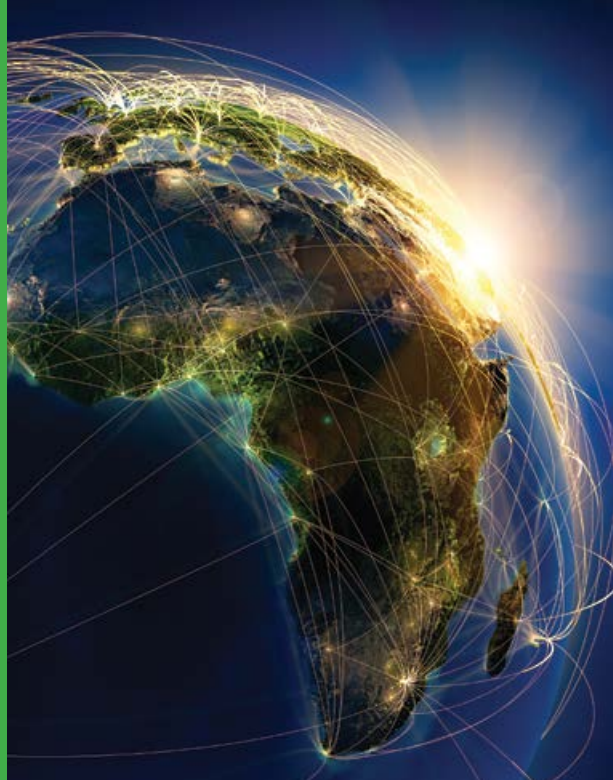


Value Chains
& Trade



MOBILE PAYMENTS

HOW DIGITAL FINANCE IS
TRANSFORMING AGRICULTURE



MOBILE PAYMENTS: HOW DIGITAL FINANCE IS TRANSFORMING AGRICULTURE

Lee H. Babcock

May 2015



The Technical Centre for Agricultural and Rural Cooperation (CTA) is a joint international institution of the African, Caribbean and Pacific (ACP) Group of States and the European Union (EU). Its mission is to advance food and nutritional security, increase prosperity and encourage sound natural resource management in ACP countries. It provides access to information and knowledge, facilitates policy dialogue and strengthens the capacity of agricultural and rural development institutions and communities.

CTA operates under the framework of the Cotonou Agreement and is funded by the EU.



For more information on CTA, visit www.cta.int

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Foreword

Leading up to the 2014 Fin4Ag – *Revolutionising finance for agri-value chains* international conference, the Technical Centre for Agricultural and Rural Cooperation (CTA) commissioned a study to explore the state of digital/mobile payments in agriculture. We are pleased to present the results of the study that we believe will make an important contribution to the body of knowledge on this topic. The study was carried out using three case studies; SmartMoney from Uganda, NWK Agri-Services from Zambia, and Rice Mobile Finance (RiMFin) from Ghana.

A key message that came out from the Fin4Ag international conference is that laying down the necessary structures for digital payments in agriculture is fundamental to revolutionising the sector. Once this is achieved there will be subsequent growth of the remaining components of digital financial services for the sector – savings, credit and insurance. We know that better access to credit by various actors is fundamental to well functioning value chains. Moving the numerous cash payment streams to a digital platform will pave the way for better access to credit.

The report introduces the concept of digital finance by providing an overview of the new technologies and business models that began only seven years ago. The report's findings provide an insight that portrays the nascent usage of digital payments by users ranging from large agricultural commodity buyers to the small-scale farmers at the bottom of the pyramid.

Among the key questions that the report answers are: Will the move from cash to cashless mode of payment have significant economic value for stakeholders in the process of building inclusive financial markets? What are the key characteristics of food and cash crops that make them ideal for digital payments? How can networks and strategic alliances optimise the financial inclusion of smallholder farmers? To what extent can new market segmentation within farmer organisations and cooperatives encourage mobile finance penetration and financial inclusion at national and regional levels? How can the uptake of mobile money in rural areas be promoted?

This is the sixth publication in CTA's "Value Chains & Trade" series with a specific focus on increasing financial inclusion through digital/mobile payments. The recommendations highlight the convenience, storage, security, financial identity and other benefits for farmers; the revenue enhancing potential for

mobile financial service providers; and the cost savings and other efficiency potentials for large commodity buyers. The underlying value propositions for these three stakeholders can inform agricultural policy and program design and implementation by governments, financial institutions, donors and NGOs.

Michael Hailu

Director

CTA

Preface

An estimated 1.5 billion people live in rural households engaged in smallholder agriculture.ⁱ These smallholder farmers face tremendous challenges in improving their livelihoods, including limited or no access to value-creating services and resourcesⁱⁱ and branchless banking. Digital or mobile finance technologies using mobile money platforms have demonstrated the potential to unlock some of that lost value. Understanding this opportunity is the focus of *Mobile payments: How digital finance is transforming agriculture*.

This report offers new and interesting insights on the role that digital finance can play in providing a more cost-effective and secure method for financial transactions in the agricultural sector, particularly for rural smallholder farms. In doing so, it offers a three-step approach for digital finance-based business development that emphasizes deep engagement with smallholder farmers, innovative partnership strategies, and a focus on mutual value creation. Complementing these recommendations, the initiatives profiled in this report offer compelling cases of how three different organisations approached the agri-digital finance opportunity and the solutions they crafted to successfully reach smallholder farmers.

Increasing access to agri-digital finance not only creates new market opportunities for business, but also provides a vital service to smallholder farmers. This report highlights how digital finance can bring more financial service options to the smallholder farmers, thus providing rural farmers with increased access to finance and enhanced opportunities for value creation.

Together, the insights and recommendations presented in *Mobile payments: How digital finance is transforming agriculture* opens up new conversations about the way digital technologies and innovations can create new business strategies that can meaningfully improve the livelihoods of rural smallholder farmers and their families.

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i The World Bank. 2008. *World Development Report: Agriculture for Development*, Washington, DC: World Bank.

ii London, T., Anupindi, R. and Sheth, S. 2010. 'Creating mutual value: Lessons from ventures serving base of the pyramid producers'. *Journal of Business Research* 63(6): 582-94.

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Glossary

Agriculture developer – This is the entity taking the lead role in closing the efficiency gaps in the value chain. It can be a private sector agricultural lead firm, a donor or government-funded agriculture development implementer or some other entity.

AML – A central bank compliance requirement that an account is not used for money laundering.

ARPU – A key metric for MNOs.

Branchless banking – A distribution strategy for financial products that relies on ATMs, online banking, POS devices and mobile phones. Mobile phone branchless banking relies on the underlying infrastructure of a mobile money platform.

CFT – A central bank compliance requirement that accounts are not used to finance terrorism.

Churn – The term used to describe SIM-card switching by voice customers indicating their lack of loyalty to any one MNO. MNOs provide value-added services such as mobile money to promote loyalty among customers and thereby eliminate churn.

CICO – An independent retail entrepreneur who typically has an ongoing business kiosk (e.g. selling fast moving consumer goods) or other comparable entity that serves as touch point for the community. By becoming an MNO agent they can potentially experience increased foot traffic into their store and earn commissions but must provide customer service and successfully manage the cash and electronic liquidity requirements. In the context of this paper, agents can be value chain stakeholders such as input supply stores, cooperatives, warehouse operators, etc.

CUBeR – The first step for inserting digital finance into an agriculture value chain.

EMoFi – The third step for inserting mobile payments into agriculture.

Financial institution – A bank or non-bank entity that uses an MNO or a third-party provider mobile wallet for simple distribution and/or repayment of a loan, or has joint ventured with either to provide a financial product on the platform.

GSM – The most prolific mobile standard in the world.

GSMA – An apex organisation for 850 mobile network operators worldwide.

KYC – Know Your Customer is a worldwide central bank compliance requirement that the identity of clients be verified.

M&E – A process for tracking programme progress and evaluating programme impact to inform policy makers and project management.

MFSP – This is either an MNO, a financial institution or a third party that leverages the GSM (or the equivalent CDMA) voice technology platform to accommodate transfer of electronic value.

MNO – A ‘telecommunications’ company that provides voice connectivity (e.g. Tigo, MTN and Airtel).

Mobile banking – The provision of formal, central bank-regulated bank products on the phone.

RiMFin initiative – Rice Mobile Finance – A strategic alliance in Ghana facilitated by Agribusiness Systems International with smallholder rice farmers, TigoCash and GADCO, a rice buyer and miller.

StAF – This is a formation between an agriculture developer, a mobile financial services provider and other entities and is the second step for inserting digital finance into an agriculture value chain.

Third-party providers – These providers provide a mobile wallet and payment functionality by riding on top of the MNO infrastructure.

List of abbreviations

AFI	Alliance for Financial Inclusion
AML	anti-money laundering
ARPU	annual revenue per user
B2B	business-to-business
B2P	business-to-person
BTCA	Better Than Cash Alliance
CDMA	Code Division Multiple Access (mobile standard)
CFT	combating financing of terrorism
CGAP	Consultative Group for Assistance to the Poor (World Bank)
CICO	cash-in/cash-out agent
CIDA	Canadian International Development Agency
CTA	The Technical Centre for Agricultural and Rural Cooperation
CUBeR	cash usage behaviour research
DFID	Department for International Development (UK)
EMoFi	embedded mobile finance into agriculture
G2P	government-to-person
GADCO	Ghana Agriculture Development Company
GDP	gross domestic product
GIZ	German Federal Enterprise for International Cooperation
GSM	Global System for Mobile Communications (mobile standard)
IFAD	International Fund for Agricultural Development
M&E	monitoring and evaluation
MDG	millennium development goals
MFI	microfinance institution
MFSP	mobile financial service provider
MNO	mobile network operator
MTIC	Ministry of Trade, Industry and Cooperatives (MTIC)
ODA	official development assistance
P2P	person-to-person payment streams
ROI	return on investment
SACCO	Savings and Credit Co-operative (i.e. credit union)
SIM	subscriber identity module
StAF	strategic alliance formation
USAID	United States Agency for International Development

Executive Summary

The challenge of agricultural finance is to securely provide cost-effective financing to rural smallholder farmers with minimum risk of fraud and maximum accountability and transparency. Mobile money crop payments by large buyers to farmers can provide the transactional volume economics for creating an ecosystem of CICOs that can be subsequently leveraged as a branchless banking distribution channel for mobile banking credit, savings and micro-insurance products.¹ Mobile money is simple, convenient, affordable – and disruptively innovative (Babcock, 2013c). According to the GSMA (Penicaud and Katakam, 2014), the hub organisation for 850+ MNOs worldwide, there are more than 219 mobile money platforms worldwide. Most of these platforms are primarily in developing countries and are confined to the urban city centres. Private-sector players in this space (i.e. mobile network operators, third-party providers, financial institutions) are seeking to expand into rural areas in pursuit of nationwide penetration and new market segments that will actively transact² over the mobile channel. This presents a potential alignment between the agricultural and mobile money sectors; smallholder farmers will benefit by having convenience and safety, a ‘financial identity’ and the ability to participate in an open and transparent formal economic activity.

