Opportunities in agricultural value chain digitisation:
Learnings from Uganda

SEPTEMBER 2017

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Executive Summary

Digitising agricultural value chains via mobile enabled tools in the so called agricultural "last mile" brings a wide array of benefits to agribusinesses in developing markets, leading to business performance improvements. It also benefits smallholder farmers by enabling financial inclusion; supporting the uptake of better agricultural practices and skills development; and allowing for more transparency and visibility for farmers into last mile operations.

More so than in other Sub-Saharan markets, over the last couple of years Uganda has benefited from donor funding dedicated to mobile money Business-To-Person (B2P) payments pilots in agriculture. With last mile digitisation initiatives focusing from the onset on payments, mobile money providers have become key enablers and required direct or indirect partners in the implementation.

- This study broadly identifies **two ownership models** for last mile digital payments in Uganda, a **third-party/tech provider led model** (so-called "aggregator") where the tech provider integrates with the mobile money service of one or more MNOs and offers its own bulk payments solution to agribusinesses; and an alternative mobile **money provider led model** where the mobile money provider offers a payment solution for last mile sourcing directly to the agribusiness.

- The agility of small tech firms to upgrade and customise solutions to enterprise customer needs is a strength of the aggregator model, however to provide support in the realm of mobile money pricing and service ecosystem, **an active and engaged mobile money provider is required**. The mobile money service provider led model offers potential to aggregate multiple solutions in a suite of services leveraging the MNO's scale, brand and existing enterprise relationships to become a one-stop-shop for the enterprise customer.

- **Ugandan farmers recognise the value of mobile money especially for efficient cash management and to pay school and health fees**. The cost of mobile money, such as the fees charged for withdrawals and transactions, is the biggest barrier to farmer acceptance. However, agribusinesses are prepared to implement **cost mitigation strategies for farmers**, provided that digitisation offers them enough value. To stimulate adoption, MNOs have also been willing to offer preferential mobile money tariffs to enrolled farmers.

- While mobile money payments are one of the building blocks of last mile digitisation, **there is an opportunity to upgrade the solution to encompass a more holistic suite of services** that go beyond digital payments to cover areas as diverse as digitised farm management systems, certification and traceability among others.

- The case of Uganda shows that the agribusinesses that are more likely to adopt basic mobile money bulk payments are those with low ICT adoption, while agribusinesses that are already using ICT tools are more likely to adopt holistic last mile solutions that extend beyond payments.

- Generally, the experience of Uganda shows that **the need to implement digitisation initiatives in the last mile is stronger in competitive value chains**, where agribusinesses compete to procure crops from the same farmer. It is in these value chains that there is a strong incentive for the agribusiness to increase farmer loyalty (having farmers returning to sell their crop) and that digital tools can support farmer loyalty schemes.

- **The evolution from bulk payments to real time individual payments will benefit farmers** by allowing them to save precious time, access digital receipting, and build a digital profile for additional services. **It will benefit agribusinesses allowing for improved farm management systems** (e.g. inventory management functionalities) and overall operational efficiency.

- Eventually, **the upgrade to real time analytics will support traceability and certification requirements for agribusinesses** in competitive value chains, also providing value to farmers, with the additional benefit of increasing operational efficiency and reducing operational expenses for the agribusiness.

Introduction

Agriculture contributes between 10 percent and 35 percent of GDP in developing countries, and employs 1.34 billion people globally, of which 1.31 billion live in developing countries. As global food demand is rising, the vast majority of agribusinesses, including major corporations in the food and beverage industries, directly procure from smallholder farmers, who supply the majority (at least 70 percent) of the food production consumed worldwide.

Agribusinesses face various business inefficiencies when sourcing from smallholder farmers, primarily related to the challenges of operating in cash. These include theft and fraud, time and logistical inefficiencies of cash payments, and overall lack of visibility into their operations. In addition, those agribusinesses procuring cash and export crops from smallholders are under pressure to ensure not only that supply chains are reliable and efficient but also that the produce they source is adherent to international standards and increasingly traceable. Digitising agricultural value chains through mobile enabled tools in the so called "last mile"- defined as the movement of people and goods involved in the procurement process of crops from smallholder farmers to agribusinesses - offers significant opportunities to address these challenges.

Last mile digitisation brings a wide array of benefits to agribusinesses through effective control and monitoring of operations, transparency of transactions, analytics capability and the establishment of effective communication channels, both internally as well as with smallholder suppliers. In addition, last mile tools lead to improvements such as ease of traceability and certification compliance, build-up of farmer loyalty and improved management of quality of production. Ultimately, the implementation of digital tools in the last mile can lead to business performance improvements such as increased productivity, cost reduction and revenue and profitability growth.

FIGURE 1

Digital tools to optimise the last mile procurement

BUSINESS CHALLENGES	Farmers do not follow best practices, and lack skills and access to agri-related information, educational resources etc.	Cash payments are risky and costly for agribusinesses and for farmers. A cash economy also prevents farmers from accessing credit savings and insurance	Farmers do not possess formal and/or economic identities that capture transactional history, geolocation, farm size etc.	Agribusinesses need full and real-time visibility for traceability and certification of goods when sourcing from smallholders	Agribusinesses rely on manual systems which do not capture the data required for efficient equipment, farm and warehouse management	Agribusinesses rely on manual data management systems and lack real-time visibility into their business data
DIGITAL SOLUTIONS	**1. Information services:** Agricultural extension, education, certification standards, skills development	**2. Mobile money:** Transfers, payments and digital financial services	**3. Digital profiles:** Mobile for authentication and verification and as a tool to create economic identities/ digital profile	**4. Track and trace systems, farm management systems**	**5. IoT applications for agriculture:** Equipment logistics, crop, soil and weather monitoring, smart warehousing	**6. Agribusiness analytics:** Predictive analytics, precision agriculture

Crucially, last mile digitisation also brings important benefits to smallholder farmers. The delivery of information services via mobile (e.g. text-messaging from agribusinesses) can support better agricultural practices and skills development for famers, leading to increased productivity;[1] enable more transparency and visibility for farmers into last mile operations reducing the risk of fraud; and allow for easier access to certification requirements from agribusinesses. In addition, the transition from cash transactions to mobile money allows for more secure, timelier and potentially less costly payments for farmers. Digital payments in turn can support the creation of an economic identity for farmers via transactional records from the sale of agricultural produce, which in conjunction with other data points (e.g. geolocation, farm size) open up to full financial inclusion for farmers (access to credit, insurance and saving accounts).

This report draws on the experience of agricultural value chain digitisation practitioners in Uganda, a market that has witnessed a high degree of activity in this space, to outline early learnings and key factors to consider for key stakeholders (MNOs, tech providers, agribusinesses, farmers and donors). There is a need for providers of digital tools for enterprise customers in the agricultural last mile to learn from those who have already experimented with digitisation projects and to understand key opportunities, enablers and challenges and how to best address the needs of agribusinesses and farmers. Moreover, industry practitioners need to identify potential partners, as well as partnership structures (MNO and non-MNO led) required for value chain digitisation initiatives.

The study first provides an overview of the agricultural sector in Uganda, highlighting the value chains that offer the most suitable entry points for digitisation. It then focuses on the opportunity for digitising payments via mobile money to smallholder farmers (section 2), which is where early stage last mile digitisation pilots in Uganda have focused. Starting from digital payments, and extending to other digital tools, section 3 explores the ownership models under which last mile digital solutions can be offered to agribusinesses, identifying broadly a third party/tech provider-led model and an MNO-led model. The report then presents in section 4 two case studies of last mile digitisation in Uganda, respectively Yo Uganda's last mile sourcing solution for the coffee value chain (third party/tech provider-led model) and Uganda Telecom Limited (UTL) mobile money bulk payments for the agriculture sector (MNO-led model).

Finally, section 5 draws on the Ugandan case studies to outline key learnings for the broader industry on the technology readiness of different types of businesses for value chain digitisation. Specifically for digital payments, section 5 discusses the suitability of bulk payments solutions, which have been the focus of many early initiatives, for different agricultural value chains. From a farmer standpoint, it also highlights the need to develop the mobile money services ecosystem and the need to implement cost mitigation strategies for farmers in order to allow for mobile money take up. Lastly, based on the Uganda experience, the study highlights pathways to more holistic digital solutions beyond payments and extending to farm management systems and systems supporting certification and traceability requirements (track and trace).

1. See GSMA mAgri, July 2017, "Creating scalable, engaging mobile solutions for agriculture A study of six content services in the mNutrition Initiative portfolio" https://www.gsma.com/mobilefordevelopment/programme/magri/creating-scalable-engaging-mobile-solutions-for-agriculture

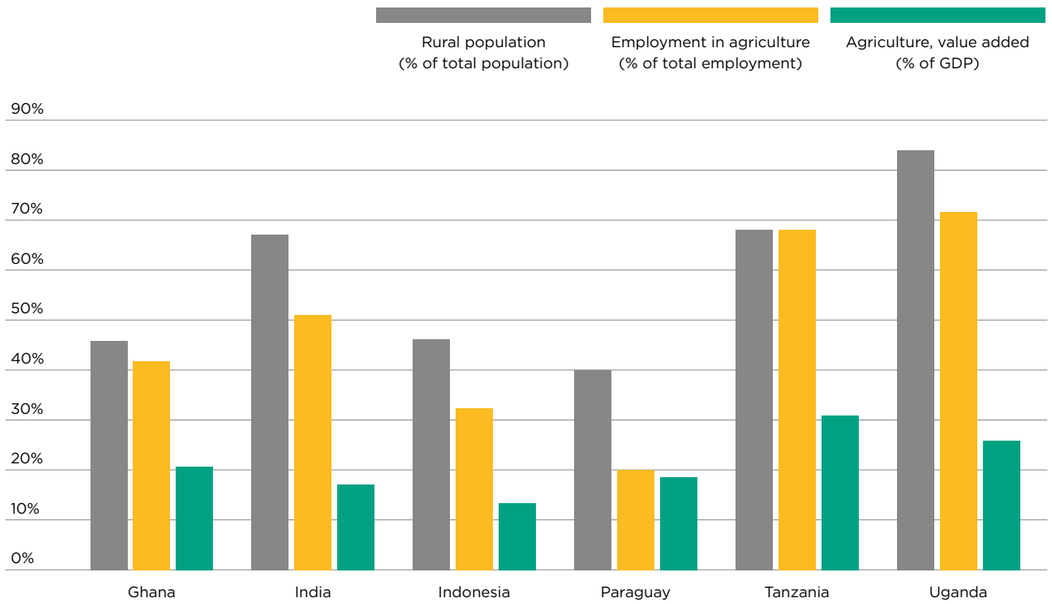
1. Agriculture in Uganda

More than 70 percent of the working population in Uganda is employed in agriculture.[2] Agricultural productivity benefits from little variation in temperature around the year and fairly reliable precipitation patterns that allow for two annual crop cycles in most parts of the country. The sector is made up of cash crops, food crops, livestock, forestry and fishing activities. Cash crops include coffee, cotton, tea, cocoa, tobacco, sugar cane and horticultural products. Food crops include cereals (maize, millet, rice, sorghum); root crops (cassava, potatoes, sweet potatoes); pulses (beans, cow peas, field peas, pigeon peas); oil crops (groundnuts, sesame, soybeans); plantains and coffee.

In 2015/2016, the sector's share to total GDP at current prices was 23.6 percent. In terms of sector performance, agriculture grew by 3.2 percent thanks to the positive contribution of fishing and cash crops activities which expanded by 4.8 percent and 7.8 percent respectively.

