

A Review of Digital Innovations and their Associated Risks: Implications for Agribusiness Development in Nigeria

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ABSTRACT

Financial technology (Fintech) is changing the world of finance for consumers in a variety of ways. Leveraging on digital tools like mobile phones, internet, smart cards, POS devices, etc., business models have experienced remarkable transformations. These transformations have practical impacts on different sectors of the economy; agriculture inclusive. This paper is a review of recent literature on digital innovations and their associated risks relative to the agro-entrepreneur. It noted that Digital Financial Services (DFS), also known as Mobile Financial Services (MFS) have positive implications for financial inclusion, agricultural value chain financing, and women empowerment among other things. However, in Nigeria these positive implications have not been felt by the majority of the masses. It is still on record that about 40 percent of the adult population in this country is financially excluded despite the many efforts of the apex bank to achieve financial inclusion. There is no gain saying the fact that majority of this financially excluded population are rural dwellers and as such are majorly engaged with farming and other agricultural activities. Again, findings indicate that there is no context-sensitive package that can deliver finance to agro-entrepreneurs in a disruptive way as seen in Kenya, Uganda and Ghana. This paper will serve as a policy instrument to the government, private investors, Development Finance Institutions, DFIs, MNOs, fintech companies, researchers, and policy makers. It is a call for a collaborative consideration on how to capture the many potential benefits of DFS in agriculture, not forgetting its associated risks, in a bid to create a trade competitive agribusiness ecosystem.

Introduction

There are a number of promising mobile applications in the developing world. One such application is the mobile financial services, (MFS). It is a term used to cover a wide range of potential financial services that can be provided over a mobile network, from mobile money services (including transfers and payments to bank-type services (deposits and borrowing), insurance and other services (Kevin, 2012).

Mobile financial services have been helpful in a number of ways in driving financial inclusion in a number of countries- bringing finance to the unbanked. For instance, mobile money wallets have been useful for transfers among subscribers. Some of them are enabled for payment of bills such as electricity, water and other utilities, fees and merchants. Credit history has been a

requirement for credit by the providers of finance but innovation is enabling people not only to store and transfer money but even to borrow (World Bank, 2014). Technological innovations have made a lot of initiatives possible in changing how value chain finance can reach smallholders. But successful deployment requires coordination among several disparate partners. This was the case in Uganda, involving coffee growers, (UNCDF, 2016) and Ghana, involving rice farmers, (Babcock, 2015).

Mobile finance can easily be incorporated with digital technologies. It makes use of digital technology tools like smart cards, scratch cards, point-of-sale (POS) device, biometric identity capture, Automated Teller Machine, (ATM) and prepaid cards, etc. Digital finance



can deliver the speed, security, transparency and cost efficiency needed to increase financial inclusion (World Bank, 2014). Mobile banking (bank products on the phone) and branchless banking emerged through joint ventures between Mobile Network operators, MNOs and banks. It is typical of mobile financial services to either ignite or grow rapidly or not to grow much at all. Mobile financial services can lead to improvements in the efficiency of financial services through increasing access and lowering costs, greater inclusion in the wider economy, complementary role on other production factors thereby enhancing efficiency, and reduction in information asymmetry, thus connecting the smallholder to knowledge and networks.

The Wiktionary (2017) defines entrepreneurship as the art or science of innovation and risk-taking for profit in business. An entrepreneur manages and drives a business undertaking and shoulders much of the accompanying risks. Agricultural entrepreneurship therefore relates to the production and marketing of various agricultural products. It spans through the provision of inputs to production at all levels, (smallholders, large scale producers, etc.), processing, marketing and sales of agricultural products.

Because DFS differ in many ways from traditional financial services and are disruptive in nature, there are implications for regulators. Emphasis here is on those added risks by the mobile channels and associated agencies. Thus this paper discusses the application of digital financial services and associated risks and considers how to balance this innovation to benefit agro-entrepreneurs in Nigeria.

Literature has it that Nigeria has a tele-density of over 100 percent. This is good news because ownership of a mobile phone is a prerequisite to access to DFS. Nigeria has over 21 licensed mobile money operators however, it has not as a country been able to experience the kind of DFS revolutions that other countries, (Kenya, Tanzania, Uganda, Rwanda and Ghana) in emerging markets have experienced. Could this trend be attributed to the fact that Nigeria adopted the bank-led approach to Mobile Money Services, (MMS)? One is left to wonder if success in Mobile Money Services, (MMS) has any bearing with the model adopted by the regulatory bodies, whether bank-led or Mobile Network Operator, (MNO) led.