The roll-out of mobile finance to rural areas inevitably encounters certain barriers such as illiteracy, financial illiteracy, digital illiteracy and lack of trust and limited agent/network coverage. This report has been produced through primary research on agriculture mobile payments initiatives in Ghana, Uganda and Zambia with the aim of understanding the potential of mobile finance for the agricultural sector and how these barriers might be overcome. The primary and secondary audiences for this report are agricultural stakeholders and mobile financial service providers, respectively.

This research revealed various dynamics that ultimately position smallholder farmers as an economically viable target market for mobile financial service

- 1 The use of a mobile money ‘wallet’ for cash receipts/payments is analogous to the use of an actual wallet. Once the infrastructure of an electronic mobile money platform has been created there is potential to also provide formal central bank-regulated banking products (mobile banking).
- 2 A current challenge for the industry is little or no transactional activity by new subscribers limiting the potential for annual revenue per user (ARPU).

providers in relation to large commodity buyers.

1. Large commodity buyers want to reduce the administrative, record keeping, security and other costs involved in using obsolete cash payment schemes while establishing a closer direct relationship with their farmers.
2. In order to reduce their costs, large buyers are willing to invest in the roll-out of mobile payments in rural areas where traditional mobile money – and commercial finance – models are not economically viable.
3. In addition, MFSPs – who rely on a volume-based business model – can register new subscribers and increase their transaction fee income while farmers get the benefits of convenience, safety, security and their own financial identity.

According to the World Bank, Better Than Cash Alliance and Bill & Melinda Gates Foundation (2014) “increasing (the) efficiency of and access to (digital) payments, savings, insurance and credit services” (p. ii) will support the G20’s policy objectives to reduce poverty, promote women’s economic empowerment and increase jobs. Transitioning cash payments for crop income to mobile payments will help to jump-start what the World Bank’s CGAP refers to as Digital Finance Plus – the creation of mobile payments for household expenditures for solar power, clean cooking stoves, water, utilities, health, education, food and transportation as well as agricultural inputs (e.g. seeds, fertiliser and chemicals). Given that agriculture is often the only source of household income, agriculture mobile payments for crop income must be developed and scaled up (Babcock, 2014a). By helping to transition cash payments for crop income to mobile payments, agriculture developers will play a key role in building the electronic infrastructure that will subsequently serve the savings, credit and micro-insurance needs of rural, village-based economies at the agricultural base of the pyramid. Given the prominence of the agriculture sector in developing countries, and the need for financial inclusion and significant foreign direct investment by mobile financial service providers (MFSPs) in pursuit of a return on investment (ROI), there is potential for mobile finance to achieve for the economic base of the pyramid what the commercial banking sector achieved for the industrial revolution.

An outcome of this research has been a three-step approach for replacing cash payments being made by large buyers (e.g. lead firms, cooperatives) to smallholder farmers, with mobile payments. These three steps are: (i) cash usage behavioural research (CUBer); (ii) strategic alliance formation (StAF); and (iii) embedding mobile finance (EMoFi) into the value chain knowledge exchange and other interventions.

1

Agriculture

1.1 Worldwide

According to IFAD (2013) there are 500 million farming families that support 2.5 billion people and provide over 80% of the food consumed in developing countries. The global demand for smallholder agricultural finance is estimated to be US\$450 billion³ (Carroll *et al.*, 2012). Further, only 22% of rural populations in low-income countries have formal bank accounts (Demirguc-Kunt and Klapper, 2012). Meanwhile, the expected future demand of two billion more people by 2050 is driving record crop prices (Bourne, 2014) and influencing the rapidly changing nature of agriculture “from one of fragmented production and market relationships toward integrated market systems” (Miller and Jones, 2010, p. 6). Within this market system context, this report describes how agriculture mobile payments for crop income can be integrated into value chains as indicated by CTA’s primary research done in Uganda, Zambia and Ghana.

1.2 Uganda

SmartMoney is a mobile savings and payments platform in Tanzania and Uganda. CTA’s research was conducted in Uganda where 80% of households rely on subsistence farming (Gollin and Rogerson, 2010). There is a wide range of crops including coffee, cotton, tea and tobacco. It is one of the largest producers of coffee, second only to Ethiopia (Daily Monitor, 2014). Cotton was introduced as a cash crop in 1903 and is the main source of income for over 250,000 farming households (Gollin and Rogerson, 2010). In 2013, cotton earnings declined to US\$31 million from US\$76 million in 2012 due to reduced quantity of exports (New Vision, 2014). Over 90% of farming households have a mobile phone and 46% of farmers use mobile money products (Mercy Corps, 2013).

3 For ease of analysis all money amounts have been denominated in US dollars.

1.3 Zambia

NWK Agri-Services is the largest cotton buyer in Zambia. According to Zambia National Commercial Bank (Zanaco) there are 1 million smallholder farmers, of whom only 20% have bank accounts (Zanaco, 2013). Of the 1 million farmers there are 280,000 that grow cotton, which provides employment for over 3 million people and contributes 19% of agricultural GDP (Kalinda and Bwalya, 2014).

1.4 Ghana

Ghana is a net importer of rice for which it spends US\$450 million per year. As of December 2012, rice imports cost US\$1.20/kg compared to US\$.49/kg for domestically produced rice. In response, the Ministry of Food and Agriculture's 2009 National Rice Development Strategy was designed to double rice production in Ghana by 2018 (Oxford, 2013) to supply urban markets, which represent 76% of total rice consumption (Millennium Challenge Corporation, n.d.). The rice mobile finance (RiMFin) initiative included TigoCash, one of Ghana's leading mobile network operators; the Ghana Agriculture Development Company (GADCO), a major rice producer and miller, and 722 rain-fed and irrigated rice farmers.

2

Digital finance

Originally referred to as mobile money, this young and fast-moving industry is commonly referred to as digital finance. Mobile money is most often associated with person-to-person (P2P) transfers, from mobile wallets on cell phones, but is now being recognised for its potential to serve the needs of large entities (B2P) or governments (G2P) to pay people. As more and more money circulated outside of the banking system, banks began to see it as a competitive threat especially as the cost of a mobile banking transaction is only 2% of a branch transaction and 8% of an ATM transaction (Monahan and Van Dyke, 2013). The terms mobile banking (bank products on the phone) and branchless banking (non-traditional banking channels) have rapidly emerged primarily through joint ventures between mobile network operators (MNOs) and banks. These rapid changes have not been lost on central bank regulators worldwide who have, for the most part, embraced the potential for financial inclusion and are promulgating regulatory lessons learned and best practices. Given the leadership of M-PESA in Kenya, central banks in Africa seem to primarily embrace an MNO-led approach that places most of the regulatory responsibility on the mobile network operators (MNO). Some exceptions are Egypt, Ethiopia, Nigeria and South Africa that have a bank-led approach. South and Southeast Asia seem to primarily embrace the bank-led approach.

Mobile finance can be easily integrated with digital technologies such as smart cards, scratch cards, point-of-sale (POS) devices, biometric identity capture, ATMs and other. Hence the term digital finance is one that “can provide the speed, security, transparency, and cost efficiency needed to increase financial inclusion at scale” (World Bank *et al.*, 2014). This report considers the insertion points for digital crop income payments into agriculture value chains. The terms digital finance and digital payments as well as mobile finance and mobile payments will be used interchangeably here.

BOX 1. MUSONI

The Musoni Core Banking System improves the efficiency and reduces the costs of providing financial services in rural areas. This innovative platform enables MFIs and agri-suppliers to easily manage their clients and loans; offers a comprehensive range of portfolio and financial reports; and includes its own accounting module. The system integrates with both M-PESA and Airtel Money, enabling all transactions to be carried out using mobile money, making it easier to penetrate rural areas. The Musoni App (which integrates with the system) enables field officers to register clients, apply for loans, or view key reports while travelling in rural areas.

BOX 2. UMATI CAPITAL

Umati Capital (UCAP) is a non-bank financial intermediary focusing on the provision of supply chain finance across various value chains. They leverage technology to provide financing to SMEs who supply to larger entities. Umati Capital seeks to address two key problems for its defined customer segments:

- access to working capital for small business suppliers of medium to large sized corporates;
- provision of a supplier financing programme tailored-made to the supplier's payment cycles.

Currently engaged in the Kenyan dairy sector, UCAP uses technology to make faster lending decisions. With funds for lending from angel investors, UCAP set up mobile applications throughout each stage of the value chain to capture data to inform their disbursement of smallholder farmer loans via the mobile wallet channel. It is currently running a pilot with 320 dairy farmers. The results are promising and they plan to scale up with two major processors to reach 200,000 dairy farmers.

According to the GSMA (Penicaud and Katakam, 2014) there were 219 mobile money platforms worldwide at the end of 2013. The GSMA's membership of 850+ mobile network operators (MNOs) initially pursued mobile money only as a value-added service for their voice platform to reduce the incidence of churn.⁴ As the volume of transactions increased, it was clear that mobile finance provides an economically valuable proposition; many MNOs are now beginning to position mobile money as their own profit and loss (P&L) centre. Any initiatives in the agriculture sector that can deliver transaction volume will help build the case for a strategic alliance between an agriculture developer and a mobile financial services provider (MFSP).

4 The term used to describe SIM-card switching by voice customers indicating their lack of loyalty to any one MNO. MNOs are providing value added services such as mobile money and other applications to promote loyalty among customers and thereby eliminate churn.

The most often-cited platform is Safaricom's M-PESA in Kenya that was originally conceived as a mechanism for the distribution and repayments of microfinance loans. Following its launch, it was quickly adapted in response to customer demand to become primarily a P2P payments platform. They currently process US\$18 billion of transactions annually that equates to 43% of the national economic output (Stevis and McGroarty, 2014).⁵ M-PESA has also joint ventured with Commercial Bank of Africa to offer their M-Shwari bank products within the M-PESA user interface. In a nod to the original intent of M-PESA, Musoni and Umati Capital are non-banking financial institutions that rely on M-PESA and other MFSPs for distribution and repayments of its loans. The rapid uptake of mobile finance in Kenya was unique because of the monopolistic position of Safaricom, progressive central bank regulators and dense population geographies. These uniquely aligned and favourable dynamics in Kenya are unlikely to be replicated elsewhere but the M-PESA experience in Kenya has modelled the potential throughout Africa and elsewhere in the world.

As a brief preamble to the Ghana, Uganda and Zambia case studies, what follows is a description of various donor initiatives and two important trends; international remittances and alternative credit scoring.

5 According to the Alliance for Financial Inclusion, there are nine African countries that have more mobile wallets than formal bank accounts.

3 Trends for 2015 and beyond

As of June 2013, there were 203 million mobile wallets worldwide, of which there were 98 million in sub-Saharan Africa. In addition, there are more mobile wallets than bank accounts in Cameroon, the Democratic Republic of Congo, Gabon, Kenya, Madagascar, Tanzania, Uganda, Zambia and Zimbabwe (Penicaud and Katakam, 2014). This mass adoption scale-out has primarily followed the urban centric 'extensive' business model (Mas, 2014) that relies on lots of customers doing a few, larger value (approximately US\$15 and more) transactions with a limited range of products and services. Agriculture digital crop payments nicely aligns with what Mas (2014) describes should be a move towards more 'intensive' business models that rely on a lower customer base but with more numerous transactions, with a broader range of products and services that accommodate a farming family's need for money management. Within the scope of additional service layers that are rapidly emerging due to mass adoption, as well as the requisite need for a broader range of products and services, international remittances and alternative credit scoring are two areas that are suitable for agriculture digital finance.