FIGURE 2 Source: World Bank

National relevance of agriculture in selected countries



2. In Uganda, 74.5 percent of working age population reside in rural regions. See "Uganda Bureau of Statistics, 2016 Statistical Abstract" http://www.ubos.org/onlinefiles/uploads/ubos/statistical_abstracts/2016%20Statistical%20Abstract.pdf

FIGURE 3 Source: Uganda Bureau of Statistics, GSMA Intelligence

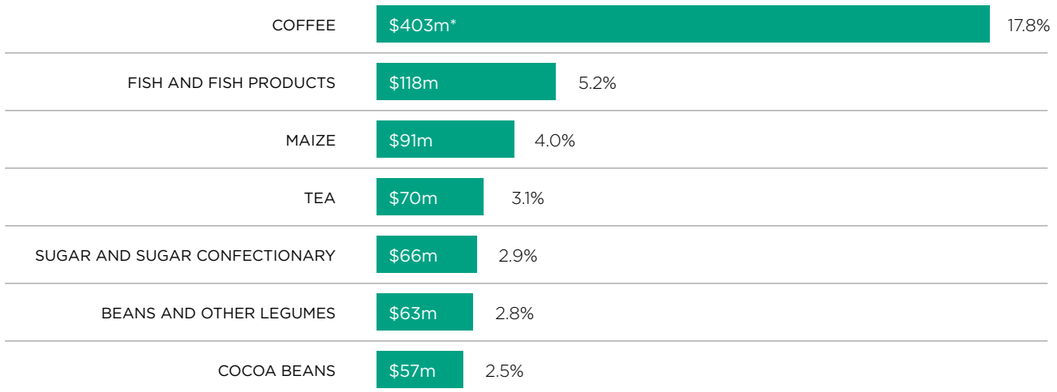
Average yearly production (000s tonnes), top twenty value chains in Uganda, 2000-2014

1. BANANAS	8,749	11. DRY BEANS	552
2. CASSAVA	4,146	12. OIL CROPS	371
3. SUGAR CROPS	2,628	13. NUTS	236
4. ROOTS AND TUBERS	2,470	14. BULB AND STEM VEGETABLES	233
5. MAIZE	1,831	15. COFFEE	182
6. MILK	1,182	16. RICE, PADDY	171
7. CEREALS, GRAINS	850	17. SOYBEANS	152
8. POTATOES	644	18. BEANS AND OTHER LEGUMES	151
9. VEGETABLES	638	19 COTTON	149
10. MEAT	597	20. POULTRY	65

Some of Uganda's most widely cultivated crops such as coffee, maize and tea make a significant contribution to the country's formal exports by value. In particular, coffee remains the main foreign exchange earner with a share to total formal exports reaching 17.8 percent by value in 2015. Alongside coffee, another 13 out of 20 top exports by value are also production outputs of agricultural value chains. Export crops are likely to be suitable entry points for digitisation due to the presence of formal agribusinesses sourcing from smallholders and the traceability and certification requirements that these agribusinesses are likely to follow.

FIGURE 4 Source: Uganda Bureau of Statistics

Contribution of Uganda's cash crops to total exports



***Formal export by value (US$), 2015**

2. Digitising B2P payments in Uganda's agricultural value chains

When examining the progress of Sub-Saharan African countries in digitising agricultural value chains, Uganda emerges as a pioneer among its peers. More so than in other regional markets, over the last couple of years Uganda has benefited from donor funding for the deployment of B2P payments digitisation pilots in agriculture with MNOs, aggregators and third party mobile money providers. Early stage last mile digitisation pilots are almost exclusively confined to mobile money enabled B2P payment solutions and bulk payments platforms. These pilots are for the moment not focusing on other last mile digital solutions such as track and trace systems and agribusiness analytics tools.

Mobile money for financial inclusion in Uganda

In Uganda, the financially excluded are estimated at over 2.5 million, making up over 15 percent of the adult population.[3] The rural/urban gap in financial exclusion is widening. Studies have revealed that over 2.2 million adults in rural areas are financially excluded and that 74 percent of the rural poor rely on informal financial services, such as community-led groups and welfare funds such as Village Savings and Lending Associations (VSLAs) and Savings and Credit Cooperatives (SACCOs).[4]

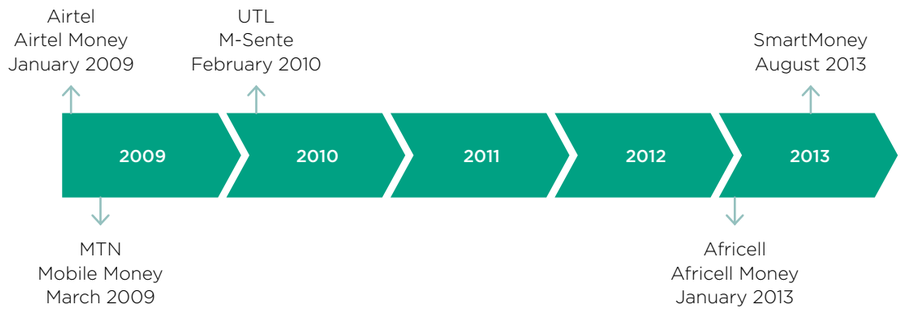
The financing gap in agriculture best explains the extent of the challenge. In 2013, only 10 percent of total borrowers in the consumer lending market borrowed for agricultural production yet the majority of Uganda's population derive their sustenance from agriculture.[5] The rural population is more likely to access credit through informal means compared to their counterparts in urban areas.[6] The main reason for this financing gap is the lack of bespoke credit products that cater for the needs of the agricultural sector, which ultimately hinders Uganda's economic development prospects.

Since 2009, mobile money has emerged as a key enabler for financial access not only in urban but also in rural areas. Airtel launched Uganda's first mobile money service in January 2009 followed by MTN, UTL and Africell. In 2013, SmartMoney, a third party provider focusing on the rural segment, launched in Western Uganda.

3. The 2013 Finscope Report defines the "financially excluded" as unserved, non-users of formal banks, non-bank formal or informal institutions. See "Uganda 2013 Finscope III Survey Report Findings. Unlocking Barriers to Financial Inclusion" https://www.bou.or.ug/opencms/bou/bou-downloads/Financial_Inclusion/Finscope-Report-2013.pdf
4. See CARE International Policy Brief, November 2014 "Financial Inclusion in Uganda" https://www.care.org.au/wp-content/uploads/2014/12/Financial-Inclusion-in-Uganda-Nov-2014.pdf
5. See "Uganda 2013 Finscope III Survey Report Findings. Unlocking Barriers to Financial Inclusion" https://www.bou.or.ug/opencms/bou/bou-downloads/Financial_Inclusion/Finscope-Report-2013.pdf
6. The above mentioned 2013 Finscope Report informs that some 60.6 percent of the total users of SACCOs were females and 87 percent were in rural areas. This phenomenon is partly explained by the spread of SACCOs in rural areas, where farmers are more likely to mobilise around community-level organisations.

FIGURE 5

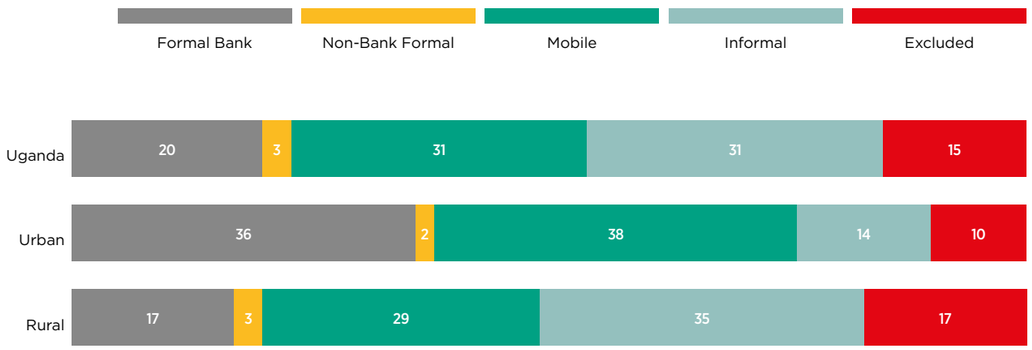
Mobile money service launches in Uganda



In the last five years, mobile money services have experienced a fivefold increase in the number of mobile money transactions from 149 million in June 2012 to 809 million in June 2016; and tripling of the number of registered mobile money users from 5.7 million in June 2012 to 19.6 million in June 2016.[7] In rural Uganda, it is estimated that mobile money is the primary enabler for accessing financial services for just under 30 percent of the population.

FIGURE 6 Source: Uganda Bureau of Statistics

Financial access in Uganda via formal and informal channels, 2013 (%)



7. Source: Annual reports, Bank of Uganda, https://www.bou.or.ug/bou/publications_research/annual_reports.html

Benefits of digitising B2P payments for agribusinesses

Evidence from field research in Uganda shows that agribusinesses see digital payments as potentially having an immediate impact on increasing operational efficiencies. Even though agribusinesses interviewed by GSMA did not have visibility on the overall cost of paying farmers in cash as opposed to paying them in mobile money, they identified paying farmers in cash as their main pain point and the most significant cost element.[8] In the case of Uganda's Arabica coffee value chain (see section 4), agribusinesses making cash payments to farmers need to make regular journeys from the washing stations (where coffee is sold) to nearby towns where banks are located, wasting time and succumbing to cash handling risks and possible losses. Once back at the washing stations, agribusiness staff devote significant amounts of time to processing cash payments. In addition, transportation infrastructure is generally poor and roads often become inaccessible during the rainy season, making the whole process of paying farmers in cash more challenging.

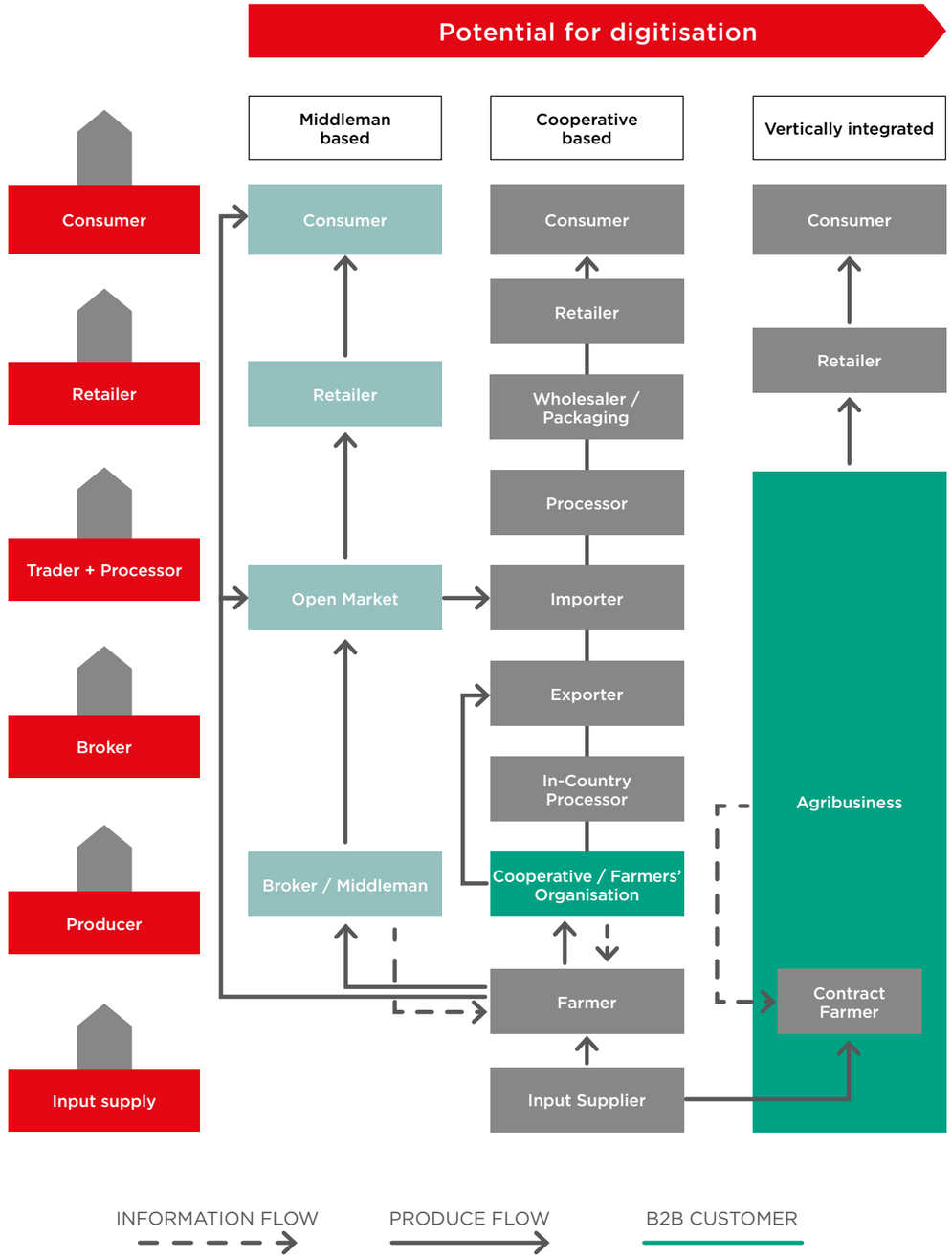
Besides digitising payments to smallholders when sourcing crops, Ugandan agribusinesses see the value of using mobile money for additional B2P payments and person-to-business (P2B) repayments, when they opt to pre-finance farmers via loans for inputs such as fertilisers, pesticides and seeds. For agribusinesses, pre-financing farmers is an opportunity to strengthen farmer relationships and promote farmer loyalty (farmers returning to sell their crops to the same buyer), an important business objective particularly in Uganda's cash and export crops (e.g. coffee, sugar) where smallholder sourcing is a competitive activity. In addition, pre-financing farmers allows agribusinesses to determine the type of inputs used by farmers, with direct effects on production quality and quantity.