In Kenya M-Pesa has become ubiquitous, (Hansen, 2014). It has been of services to farmers in the rural areas as well as their middle men buyers in semi-urban areas. Artisans are not left out. Can similar packages be replicated in Nigeria in the Green Alternative? In the area of improvements in access to market, is there any context-specific innovative package that can exploit the many potential benefits of DFS?

The Nigerian Growth Enhancement Support Scheme (GESS) electronic wallet (e-wallet) is another of such innovation, an input- financing system that made use of vouchers and focused on smallholder farmers. The question now is, how did the GESS which provided DFS to rural farmers fair in Nigeria? Now that The Green Alternative has replaced ATA, is DFS encouraged and how? What line of attack is in place to achieve its objectives of increased productivity through access to timely, high quality and price competitive inputs? These are pertinent questions to answer at this level. The articulated policy thrusts aimed at achieving the above objectives should consider the many benefits of mobile financial services and how they can be tapped. In Kenya, Uganda and Ghana, it was a conscious collaborative effort because to improve the livelihood of the poor, they have to be connected on a large scale. In the case of Nigeria, such efforts (example the partnership between Stellar- a financial platform and Oradian- a fintech Service provider), have not reached scale. Thus there is need for collaboration/partnership by the government, fintech companies, mobile network operators, banks, e-money operators and development organizations with the aim of building more robust financial services products to boost agribusiness development. Findings will be useful to the government in her pursuit of an all-inclusive economy since the provision of an enabling environment is entirely her prerogative in the Nigerian context.

The broad objective of this paper is to review digital innovations vis-à-vis associated risks, and their implications for agribusiness development in Nigeria. The specific objectives are to:

- i. analyze the application of digital innovations in agriculture;
- ii. explore the role of digital finance in financial inclusion for agro-entrepreneurs;
- iii. review the benefits of DFS to women; and
- iv. identify the risks associated with DFS and their management strategies.

This analysis made use of secondary data as well as academic papers, books, journals, articles, internet, etc. Overview of Digital Financial Technology Tools that Support Mobile Finance.

Digital financial services are the delivery of formal financial services through electronic channels. It supports the provision of financial services to the low-income through solutions such as mobile money, mobile/internet banking, use of cards, etc. (World Bank, 2014). Underneath is a definition of some of these tools/terminologies:



Mobile phones: These are multifunctional devices that permit a variety of communication methods ranging from voice and short message services, SMS, to more sophisticated means such as software applications or web browser.

Smart cards: A payment device card with a machine - readable embedded chip that stores information about the customer and his/her account.

Point-of -sale (POS) device: A small portable device that facilitates an electronic financial transaction

Debit card: An electronic payment that enables the holder to withdraw or deposit funds to or from a bank account. It can also be used in an ATM machine or in a POS device.

Electronic funds transfer or e-payment platforms: These are payment services that are carried out by means of an electronic terminal such as telephone, computer, or magnetic tape. The services involve a customer's instruction or authorization given to a financial institution to debit or credit an account.

Electronic money (e-money): A brand of stored-value instrument or product largely understood to have the following attributes: (1) issued upon receipt of funds, (2) consisting of electronically recorded value warehoused on a device such as a chip, prepaid card, mobile phone, or computer system. (3) acknowledged as a means of payment other persons/establishments aside from issuer, and (4) changeable to cash.

E-money account: Just like a conventional bank account, e-money account belongs to a holder of e-money and is domiciled with the e-money issuer. The e-money issuer can be a bank or a non-bank. If a bank the account could be a consistent transactional bank account but if it is a non-bank, the account becomes a record of the e-money issued by the issuer and held by the customer. The non-bank e-money issuer usually pools the customers' fund and holds it in a bank account(s).

Branchless banking: This is the delivery of financial services by use of agents and outside the traditional bank branches. It relies on Information and Communication Technologies, (ICT) to pass on transaction details. It makes use of card-reading point-of- sale terminals or mobile phone. In some cases, a trust account is established for such customers.

Mobile financial services are operated under three models. Below is a description of these models and their characteristics:

Bank Model: This relates to banks or other licensed deposit taking institutions. Clients hold accounts or a mobile wallet with the banks. The service offered is

typically, mobile access to balance inquiry, transfers between accounts and payments thus providing convenience to existing bank clients and the bank.

MNO (Mobile Network Operator) Model: This is a situation where cell phone companies leverage on their existing wireless network messaging coverage for the purpose of payment services that enables customers remit funds to each other. Funds so remitted are subsequently settled through the MNO's established agent network. Transactions by individuals involving payments are carried out completely within the MNO and do not require customers to have a bank account. Funds in transit are usually maintained in a trust account with one or more banks, awaiting withdrawal by recipients. The service provider only executes payment instructions and does not perform any credit evaluation and risk management functions of banks. The easy, low cost and increasingly universal access to cell phone services in comparison with the somewhat high cost of a bank account, (minimum balance, service charges, full requirements for KYC and the time it takes to travel to branches), is an indication that MNO model is highly effective in bringing informal cash dealings into a form of formal financial system thus expanding access to financial services, (Lake, 2013).