3.1 International remittances

International migration is a money management strategy for poor households and facilitating international remittances will have a substantive impact on improving livelihoods in developing countries (Clemens and Ogden, 2013). According to the World Bank, worldwide remittances will be recorded for the end of 2013 at US\$550 billion and by 2016 will rise to US\$700 billion (World Bank, 2013a). Of those amounts remittances to developing countries will be US\$404 billion, US\$436 billion and US\$516 billion for 2013, 2014 and 2016 respectively (World Bank, 2014). Approximately 30–40% of developing country remittances go to rural areas and have reduced the percentage of the poor in Uganda and Ghana by 11% and 5%, respectively (IFAD, n.d. – c). IFAD states "long, costly and potentially dangerous treks from isolated villages to urban financial institutions could soon be replaced by instantaneous transfer of funds from one country to another using mobile phones" (IFAD, n.d. – c).

According to the GSMA (2013) international remittances “is a business opportunity that many MNOs are keen to explore, particularly those with a live domestic mobile money service” (p. 1). New digital finance entrants into the international remittances market such as mHits,⁶ WorldRemit, BitPesa⁷ and others are leveraging digital finance to deliver remittances for a fraction of the cost of traditional service providers, such as Western Union and Moneygram and/or bank transfers. However, there must be a developed home country digital finance ecosystem to accommodate the international remittance and move it into a mobile wallet (Rotman and Thomas, 2012).

BOX 3. WORLDREMIT

WorldRemit is an international remittance business. Migrants and expatriates from 34 countries can make online transfers to families and friends in over 100 recipient destinations. For these specific remittance corridors WorldRemit offers a wide range of options to send and receive payments. Senders can make payments online, through smartphones or tablets, by debit or credit card or via bank transfer. Recipients can get paid via direct transfers to mobile wallets, bank transfers, cash pickup or delivery, or airtime (call credit) top-up for their mobile phones.

For example, WorldRemit has recently begun to service the UK, US and South African remittance corridors into Uganda. This new service allows migrants and expatriates to send money to the MTN Mobile Money[®] wallets of their Ugandan family and friends. The global online money company, which recently secured a US\$40 million investment from Accel Partners, will provide this new service to increase the pay-out options available to customers sending money to Uganda. Once they have the money, recipients in Uganda can use their mobile wallets for many purposes, such as paying for agricultural inputs, paying utility bills, buying airtime (call credit) or withdrawing cash from authorised agents.

Within agriculture, diaspora remittances investment in developing countries is four times the global level of ODA for agriculture (IFAD, n.d. – b). This level of investment in agriculture has occurred in spite of the fact that the average cost for sending remittances hovered around 9% – it declined to 8.4% in the first quarter of 2014 – except for sub-Saharan Africa where it has been around 12% (World Bank, 2014). As the international community considers the Millennium Development Goals (MDG) post-2015, the reduction of remittances costs, aligned with the 5 X 5 objective,⁸ is likely be on the agenda.⁹

6 <http://www.mhits.com.au/send-money>

7 <https://www.bitpesa.co>

8 The 5 X 5 objective is a commitment by the G8 and G20 to reduce remittance costs by 5 points in 5 years by promoting transparency and competition.

9 These issues were discussed in Geneva at UNCTAD’s June 20, 2014 conference Cutting the Costs of Remittances: The Role of Mobile Money <http://unctad.org/en/pages/MeetingDetails.aspx?meetingid=558>

Future agriculture mobile finance strategic alliances, such as those described in this report, will register new mobile wallets in rural areas, thereby creating the critical 'last mile' link in the distribution channel for international remittances.

3.2 Alternative credit scoring

Big data analytics leverages the power of statistics, computer programming and operational research. By leveraging the power of cloud-based information and communication technologies, statistical algorithms can be designed to mine databases with software programmes that capture operational information by sector, demographic or any other desired target capture. In fact, MNOs already use algorithms for computing airtime (call) credit. Data analytics has an especially pertinent application with digital finance generally and, by extension, agricultural digital finance. A mobile wallet provides a farmer with a know-your-customer (KYC) compliant financial identity. This KYC compliant mobile wallet can be data-mined to compute alternative credit scores to promote their access to credit. This is because every time a mobile phone is used, a digital history is created for airtime (call credit) top-up purchases, mobile finance transactions, SMS messaging patterns, and more.

BOX 4. FIRST ACCESS

Founded by microfinance veterans, First Access currently operates in Tanzania. They are a data analytics company that predicts risk for consumers who have never had a bank account or credit score by using their prepaid mobile data. Their clients are banks and MFIs, agricultural input/equipment suppliers as well as solar/biofuel suppliers. Their credit scores have informed 350,000 loan applications.

This data by itself and/or combined with other non-mobile phone data from other databases (e.g. about marital status, income levels, etc.) can be mined with software algorithms that measure a farmer's credit risk (Grossman and Tarazi, 2014; Parada and Bull, 2014). A nascent industry of firms that compute such alternative credit scores for the economic base of the pyramid has rapidly developed. These include Cignifi,¹⁰ FirstAccess¹¹ and Experian MicroAnalytics/PERC (Turner, 2014).

10 <http://www.cignifi.com/en-us/technology>

11 <http://www.firstaccessmarket.com>

Alternative credit scoring relies on the 'passthrough' model. This model entails the farmer 'opting in' at the request of a field-based loan officer who initiates a request from that financial institution's credit scoring service provider. The credit scoring service provider pulls data from non-financial data furnishers (e.g. mobile network operators, commodity buyers, agricultural cooperatives, etc.) and then computes and delivers the credit score within seconds to the loan officer's mobile device. Upon delivery of the credit score, the service provider then deletes all borrower information. All non-financial borrower information resides with and is controlled by the data furnisher. In this way trust is engendered, and a new business model has emerged, between the data furnisher that wants to protect their customer data, the credit scoring firm and the financial institution. This also aligns with the GSMA's current pursuit of ways to monetise the extensive data captured by mobile network operators (MNOs).

As with SmartMoney, NWK Agri-Services and RiMFin, these 'first mover' alternative credit scoring firms deserve close scrutiny for lessons learned and best practices as a preamble to scale-out the alternative credit scoring industry and inclusion of such service providers as strategic alliance partners for roll-outs of agriculture digital payments for crop income schemes.

4

Donor initiatives

In Africa, the growth of remittances, foreign direct investment, portfolio investment and improved tax revenue collections means that overall dependence on foreign aid will shrink (AfDB, OECD and UNDP, 2014). These dynamics are matched by downward pressures on official development assistance (ODA) supported budgets of donor countries that are being offset by private sector and philanthropic development monies. A key contribution by the Bill & Melinda Gates Foundation is their support for the Alliance for Financial Inclusion (AFI).¹² AFI counts as its members financial policy makers from 90 developing countries that consider and promulgate guidelines for digital financial services. Administered by GIZ, AFI provides multilingual guidance for, but is not limited to: consumer financial protection, AML/CFT,¹³ interoperability¹⁴ and supervision and monitoring. The Better than Cash Alliance (BTCA),¹⁵ funded by VISA, MasterCard, Citi, USAID, UNCDF, Ford Foundation, BMGF and Omidyar Network, is committed to accelerating the shift from cash to digital payments.

The development sector can provide critical support for research and proof of concept initiatives to pave the way for private-sector investment in digital finance for agriculture. The support that was successfully provided by the development sector at the outset of the microfinance movement is now dominated by the for-profit mandate of socially responsible investors. Some areas that deserve donor support include lack of farmer awareness and understanding, product design and gender disparity. On the supply side, donors can support issues related to cash-in/cash-out (CICO) liquidity management, interoperability and network coverage (Grossman and Tarazi, 2014; World Bank *et al.*, 2014).

12 <http://www.afi-global.org/policy-areas/digital-financial-services>

13 Anti-Money Laundering (AML) and Combating Financing of Terrorists (CFT) are worldwide compliance requirements for central banks.

14 Mobile financial service providers tend to issue mobile wallets in a closed loop system whereby their mobile wallet user can only send/receive to another mobile wallet user with the same provider. Interoperability refers to an open loop system whereby a mobile wallet user can send/receive to mobile wallets users with all other providers.

15 <http://betterthancash.org>

BOX 5. CONNECTED FARMER ALLIANCE

Jointly funded by USAID and Vodafone Group plc, the Connected Farmer Alliance (CFA) is a 3-year partnership focused on designing, developing, and scaling mobile solutions for agriculture in Kenya, Mozambique and Tanzania. Implemented by TechnoServe, CFA is targeting 500,000 smallholder farmers (including 150,000 women) with two types of solutions. Connected Farmer, the mobile supply chain solution developed by CFA and recently offered in the market commercially, enables agribusinesses to engage more effectively with their smallholder suppliers. By facilitating payment and loan transactions via M-PESA, digitising farmer data management, and creating an easy platform for direct-to-farmer communicating, Connected Farmer lowers the cost of doing business with smallholders. CFA is also bringing mobile financial services to smallholders, including savings, insurance and credit, leveraging the existing M-PESA mobile money platform from Vodafone. All solutions created by CFA are embedded in the commercial divisions of Vodafone and their local operating companies (Safaricom and Vodacom), ensuring continued investment and growth beyond the life of the programme.

At the July 2014 Fin4Ag¹⁶ conference in Nairobi, CTA brought together leading agricultural finance practitioners, MNOs and card payment providers to create relationships, collaboration and a common dialogue between these sectors. This was preceded by CTA's November 2013 ICT4Ag Conference¹⁷ that brought together these sector representatives. At the ICT4Ag conference, the Alliance for a Green Revolution in Africa (AGRA) considered mobile money as essential to its strategic planning process. USAID has a digital solutions division, within its global development lab, that has three components: mobile money, mobile data and mobile access.¹⁸

Digital solutions have been integrated into the USAID-Feed the Future menu of technologies and interventions.¹⁹ The UK Department for International Development (DFID) provided the seed funding for the proof of concept of Kenya's M-PESA.²⁰ At the October 2013 Base of the Pyramid (BoP) Summit,²¹ the agriculture working group considered mobile money to be essential for private-sector players committed to doing profitable and effective business at the BoP. The Bill & Melinda Gates Foundation promotes digital payment schemes as a foundation for subsequent digital finance savings, credit and micro-insurance services.²² An outcome of the recent World Bank CGAP strategic planning exercise for FY2014 to FY2018 was the creation of a new

16 <http://fin4ag.org>

17 <http://ict4ag.org/en/>

18 <http://www.usaid.gov/digital-development>

19 <http://agrilinks.org/library/scalable-agricultural-technologies-ict-and-insurance>

20 <http://webarchive.nationalarchives.gov.uk/+http://www.dfid.gov.uk/media-room/news-stories/2007/M-PESA-1-million-kenyans-bank-by-phone/>

21 <http://www.bop2013.org>

22 <http://www.gatesfoundation.org/What-We-Do/Global-Development/Financial-Services-for-the-Poor>

initiative: financial innovation for smallholder families. This initiative embraces the potential of digital finance and branchless banking for agriculture. As part of this, the CGAP Digital Finance Plus initiative²³ has recently compiled an inventory of 55 initiatives²⁴ in agriculture and in utilities, water, health and education that leverage mobile money in their financing and distribution business models.