Entry points for digitising B2P payments across agricultural value chains

Selecting well-suited value chains as entry points is a critical step in the early stages of B2P payments digitisation in agriculture. Entry points are more likely to be in formal value chains where commercial agribusinesses and community organisations (e.g. cooperatives) procure crops from farmers, as opposed to informal value chains where farmers trade with middlemen or sell directly to the open markets.[9] It is where farmers transact with formal buyers directly that digital payments are more likely to be implemented because for the buyer the incentives to increase transparency, quality and predictability of supply, especially if they procure crops to sell in international markets, are stronger.

FIGURE 7

Generic structure of agricultural value chains



8. It is important to note that in current B2P payment pilots in Uganda agribusinesses typically do not incur in transactional costs when paying farmers. Neither mobile money providers nor third parties integrating with multiple mobile money providers are currently charging agribusinesses for performing B2P payments.
9. GSMA estimates the value of formal agricultural production in a given country by estimating for each crop category a formality procurement score as a weighted average of three metrics (share of exports, commercial activity in the value chain and structure of the value chain). Scores range from 1 (informal) to 5 (formal). For commercial activity in the value chain and structure of the value chain, GSMA has taken as a reference the major producing countries for each of the produce categories. For further information see GSMA mAgri and GSMA Intelligence, November 2016, "Market size and opportunity in digitising payments in agricultural value chains" http://www.gsma.com/mobilefordevelopment/programme/magri/market-size-and-opportunity-in-digitising-payments-in-agricultural-value-chains

Where formal procurement takes place, mobile money providers have an opportunity to form partnerships with agribusinesses to digitise existing B2P cash payments and drive benefits related to cost reduction, increased efficiency, transparency, and safety for both agribusinesses and farmers. Additional benefits of operating formal value chains include more predictable revenue streams and transaction frequencies and the presence of fewer commercial players, which eases the complexity of client engagement compared to the more fragmented informal value chains.

In Uganda, cash crop growing regions with a strong presence of agribusinesses operating in formal value chains, such as the Arabica coffee region in Mount Elgon and the sugar cane region in Jinja District, present opportunities for collaboration between mobile money providers and agribusinesses to implement payment digitisation initiatives. Although the coffee value chain is comparatively small in actual production output (see figure 8), the great majority of Uganda's coffee is sold in international markets. On the other hand, the most widely cultivated crops such as banana, cassava and maize form part of largely informal agricultural value chains. A significant proportion of output from such value chains is used for household consumption with most of the marketable surplus taken to informal markets. It is therefore in crops such as coffee where opportunities for digitisation are stronger, especially in the early stages of mobile money adoption in rural.

A more holistic consideration of agriculture in Uganda uncovers the full breadth of opportunities for digitisation across different value chains. Taking into account crop production outputs together with a whole range of other relevant factors such as their growth potential and extent of formal sector involvement, alongside mobile money-specific factors - size of transactions that fits within mobile money transaction limits and frequency of payments to smallholders – it is possible to identify high priority value chains for mobile money providers interested in digitising rural B2P payments.

GSMA mAgri and GSMA Intelligence have developed a model to prioritise the most attractive value chains for digitisation across 70 emerging markets according to scores for the following indicators: [10]

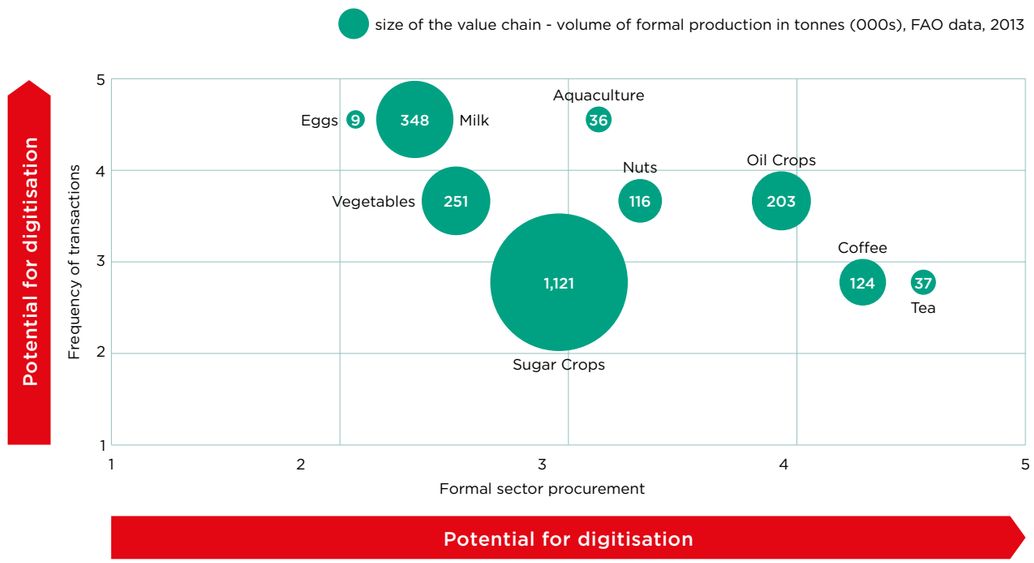
- Value of agricultural formal sector procurement by value chain in USD;
- Formal sector procurement by value chain;
- Volume of production by value chain;
- Value chain prognosis/growth potential;
- Average size of transactions by value chain in USD;
- Frequency of transactions by value chain;
- Interlinkages of value chains.

In the case of Uganda's sizeable milk value chain, the sixth largest by average yearly production output in 2000- 2014, it scores comparatively low on formal sector procurement. However, high scores on remaining indicators[11] make it potentially suitable for B2P payments digitisation.

10. For further information please contact magri@gsma.com.
11. Volume of production; Value chain prognosis/growth potential; Average size of transactions in USD by value chain; Frequency of transactions by value chain; Interlinkages of value chains.

FIGURE 8 Source: GSMA Intelligence, GSMA mAgri

Priority value chains for B2P payments digitisation initiatives in Uganda



Using a proprietary model developed by GSMA Intelligence and GSMA mAgri, this figure displays the ten most attractive value chains for digitisation.

Factors taken into account include, amongst others: The size of the value chain (volume of formal production in tonnes, FAO data 2013), which is here shown in the green bubbles; Formal sector procurement by value chain (horizontal axis); Frequency of transactions by value chain (vertical axis).

Formal sector procurement is a metric worked out as the weighted average of three sub-indicators: Commercial Activity in Value Chain (subsistence crop versus cash crop); Structure of the value chain (localised traders versus institutional buyers); Share of exports (consumed locally versus exported). The assumption is that formal value chains, with established structures where actor roles and economic relationships are well-defined, offer mobile money providers greater opportunities for digital payments. Each value chain has been given an aggregate score (1-5)against the sub-indicators, the higher the score the strongest the potential for digitisation.

Frequency of transactions is a major factor to consider while assessing a value chain's viability for digitisation, as regular transactions ease liquidity management for a mobile money provider and provide stable revenues to its mobile money agents. Similarly to "formal sector procurement", agricultural value chains receive a score of 1 to 5 depending on the estimated number of transactions per year: 1 transaction (scores 1); 2-5 five transactions (2); 6-20 transactions (3); 21-50 transactions (4); 50+ transaction (5).

In Uganda, the majority of early digitisation initiatives have focused on coffee due to the significance of this value chain in the country's economy and the high level of formal sector engagement. Subsequently pilots have been extended to other important value chains in the country's formal economy such as sugarcane, tea and dairy. Although this current study draws upon digitisation initiatives on coffee and sugarcane, the learnings are broader and transferable to other crops.

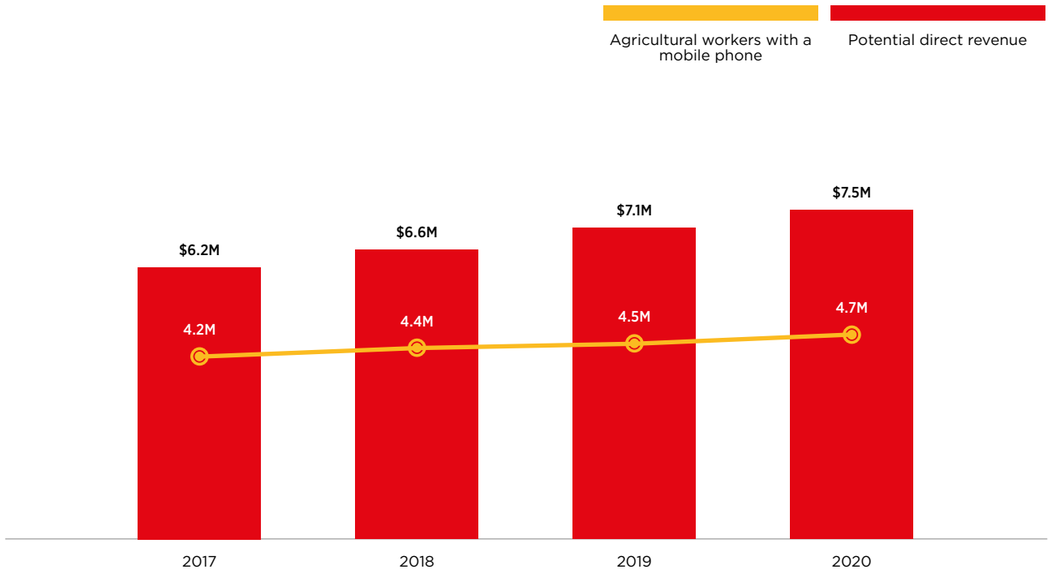
Benefits of value chain payments digitisation for mobile money providers

By focusing on agricultural value chain payments, Ugandan mobile money providers can include rural customers in payment systems, create a sustainable and predictable business case for rural agents, derive direct revenue from agribusinesses from bulk disbursement fees (typically up to 1 percent of transaction value) and from cash withdrawal fees charged to end users, and start building digital rural ecosystem around the digitised B2P payments. While mobile money remains one of the fastest growing areas for the country's MNOs,[12] to sustain growth it has become critical for service providers to target less penetrated segments including youth, women and rural more effectively.

GSMA mAgri estimates that the value of Uganda's digital agricultural B2P value chain payments could be as high as USD 616 million million in 2017 and expand to USD 754 million in 2020.[13] This would result in a direct revenue opportunity from transaction fees to mobile money providers of USD 6.2 million and USD 7.5 million respectively. In subscriber market share terms, there is an opportunity to address a base of 4.2 million agricultural workers with a mobile phone (2017), of whom only 36 percent are estimated to also be mobile money subscribers.

FIGURE 9 Source: GSMA Intelligence and GSMA mAgri

Potential direct revenue opportunity for B2P in agriculture in Uganda



12. In the year ended 31 December 2016, Uganda's largest MNO, MTN, with 38.7% subscriber market share (GSMA Intelligence) saw a year-on-year spike of 44 percent in digital services revenue, of which mobile money revenue is part. Mobile money services have become an increasingly crucial revenue generator for MTN Uganda representing 20 percent of total digital revenue in 2016. See MTN 2016 Annual Results https://www.mtn.com/en/investors/financial-reporting/annual-results/
13. See GSMA mAgri and GSMA Intelligence, November 2016, "Market size and opportunity in digitising payments in agricultural value chains" https://www.gsma.com/mobilefordevelopment/programme/magri/market-size-and-opportunity-in-digitising-payments-in-agricultural-value-chains

To maximise this opportunity, mobile money providers must be able to rely on adequate coverage in target rural areas, and operate in an enabling mobile money regulatory environment that allows agriculture-specific mobile money use cases. Once the foundations are in place, only a deep understanding of agricultural value chains and incentives of commercial players in the sector can allow for the development of viable partnerships and business models.

