studies that may affect social and economic upgrading or downgrading. First and foremost, the matter of farm groups and cooperatives linked to social networks was a strongly emphasized element in both case studies. When asked about additional sources of farming advice, nearly all interviewees referenced farming groups or cooperatives near the top of the list.

Another external factor is market access. Its improvement results in economic and social upgrading, which contributes to positive changes in livelihood for the farmers. It was originally expected that this positive change would be a result of the ability to acquire market prices and information through mobile phones, yet numerous interviewees expressed that this did not solve the overarching problem of actually accessing markets. This calls for a holistic solution that goes beyond voice- or text-based information services.

The final shared theme of the two case studies is gender. This is a vital factor, as agriculture in Uganda is a female-dominated sector, with women accounting for as many as 70 percent of agricultural workers (Accenture 2011: 14), but males dominating as the traditional heads of households. In the case studies there were few but nonetheless significant mentions of the gender component regarding availability and access to a mobile phone.

²⁷ Interview with E. Mugisa, farmer served by CKW, November 2011.

In spite of the numerous obstacles faced by the mostly female agricultural producers, it is clear that both the EAAI and CKW projects have brought about economic and social upgrading.

Summary of findings and implications

This paper has considered the developmental uses of mobile phones in Kenya and Uganda. In both countries, it was found that innovative use is being made of applications based on the mobile money platforms developed by Safaricom in Kenya (M-Pesa) and MTN in Uganda (MobileMoney). These innovations span a remarkably wide range of economic activities in the private as well as the public sector, from manual irrigation pumps in agriculture to MFIs for small enterprises to payment of utility accounts and transfers of social assistance grants to vulnerable families and the aged.

The scale of the projects is remarkably extensive in some instances. For example, the ESP programme in Uganda is being implemented in 14 districts and plans to reach 600,000 people over a four-year period ending February 2015. KickStart has sold over 200,000 manual irrigation pumps to farmers in Africa, lifting many out of poverty by raising their income considerably. Introduction of the Mobile Layaway, a scheme that enables farmers wanting to buy a pump to save money on their mobile phones through M-Pesa, has increased the proportion of poor and women farmers who purchase the pumps.

But some cost-cutting by MNOs is likely to result in many mobile phone vendors going out of business as cheaper ways to sell airtime are made available through mobile money services. Change does not come without casualties, even though it was the advent of mobile phone services of the MNOs that led to the creation of these jobs in the first place.

In Nairobi, Kenya, there is a high level of innovation taking place at a cluster of hubs and labs all located in the same building. These hubs and labs act as an incubator by providing an open space, expertise and mentoring for anybody and any organization wishing to develop applications in the computer and telecommunications industries for use on mobile phones. Although these services have only been applied for a relatively short period (the oldest dates back to March 2010), they have already helped about 70 companies to get going.

In Uganda, two case studies of the role that mobile phones play in enhancing agricultural performance of rural farmers, most of whom are women, confirmed positive outcomes with regard to both economic and social upgrading. At the same time, it was found that mobile phones and the telecommunication they provide are not sufficient in themselves to upgrade the lives of agricultural producers. For instance, although the producers can now, thanks to mobile phones, establish where the best markets were to sell their products, they can frequently not reach the markets owing to inadequate transport and the absence of road or rail linkages. It is therefore necessary to have a holistic approach to rural agricultural development that includes not only mobile telecommunications but also the necessary infrastructure and services.

Discussion

This section analyses the relationship between the developmental use of mobile phones on the one hand and economic and social upgrading and downgrading on the other. This leads on to extending the conceptualization of economic and social upgrading and downgrading as it has appeared thus far in Capturing the Gains Working Papers. Finally, a comparison is made between

the themes of published articles on the impact of mobile phones in developing countries and that of this paper, clarifying what differentiates the focus of this paper from the others.

The developmental use of mobile phones and economic and social upgrading

This relationship is explored for different groups of case studies.

Use of M-Pesa platform in Kenya: Kickstart, Musoni and BIA

When KickStart introduced its Mobile Layaway service based on the M-Pesa platform, it enabled poorer farmers to acquire irrigation pumps and raise the productivity of their land and labour. Their incomes rose and they could start employing more people. The use of mobile phones by poorer farmers to save enough to buy irrigation pumps resulted in both economic and social upgrading of the farmers and their families. The rise in output per person and yield per hectare constitutes economic upgrading, while the increase in employment and family income with concomitant better nutrition, health and education comprises social upgrading.

It was because of the existence of the M-Pesa platform that Musoni was started up, thereby creating employment. The greater efficiency of this MFI by means of M-Pesa's mobile money transfers enabled more enterprises to start up. This, in turn, created more employment and income. Economic and social upgrading are therefore both present in the case of Musoni.