BOX 6. AGRI-FIN MOBILE

Funded by the Swiss Agency for Development and Cooperation (SDC) the Agri-Fin Mobile programme, implemented by Mercy Corps, works with partners in Indonesia, Uganda and Zimbabwe. Agri-Fin bundles mobile financial services with farm and crop management tools to promote mass market uptake. As a network orchestrator, Agri-Fin has created strategic alliances in Uganda with Beyonic (mobile money aggregator), FIT (content provider) and Bank of Uganda; in Zimbabwe with EcoNet (mobile network operator), EcoFarmer (content provider), EcoCash (mobile wallet) and Stewart Bank; and in Indonesia with Bank Andara, 8villages (mobile social media platform for farmers) and the Ministry of Agriculture.

Any interest donors might have in buying down the risk of market entry into rural, agricultural areas through research and/or proof of concept initiatives will improve the value proposition for private-sector investment. Such alignment of donor and private-sector interests will help to further streamline and scale-up the agricultural sector, given the need to feed an expected worldwide population of 9.6 billion by 2050 (Pew Research Center, 2014). Given the growing interest by donors and the private sector in integrating digital finance throughout the agriculture value chain, this report outlines three sample initiatives in Ghana, Uganda and Zambia of agriculture digital payments for crop income schemes. A scale-out of mobile crop income payments will be the preamble for shifting other village-based payments and finance streams to digital.

23 <http://www.youtube.com/watch?v=zgGeQuP5Myg>

24 <http://www.cgap.org/topics/digital-finance-plus>

5

Case studies

5.1 Research methodology

The research consisted of a qualitative business model analysis of three mobile payments for crop income initiatives that sought to transition the cash payments of large commodity buyers to smallholder farmers using mobile payments. This study aimed to find the requisite steps for successfully making such a transition. Qualitative research was carried out to understand questions related to the broad parameters, diverse agendas of partners and primary characteristics of the operating environment. We hope to see more such agriculture mobile finance business models and believe the answers to these questions will contribute to the success of subsequent initiatives.

Research in Ghana, Uganda and Zambia was carried out during May and June 2014. In Ghana and Uganda, multiple face-to-face interviews were conducted with farmers, farmer's groups, cash-in/cash-out (CICO) agents, large commodity buyers and mobile financial service providers (MFSPs). In Zambia, interviews were conducted with cotton strategic alliance mobile/digital payments partners including: the CEO and senior management team of the largest rice buyer, a digital finance service provider and an agricultural development NGO. Interviews were also conducted with donors and other entities involved in agricultural financial inclusion. Each initiative and its stakeholders were unique, so a more open-ended approach to interviews was used. The interviews were designed to identify and develop key dynamics and value propositions. Answers to the following basic questions were sought:

1. What feasibility, value chain analysis, market research or other pre-investment consideration, if any, was done prior to initiation?
2. How many cash transactions were migrated to the mobile/digital platform?
3. How many farmers were impacted?

4. What was the average size of these transactions?
5. What were the cost savings?
6. What were the key challenges and successes and/or failures?
7. What was the process and what were the highlights of strategic alliance formation?
8. Were there any shortfalls and/or particular strengths in the formation of strategic alliances?
9. How was the initiative horizontally embedded into the programmed value chain interventions?

The open-ended interview questions and answers were noted in shorthand and later transcribed at the end of the day. These particular initiatives were chosen because they were the only ones known to be leveraging the procurement policies of large commodity buyers.

This qualitative study sought to extract the lessons learned and best practices, in order to examine the requisite steps for mobile crop income payments. To date, there have been no similar efforts to examine these requisite steps for transitioning cash payments to farmers to mobile/digital payments. Therefore, this study is an original contribution to the body of knowledge on how to roll-out digital finance into rural, 'last-mile' agricultural communities. What follows are the case studies and the subsequent steps that have emerged for how to successfully transition crop payments from cash to mobile/digital payments.

5.2 SmartMoney - Uganda

In Uganda, cars share the main road with pedestrians, motorcycles and occasionally goats, cattle, oxen and baboons, as well as the ubiquitous and brightly coloured MTN and Airtel agent kiosks. When turning off the main road onto the muddy side roads that provide walkways for pedestrians to the remote agricultural villages, pedestrians share the road with motorcycles, animals and the very occasional car and the occasional MTN and Airtel agent kiosk. These village-based cotton and coffee communities are the target markets pursued by SmartMoney.

SmartMoney is a third-party, savings and payment system, currently operating in Tanzania and in Uganda. It partners with large coffee and cotton buyers

to introduce mobile payments to various actors along the value chain. It replaces cash with SmartMoney in the entire value chain and uses the disbursements of large coffee and cotton buyers to jump-start the village economy with digital currency. Large agribusinesses can use the SmartMoney platform to transfer electronic crop payments into the SmartMoney wallets of intermediary buyers. The intermediary buyer then purchases crops by transferring electronic crop income payments into the SmartMoney wallet of the farmer who, in turn, can spend this digital currency in the numerous SmartMoney shops and with other SmartMoney users in the village. A unique characteristic of the service is that the farmer incurs no deposit, withdrawal or transfer fees to move into or out of another SmartMoney account.

SmartMoney has partnered with the Ministry of Trade, Industry and Cooperatives (MTIC) to introduce the service to their more than 13,000 cooperatives throughout the country. Together with the MTIC point of contact, SmartMoney conducted pilots in northern and eastern Uganda and began implementation in August 2013 with coffee and cotton buyers in the Kasese district in western Uganda. The five SmartMoney community operations managers (COMs) serve as relationship managers for the SmartMoney CICO retail shops, SACCOs, cooperatives, large buyers and users. The COMs also manage the 38 independent community representatives (CRs) who register new users on a fee-per-new-user basis that illustrates the potential of digital payments to “boost job creation” (World Bank *et al.*, 2014). MTIC has been an invaluable partner from the very beginning because the service aligns with their mandate to improve farmers’ income and their general livelihoods (Uganda, Republic of, 2011).

SmartMoney has segmented the rural, village-based, ‘last-mile’ target markets and is focusing on agriculture with a value proposition that provides a free service to the farmer. MTN and Airtel have focused on the population densities in the urban centres and the ‘main highway’ middle mile populations. These population densities can sustain MTN’s fee-based service, which has less of a value proposition for the sparsely populated, last mile communities that usually make smaller purchases.

TABLE 1: MOBILE WALLET FEE COMPARISON

	Cash in deposit	P2P transfer In	Cash out withdrawal	P2P transfer out
MTN	Fee	No fee	Fee	Fee
SmartMoney	No fee	No fee	No fee	No fee

Large buyers, who need to reduce their costs related to cash payments, invest in the roll-out of SmartMoney by retaining them as a service provider and by doing so, increase the efficiency of the value chain and earn goodwill at the village level. The relationship between SmartMoney and MTN is more collaborative than competitive in the way a 'rising tide floats all boats' because the two services when combined help the growth of each other's models (see Box 7).

BOX 7. SMARTMONEY AND MTN COLLABORATIVE USAGE

Kirindiro Rauliano (aged 36) is a cotton farmer and SmartMoney and MTN user who lives in the sub-district of Namwamba in the village of Kisage. He supports his wife and three sons and helps to finance his brother's quarterly tuition in Kampala. His cotton sales go into his no-fee, no-charges SmartMoney wallet which he can use for his numerous, small purchases in the village. Once every quarter, he will travel to an MTN agent to transfer US\$140 to his brother's MTN wallet in Kampala for which Kirindiro will pay a fee of only 50 cents.

Since August 2013, SmartMoney has invested in building an infrastructure of more than 45,000 registered users as well as strategically selected SACCO and retail shop service centres. They have also raised awareness of, and education about, the features and benefits of the service and developed a level of name recognition and trust in their targeted value chains and villages.

After the February 2013 presentation at MTIC by the CEO, Michael Spencer, a 1-month pilot project was done in the north, in March, and a 1-month pilot in the east, in April. These pilots confirmed there was demand at the farmer level to be paid digitally; in fact, the interest of the farmers was immediate and enthusiastic. These pilots focused on the farmer but what emerged is the need to broaden the focus to the entire village economy (Kalisa and Manyenye, 2014). By August 2013, SmartMoney began a full roll-out in Kasese district in the west by investing in the creation of SmartMoney shops, service centres and users in selected village communities. This labour-intensive relationship building approach built awareness of the features and benefits of the service. Meanwhile, the SmartMoney sales and marketing team worked with selected large buyers to determine their cash usage behaviour patterns, their intermediary buyers, as well as their farmers. This analysis of the entire cash value chain considered the number, frequency and average amount of transactions incurred by a large buyer. As of August 2014, SmartMoney entered into a contractual relationship with four large coffee buyers. Table 2 itemises some illustrative cash handling costs for a cotton buyer.

TABLE 2: ILLUSTRATIVE CASH HANDLING COSTS FOR A COTTON BUYER

Item	Per week	Per month	Amount (US\$)	Total amount (US\$)
Insurance (3% of - US\$162,000 - cash on hand)				4,858
Bank withdrawal fees	2	4	80	647
Employee reimbursement for fuel to make bank withdrawals	2	4	160	1,295
Employee reimbursement for allowances to make bank withdrawals	2	4	120	1036
Two security guards		4	160	1,295
Lost advances due to lack of a proper record keeping system				10,124
Shortages of appropriate cash denominations with which to make exact payments for crop				810
Soft costs: Lack of employee productivity, employee injury/death if robbed, employee fear of robbery				Not quantifiable
Total costs (US\$)				20,065

Each large buyer will have a different cost profile for handling cash, which will inform and influence the commercial negotiation between SmartMoney and the buyer.

In addition to partnerships with large agricultural buyers, which is fundamental to the market research process, SmartMoney partners with retail shops and SACCO (Savings and Credit Co-operative) service centres (i.e. credit unions) to accommodate cash-in/cash-out needs within the system.

Cash-in/cash-out between users

The use of other SmartMoney users to cash-in or cash-out is another distinction between SmartMoney and other mobile money platforms such as MTN. The absence of any fees between SmartMoney wallets allows for village neighbours and economic actors to conveniently support each other for cash-in/cash-out needs in the SmartMoney system.

Cash-out/cash-in with retail shops

For larger cash-out needs, SmartMoney retail shops provide robust liquidity because they take in cash for the sale of goods. These shops earn no commission but they have multiple other benefits as a SmartMoney service centre. When liquidity is properly managed, disbursing cash-outs helps them manage their cash balances downward, reducing their risk of theft and their trips to a financial institution to deposit cash. Conversely, making electronic deposits to a financial institution allows them to manage their electronic float. Other SmartMoney shops that provide a wholesale function are strategically positioned at the nexus between the village and the densely populated corridor on the main road. The village shop can place a voice call to the 'wholesale' shop to order three boxes of laundry detergent and then make a SmartMoney transfer to pay for the soap and a one-way motorcycle taxi transport.²⁵ A key benefit is that the sole employee/owner does not need to close the village shop in order to physically procure more stock and the 'wholesale' shop increases its sales volume.