Besides the direct revenue opportunity, digitising agricultural payments offers potential to generate additional measurable benefits for MNOs.

FIGURE 10

Business benefits for MNOs in agricultural B2P payments

Business benefits	Examples	
Add new customers (market share)	New mobile money customers in rural	New mobile customers in rural
Boost mobile money usage	Agri-related use cases (agri credit and savings)	Non-agri related use cases (P2B payments - school fees, health insurance fees, utility bills)
Increase network usage	Voice and messaging	Value-added services (VAS)
Increase agent activity	Higher cash-in volumes	Higher cash-out volumes

Head office of Busana Coffee Growers Company, Nakaseke District, Uganda. The building is next to a base station of Uganda Telecom.

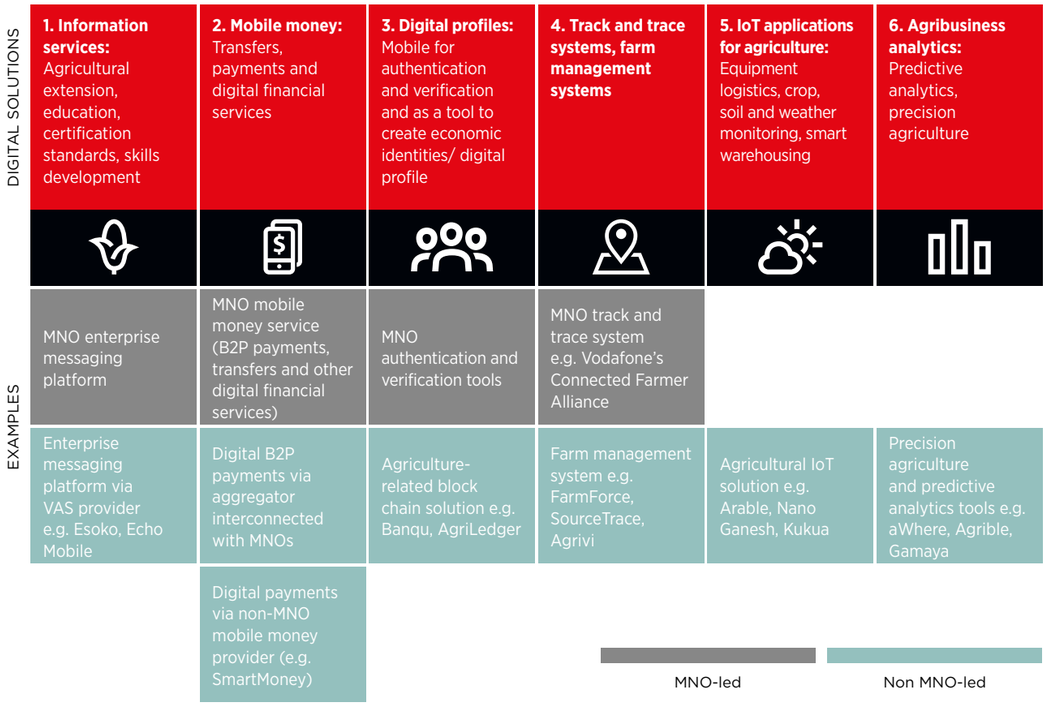
3. Ownership models

Last mile digital tools and providers

As mentioned in section 2, with donor funding targeting financial inclusion, early stage last mile digitisation pilots in Uganda have largely focused on bulk payments to farmers. While mobile money payments are one of the building blocks of last mile digitisation, a plethora of digital tools addressing different pain points for agribusinesses (and farmers) in last mile sourcing have emerged. These include information services for agribusinesses to communicate with smallholder suppliers (e.g. SMS bulk messaging), tools to create digital profiles for farmers, track and trace and farm management systems, agricultural IoT solutions, precision agriculture and predictive analytics tools. Depending on their requirements and on the availability of solutions in their markets, agribusinesses interested in digitising the last mile can opt to work with different providers, such as specialised technology providers. MNOs have also started to cater to the needs of enterprise customers in the agriculture sector.

FIGURE 11

Digital solutions for the last mile



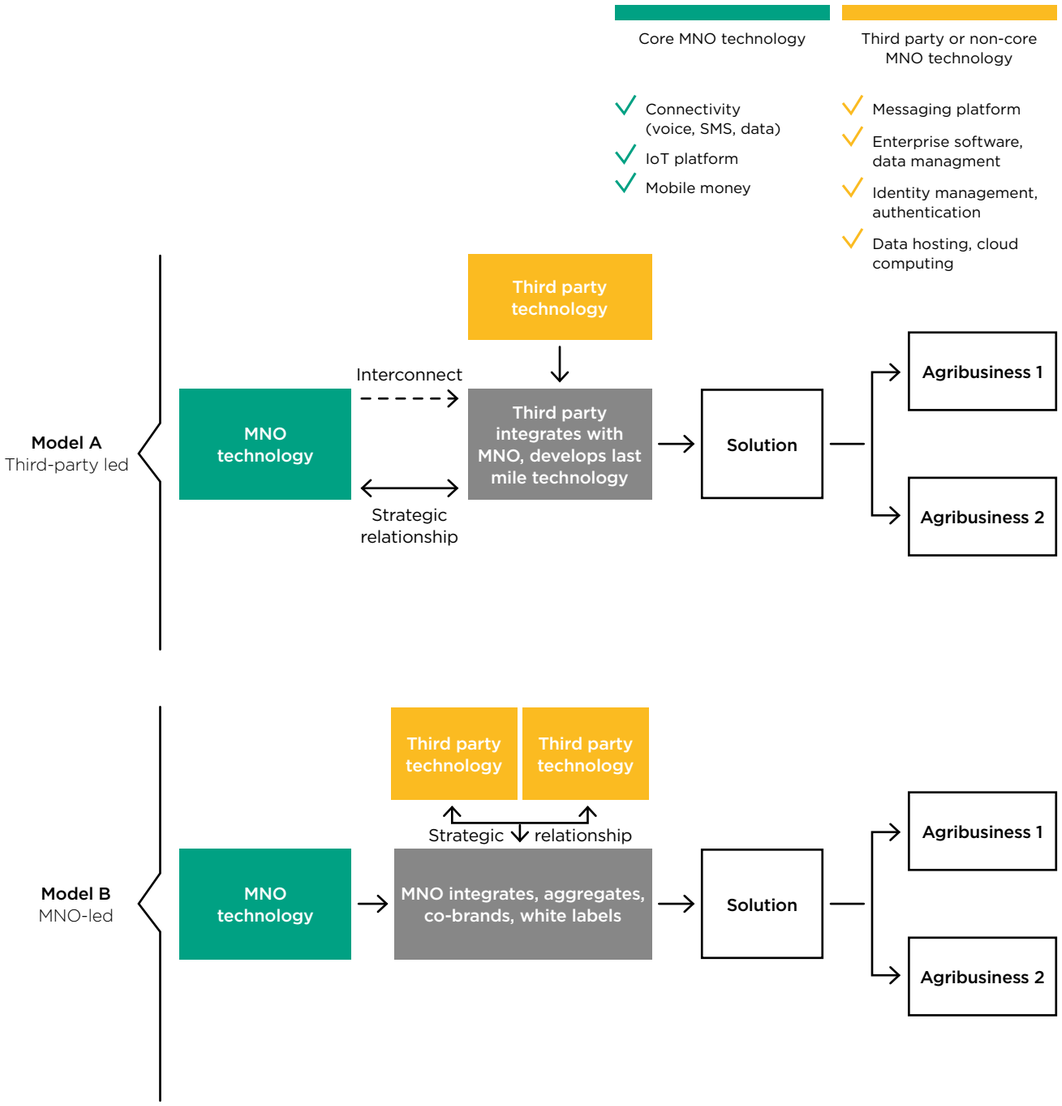
Aside from providing connectivity and enabling mobile money payments in the agricultural last mile for third party tech providers, there is the opportunity for MNOs to partner with existing tech providers and offer a unique suite of services for the agricultural sector. For example, in the field of track and trace and farm management systems, where last mile tools are typically developed by specialist software firms and, in the case of large agribusinesses, are often developed in-house, new MNO-led solutions have emerged such as Connected Farmer in East Africa.[14] The solution integrates Vodafone's core mobile money asset with the last mile sourcing tool of Mezzanine Ware, a specialised tech provider of B2B mobile-enabled solutions in Africa, which is now part of Vodafone Group.[15] In the field of IoT, where a range of specialised providers have their own M2M applications (e.g. low-cost sensors for equipment, crop and soil monitoring), MNOs in developing markets are yet to create their own suite of services for the agricultural sector. However, there is an opportunity for such an MNO-led suite of services to emerge and enable IoT solutions to scale.[16] In Sub-Saharan Africa, partnerships in this field already exist. For example, Orange Business Services already provides M2M services and connectivity to Dacom, a provider of connected sensors that transmit data in real time on weather, livestock health and soil conditions.[17]

At a general level, it is possible to broadly identify two models under which last mile digital tools can be offered to agribusinesses. Under the first model in figure 12 (model A), which is currently prevalent, a range of third-party tech providers with different skillsets and capabilities uses MNO core assets, such as connectivity and mobile money, to develop their own digital solutions as described in figure 11, and market them directly to agribusinesses. An alternative model B envisages the MNO partnering in a given market with one or more tech providers to package a white labelled or co-branded solution for agribusiness customers.

14. The Connected Farmer enterprise solution allows agribusinesses to engage more efficiently with farmers via SMS. Agribusinesses can send farmers information on farming techniques and best practices. At the same time they can request information from farmers, such as which stage they are at in the growing season. See http://www.mezzanineware.com/agriculture
15. See http://www.mezzanineware.com
16. See GSMA Intelligence, March 2015, "Agricultural machine-to-machine (Agri M2M): a platform for expansion" https://www.gsma.com/mobilefordevelopment/programme/magri/agricultural-m2m-a-platform-for-expansion
17. See https://dacom.farm and http://www.orange-business.com/en/dacom

FIGURE 12

Models for agricultural last mile digitisation



A key benefit of model A is the agility of small tech firms to upgrade and customise solutions to the enterprise customer needs. On the downside, the fragmentation of the ecosystem means that agribusinesses seeking to implement multiple digital tools for last mile sourcing have to manage different solutions and provider relationships. A key benefit of model B, on the other hand, is in the potential to aggregate multiple solutions in a suite of services with the MNO leveraging its scale, brand and existing enterprise relationships to become a one-stop-shop for the enterprise customer.

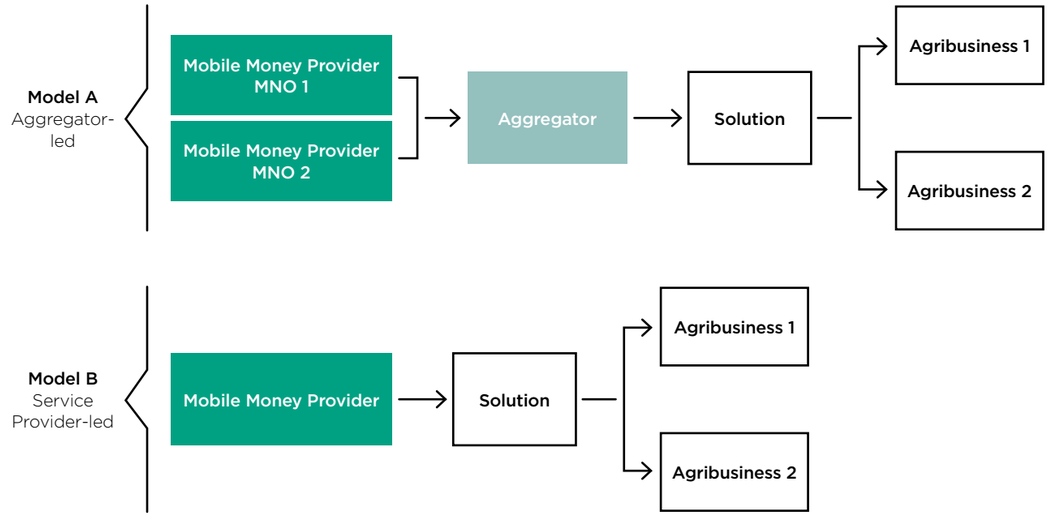
Last mile mobile money payments in Uganda

In Uganda, with last mile digitisation initiatives focusing from the onset on payments, mobile money providers have become key enablers and required direct or indirect partners in the implementation. Under model A, a third-party tech provider (so-called "aggregator") integrates with the mobile money service of one or more MNOs and offers its own bulk payments solution to agribusinesses. The alternative to this model is a setup where a mobile money provider, such as an MNO (e.g. UTL) or a non-MNO mobile money provider (e.g. SmartMoney), offers a payment solution for last mile sourcing directly to the agribusiness.