BIA could not have been launched without the M-Pesa platform, hence M-Pesa helped create employment at BIA in the first place. M-Pesa's greater efficiency at handling all the financial transactions by means of mobile phones enabled poorer families to enrol their children at BIA than would otherwise have been the case. The broadening of access to education for lower-income people ultimately raises human capacities and thus constitutes economic upgrading. At the same time, it raises the future earnings potential with better working conditions of these pupils, that is, it contributes to social upgrading. Hence, economic and social upgrading are integrated and interrelated at BIA schools.

Pulling together these three case studies based on the M-Pesa platform, all three create additional employment and enable access by poorer people to their services. They also all show the fundamental role that mobile phones play in enabling economic and social upgrading to take place. In the first two cases, the upgrading commences within a short time span; it is delayed in the case of the primary schools.

iHub and m:Lab in Nairobi, Kenya

m:Lab and iHub incubate firms by means of nurturing, mentorship, funding and networking with the aim of helping them start up and become self-reliant. m:Lab has done so successfully for six firms with the aid of ICT and mobile phone applications. Hence, economic upgrading through the creation of new economic activity and upskilling of people is taking place. Social upgrading would almost inevitably accompany the economic upgrading, as the entrepreneurs and their employees are highly likely to start earning more.

MTN MM in Uganda

MTN MM provides financial services for the ESP programme of the Ugandan government. It runs SAGE, which provides an income of US\$10 per month. The transfers take place via mobile phones using MTN MM or via SIM cards. The aim of SAGE is to tackle chronic poverty by targeting vulnerable families and the aged. It thus constitutes social upgrading by raising the income of thousands of people.

EAAI and CKW projects

Both of these projects operate in agriculture in rural Uganda. Improvements in the quality and quantity of production are a common theme for both of them. Although mobile phones do play a role in the EAAI project, it is only one of the contributing factors. Radio transmissions and communal meetings at the KIC are also very important. In the case of CKW, the mobile phone, and the application specially developed for it, plays a key role, but the availability of the CKWs and the community organizations are also very important.

Nonetheless, in both projects mobile phones contribute to economic upgrading by enabling farmers to grow better-quality and larger quantities of products as well as enhancing their knowledge. Social upgrading results from the higher incomes of the families, through better nutrition and schooling of children.

Extension of the conceptualization of economic and social upgrading

The presentation in this paper of the mobile phone, an end product in the mobile telecommunications global value chain, as a tool with which to achieve economic and social upgrading in other sectors of the economy is unique among all four sectors researched by Capturing the Gains. This points to the need to revisit and extend Capturing the Gains' conceptualization of economic and social upgrading.

The first noteworthy feature of the developmental use of mobile phones is that the final consumer product in the mobile telecommunications supply chain, the mobile phone, becomes a tool that enables economic and social upgrading to take place in other sectors of the economy. In the cases dealt with here, economic and social upgrading through innovative mobile phone usage have taken place in a variety of sectors, namely, agriculture, finance, retail, education and public services.

The second point is that the mobile phone plays the role of a hand-used tool. But it is different from the pre-industrial tools craftsmen wielded in that it is smart. The phone is itself a technologically advanced product with numerous functions. It has the capacity to store and transmit data as well as load and use applications that can perform an ever-increasing range of tasks.

The third important point about the case studies of economic and social upgrading through the developmental use of mobile phones is that none of the cases entails exports. Thus, economic upgrading can and does take place without there being any exports. In the parsimonious definition of economic upgrading by Bernhardt and Milberg (2011), none of the cases of economic upgrading considered in this paper would be included. It is therefore necessary to revise and extend the definition of economic upgrading put forward by Bernhardt and Milberg.

The definition of Barrientos et al. (2010) is broader than that of Bernhardt and Milberg and does count the case studies dealt with in the paper as economic and social upgrading. However, their conceptualization is also limited in that it does not include the notion of start-up enterprises where a previously unproductive (and unemployed) entrepreneur sets up an enterprise that is productive and generates an income for the entrepreneur. In such a case, economic and social upgrading are both incorporated into the act of creating the enterprise and producing value by means of the good or service produced. It may also not be a sole entrepreneur but a family that commences production, and the income from the sales may be shared between members of the family.

The uniqueness of the mobile telecommunications sector, whereby the end product, the mobile phone, becomes the key input into completely new forms of economic activity, points to the necessity to extend the conceptualization of economic and social upgrading by Capturing the Gains. This paper has hopefully contributed towards that task.

Distinctiveness of this paper's focus on the developmental use of mobile phones

This paper distinguishes itself from other papers on the developmental uses of mobile phones in Sub-Saharan Africa.