Cash-in/cash-out with SACCOs

SACCOs are co-branded with SmartMoney and provide a dual role as a receiver of cash-in and registration agent for new SmartMoney users. They also earn no commission for SmartMoney transactions but they receive a registration fee for new SmartMoney users. The increased foot traffic of SmartMoney users presents the opportunity to cross-sell agricultural financial products and services, increase membership, and improve loan tracking for any loans they disburse on SmartMoney. They also benefit from SmartMoney's radio, print and billboard advertising. Conversely, SmartMoney has the benefit of trust accruing to SACCOs within the village community.

Whether for a large agriculture buyer, retail shop or SACCO, the framework of the alliance is the same; SmartMoney provides its service and training for SACCOs signage, posters, brochures and other marketing materials. In return, SmartMoney's partners promote the use of SmartMoney and commit that they will provide the necessary resources. SACCOs commit to registering new SmartMoney users and large agriculture buyers commit to embedding SmartMoney into their agriculture knowledge transfer initiatives. As the network effect accelerates and the tipping point is exceeded, the SmartMoney business model innovation has the potential to charge fees at the SACCO and retail shop levels as part of the development of this new agriculture village-based digital currency infrastructure.

²⁵ The motorcyclist will then search for a return fare from the village to the main road, thereby providing more transport opportunities for village residents.

SmartMoney's segmentation strategy is to understand its market, register new users and service centres, and further develop itself as a known and trusted stakeholder within the cotton and coffee sectors. To accomplish these objectives, SmartMoney pursues opportunities to embed its relationship manager in the sharing of knowledge about good agriculture practices, in increased production quantity and quality, post-harvest handling, marketing and farmer group formation.

The Bukonzo United Teachers SACCO has been a SmartMoney service centre in the village hub of Kisinga for 1 year. The SACCO started 4 years ago and has 300 members, which include 220 farmers, 50 teachers and 30 shopkeepers. They provide agriculture loans, salary loans (to teachers) and working capital loans (to shopkeepers). Bukonzo and the SmartMoney relationship manager play an active role, either directly or indirectly, with the district government agriculture extension agent, helping farmers to form groups and to share knowledge on agriculture best practices for the surrounding villages of Busyangha, Kalingwe, Kiburara and Kamuruli. On a selected basis, the SmartMoney relationship manager joins the farmer training sessions to promote the features and benefits of the SmartMoney service and to register new users.

BOX 8. SMARTMONEY PAYMENTS FOR SCHOOLS

Bukonzo does about 10 SmartMoney transactions per day. They have many farming parents in the surrounding villages sending e-value to their high-school children who live in boarding schools in the village hub of Kisinga. At 10 km, the village of Kamuruli is the farthest away by road; Busyangwa, Lalingwa and Kaburara villages are only accessible by foot due to rugged mountain terrain. Upon receipt of e-value into their SmartMoney wallet the child can then cash out at Bukonzo. The family maintains its productivity on the farm secure in the knowledge their child has provisions.

Nyakatonzi Growers Co-Operative Union has recently become a SmartMoney large buyer and has 62 cotton, coffee, maize, rice, beans and soybean farmer societies with a total membership of more than 15,000 farmers. Their volume purchases of cotton for a season is as much as US\$2.8 million. The Kyabarungira Farmers Marketing Association (KFMA) is the first Nyakatonzi Society to transition to SmartMoney. Nyakatonzi sends its SmartMoney advance payment to KFMA who in turn purchases coffee by making SmartMoney payments to farmers with SmartMoney wallets.

Nyakatonzi has received technical assistance from the Government of Uganda, USAID, Swedish Cooperative Centre and other donors. Any future

donor assistance to Nyakatonzi could include SmartMoney as a resource partner in a programmed agriculture knowledge-sharing initiative.

BOX 9. SMARTMONEY VILLAGE-BASED DIGITAL TRANSACTIONS

KFMA's coffee washing and hulling station is in the centre of Kyabarungira, a targeted SmartMoney village, clustered at a three-way dirt road intersection, and made up of about 20 shops (drug store, goat butcher, barber, etc.), motor cycle shop, livestock market and 'fast food' vendors. One vendor was a woman sitting on a stool under a makeshift canopy behind a pot with boiling cooking oil and various food items, one of which was handmade pancakes. She did a brisk business and when paid in cash would then pick up more dough to handpress more pancakes to deep fry. As the SmartMoney digital system expands, this unhygienic practice will cease.

TABLE 3: MOBILE WALLET FEE COMPARISON

Description	Price (US\$)	MTN fee (US\$)	SmartMoney fee
Three smoked corn cobs	0.57	0.37	0
Mukyono (roasted goat or beef on a stick)	0.37	0.37	0
Five deep-fried cassava/banana pancakes	0.18	0.37	0

Privately owned Ideal Commodities, another potential SmartMoney large buyer, buys coffee from the Great Lakes Renzori Cooperative that represents 2,230 farmers. At the Great Lakes level, more than 13,500 cash transactions are made to farmers during the 8 months of long and short seasons. At the Ideal Commodities level, there are almost 4,000 cash transactions to traders, individual farmers and Great Lakes, representing volume purchases of US\$7.1 million. Less than a year old, Ideal Commodities conducts agriculture knowledge-sharing between May and July (in between the short and long rainy seasons) in quality coffee production to reduce the incidences of moisture and foreign matter, as well as in SmartMoney's mobile savings and payments service.

5.3 NWK Agri-Services - Zambia

NWK Agri-Services (formerly Dunavant) has been in Zambia since 2000 and they now have six ginneries. They have 60 agricultural operating offices/sheds and employ 450 full-time and 1,000 seasonal staff, that source cotton from over 130,000 smallholder farmers. Their 2011 cash payments throughout the country totalled US\$44 million (Kalinda and Bwalya, 2014) and in 2013 totalled US\$17 million.²⁶ These cash handling costs are significant, but do not compare to the loss of an employee's life during an attempted robbery, in 2013.

NWK, the largest cotton ginnery in Zambia, has explored the use of an e-payments solution for 8 years that began with mobile money payments, then e-vouchers and now bank cards. These initiatives are faced with: limited population density,²⁷ limited density of ATMs and lack of liquidity.²⁸ Nevertheless, according to Rob Munro "there is an arms race among commodity buyers to have the fastest speed of payment".²⁹

The USAID-PROFIT project was started in 2005. It had a collaborative relationship with CAD International who aimed to address the operational and financial challenges of agricultural rural communities. In 2008, the PROFIT project provided a US\$280,000 grant to CAD to design an outgrower farmer management information system (MIS) with mobile payments functionality. PROFIT brokered a strategic alliance between Dunavant (the predecessor firm of NWK), the largest cotton ginnery in Zambia and CAD to provide a mobile payments solution for paying Dunavant's 130,000 farmers. The B2P pilot project with 580 farmers was successful, but the limited cell phone penetration and the necessary investment for building up a CICO agent network severely constrained any potential for scale-out. During this period, CAD International was renamed Mobile Transactions Zambia Limited (MTZL), and is now known as ZoonA.

While continuing to develop and refine their m-payments business model, ZoonA sought to leverage their technology backbone into an agricultural e-voucher platform. Stakeholders in Zambia including the government, the

26 Interview 14 May 2013 with Nigel Seabrook, CEO, NWK Agri-Services.

27 Zambia's population density is 16 people per km² which compares to Uganda's density of 167 people per km².

28 There is only one rainy season per year. Therefore outflows for planting happen in October/November and inflows for harvest happen in July/August.

29 Interview 12 May 2014 with Rob Munro, Senior Technical Advisor, Musika, a Zambian non-profit organisation that stimulates and supports private-sector investment in the smallholder market.

United Nations World Food Programme (WFP) and Food and Agriculture Organization of the United Nations (FAO) and the Conservation Farming Unit NGO use the e-voucher platform for the distribution of food aid and agricultural input subsidies. E-vouchers transparently streamline distribution and promote growth of the private sector input supply chain. The Zoon e-voucher platform also serves the needs of partners in Malawi, Mozambique and Zimbabwe.

BOX 10. ZOONA

Zoon is a third-party digital financial services provider that has innovatively navigated around the unique challenge of Zambia's very low population density. They serve micro-, small- and medium-sized enterprises (MSMEs) in Africa, through a suite of payment and financing products and services. They have 500 mobile money agent outlets positioned throughout the geographically dispersed population centres throughout Zambia. By the end of 2013, Zoon had facilitated 1 million transfers since 2009, made 2.2 million cash-in/cash-out transactions worth US\$142 million and paid US\$1.4 million in commissions to agents. For large buyers such as Zambian Breweries, Zoon creates custom payment solutions that replace the wholesale distribution and retail cash value chain with a digital value chain. Their e-voucher products serve the food aid and agricultural input subsidy distributions for clients including WFP, FAO and Ministry of Community Development in Zambia, Malawi, Mozambique and Zimbabwe.

Meanwhile, Dunavant's need for a lower cost solution for making cash payments remained. With funding from CIDA in 2010, a strategic alliance between Zoon, Mennonite Economic Development Associates (MEDA) and Dunavant began working together for the further development of an e-voucher scheme to make payments to farmers for their sale of cotton to Dunavant. Upon delivery of cotton the farmer opted for, and received, payment with an e-voucher that had the familiar design of an airtime top-up card. The farmer then visited a participating retailer where the card was scratched to reveal the unique code identifying the farmer and the value on the card which the farmer used to buy more inputs.

The first e-voucher pilot project in 2011 was with 178 farmers in Katete district and in 2012 the pilot was with 622 farmers in Katete and five other districts. Unfortunately, in 2012, the market price of cotton that farmers delivered early in the harvest season declined by more than half, compared to the previous season, before it ticked slightly upward by the end of the 2012 harvest season. To mitigate against farmer dissatisfaction about fluctuating market prices, Dunavant made the business decision to 'top-up' the price paid to farmers that delivered early in the season through issuing top-up payments, but with the mandate that they take these payments in the form of top-up e-vouchers

delivered in the form of scratch cards and redeemed at a retailer using a cell phone through Zoono's e-voucher platform. These top-up e-vouchers were distributed to and successfully redeemed by 22,550 farmers (MEDA, 2013).