It is important to highlight that while these models initially enable payments to farmers, under both alternatives it is possible to upgrade the solution to encompass a more holistic suite of services that go above and beyond digital payments to cover areas as diverse as digitised farm management systems, certification and traceability among others.

FIGURE 13

Providers of agricultural last mile mobile money payments in Uganda



By comparing the two models, it is clear that there are incentives for both mobile money providers and aggregators to engage in each model, with opportunities to generate revenue from agribusinesses (see figure 14). However, it is also evident that to be successful the aggregator-led model is dependent on the active participation and support of one or more mobile money providers, in particular when it comes to the key foundational elements of mobile money networks (sales and distribution network and liquidity management).

In Uganda, the aggregator-led model is exemplified by several small-to-medium size mobile technology companies such as Yo Uganda, Beyonic, Segovia, Pegasus and DMARK. Some of these organisations have an expanded footprint that spans across several regional markets. For example, Beyonic focuses on East African markets of Uganda, Kenya, Tanzania and Rwanda while Segovia has its priority markets in Uganda, Kenya, Rwanda, Tanzania, Zambia, Nigeria, Ghana and Niger. Under the service provider-led model, UTL is the only MNO that is currently commercialising its own bulk payments solution to agribusinesses. Alongside UTL, third-party mobile money provider SmartMoney, which currently operates in Western Uganda and in Tanzania through its proprietary mobile money platform, is also targeting agribusinesses with such solutions.

FIGURE 14

Aggregator-led model versus service provider-led model for agricultural last mile mobile money payments in Uganda

	Aggregator-Led model		Service Provider-Led Model
	Mobile Money Provider	Aggregator	Mobile Money Provider
Incentives	• Benefits from withdrawal fees charged to farmer • Receives part of the disbursement fees charged by aggregator to the agribusiness	• Benefits from collection of disbursement fees charged to the agribusiness • Leads product development cycle • Digital payment as platform for expansion to other services for the agribusiness	• Benefits from collection of disbursement fees charged to the agribusiness and from withdrawal fees charged to farmer • Leads product development cycle • Digital payment as platform for expansion to other services for the agribusiness
Mobile money network	• Can support aggregator if engaged in partnership (sales and distribution network, agent deployment, liquidity management)	• Managing liquidity and agent network not a core competency • Capital intensive activity, challenging to scale without MNO support	• Directly manages the sales and distribution network, agent deployment, liquidity management • Can implement ad-hoc support in targeted areas for payments digitisation
Mobile money pricing	• Can support aggregator if engaged in partnership (e.g. preferential tariffs for enrolled farmers)	• Not in control, depends on MNO • Needs close partnership with MNO to implement preferential pricing (if supported by MNO's mobile money platform)	• Can implement preferential pricing (if supported by mobile money platform) in targeted areas for payments digitisation
Mobile money service ecosystem	• Can develop new services for rural users (e.g. credit and savings, P2B payments such as for utilities) • Needs banks, MFIs to provide derivative services (e.g. agricultural credit)	• Not in control, depends on MNO for service ecosystem development • Unlikely to provide sufficient scale to justify business case for new mobile money services	• Can develop new services for rural users (e.g. credit and savings, P2B payments such as for utilities) • Needs banks, MFIs to provide derivative services (e.g. agricultural credit)

The ability to connect with multiple mobile money providers strengthens the value proposition of the aggregator to agribusinesses in principle, as it enables the disbursement of payments to multiple mobile money providers. However, the management of the actual sales and distribution channel and the provision of liquidity are core mobile money provider competencies without which the whole aggregator value proposition is at risk. Aggregators in Uganda have tried to self-address foundational elements of mobile money networks (see section 4) but they do not have the core competencies and the financial capabilities required and are unlikely to be able to implement scalable solutions without the support of MNOs. In addition, if aggregators can provide additional value to agribusinesses by signing multiple mobile money providers, individual mobile money providers may not perceive a significant value proposition, particularly when other service providers are supporting aggregator-led digital payments.

When aggregators are lead parties, it is through having close and active mobile money provider partners that other key foundational issues such as the cost of mobile money services to farmers (mobile money pricing) and the need to develop a service ecosystem can be addressed. In order to facilitate adoption in the targeted farmer base, the implementation of cost mitigation strategies, such as preferential pricing for enrolled farmers, may be required, particularly in the early phases of implementing last mile mobile money payments. Mobile money providers have the further opportunity to add value to the end-user with additional mobile money services to digitise subsequent cash flows of rural households, once the main inflow (the agribusiness payment) has reached the farmer's mobile money account. Provided that engagement from the mobile money provider exists, the agility of specialised tech providers can make the aggregator-led model more responsive to customer needs, enabling faster service upgrades, making the product development process more flexible and potentially facilitating the extension to additional last mile digital tools.

Members of the Busana Coffee Growers Company, Nakaseke District, Uganda.

4. Case studies

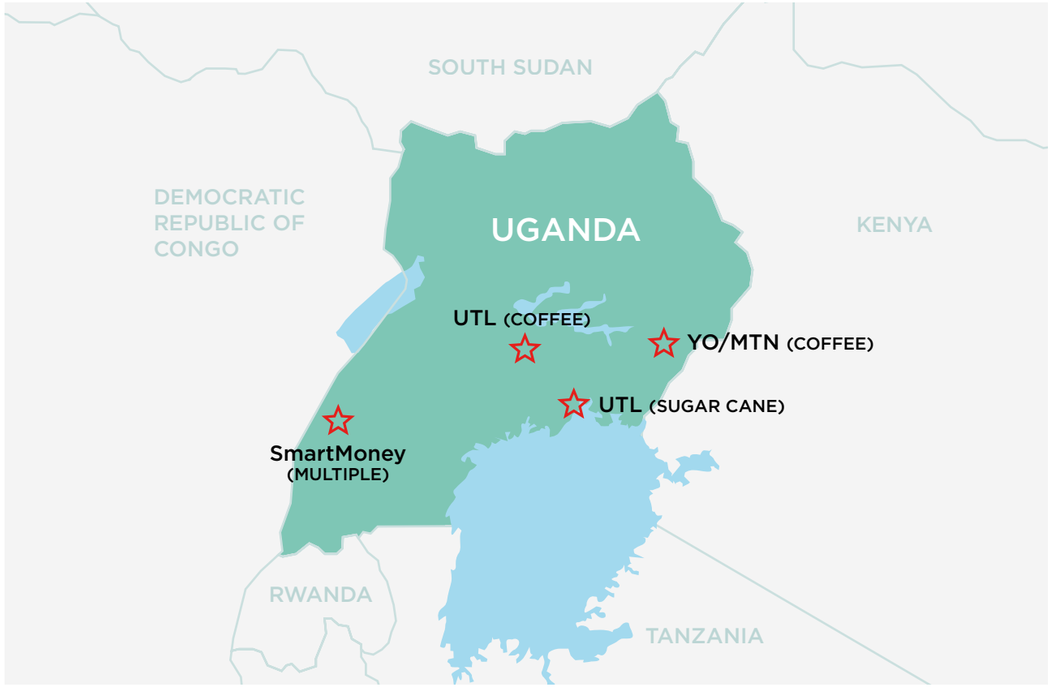
This section explores two examples of last mile digitisation in Uganda.

Under model A (aggregator-led model), the first case study recounts and evaluates the activities of a digitisation initiative run by technology provider Yo Uganda with the support of MNO MTN: a 3,000 farmer-strong pilot involving privately-owned Arabica coffee exporter Kyagalanyi Coffee with washing station operations in Mount Elgon in Eastern Uganda. Although the pilot's current focus is on digitising procurement payments, Yo's last mile platform allows for real time visibility and analytics, thus supporting traceability of payments and streamlining of the coffee certification process.

Under model B (service provider–led model), the second case study gives an in-depth account and assessment of the activities of two service provider-led digitisation initiatives run by UTL: a pilot targeting 150 farmers working with local Robusta coffee cooperative Busana Coffee Growers Company and the digitisation of procurement payments to farmers; and a pilot targeting 150 salaried labourers working for independently owned sugarcane agribusiness Bumagaya Sugar and the digitisation of salary payments to labourers. Both pilots limit their range of activities to digitisation of procurement or salary payments and involve agribusinesses with low ICT adoption.

FIGURE 15

Examples of last mile digitisation initiatives in Uganda



The case studies aim to:

- Outline the ownership model and differences in the implementation of the aggregator-led model versus the service provider–led model;
- Identify the operational set up and key resources required under each model;
- Present the user journey of digitising payments for agribusinesses and farmers under each model.

Aggregator-led model: Yo Uganda's last mile sourcing solution for Kyagalanyi Coffee

Service overview

In 2015, mobile technology provider Yo Uganda (Yo) partnered with coffee exporter Kyagalanyi Coffee, MNO MTN Uganda and United Nations Capital Development Fund (UNCDF) to launch a pilot in Mount Elgon, Eastern Region, to digitise B2P payments to smallholders in the coffee value chain.[18] As of January 2017, around 3,000 unique smallholder farmers supplying coffee cherries to Kyagalanyi had accepted mobile money as a mode of payment.

Kyagalanyi is the oldest licensed Arabica coffee exporter in Uganda.[19] The company engaged in the pilot in order to reduce the cost of operations, to increase business efficiencies, and to provide additional value to farmers as the business competes with other formal and informal buyers in Mount Elgon region.

Yo is the lead party in the pilot and main technology implementer. Yo leverages mobile platforms such as mobile money, SMS, Unstructured Supplementary Service Data (USSD) and Interactive voice response (IVR) to develop solutions for merchant payments, bulk payments, mobile banking as well as VAS. For the Kyagalanyi pilot, Yo has developed a solution that integrates MTN's basic bulk payments platform with Kyagalanyi's pre-existent procurement and financial accounting system.

MTN is the largest MNO in Uganda with 38.7 percent subscriber market share at the end of 2016. Driving mobile money adoption in rural regions and reaping indirect benefits arising from voice and messaging services as a result of expanding coverage to underserved areas have been the main reasons for MTN to support the pilot. In addition, participation to the Kyagalanyi pilot programme gives MTN the opportunity to make the business case and drive traction for mobile money bulk payments in agriculture.

Operational set up and key resources

Technology

Yo has developed specifically for this project a last mile sourcing solution whose core functionality is bulk payments. Besides making payments, the platform allows Kyagalanyi to store key data on producers such as farm location, acreage and transaction history (cumulative buying record), which are used to calculate production estimates for each farmer enrolled in the scheme. In addition, for certification and traceability purposes, the platform stores data on soil quality and on the type of coffee produced in each farm. Only farmers who meet certification and traceability requirements can sell coffee to Kyagalanyi, as the agribusinesses adheres to Global Coffee Platform (4C), UTZ and Rainforest Alliance certification standards.[20]

18. The Yo-UNCDF-MTN partnership was formed under UNCDF's Mobile Money for the Poor initiative (MM4P). MM4P provides support to branch-less and mobile financial services to demonstrate how the correct mix of financial, technical and policy support can build a robust ecosystem that reaches low income people in least developed countries http://mm4p.uncdf.org/
19. The company is part of the Volcafe group, the coffee division of ED&F Man and is involved in the procurement, processing, export and marketing of Arabica and Robusta coffee. Kyagalanyi sources a significant proportion of its Arabica coffee from Mount Elgon region, one of four regions suited for this cultivation in Uganda
20. The 4C Association is a membership organisation of coffee farmers, trade and industry and civil society http://www.globalcoffeeplatform.org. UTZ Certified is a program and a label for sustainable farming https://utz.org. The Rainforest Alliance is a an NGO working to conserve biodiversity and ensure sustainable livelihoods by transforming land-use practices, business practices and consumer behaviour http://www.rainforest-alliance.org/faqs/what-does-rainforest-alliance-certified-mean. See also http://kyagalanyi.co.ug/sustainability/sustainable-coffee-schemes

Under the current model, Yo charges Kyagalanyi to use its last mile sourcing solution on a transactional basis (equivalent to a standard B2P mobile money fee), with an additional bulk disbursement fee payable to MTN.[21] To support the pilot, MTN has leveraged the capability of its mobile money platform to offer preferential tariffs. The MNO has agreed a 39 percent reduction on the fee for bulk disbursements, in order to support the agribusiness in the early stages of deployment and in consideration of the double fee that an agribusiness incurs when using the services of an aggregator. Prior to the launch of the pilot, MTN strengthened its network coverage in the targeted region. To do so, MTN received a USD 100,000 loan from Bill & Melinda Gates Foundation to de-risk the investment in a base station in the target region.