Hybrid Model: This model combines the benefit of the bank model and the MNO model and any other third party to offer communications and financial transaction services.

How does mobile money work? Mobile money applications are characteristically small pieces of software implanted on a SIM card or obtainable over a mobile set-up. Mobile devices do not have to be expensive to be able to send value to someone else. Upon receipt of the value, a user simply visits a retail agent to change the digital value into cash after his/her identity has been verified. Thereafter, the agent makes the switch. This way, money can cross wide geographical distances at the speed of a text message, (Kevin, 2012).

To improve the livelihood of the poor, they have to be connected on a large scale. The best available data on this innovation comes from Kenya's M-Pesa. During the violence that followed Kenya's 2007 election, evidence showed that M-Pesa "became one of the only means through which residents of Nairobi's informal Kibera settlement could access cash" (Morawczynski, 2009). The use of mobile money transfers and payments is a first step for many into formal financial system.



Digital Financial Services Ecosystem

The Digital Financial Services ecosystem is a set of interconnected products and services consisting of users (consumers, businesses, government agencies and non-profit groups); the providers (banks, other financial institutions, and non-banks); the Mobile Network Operators who make available the technical, and other infrastructures that make them possible; and the government, who provides policies, laws and regulations to build an enabling environment. According to the International Telecommunication Union (ITU-T, 2016), DFS ecosystem aims to support all people and enterprises within a country and should support national goals such as financial inclusion.

It is made up of a rich population of Mobile Money Operators, MMOs, super-agents and agent aggregators and sub-agents. These constitute the principal suppliers who procure and develop capabilities to make and distribute consumer value proposals. The core DFS suppliers develop sufficient physical resources essential for business operations. There are also the people, locations, technology, activities and finance. Human capital and institutional capabilities are supplied at various stages of development (Olayinka, et al, 2016). The ecosystem is a rich population of varying sector players that have to be built into a network to enhance workability and interoperability. There are basically, two support structures for actors and services in a DFS Ecosystem: an enabling environment and a solid level of infrastructure readiness

The Enabling Environment consists of: Laws, regulations and their implementation, including the basic consents given to financial institutions in their countries; the authority of financial supervisory bodies and guideline and approvals given to non-bank financial services providers. It also includes law and regulation that establishes the role of ICT providers and the authority of telecom regulators in a country, national guidelines with respect to financial inclusion. There are also the standards setting bodies and their standards, industry groups made up of individual providers, and are usually industry-specific (e.g. GSMA), NGO's, Development Organizations, etc., working to implement DFS ecosystems (e.g. World Bank, CGAP, the Bill & Melinda Gates Foundation), (ITU-T, 2016).

Infrastructure readiness consists of;

Payments Systems: These should be available for transactions between and among end users - consumers, merchants, businesses and governments.

Security: Payment system that is secure and interoperable among participants.

Voice and Data Communication Networks: These

should support financial messaging among end users and providers and support a level of communication network quality and security.

There should also be energy availability that is sufficient to support the users of a digital financial ecosystem. Acceptable identification criteria equipped to identify end users and their providers, and authentication systems capable of recognizing and validating these identities. Identity arrangements may be national ID's, sectorial ID's (e.g. bank account numbers, mobile phone numbers) or private sector identification cards. These are also important in the DFS ecosystem. Some national identity cards are biometrically enabled, (ITU-T, 2016). DFS Providers.

This refers to all entities that provide digital financial services to end users. This spans through the traditional financial services providers (banks, savings institutions, credit unions, and other chartered financial institutions) tonon-bank providers such as e-money operators, postal authorities, and variety of different commercial providers. All these entities work within the ambit of national laws and regulations, (ITU-T, 2016).

Applications of Digital Financial Innovation in Agriculture

According to United States Agency for International Development, USAID (2015), there is the crucial need to support access to and use of sustainable financial services in rural areas that will help reach Feed the Future's goals of growing agricultural incomes and dipping malnutrition. There is evidence that digital financial services help us to achieve this goal by reducing costs, increasing traceability of payments, improving household resilience to shocks, and creating new business models.

Different countries have employed different digital financial innovations in agriculture. In Kenya the Mobile Network Operator, MNO Safaricom developed M-PESA, (M for mobile and Pesa for money in the Swahili language). It is an e-money transfer and payment product, the first mobile money deployment to reach scale. M-PESA being an MNO-led deployment does not require its users to have a bank account. Rather, customers can choose to retain electronic value on the mobile device itself, as stored value. The payment product and stored-value services of M-Pesa led to its rapid uptake by even the poor clientele, thus showing its value to customers (World bank, 2016). The report noted that households that had access to M-pesa were able to receive more financial backing from larger and more distant networks of friends and family and were better



able to survive hard times, able to maintain their regular diets and to retain their children in school.