BOX 11. NWK AGRI-SERVICES LIFE AND WEATHER INSURANCE

MicroEnsure is a recognised leader in the provision of insurance for the mass market in Africa and Asia. They work with MNOs, banks, MFIs and other aggregators such as NWK Agri-Services. MicroEnsure has partnered with NWK Agri-Services to provide free life and weather insurance for its farmers. FarmerShield is a combined life and weather index insurance cover, designed to increase farmer loyalty and increase the amount of land and care farmers dedicate to cotton production. The weather index insurance is based on satellite monitoring of rainfall and has resulted in insurance payouts of US\$41,000 to over 3,900 farmers. An average of three life claims a month are being paid out under FarmerShield. NWK Agri-Services will reward their farmers who delivered their cotton early last season (by 30 June 2013) and achieved 100% loan repayment - by providing free life insurance through FarmerShield Life - if they take out a contract-farming package with NWK Agri-Services this coming season. The cover will be extended until 30 November 2014 if the farmers deliver at least 350 kg cotton per hectare to NWK Agri-Services and achieve 100% loan repayment by 30 June 2014. FarmerShield Life is available in all NWK Sheds across Zambia and is underwritten by African Life Assurance. MicroEnsure is currently analysing the impact, if any, on reduced side-selling and increased production.

FarmerShield Weather is a weather insurance cover that protects farmers against a severe dry spell or excess rain. The coverage will pay up to US\$20 per hectare in the case of severe drought or rain. Coverage costs just US\$3 and can be added to the farmers' loan balance so that there is nothing to pay upfront. For NWK Gold Club Members, FarmerShield Weather is subsidised by the company and is available for just 81 cents. For this coming July/August planting season, FarmerShield Weather is available in 10 NWK Sheds and is underwritten by Focus General Insurance.

Nevertheless, in spite of the benefits stated by farmers of forced savings and retailer discounts, the results were mixed. E-vouchers are inflexible in that they can be spent only at participating input supply retailers (which provides targeted growth stimulus for the input supply chain) and cannot be redeemed for cash. While this is ideal for input subsidy programs, it is not ideal for payments to farmers that must be converted to cash. In addition, the market collapse in the price of cotton³⁰ negatively tainted everything for the 2012 season including e-vouchers.

After piloting mobile payments (funded by USAID) and e-vouchers (funded by CIDA) Dunavant continued its persistent pursuit of digital finance, in strategic alliance with Musika, of pre-paid bankcards. With Musika promoting awareness of, and education about, the features and benefits of pre-paid

30 The 2012 price per kg declined by more than half to 26 cents from 52 cents in 2011.

bankcards, Dunavant did a bankcard pilot in 2013 with 500 farmers. This pilot has informed a tender issued by NWK Agriservices in February 2014 for e-payments, which has been awarded to a number of financial institutions and payment providers. While Zanaco's scheme deploys a debit bankcard, First National Bank's (FNB) scheme deploys an SMS message to a farmer's phone with a pin code. The farmer then visits an ATM to enter his unique pin code identifying the farmer and the cash amount to be withdrawn.

Throughout this 8-year journey NWK changed ownership and name, Zoona had three name changes, Musika became involved in 2012 and now there are four commercial bank partners; Barclays, FNB, Banc ABC and Zanaco. The constant that has remained is the challenge of how to craft a digital finance solution that navigates limited population and ATM densities as well as agent liquidity. Another constant has been NWK's commitment to invest in whatever digital solution that might eventually prove viable for their needs. Even though NWK knows well the farmer cash inflows,³¹ according to the CEO they might have done a better job at learning about the farmer's broader cash usage behaviour patterns and levels of financial literacy. After 8 years and numerous partners, NWK has learned the three characteristics of a successful partnership. They are: 1) a reliable and cost-effective product, 2) liquidity/ability of the agent to redeem/pay at the appropriate time and 3) accessibility/coverage of agents. Finally, NWK has been an industry pioneer in farmer agriculture extension programming to share best practices in planting, weeding, spraying and harvesting (Kalinda and Bwalya, 2014) and has included on a limited scale, promoting awareness of, and education about, digital finance.

5.4 Rice mobile finance (RiMFin) - Ghana

Initiated by Agribusiness Systems International (ASI), the RiMFin initiative included Millicom Ghana Ltd. operating as Tigo, one of Ghana's leading mobile network operators; the Ghana Agriculture Development Company (GADCO), a major rice producer and miller, and 722 rain-fed and irrigated rice farmers. In addition to being the largest mobile financial services provider, TigoCash was strategically interested in serving rural areas and provided an interoperable voucher code functionality that could accommodate farmers with non-TigoCash wallets.

With funding from a VISA Innovation Grant, RiMFin implemented a programme pilot from September 2013 to June 2014. GADCO's intent is to eventually source rice from 5,000 out-grower farmers for which they will mandate that

³¹ Average farmer payment is US\$50.

farmers must receive crop payments into their TigoCash wallets or, for those farmers without a TigoCash wallet, via a voucher code that can be redeemed at a TigoCash agent. A motivating factor that helps to promote behaviour change among farmers, in terms of mobile wallet adoption, is that GADCO will buy all their rice, as opposed to the previous situation whereby farmers had to find multiple buyers to sell their rice.

By the end of the pilot, there were a total of 727 mobile crop income payments to farmers for a total value of US\$264,637. Some lessons that have emerged are the need for ongoing training about basic cell phone functionalities, such as SMS messaging, pin codes and how to initiate a balance inquiry, as well as basic financial literacy such as the concept of savings and the difference between the new Ghana cedi and old Ghana cedi. Nevertheless, feedback from the RiMFin farmers was overwhelmingly positive, with any negative criticism confined to the need for Tigo to improve its network coverage vis-à-vis investment in shared and/or additional towers. Additional feedback from farmers indicated that farmers:

- prefer not to queue for payment at a financial institution
- prefer the simplicity of not having to fill out documents to withdraw money at an agent
- enjoy the almost 24/7 daily, weekend and holiday availability of agents (even during power outages) compared to financial institutions
- prefer the increased privacy that mitigates against community and social pressures to give loans or gifts
- enjoy the ease with which they can buy airtime with their TigoCash wallet, as opposed to the inconvenience of buying, and loading airtime from a scratch card.

For RiMFin farmers that supply GADCO, hiring seasonal workers for harvest or land preparation is now easier for them to negotiate, because they can show their TigoCash wallet balance to prospective workers who need assurance they will be paid. Finally, GADCO distributes monthly account statements that allows RiMFin farmers to reconcile their activities with their TigoCash wallet account, thereby building trust, while also allowing them to measure their own, and others, month-to-month financial performance. It should be noted that such monthly account statements for reconciliation with mobile wallet balances are characteristic of open and transparent

formal economic activity as compared to cash payment schemes that encourage non-transparent, informal economic activity.

Upon award of the grant from VISA, ASI conducted market research on the cash usage behaviour patterns and levels of financial literacy for the Volta Region rain-fed and irrigated rice farmers that supply GADCO. ASI's market research indicated that 81% of the farmers surveyed own mobile phones. Of those farmers who did not own mobile phones, 70% reported that a family member did own a mobile phone. Of the farmers who own mobile phones, 32% could send text messages (SMS) and 92% of farmers could receive and read text messages. Approximately 63% of the farmers surveyed expressed a willingness to use mobile financial services for their financial transactions. As many as 60% reported they receive, on average, between 2–4 payments from rice sales every year and 88% receive 2–14 other income payments per year. Almost half (49%) of farmers receive average payment amounts between US\$27–161, only 9% receive average payment amounts less than US\$27 and as many as 10% receive average payment amounts of more than US\$560. Finally, all of the information in the aggregate helps inform user interface and financial product design, financial literacy and mobile finance training curricula design as well as the optimal locations for CICO's.

The market research conducted by ASI helped justify the proposition for bringing together ASI, GADCO, TigoCash and farmers as project partners during the RiMFin project. The high percentages of farmers with access to phones and interest in using mobile finance validated GADCO's plan to mitigate, or eliminate, their cash handling costs related to eventually sourcing from, and making payments to 5,000 outgrowers.

Since 2007, when mobile money began, there have not been any significant efforts by MNOs to segment their markets in favour of confining their mobile money roll-outs in the densely populated urban centres. ASI's research, and previous research for cocoa in Indonesia,³² might be the first comprehensive research efforts that map out agriculture mobile finance opportunities from an MNO perspective³³ in terms of numbers, amounts and locations of cash payments that can be migrated to mobile payments. The market research also helps inform the requisite content and overall design of a mobile finance and financial literacy-training programme to promote mobile wallet adoption behaviour change among farmers.

The RiMFin initiative was a proof of concept funded by VISA that, if successful,

32 http://issuu.com/nethopeorg/docs/cocoa_farmer_market_insights_research_-_final_repo

33 The author identified the need for, and was involved in the design of, the Indonesian cocoa and Ghana-RiMFin market research initiatives and overall project designs.

would subsequently inform a business case. Their successful partnership approach was to structure each partner's roles and responsibilities in the alliance into a formal memorandum of understanding. ASI and GADCO identified the pilot participants and supported customer registration and training activities conducted by TigoCash. GADCO submitted scheduled farmer payments, and transferred the total value to TigoCash who then made batch payments into farmer wallets. It is important to note that GADCO added 1% of the total value to the transfer they made to Tigo. Typically upon receipt, a wallet subscriber will cash out at an agent for which they would normally pay a 0.5% commission fee. GADCO already paid that withdrawal commission fee as part of its 1% to TigoCash which further motivated the participation of RiMFin farmers. It also highlights the commitment by a large buyer to invest in the roll out of agriculture mobile crop income payments as portrayed previously by SmartMoney in Uganda and NWK AgriServices in Zambia. The other 0.5% paid by GADCO is for the value-add benefit of not incurring costs related to making cash payments. It also formalises the GADCO-TigoCash business relationship upon which GADCO might increase the amount they pay to TigoCash in return for any SMS or Interactive Voice Response (IVR) agricultural extension and/or marketing content distributed to, or survey data captured from, farmers that might serve to grow GADCO's business model. As part of transitioning the initiative to all 5,000 GADCO farmers during the next harvest season, GADCO will make their own batch payments directly into farmer wallets, through the Tigo Cash bulk payments web interface.

ASI hired the RiMFin project manager from within the ranks of TigoCash to liaise with GADCO and the farmers, supplement the TigoCash customer service centre function and otherwise align TigoCash resources to support the success of the RiMFin pilot. TigoCash also took the lead in promoting awareness of, and education about, the features and benefits of a mobile wallet. To help form the alliance, a pre-pilot trial with 300 farmers was initiated by transferring US\$3 into their TigoCash wallets. This incentivized farmers to navigate the user interface in order to get into their wallet to retrieve the US\$3. In addition, Tigo donated SIM cards to those farmers that didn't already subscribe to Tigo.

GADCO has a robust team, and streamlined processes for delivery of production, pest/disease, and marketing training protocols for their rain-fed and irrigated outgrowers. According to the GADCO rain-fed field manager, mobile payments streamlines their operation because they no longer need to make cash payments which presents them with an opportunity to overcome safety and security issues, so managers and agents are more productive in

managing and transferring knowledge to farmers.

The first training for seed placement, fertiliser, etc. takes place right before the planting season. The second training occurs a month later and covers pest/disease control, water management and fertiliser top dressing. As previously stated, TigoCash took the lead in promoting awareness of, and education about mobile finance. As part of their efforts to scale up mobile money to their 5,000 farmers, GADCO's field manager believed there was potential to integrate mobile finance into the third round of training, closer to harvest, that again covers pest/disease control, as well as marketing. In addition, there are a few agriculture input supply shops that also serve as TigoCash agents that sponsor their own regularly scheduled radio programming about the types and uses of chemicals, fertilisers and seeds. As part of this radio programming the RiMFin project manager has been a guest speaker during which he spoke about the features and benefits of TigoCash. Such radio programming as well as other arrangements with input suppliers/TigoCash agents, allows for the transfer of knowledge to farmers and presents opportunities for the further scale up of the RiMFin business model.