Mobilisation

Besides technology implementation, in order to support the pilot, Yo has taken the lead in supporting the mobile money agent network in the targeted region. To do so, Yo contracted liquidity management specialist Potbell to manage liquidity of the agents through a network of master agents, as well as to train them. In addition, together with UNCDF, Yo developed mobile money training programmes rolled out for on-boarding farmers to the B2P payments digitisation scheme. At the inception phase of the pilot, Yo oversaw a team of 24 field staff responsible for on-boarding and educating subscribers on mobile money services.

MTN has also supported Yo in strengthening the mobile money agent network in the targeted region, and with the development of ad-hoc training initiatives for newly recruited agents. An additional stakeholder in the project is solar solutions provider Fenix International, which was contracted at the start of the pilot to provide farmers with subsidised mobile phones and solar charging solutions payable in loan instalments.

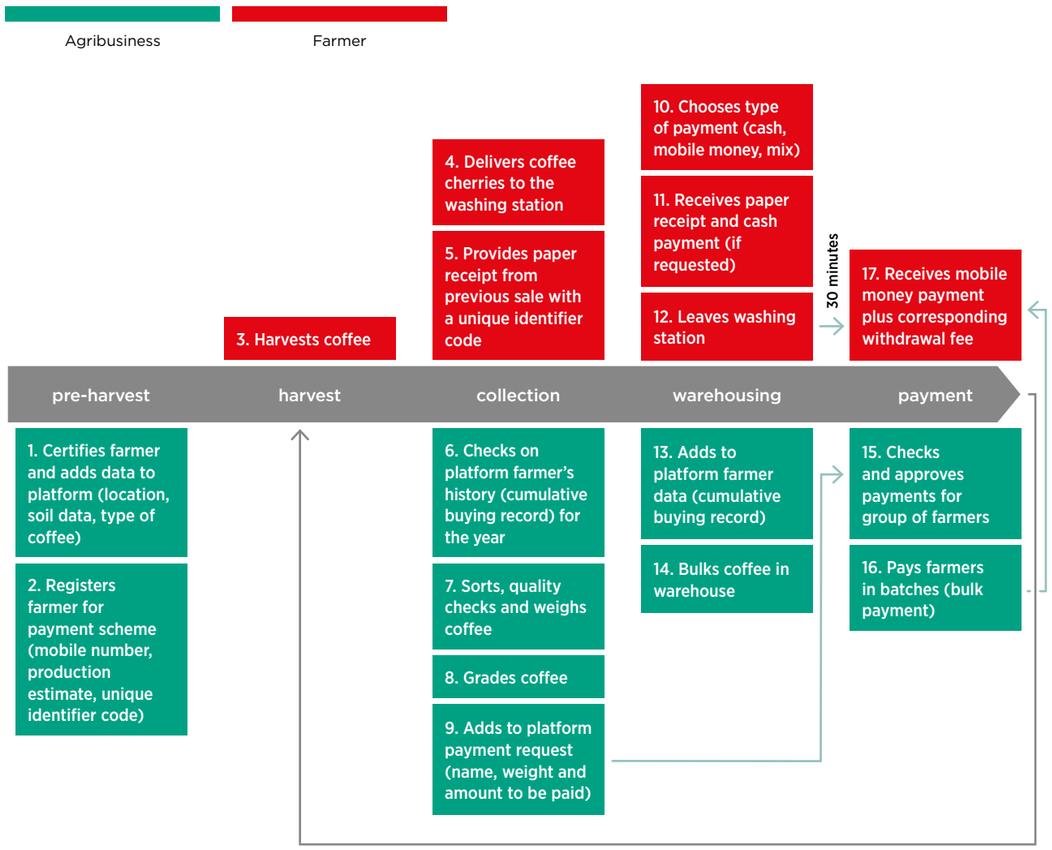
User journey

Kyagalanyi purchases coffee in three ways. Direct procurement from farmers takes place under two models. Farmers have the option to bring their coffee as cherries to one of the six washing stations that the agribusiness operates in Mount Elgon, where they receive payment at delivery. Alternatively, farmers who home-process the cherries to obtain coffee parchment have the option to deliver the parchments to a collection centre. In this case, farmers can extract higher value but have to wait for a longer time to receive payments (up to two weeks) as the parchment is transported and graded at a collection centre. Under a third model, in addition to purchasing coffee directly from farmers, Kyagalanyi buys a significant proportion of coffee from traders who independently source their coffee from farmers or smaller-in-size traders.

The steps in figure 16 illustrate the user journey of the farmers and the agribusiness, under the model where Kyagalanyi directly procures coffee cherries from smallholders at the washing station, from the point when farmers are certified by the agribusiness (step 1) to the point they receive the mobile money payment (step 17). In Mount Elgon, the coffee season begins in July or August and extends to January or February. During the season, farmers complete three-four deliveries per week, selling coffee approximately 24 weeks in a year.

FIGURE 16

Kyagalanyi Coffee pilot, user journey



When compared to a basic bulk payment platform, Yo's solution is representative of a more holistic approach to agricultural last mile digitisation. The digitisation of payments is still at the core of the solution, but a number of other key functionalities help the agribusiness to improve overall last mile efficiency and better manage farmer relations. For example, the platform is used to streamline traceability and certification compliance (step 1 in figure 16), and to store and collect data that is used in the procurement process (steps 6, 9, 13).

21. Kyagalanyi currently benefits from the subsidisation by donor party UNCDF's Mobile Money for the Poor (MM4P) of the first 2,500 transactions processed on the Yo platform.

BOX 1

The pain points of cash payments for Kyagalanyi Coffee

Kyagalanyi field staff face risks to their personal safety and the float from robbery, both during travel and at the point of collection. During the coffee season, to ensure that there is sufficient cash to pay farmers, washing stations' managers travel every other day from the closest town of Mbale, where the agribusiness is based, to the washing stations with up to UGX 70 million (USD 19,500) in cash. The cost of securing that cash with armoured guards, as well as the potential risk of loss to robbery are high. The actual cost of transportation to withdraw physical cash is another cost implication for Kyagalanyi. Washing station managers need to make up to three trips per week to Mbale to withdraw cash. Time is also wasted on this journey due to the poor quality road network.

Service provider-led model: UTL's mobile money bulk payments for the agriculture sector

Service overview

UTL is the third largest MNO in the country with 18.3 percent subscriber market share at the end of 2016, following MTN (38.7 percent) and Airtel (32.0 percent).[22] UTL's mobile money service M-Sente has an estimated 10 percent share of mobile money subscriptions. The former telecoms incumbent, UTL, is fully owned by The Government of Uganda, which has meant that the company has historically focused on providing access to the underserved. As a challenger MNO, UTL's strategy is geared towards the rural segment and increasingly towards enterprise services. As a first step, offering a bulk payment solution to agribusinesses is a promising testing ground to experiment with new enterprise services.

With the support of Financial Sector Deepening Uganda (FSDU),[23] in 2015 M-Sente launched B2P bulk payments digitisation pilots in coffee and sugar cane value chains. For the coffee pilot, UTL partners with Uganda Coffee Farmers Alliance (UCFA), a farmer-owned organisation established to provide marketing and other support services to coffee farmer organisations, currently reaching 53,000 households in rural Uganda.[24] The pilot involves UCFA member Busana Coffee Growers Company (BCGC), a 500 strong farmer cooperative based in Luweero, Central Region, which sells Robusta coffee beans to coffee exporter Ibero.[25] For the sugar cane pilot, UTL works with Bumagaya Sugar, an independently owned agribusiness based in Buikwe, Eastern Region. The agribusiness employs 150 salaried agricultural workers and sells raw sugar cane to Uganda's third largest sugar company, Sugar Corporation of Uganda Limited (SCOUL).[26]

Operational set up and key resources

Technology

UTL is the lead party in the pilot and technology implementer of the in-house mobile money bulk payment platform that the MNO markets to enterprise clients. The platform's web interface has generic bulk payment functionalities, enabling enterprise users to make one-touch disbursement to recipients, run statement reports of successful and failed transactions, and send SMS reminders when transactions are completed. The platform is currently not customisable to specific enterprise customer needs (e.g. dedicated interface, additional functionalities such as inventory records management).

UTL's underlying mobile money platform is powered by mobile money software provider Telecom Live Content.[27] It enables UTL to zero rate bulk disbursement fees for B2P payments from the agribusiness to farmers and to offer preferential fees to farmers enrolled in the B2P schemes (currently up to 40 percent withdrawal fee reduction). The platform also supports the configuration of multiple languages. All these functionalities target mobile money adoption in rural areas, the key strategic objective for UTL in the early days of the pilots.[28]

Mobilisation

Besides technology deployment, UTL has been the lead party of ad-hoc mobilisation programmes for farmers in both pilots. These programmes are implemented in partnership with agribusinesses and provide demonstrations on mobile money usage for new users, and basic mobile use training to farmers who do not own a mobile phone. In the early phases, UTL also offered a device financing scheme to farmers without a mobile phone, who accounted for approximately 50 percent of the 150 farmers targeted. The scheme allowed farmers to pay back their mobile phone loans in instalments that were directly subtracted by the agribusiness from subsequent salary payments.[29] A device financing scheme was not required in the coffee pilot, as the majority of enrolled farmers already owned a mobile phone. At the inception phase of that particular pilot, UTL donated a PC to the coffee farmer association (BCGC) to manage the bulk payment system, as the cooperative did not have one.

User journey

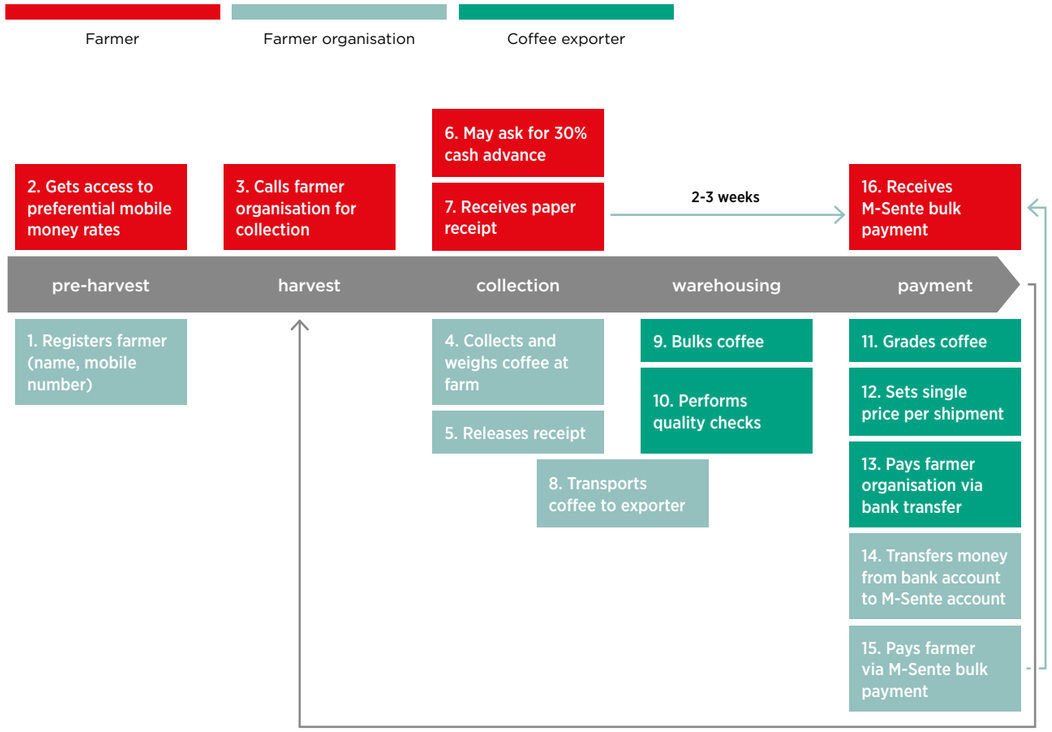
A user journey of M-Sente's bulk payment with BCCG illustrates the key steps from the point when Robusta coffee farmers register their mobile numbers with the cooperative to receive payments to the point when the cooperative eventually processes the payments. Robusta coffee green beans are harvested over two seasons, each lasting between six and eight weeks. On average, farmers sell green beans to the cooperative in four transactions during the first season, and in two to three transactions during the second season.