The innovative applications of the mobile phone, such as M-Pesa, spawned a plethora of publications on their impact on mobile phone users. These have become so profuse that several reviews have been written to pull together the findings of the multitude of papers dealing with the social and economic consequences of mobile phones and their applications. For instance, Donner (2008) has written an article presenting a literature review of roughly 200 recent studies on mobile phone uses in the developing world, and Duncombe and Boateng (2009) have reviewed 43 articles on mobile phones and financial services in developing countries. In addition, general articles have been written by Aker (2011), Aker and Mbiti (2010) and Porter (2012). Aker and Mbiti provide an overview of the role of mobile phones in economic development, Aker reviews the use of ICT and mobile telecommunication for agricultural extension in developing countries and Porter explores how mobile phones enhance the material well-being of poor people in Sub-Saharan Africa.

More specialized papers have also been written that collate the research findings of numerous other studies. Porteous (2006) has explored the enabling environment for mobile banking in Africa, Schmid (2009) explains how Africa could harness the 'broadband boom' resulting from the advent of optical cables and Donner and Escobar (2010) have reviewed evidence on mobile use by micro and small enterprises in developing countries.

Finally, in-depth research has been done on particular applications of mobile phones in East African countries. Among the leading studies are those of Donner (2003; 2004; 2005; 2006) and Morawczynsky (2007; 2008; 2009). Donner explores the uses of mobile phones by small business owners in Rwanda while Morawczynski analyses how M-Pesa's mobile money innovation brought about significant improvements in the lives of thousands of people in a Nairobi slum and their rural dependants to whom they sent remittances.

Yet none of these studies deals with the focus of this paper. The studies mentioned above cover a wide range of mobile phone uses, which includes their developmental uses. However, the developmental uses they focus on are either commercial purposes or ways in which the users of the innovations can improve the quality of their own lives. In this paper, all but one²⁸ of the case studies are the outcome of social entrepreneurship that aims to improve the quality of lives of others. Social entrepreneurship has been defined as:

... a process by which citizens build or transform institutions to advance solutions to social problems, such as poverty, illness, illiteracy, environmental destruction, human rights abuses and corruption, in order to make life better for many (Bornstein and Davis 2010: 1).

²⁸ The one exception is the e-mobile water utility payment to the national water utility corporation in Uganda. This is a service of convenience to the corporation's customers.

What distinguishes social entrepreneurs from business entrepreneurs is that, for social entrepreneurs, the social mission is fundamental. Social entrepreneurship is, in the words of Dees (1998: 5):

... a mission of social improvement that cannot be reduced to creating private benefits (financial returns or consumption benefits) for individuals; [...] social impact is the gauge. Social entrepreneurs look for a long-term social return on investment.

Yunus (2010: 4) distinguishes social entrepreneurship from social business. He explains the difference between them in a way that helps clarify further what is meant by social entrepreneurship:

“Social entrepreneurship” [...] describes an initiative of social consequences created by an entrepreneur with a social vision. This initiative may be a non-economic initiative, a charity initiative, or a business initiative with or without personal profit. Some social entrepreneurs house their projects within traditional non-governmental organisations, while others are involved in for-profit activities. In contrast with social entrepreneurship, social business is a very specific type of business – non-loss, non-dividend company with a social objective.

The case studies dealt with in this paper – KickStart, Musoni, BIA, iHub, m:Lab, SAGE, EAAI and CKW – all have the social mission of improving the recipients’ capacity to improve the quality of their lives in the long run; that is, they are all social entrepreneurships.

Conclusion

This paper has examined the developmental use of mobile phones in only two East African countries, Kenya and Uganda. Furthermore, it has focused on a limited number of case studies in each country. It cannot therefore claim to be representative of the developmental uses of mobile phones in Sub-Saharan Africa or even East Africa. However, what it does demonstrate is the innovative ways in which mobile telecommunication hardware and software are being applied in these two countries.

The developmental uses of mobile phones have been accompanied by economic and social upgrading, although there has also been some social downgrading as a result of job losses owing to the increased efficiency and cost reduction of economic upgrading. Some of the case studies also demonstrate that economic and social upgrading happen simultaneously when the productivity, income and employment of small-scale farmers in Kenya and Uganda all increase as an outcome of the developmental application of mobile phones. In addition, the case studies of economic upgrading considered in this paper are not necessarily linked to any increases in exports, although they do increase the GDP. Both these findings therefore broaden the conceptual understanding of economic and social upgrading as formulated in other Capturing the Gains papers.

Finally, all but one of the case studies in this paper are examples of social entrepreneurship. This means the individuals and organizations that developed the entrepreneurial project using mobile phones not only upgraded themselves but also raised the capacity of the recipients of the projects to upgrade themselves economically and socially.

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