5.5 Summary of cases

In all three cases, large buyers must make frequent trips to make bank withdrawals to disburse large amounts of cash, with security, logistics and record keeping protocols and costs, to large numbers of farmers throughout rural areas (Grossman and Tarazi, 2014). Such cash payment schemes are obsolete, costly, slow, prone to fraud and reveal a glaring value chain efficiency gap that must be closed. Each case portrayed the commitment of large buyers to invest in closing that efficiency gap.

SmartMoney-Uganda's business model is to charge their large buyer clients a fee. Over the last 8 years, NWK AgriServices, the largest cotton buyer in Zambia, has invested time and effort in pursuit of a viable digital finance solution that they acknowledge will require their ongoing investment. GADCO, the largest rice buyer in Ghana, pays a fee to TigoCash part of which subsidises the subsequent withdrawal fee farmers would normally pay to cash-out from an agent.

Investment by large buyers and the emergence of this new business model is necessary because there is a limited or non-existent economic value proposition for traditional cash-in/cash-out (CICO) agents in remote rural areas due to limited population densities (Mas, 2013). One reason mobile money has taken off in urban centres is because of the high population

densities (Mas, 2014) that make the economics work for agents, MFSPs and users. In fact, the economics work so well in urban areas that there has been no need to carefully segment the market as is commonly done in developed economies. The lower population densities in rural areas will require a more diligent effort to segment and design viable business models that Mas (2014) states will be “a tall order”. These three cases illustrate how this can be done.

6

Research findings

In each case, farmers perceived four barriers to rolling out digital crop income payment schemes in rural areas. These barriers were: illiteracy, financial illiteracy, digital illiteracy and lack of trust. In the case of illiteracy, financial illiteracy and lack of trust, agriculture developers have many decades of experience successfully dealing with these barriers in order to transfer knowledge about good agriculture and agriculture finance practices. These barriers limit, or eliminate, the impact of conventional marketing and advertising through print and other media campaigns to promote mobile finance adoption. Securing trust is vital for the uptake of mobile finance in rural areas (Babcock, 2011; Babcock, 2013d). This is because smallholders have long been disenfranchised from the formal economy and they tend to be illiterate and distrustful of banks and other large entities. Building trust will involve promoting financial and mobile finance literacy by building a greater understanding among farmers about agriculture finance, as well as the features and benefits of mobile finance.

In order to share knowledge about good agricultural and agricultural finance practices, agriculture developers have developed skills and tool kits for navigating around illiteracy as well as financial and digital illiteracy. After many decades of experience with adult participatory learning, use of radio, video and other information and communication technologies, designing non-narrative, visual curricula and more, these skills can be attractive to mobile finance stakeholders. Of perhaps greater import though, is the status of agriculture developers as trusted intermediaries in these value chain communities. This status stems from the work that is done, often over a 3 to 5-year time period or more. Agriculture developers that work with these populations can serve as key partners to bridge the gap between farmers, other value chain stakeholders and the mobile financial service provider (MFSP).

This report profiled three digital crop income payment schemes that sought to transition payments by large commodity buyers to farmers from cash-to-mobile. Based on this research, and the reality of illiteracy, financial and

digital illiteracy and lack of trust, what follows are three steps that emerged for leveraging the procurement policies of large buyers to expand uptake and usage of mobile finance by farmers and by extension, rural, village-based economies driven by agriculture. These three steps are: (1) cash usage behavioural research (CUBeR); (2) strategic alliance formation (StAF); and (3) embedded mobile finance (EMoFi).

6.1 Step one - Cash usage behavioural research (CUBeR)

To inform the design of the requisite ecosystem of CICO agents and merchants (e.g. input suppliers, cooperatives, equipment vendors, warehouses, etc.) that are tightly aligned along the targeted value chain, research is needed into the cash usage behaviour patterns of farmers that includes assessing their level of financial literacy and basic numeracy skills. This research can identify latent demand for financial products, such as credit, savings and payments, as well as mobile money functions (e.g. free account balance inquiry, pictogram-based menu, etc.).

The RiMFin alliance in Ghana most succinctly connected theory to practice by conducting specific market research into the cash usage behaviour patterns and financial literacy of farmers as a preamble to designing its programming. In the case of SmartMoney-Uganda, the pilots in the north and east were enthusiastically received by farmers. These pilots as well as their analysis of cash handling costs for large buyers also informed their subsequent investment to build awareness of and education about mobile payments, as well as SmartMoney's commercial viability when they launched in western Uganda. In Zambia, even though NWK Agri-Services did numerous pilots, the CEO believed they might have done better research into their farmers' cash usage behaviour patterns and levels of financial literacy.

Agriculture developers often design their programmed interventions-based on comprehensive pre-project value chain analysis work to identify efficiency gaps. The obsolete use of cash throughout the value chain is by definition an efficiency gap, so any such value chain analysis should capture this kind of cash usage behavioural research. Meanwhile, from the perspective of mobile network operators (MNOs) there has not yet been much substantive effort to conduct market research, because it is not required for roll-outs in densely populated urban centres. Lacking such a disciplined marketing research approach, they have used the same marketing strategy (in rural areas) perhaps with some minor variations, that they have used in the large urban city centres, where the population is more

literate, financially literate, digitally literate and more likely to trust MNOs and financial institutions. As such, any limited uptake of mobile finance in rural areas has been more opportunistic than strategic in nature (Babcock, 2014a). An example of this was Vodacom’s initial roll-out of M-PESA in Tanzania, where their “initial campaign was completely unsuccessful since it did not capture the target market” (IFC, p. 3). This unscientific approach by the industry has been less than successful and it seems the MNOs are now realising the need for strategic alliances to better understand the needs and constraints of a somewhat unfamiliar market segment.

As either a stand-alone exercise or integrated into a pre-project analysis effort, this market research will provide visibility into the frequency of cash transactions, the average amounts, who makes the cash payments, and the precise locations where these transactions take place. The research done with cocoa farmers on the island of Sulawesi in Indonesia (see Box 12) is a good example of this type of research.

BOX 12. UNDERSTANDING PATTERNS OF DAILY LIFE AT THE BOP TO LEVERAGE MARKET SOLUTIONS³⁴

For the USAID-funded cocoa development project on the Indonesian island of Sulawesi, mobile phones were selected as a cost-effective and convenient way to distribute and repay loans. This input supply financing scheme had a partner bank to disburse the loan, on behalf of the farmer, directly to the input supplier’s mobile bank account. The farmer could then pick up the seeds and fertilisers from the input supplier for the next season. Upon harvest the farmer sells the cocoa to the other project partner, a large international buyer of soft commodities. Accounts are settled electronically, the farmer receives the profit via mobile phone, and the bank loan is paid off. Agricultural finance schemes like these are not novel, but using mobiles as the channel for disbursements and repayments, is novel.

Market research with 549 farmers looked at smallholders’ use of cash and their levels of savings, spending, borrowing and financial literacy. It revealed that 34% of the survey participants received between 1 to 12 cash transactions per year for their cocoa beans and 62% of the participants received between 13 to 24 cash transactions per year. This indicated that the 600,000 cocoa farmers on the island of Sulawesi received 7.8 to 14.4 million cash transactions for their cocoa that was estimated to be worth \$450 million. This was a hugely important quantification of the cocoa digital finance market opportunity for the MFSP. It was also learned that 67% of the farmers were interested in mobile money and that 46% and 36% already save and borrow, respectively. Finally, the insight gained about precisely where and how they spend their money helped to identify and subsequently develop and train the network of agents and merchants who are tightly aligned along the cocoa value chain—that essential space where the farmers live and work. This market research has emerged as a best practice for any agriculture mobile finance initiative.

34 Derived from Babcock, L. 2013c. The Next Great Innovation in Finance. NextBillion Blog.

6.2 Step two - Strategic alliance formation (StAF)

According to the GSMA (Penicaud and Katakam, 2013), future “investment will have to be made to reach out to more rural agents” and that “carefully identifying the right areas to put mobile money agents is critical” (p. 24). This portrays the industry’s interest in expanding beyond urban centres and according to Rob Munro, is matched with “an arms race among rural commodity buyers to have the fastest speed of payment”³⁵. The need for such non-traditional alliances is consistent with the literature as described by Accenture (2013) “challenges presented by the convergence between business objectives and developmental impact are increasingly seeing the formation of complex, multi-stakeholder” alliances in order to “leverage the skills, capabilities and financial resources of both development actors and business players” (p. 12).

A strategic alliance between a large commodity buyer and a MFSP might seem challenging, but there are a number of dynamics that strategically align these future partners. The commodity buyer wants to replace the obsolete cash payment scheme with an efficient, low-cost digital payment mechanism and the MFSP wants a regular payment stream flowing into numerous mobile wallets that generate transaction fees. Meanwhile, farmers benefit from convenient and safe receipt and storage of payments and subsequent convenience of digital transactions in their village-based economies.

SmartMoney-Uganda nicely portrays an alignment of interests between multiple alliance partners. Their partners include large buyers as well as retail shops and co-branded SACCO service centres. With each partner they have written contracts that describe SmartMoney’s provision of services and training, as well as signage, posters and brochures for the SACCOs. In return, their partners promote SmartMoney and the large buyers institutionally commit to embedding SmartMoney into their agriculture knowledge transfer initiatives. RiMFin in Ghana also explicitly delineates each partner’s role and responsibilities in a memorandum of understanding. It was important that TigoCash provided the RiMFin project manager from within its ranks to ensure alignment of TigoCash resources with farmer, CICO agent and GADCO needs. The story in Zambia portrays NWK Agri-Services’ deep commitment to finding a digital finance solution. Driven by their commitment, alliances were formed with different entities to pilot different digital finance solutions, ranging from mobile payments, e-vouchers and prepaid bank cards.

³⁵ Interview 12 May 2014 with Rob Munro, Senior Technical Advisor, Musika, a Zambian non-profit organisation that stimulates and supports private sector investment in the smallholder market.

A healthy system of CICOs (i.e. input suppliers, cooperatives, warehouses, equipment vendors, etc.) providing the supply of mobile finance (e.g. number and locations of carefully selected and trained CICOs) must be carefully balanced with the number and locations of farmers and merchants demanding the service. If there are too many CICOs, their low earnings do not incentivise them to manage their CICO business and if there are not enough CICOs, farmers will lose interest. The agriculture developer in the strategic alliance must advise and guide the identification, development and training of the CICOs (supply) as well as promote among farmers awareness of, and education about the features and benefits of mobile finance (demand). This can be done by leveraging the current framework for sharing knowledge on good agricultural and agricultural finance practices throughout the value chain.