For each sale, it takes up to three weeks from the moment farmers receive a paper receipt from the cooperative at the point of collection (figure 17, step 7) to the completion of the payment (step 16). This is because the cooperative is not able to anticipate payments to farmers at the point of collection. Farmers therefore must wait for the coffee exporter (Ibero) to receive and bulk the coffee from different sellers, perform quality checks and grade the coffee, set a single price and pay the cooperative (step 8-13). Only at this point the payment process begins (step 14-16).

22. GSMA Intelligence data
23. Financial Sector Deepening Uganda (FSDU) is an independent not-for-profit company working on research and policy initiatives to support economic growth and financial inclusion of Uganda's low-income households http://www.fsduganda.or.ug
24. See http://www.ucfa.or.ug
25. Ibero is owned by Neumann Kaffee Gruppe (NKG), headquartered in Hamburg, Germany http://www.nkg.net/
26. SCOUL is part of multinational, multi-activity enterprise Mehta Group, with interests in the sugar, horticulture and floriculture sectors in Uganda and Kenya http://www.mehtagroup.com
27. See http://www.mobilemoney.ph
28. UTL is not focusing at this stage on generating enterprise revenue from B2P payments in the agricultural vertical, as charging enterprises for facilitating bulk payments would hinder rather than support mobile money adoption in rural areas.
29. Farmers have been equipped with low cost dual SIM phones from Chinese manufacturers Techno Mobile and iTel. The devices are priced at $9-10 (UGX 35,000).

FIGURE 17

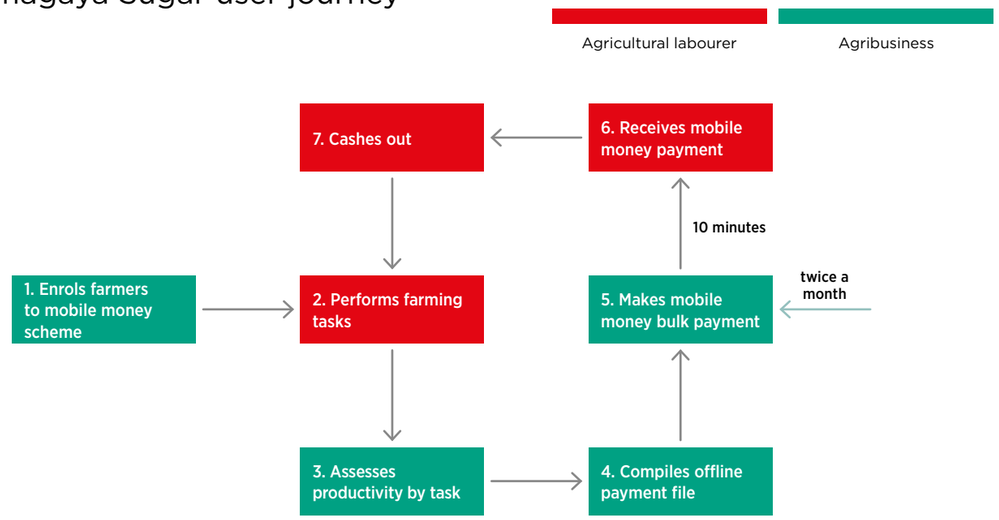
BCGC coffee pilot user journey



While the UTL coffee pilot is an example from a context where agribusinesses procure crops from independent smallholder farmers, the Bumagaya sugar cane pilot demonstrates the steps leading to processing bulk payments for salaried agricultural labourers within a commercial estate.

FIGURE 18

Bumagaya Sugar user journey



In this case, agricultural labourers perform different tasks in teams at different times of the year (e.g. weeding, fertilising, harvesting). Performance is measured on different indicators and on a per task basis, for example by number of bundles of sugar canes harvested per day by the harvesting team. Once tasks have been completed and evaluated, the agribusiness compiles an offline payment file, and on a given day (every two weeks) processes the bulk payment to the agricultural labourers' mobile money accounts. Within ten minutes from the processing of the bulk payment farmers receive their salary on their mobile money account, and typically cash out immediately at the nearest mobile money agent.

BOX 2

The value of mobile money for Bumagaya Sugar

While Bumagaya Sugar has not performed a comparative cost assessment of paying farmers in cash and in mobile money, it recognises mobile money as a more secure and less costly option. Before introducing mobile money payments, the agribusiness used to transport physical cash to the estate on payday. Given that the practices and timings of agricultural payments were well known in the areas surrounding the estate, the agribusiness was at severe risk of theft, needing the presence of armoured guards and incurring additional fixed costs.

Due to the perceived benefits of mobile money payments, Bumagaya Sugar decided to absorb the cost of withdrawal fees on behalf of the agricultural labourers, paying the withdrawal fee on top of each payment. This has been especially important when targeting Bottom of the Pyramid (BoP) salaried workers, earning an average of USD 15-20 every two weeks. At the same time, the agribusiness has benefited from UTL's initiative to zero rate bulk disbursement fees for B2P payments from the agribusiness to the farmers.

5. Key learnings

Agribusiness technology readiness for last mile digital solutions

LEARNING 1 **The agribusinesses more likely to adopt mobile money bulk payments are those with low ICT adoption.**

As suggested by the case studies in this report, bulk payments represent the most likely first digitisation opportunity for small businesses operating in local markets and selling produce to larger aggregators in the value chain. For these agricultural value chain actors, bulk payment platforms represent a low-cost, low-tech first attempt to address key operational and business issues of reducing the cost and increasing the security of payments.

In the case of BCGC, there was no pre-existing ICT tool prior to the deployment of UTL's bulk payment platform. In fact, before the start of the project, BCGC entirely relied on paper records for its operations, prompting UTL to donate a PC to the cooperative that is needed to process the bulk payments via UTL's online interface. In the case of Bumagaya Sugar, prior to implementing UTL's platform, the management did use a PC for basic financial accounting run on MS Excel, but there was no farm management system or Enterprise Resource Planning (ERP) system in place to manage the operations.

LEARNING 2 **The agribusinesses more likely to adopt holistic last mile solutions that extend beyond payments are those already using ICT tools.**

An important difference between Yo's deployment with Kyagalanyi and the UTL bulk payment initiatives with BCGC and Bumagaya Sugar is the overall level of automation of the agribusiness. In the case of Kyagalanyi, ICT adoption extends from payments to the entire set of processes of acquiring coffee from farmers in the last mile. The washing station, in particular, is the site where the company staff not only purchase coffee but also acquire key agriculture data, as previously discussed. At present, it is clear that the digitisation of payments is the strategic priority for Kyagalanyi, and more work is required in the coming coffee seasons to improve the payment processes and increase adoption from farmers (see section 4). Nonetheless, the fact that the agribusiness has already embraced basic ICT tools to optimise last mile procurement beyond payments shows the potential to implement a more holistic solution. Smarter, mobile-enabled tools could better support field operations, addressing current inefficiencies and bottlenecks. With this objective, Kyagalanyi is already planning for next season to equip washing station managers with Android tablets that allow them to input into the system a range of data points (geolocation and size of farm, inputs used, variety of crops) that are required for traceability and certification.

Suitability of bulk payments for agricultural value chains

LEARNING 3 Agricultural bulk payments are deployed more effectively in value chains where farmers are used to receiving delayed payments.

The presence of formal buyers with storage capabilities, as in the case of the coffee value chain discussed in this report, are key factors to determine whether farmers are likely to accept delayed payments. Agribusinesses may opt to aggregate and store produce over a period of time before completing payments. In these contexts, bulk payments are more likely to work. In the case of Robusta coffee in Uganda, as shown by UTL's BCGC deployment, farmers usually wait two to three weeks to receive cash payments, once the aggregation process is completed and the weighting, grading and price are confirmed by the exporter company Ibero.

As the only alternative to selling to the cooperative, to receive immediate cash payments, farmers have the option of selling to middlemen, but the upside of linking with formal agribusinesses (the cooperative), justifies the downside of receiving payments at a later date. Working with the farmers' association means obtaining better prices, benefiting from extension services offered by the cooperative to its members, and avoiding exposure to cheating and theft from middlemen. As demonstrated by the case of UTL's deployment for BCGC, there is no time reduction benefit for farmers resulting from receiving digital payments from the cooperative. The potential of mobile money for financial inclusion remains the key value of digitisation initiatives for farmers.

LEARNING 4 Agricultural bulk payments are best suited in value chains where farmers sell their crop at regular intervals.

Highly regular and small payments are best fit to be processed in batches, once produce has been aggregated by the buying party. To this extent, the dairy value chain, where transactions are small in size and highly regular (weekly sales), presents the best opportunity for payments digitisation.[30] In both Yo's deployment with Kyagalanyi and in UTL's BCGC pilot, during the coffee seasons payments are small and relatively frequent. In the latter example, about 500 farmers sell a variable amount of Robusta coffee, in transaction sizes in the range of USD 10 (~70Kg) to USD 100 (~700Kg) per transaction, all within current mobile money limits. While sales take place no more than four times per each season, they are regular and mostly small in size, making it a suitable case for digital payments.

In addition, bulk payments best address the needs of those agribusinesses that employ salaried labourers and pay these workers on a regular schedule. As shown by UTL's experience with Bumagaya Sugar, in this context a bulk payment platform is relatively straight forward to implement, provided that training on how to use mobile money is offered to labourers and that the agribusiness is prepared to take on the cost that labourers face in using mobile money (cash withdrawal fee).[31]

30. Many agricultural payments digitisation initiatives in Sub-Saharan Africa and South Asia have targeted the dairy value chain. For example, in Pakistan Nestlé has partnered with Telenor to enable the disbursement of milk collection payments via Easypaisa mobile money service for around 15,000 farmers. In Kenya, Vodafone's enterprise platform Connected Farmer Alliance (CFA) supports payments to dairy farmers via M-Pesa. See GSMA mAgri and GSMAi , November 2016 "Market size and opportunity in digitising payments in agricultural value chains", http://www.gsma.com/mobilefordevelopment/programme/magri/market-size-and-opportunity-in-digitising-payments-in-agricultural-value-chains

31. This former aspect is particularly important given that salaried labourers are most likely to be at the bottom of the pyramid. As shown by the example of Bumagaya Sugar, salaried agricultural labourers are also most likely to immediately cash out mobile money payments at the nearest agent.

Considerations on the cost of mobile money to farmers

LEARNING 5 Agribusinesses are prepared to implement cost mitigation strategies for farmers, provided that digitisation offers them enough value.

In Uganda, the cost of mobile money to the end user, such as the fees charged for withdrawals and transactions, is the biggest single barrier to farmer acceptance and adoption of mobile money payments from agribusinesses. In spite of the benefits to the farmer for using mobile money, both UTL's deployments with BCMG and Bumagaya Sugar and Yo's deployment with Kyagalanyi demonstrate that in cash economies it is very challenging to present e-cash payments as equal, or better value, than cash in hand at the actual point of sale. Cost mitigation initiatives aimed at farmers are therefore necessary to stimulate the uptake of digital payments.

In Uganda, agribusinesses have been willing to cover withdrawal costs on the farmers' behalf. In UTL's Bumagaya Sugar deployment, where agricultural workers are trailing the poverty line, the agribusiness tops up each coffee procurement payment with the withdrawal fee that payment would raise, as passing this charge to the farmers would be inadmissible. In this case, for the agribusiness the cost reduction and time reduction benefits of paying farmers with mobile money are so significant that it is prepared to also take on the withdrawal cost on behalf of the farmers. In Yo's deployment with Kyagalanyi, the respective withdrawal fees for farmers enrolled were initially passed on to enrolled farmers. As the agribusiness grew concerned with the risk of driving farmers towards competition, it decided to pre-pay the respective withdrawal fees for each single payment.