6.3 Step three - Embedded mobile finance into the value chain (EMoFi)

The agriculture developer's role is to promote awareness of and educate potential users about the features and benefits of mobile finance as well as to help identify, develop and train CICOs. This can be done by using the current 'high touch' framework for continuous sharing of agricultural knowledge by bringing farmers and other stakeholders together on demonstration farms and conducting workshops, training sessions and trade shows, to share knowledge about better quality and quantity of production, post-harvest handling, marketing and how to form cooperatives and farmer groups. This provides multiple points throughout the value chain that can be used to create a mobile finance supply and demand system that is tightly aligned along targeted value chains where farmers live and work (Babcock, 2014a).

However, in all three cases, there was little or no embedding of mobile finance into the value chain. While NWK Agri-Services in Zambia and GADCO in Ghana both organised robust agriculture knowledge-sharing activities with cotton and rice farmers, respectively, they conducted very few awareness and education initiatives on the features and benefits of mobile finance although they both acknowledged the potential of and need for such training. The TigoCash RIMFin project manager took part in a radio programme about agricultural inputs and the SmartMoney project manager for the co-branded Bukonzo SACCO joined the local government agriculture extension officer in the field. In all cases, there was potential for integrating mobile finance into agricultural knowledge-sharing initiatives.

Supply of mobile money agents and merchants

MFSPs need to train and maintain ongoing relations with agents who are based in remote rural areas and are geographically isolated. According to the GSMA (2013), MFSPs currently host periodic 'agent conventions' in the field. These events cover basic customer service, liquidity management, fraud awareness and prevention, product awareness, and more.

In collaboration with the alliance partner(s), the agriculture developer can work to identify, develop, train and even finance³⁶ the network of independent CICOs that are tightly aligned along the targeted value chain(s) where the farmers live and work. These agents can be input suppliers, cooperatives, equipment vendors, traders, processors, warehouse operators or any other value chain stakeholder that is ideally located and compliant with the MFSP partner's selection criteria. Farmers at trade shows and other forums and 'agent conventions' can be aligned on behalf of these value chain stakeholders that serve (or would like to serve) as CICOs.

Meanwhile, the same market research process that identifies agricultural CICOs can also identify the larger network of mobile payments acceptance merchants. These can be the same types of value chain stakeholders – in fact, an agent can also be a merchant – but it can be a wider net that includes kiosks, schools, pharmacies, retailers and other actors in the village-based economy.

Demand by farmers for mobile money products and services

The mobile finance industry is conscious of the lack of awareness of and knowledge about mobile finance, which significantly constrains its uptake by farmers in rural areas. This was confirmed by Spire (2013) during their analysis of key agricultural sectors in Indonesia; they found that rice, chili, maize, potato and palm oil sectors would benefit greatly by transitioning 78 million, 12 million, 16 million, 15 million and 128 million separate cash transactions per year to mobile payments, respectively. The same forums for sharing of knowledge about agricultural and agricultural finance best practices can be used to promote awareness of and education about the features and benefits of mobile finance among rural farmers.

Practitioners of finance for agricultural value chains currently engage in the creation and delivery of financial literacy curricula that can now include related curricula about mobile finance literacy. This ongoing delivery of

³⁶ Each CICO is already an entrepreneur and will need to already have, or will need to seek financing for, the requisite initial liquidity.

curricula will promote awareness of and education about mobile finance. Further, during these training sessions new mobile finance subscribers can be registered. According to the GSMA (2013) at the point of registration, if a new mobile money subscriber does a practice transaction, they are 26% more likely to become an active³⁷ account user. The 'high touch', continuous and trusted nature of agriculture knowledge-sharing presents a lot of potential for guiding new subscribers to make practice transactions upon registration, which further supports the value proposition for creating agriculture mobile finance strategic alliances.

6.4 Summary of the three steps

Cash usage behavioural research (CUBeR) will provide information about the number of cell phones in use in the targeted value chain, the levels of financial literacy of farmers and much more. This research will provide data about the patterns of daily life at the base of the pyramid, not unlike the deep databases of demographic and market knowledge that describe developed country marketplaces (London and Hart, 2010). CUBeR will also reveal information about the numbers of cash transactions that can be moved to mobile transactions, which is of key importance to a potential mobile financial service provider (MFSP) partner. Strategic alliance formation (StAF) can be quantified by this value proposition and by aligning the interests of all of the potential partners. If there is StAF, the roles and responsibility of each partner must be clearly delineated and communicated to all partners. The roles and responsibilities of each partner will depend on how they agree to embed awareness of and education about mobile finance (EMoFi) into agriculture knowledge-sharing with farmers on production, post-harvest handling, marketing and cooperative formation – as well as into the identification, development, training and financing of CICO agents.

³⁷ A common industry challenge is subscriptions that are 'inactive' – with little or no transactional activity – that generate little or no average revenue per user (ARPU).

7 Conclusion and recommendations

This study analysed initiatives in Ghana, Uganda and Zambia in an effort to understand the steps necessary to transition crop payments by large commodity buyers to farmers from cash-to-mobile. All three cases portrayed the commitment by large commodity buyers to finance the roll-out of digital finance in their respective value chains. Based on this research, we note the following outcomes:

Research outcomes	Context
<p>Cash usage behavioural research (CUBeR) must be done to inform and make the value proposition argument for the subsequent strategic alliance formation (StAF) and the design of value chain embedded mobile finance (EMoFi).</p>	<p>There are significant illiteracy related and lack of trust challenges for market creation in rural areas. Unlike in developed countries, though, there is a dearth of existing demographic and market data to inform a market entry strategy. CUBeR will provide knowledge about the patterns of daily life at the BoP. StAF can bring together partners with relevant resources, capacities and capabilities to design effective EMoFi interventions.</p>
<p>Large commodity buyers are willing to invest in the roll-out of mobile crop income payments schemes for the following reasons:</p>	<p>The lower population densities in rural areas mean the traditional economics for mobile network operators (MNOs), cash-in/cash-out (CICO) agents and mobile wallet subscribers will not work. Meanwhile, large commodity buyers are motivated to reduce their costs related to cash payment schemes and farmers can derive significant benefits. Therefore, the emergent business model seems to be large commodity buyers serving as the gateway for opportunities to service the digital finance needs of rural, village-based communities.</p>
<p>The transfer of knowledge about mobile finance to farmers will be 'high touch' and continuous in nature.</p>	<p>The uptake of mobile wallets by farmers and others in rural areas will require significant behaviour change to offset the illiteracy related issues as well as lack of trust. Meanwhile, traditional agriculture knowledge transfer on production, post-harvest handling, and marketing is also 'high touch' and continuous in nature. Combining knowledge transfer about mobile finance with traditional agriculture knowledge transfer will have high impact.</p>

For many developing countries, agriculture plays a major role in the economy, with numerous cash transactions taking place throughout the farm-to-fork agriculture value chain. When using the three steps of cash usage behavioural research (CUBeR), strategic alliance formation (StAF) and embedding mobile finance (EMoFi) to transition cash payments for crop income to mobile payments, farmers “can get immediate confirmation that transactions related to their account are complete, make immediate use of funds they receive, and check that their balance matches their expectation” (Mas, 2014). Additional benefits to farmers include a reduced security risk (as they are not carrying large amounts of cash around), as well as increased productivity (as payments go directly to the farmer’s mobile wallet), and more efficiency (as farmers don’t need to travel off-farm to collect or disburse cash). In addition, farmers and other rural, village-based economic participants will be transitioned to the formal economic activity of digital finance from the informal, non-transparent, cash-based economy.

Finally, participation in a digital finance platform can render a ‘Know Your Customer’ (KYC) ‘financial identity’ that can be data-mined to compute alternative credit scores for farmers to promote their access to credit.

7.1 Future work

To best leverage this potential of digital finance on behalf of agriculture throughout Africa, the Caribbean and the Pacific, there must be an expansion of the traditional definition of agriculture value chain finance. The current definition embraces credit, savings and micro-insurance with little regard for payment streams. Business model innovations that leverage these digital finance technologies can replace obsolete cash payment schemes in agriculture. The rapid growth of cell phone adoption, even among those farmers for whom the purchase price of a phone is a significant investment, represents a self-financed infrastructure that extends into the household at the base of the pyramid (Babcock, 2013b). By leveraging the procurement policies and financial investment of large buyers, there will be subsequent value-added opportunities to use the same mobile channel to provide savings, credit and micro-insurance while also converting non-agricultural, cash-based village economic activity to digital finance.

One of CTA's strategic goals is to promote information and communication technologies for agricultural and rural development. This research reveals how the interests of large commodity buyers can be leveraged to create the digital finance infrastructure that will subsequently help rural development. CTA is helping to lead the agriculture digital payments charge by widely promoting this emerging framework; it is currently considering conducting cash usage behavioural research (CUBeR) in selected countries and value chains. CTA seeks to be a partner of choice in strategic alliances that can benefit from its status as a trusted intermediary in rural communities.

A hoped-for outcome of this and subsequent CTA reports is the expansion of the traditional definition of agriculture value chain finance to explicitly include payment systems. By doing so, the value chain finance discipline and its practitioners will systematically explore the lessons learned and best practices for the insertion of digital finance into agriculture. The role of the agriculture developer, and other alliance partners – from step one, CUBeR to step two, StAF and to step three – EmoFi must be closely studied and guidelines created. There must be further development of research protocols, structuring of alliances and best practices for creation and delivery of financial and mobile finance literacy curricula. These and many other considerations must be systematically explored to provide deeper analysis, robust tool kits, lessons learned and best practices and guidelines in order to expand the body of knowledge about digital finance for agriculture and rural development.

8

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About the author

Lee Babcock, MBA, PhD, is Managing Director of LHB Associates. LHB Associates is a strategy and management consulting firm bringing mobile finance and other mobile business models to rural areas. He has conceptualised, designed, managed and/or researched strategic alliances for mobile finance initiatives in Ghana, Indonesia, Malawi, Tanzania, Uganda and Zambia. He has written numerous publications and delivered presentations in Belgium, Indonesia, Kenya, Rwanda, South Africa, Switzerland, the US and elsewhere, about the potential for strategically inserting digital finance/solutions into rural economies. A digital payments ecosystem will provide a distribution channel for subsequent financial products as well as for supplier financing of solar panels/lanterns, clean cook stoves, treadle pumps, water, utilities, education, health, food, and other expenditures.

He has worked extensively overseas: as a senior advisor for USAID at the US\$60 billion Indonesian Bank Restructuring Agency and as a manager for the US\$250 million USAID-funded Business Development Programme in Bosnia that was designed to rapidly invigorate SME growth during and after the war. In Azerbaijan he restructured and mitigated loss on a British Petroleum-funded local sourcing project. In Banda Aceh, Indonesia, he started up, managed and closed out a high-impact post-tsunami rural livelihoods restoration project for UNDP. As a US Peace Corps Volunteer in the Republic of Latvia he advised the Prime Minister on privatisation and economic growth. Prior to working overseas, his US experience was in Silicon Valley, Fortune 250 and professional consulting.

His diverse roles and responsibilities in different sectors, disciplines and cultures have informed his systems theory approach to mobile finance and mobile solutions for rural communities. With a PhD in e-business and an MBA in international finance & business, he is passionate about the potential of mobile money to do for the base of the economic pyramid what commercial banking did for the Industrial Revolution.