LEARNING *6* To stimulate adoption in the early phases, MNOs have been willing to offer preferential mobile money tariffs to enrolled farmers.

Besides interventions from agribusinesses, MNOs can also implement cost mitigation strategies for farmers by reducing their withdrawal and transaction fees. To stimulate adoption in the farmer base, and in consideration that the targeted segment comprises BoP users and new mobile money users, MNOs have intervened to reduce the cost of mobile money to farmers. By offering preferential tariffs via intelligent mobile money platforms, both UTL and MTN have reduced withdrawal fees for farmers enrolled in these schemes, as well as fees for subsequent mobile money transactions (e.g. person-to-person or P2P transfers) once the e-cash reaches the farmer's wallet.

In UTL's BCGC pilot, with the cooperative facing cash flow issues and being unable to cover withdrawal fees, UTL has decided to offer a 40 percent withdrawal fee reduction to farmers enrolled in the mobile money scheme, in order to stimulate adoption. This has been an important initiative to offset the cost of withdrawals for farmers, given that about 50 percent of the farmers enrolled typically cash out immediately after receiving their payment. In the Kyagalanyi scheme, in addition to the agribusiness pre-reimbursing the respective withdrawal fees to farmers, MTN has also introduced preferential transaction fees for enrolled farmers, who benefit from 10-20 percent reduction in P2P mobile money transfers. Furthermore, enrolled farmers benefit from a 50 to 100 percent bonus on loading airtime via mobile money.

While it is technically possible for mobile money providers with the latest generation of mobile money platforms to offer preferential withdrawal and transaction tariffs to famers, the decision to introduce preferential pricing must be considered against the sustainability of the business model. Service providers need to balance the requirement to provide sufficient incentives for farmers, so they can adopt digital payments, with the equally important requirement to ensure sufficient economic incentives for mobile money agents. Considering that commissions for mobile money agents are partially based on the volume of cash withdrawals, mobile money providers must ensure that when they introduce preferential pricing their commission scheme is attractive enough for rural agents, and if needed adapt them to their requirements.[32]

32. See GSMA Mobile Money, October 2015, "Spotlight on Rural Supply: Critical factors to create successful mobile money agents" https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2015/10/2015_GSMA_Spotlight-on-Rural-Supply-Critical-factors-to-create-successful-mobile-money-agents.pdf and GSMA Mobile Money, October 2014, "Extending reach: Mobile money in rural areas" http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2014/10/2014_DI_Extending-reach_Mobile-money-in-rural-areas.pdf

BOX 3

SmartMoney's "zero fee to the farmer" model

In Western Uganda, SmartMoney provides mobile-based savings and payment services designed specifically for rural markets. The mobile money provider addresses barriers to rural adoption of digital payments, namely affordability and education. To address the challenge of affordability, SmartMoney offers a "zero fee" model to farmers for deposits, withdrawals and P2P transactions sustained by revenue from enterprise and institutional customers (e.g. agribusinesses, cooperatives, schools, churches). SmartMoney's "zero fee" pricing allows its e-money to compete with cash for low-value digital transactions (e.g. paying school fees and medical expenses, buying food and household items). It does so by leveraging thousands of touch points for customer deposits, withdrawals and P2P transactions. In addition, SmartMoney drives understanding of its services with a large-scale low-cost education program that leverages existing trust networks (e.g. churches, schools, cooperatives) to provide simple, repetitive and practical customer training. The success of SmartMoney's deep ecosystem approach depends on establishing the right incentives for all rural stakeholders including farmers, merchants and institutions.

The need to develop the mobile money services ecosystem

LEARNING 7 **Farmers who are existing mobile money users recognise the value mobile money brings in efficient cash management.**

Insights from coffee farmers enrolled in the deployments supported by UTL and Yo show their appreciation for the prospect of securely storing electronic cash in the mobile money account, a de facto saving tool as opposed to storing "real" cash at home.[33] Besides, field research revealed that managing money through a mobile money account has strong potential to instil a responsible financial behaviour as opposed to receiving large lump sums of cash in hand:

"When you have lots of cash in your hands it is easier to spend it and people may ask to borrow money, which can be risky. I like to keep the money safe in the mobile account because cash is tempting"

Woman member of VSLA in Luweero, member of Busana Coffee Growers Company

Such is farmers' appreciation of the mobile account as a saving tool that an increasing number of farmers choose to convert physical cash they receive as payments from selling their crop to electronic cash in their accounts shortly after completion of cash payments by Kyagalanyi. Although this spike in demand for float puts pressure on mobile money agents who facilitate the conversion, it also serves as evidence for the demand for a rural-focussed savings product that is currently missing from the market. In this respect, with the majority of BCGC members already active in VSLAs and SACCOs, whose purpose is to provide informal savings and loan facilities, there is an opportunity for UTL to eventually extend the value proposition from payments to digital savings accounts.[34] This would however be a medium to long-term initiative, which requires a partnership with a microfinance institution or a rural bank in order to offer to farmers an interest bearing savings account.

LEARNING 8 **Farmers recognise the benefits of mobile money to process person-to-business payments securely and remotely, starting from school and health fees.**

School fees are one of the most significant cash outflows for a rural household, as stated by farmers engaged in last mile digitisation deployments discussed in this report. Typical public school fees in Uganda can be as high as UGX 100,000 per term (USD 27). Time wasting and theft are major issues for rural families paying school fees in cash. Parents usually travel in person to the nearest bank branch or to the school to pay the fees while in other cases they rely on third parties (e.g. bus drivers) to deliver payments.

"To pay school fees, you can either pay in cash at the school, or go to the nearest bank branch, which is eight miles away from the village, and pay in cash. You also have to queue at the bank. In some schools, parents can also transfer money on MTN and Airtel to pay for the fees into a school account. The school then sends an SMS when the payment is received"

Woman member of VSLA in Luweero, member of Busana Coffee Growers Company

A specialised P2B product for school fee payments has been absent from the Ugandan market until very recently.[35] To overcome this challenge, schools and parents are making use of mobile money-enabled P2P transfers whereby payments for school fees are made to dedicated mobile money accounts managed by school staff. Moving forward, partnering with schools to introduce P2B solutions for school fee payments appears to be a step in the right direction for mobile money provider to expand the mobile money ecosystem in ways that address the specific needs of rural users.[36]

Alongside school fee payments and the most common mobile money use cases such as P2P transfers and airtime top ups, farmers recognise the opportunity to securely and remotely pay other P2B bills such as utility bills (regular) and healthcare fees (occasional), which claim a significant proportion of the rural household expenditure.

Pathways to agricultural value chain digitisation beyond bulk payments

LEARNING 9 **The stronger the competition in the value chain, the more incentives agribusinesses must offer to farmers, including digital tools.**

Generally, the higher the competition between agribusinesses to procure crops from the same farmer, the stronger the incentive for the agribusiness to keep farmers loyal and having them returning to sell their crop. In a competitive value chain, an agribusinesses may seek to implement a number of digitisation initiatives in the last mile to increase farmer loyalty (e.g. information services via mobile, mobile money payments and pre-financing options). The stronger the competition in the value chain, however, the less disruptive a digital tool must be and the more value it must provide to farmers in order to keep them loyal.

In comparatively less competitive value chains, where farmers are more dependent on a specific buyer and where farmer loyalty to the agribusiness is less of a pressing issue for the agribusiness, simple bulk payment solutions can be a viable digitisation initiative for an agribusiness concerned with reducing operating costs. As illustrated in UTL's BCGC pilot, BCGC can afford to pay farmers within two-three weeks not only because Robusta coffee farmers are used to delayed

33. This finding highlights the value of mobile money as a saving tool, irrespective of the existence of an alternative interest bearing saving product.
34. In 2013, GSMA Connected Women awarded Airtel Uganda an innovation fund grant to design and launch a mobile wallet for VSLAs. See https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2015/06/Case-Study_Airtel-Uganda-1.pdf
35. In 2017, Century Bank, a banking group focusing on the rural segment, introduced school fee payments via its "CenteMobile" mobile money service.
36. See "Paying school fees with mobile money in Cote d'Ivoire", GSMA Mobile Money, October 2015 https://www.gsma.com/mobilefordevelopment/programme/mobile-money/paying-school-fees-with-mobile-money-in-cote-divoire

payments, but also because in that value chain the cooperative does not compete with other formal agribusinesses in coffee procurement.

In more competitive value chains, however, bulk payments may not be enough of an attractive proposition for the agribusiness to change the way it operates with farmers. As illustrated in Yo's deployment with Kyagalanyi, in a setup where farmers have access to different buyers and where they bring their produce to the agribusiness site as opposed to buyers collecting produce at farm gate, an agribusiness must be able to offer to suppliers (beyond competitive prices) additional value in the form of a range of incentives, if it wants to ensure that farmers return to sell their crop. To better manage farmer relations, and ensure farmer loyalty, Kyagalanyi's Coffee Services programme offers farmers incentives, including agronomic advice, seedlings and agro-input supply and certification.[37] Digital tools can help to strengthen these incentives, for example by delivering agronomic advice via mobile phones or by allowing for agro-inputs prepayments via mobile money.

LEARNING 10 The upgrade to real-time payments can provide additional value to famers, and extend last mile digitisation for agribusinesses to farm management functionalities.

Both UTL's deployment with BCGC and Yo's last mile sourcing solution for Kyagalanyi support the existing practice of paying groups of farmers with a time lag. In the case of Yo's solution, however, the current set up does enable farmers enrolled in the mobile money scheme to save precious time and leave the washing station immediately after receiving the paper receipt for the sale of coffee from the station manager. While farmers who chose to receive cash payments have to wait and queue at the washing station for about an hour to receive the payment, those who opt to receive the entire value of the sale via mobile money are able to immediately leave the washing station and receive the payment into their mobile money account within 30 minutes after the bulk payment is processed.

While in the current set up there is already a time saving benefit for farmers who chose to be paid in mobile money, moving forward there is an opportunity to upgrade Yo's last mile sourcing solution to allow for real time, individual payments. Given that Kyagalanyi is able to grade and price the coffee at the point of receipt at the washing station, a more intelligent platform could enable processing of real-time, individual mobile money payments as soon as farmers receive a receipt from the agribusiness and are ready to leave the washing station.

With real-time payments there is the additional opportunity to enable instant digital receipting and therefore improve farm management systems (e.g. inventory management functionalities) for the agribusiness. In a low-margin, highly competitive business, where procurement is constrained within short time windows, even the time necessary for writing paper receipts for farmers has an impact on operating costs.[38] For agribusinesses, digital receipts replace inefficient and time demanding paper-based data collection, offering at the same time greater scope for real-time business reporting and analytics. For farmers, digital receipts represent an additional building block to develop an economic profile and access financial services.

LEARNING 11 The upgrade to real-time analytics will support traceability and certification requirements for agribusinesses in competitive value chains.

As shown in section 4, the ability to perform mobile money payments is currently the main value proposition that Yo's last-mile sourcing solution provides to Kyagalanyi in order to support farmer relations management. The solution, in addition, stores a range of data points that are used for farmer certification and traceability compliance including agricultural data (type of coffee cultivated, soil quality) and farmer data (farm location, acreage and transaction history), which are then fed back into the company's own MS Excel-based farm management system.

There is however no underlying architecture allowing for real-time visibility and analytics. Traceability of payments, for example, is only possible in weekly intervals after the washing station manager shares the weekly report with the head office, which then manually adds the data into the files on the platform. With regards to certification, the provision of extension services (agronomic advice) is entirely based on human interaction with the agribusiness staff who offer in-person advice to farmers on how to increase yields, and ensure the production process is transparent, traceable and conforms to sustainability standards.

To meet the strategic priority of ensuring farmer loyalty, track and trace tools with real time analytics could help the agribusiness streamline farmer certification, with the additional benefit of increasing operational efficiency and reducing operational expenses for the agribusiness. In addition, the implementation of a mobile-enabled farmer communication tool, such as a bulk messaging platform, would make the process of distributing agronomic advice to farmers more efficient and scalable, helping Kyagalanyi provide additional value to farmers and therefore improve farmer relations.

37. See http://kyagalanyi.co.ug/sustainability/kyagalanyi-coffee-services
38. Kyagalanyi Coffee has estimated that the cost of a single paper receipt is UGX 67 (0.02).

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