A study by Kenya's financial sector, Deepening Trust, has it that 62 percent of adults in the country have active M-pesa accounts. Other countries have since followed suit, launching their own versions of the product. In Tanzania, over 47 percent of households have registered family members and in Uganda, 26 percent of adults are users.

The Nigerian Growth Enhancement Support Scheme (GESS) electronic wallet (e-wallet) is another of such innovation, an input-financing system that made use of vouchers and focused on smallholder farmers. The criteria for qualifying for participation were ownership of a mobile phone, among other things. The voucher-based approach has been adopted by many governments in Sub-Saharan Africa (SSA), as part of their policies to subsidize agricultural inputs. There is no doubt that farmers' access to modern agricultural inputs is a prerequisite to any worthwhile agricultural transformation and productivity. Malawi and Zambia adopted the Nigerian e-wallet scheme to deliver farm inputs to farmers through the mobile phones. It is worthy of note that mobile phones are central to all these uses. The E-wallet of the GESS was practiced under the Last Administration's Agricultural Transformation Agenda, (ATA). ATA was the Agricultural Policy during Jonathan's Administration, with a core purpose of helping to refocus Nigeria's attention on agriculture. ATA's focus included improving access to finance and inputs together with the establishment of federal agricultural research and marketing boards. The Federal Ministry of Agriculture and Rural development, (FMARD), has posited that access to inputs remains a challenge for achieving optimal productivity of agricultural outcome. This led the previous government administration to engage in subsidy programmes under the GESS which however, was "characterized by late or non-delivery of inputs, substandard or counterfeit inputs, and exclusion of rightful beneficiaries". ATA was replaced by the Green Alternative under the present Administration. The policy objectives under the Green Alternative includes increasing productivity by ensuring access to timely, high quality and price competitive inputs; enhancing productivity through access to information and knowledge; enhancing productivity through access to finance and agribusiness development, among other things.

Input voucher programme is a tripartite arrangement involving a targeting mechanism, a financing mechanism, and a voucher redemption system with

built-in safeguards against fraud (Gregory, 2006). Smallholder farmers make use of input vouchers to pay for inputs such as fertilizer and seeds at a registered shop of their choice. They serve as real money and certificates (Kachule and Chilongo, 2007). Vouchers have built-in information relating to type and quantity of input, period of validity and name of retail shop (Mazvimavi et al, 2013). Voucher holders can purchase specified amounts and types of inputs from trained dealers who agree to accept vouchers as payment. Farmers then redeem the inputs as specified in the vouchers through agro-dealers. The agro-dealers subsequently redeem the vouchers from the program organizers with an agreed margin to cover their expenses. Vouchers by their design are aimed at addressing the problem of access to inputs rather than availability of inputs. This means that farm inputs have to be available or made available first before a voucher system can be employed for a fast, efficient and effective distribution, (Gregory, 2006).

Adebayo, (2014), on the effectiveness of E-wallet practice in grass root agricultural services delivery in Nigeria, a case study of Kwara State Growth Enhancement Support Scheme, revealed that 87.2 percent of the respondents benefited from improved seeds of maize, rice and two bags of fertilizers each. Such benefits as quick accessibility of improved and subsidized farm inputs, increased production and revival of farmer's confidence in government programs were notable. However, there was the problem of telephony network failure, low level of awareness among farmers, cumbersome procedure of getting approvals, low density coverage of agro-dealers in the supply of fertilizer and maize seeds (Adebayo, 2014). A study of Kerala fishermen provided a clean identification of significant impacts of mobile phones on earnings, price volatility and waste reduction, (Jensen, 2007).

Electronic extension (e-extension) systems can employ a wide range of tools, software, platforms and devices with diverse sources of information. Extension agents can thus cut down on travelling to visit farmers by making use of a combination of voice, text, videos, and internet, all of which are digital tools, to decrease operation costs and increase the rate of interaction with farmer.

The Federal Ministry of Agriculture and Rural Development, (FMARD), in its policy and strategy document has outlined a number of thematic interventions to unlock full potential under The Green Alternative. One of these interventions is "access to information and knowledge", (FMARD, 2016). Provision of right information at the right time for



planning and decision-making purposes is essential for increased agricultural productivity and improvement in agribusinesses. This will involve all stakeholders in the sector- input suppliers, farmers, processors, traders, policy makers, development partners and research. E-extension can be the digital product to deploy to achieve this.

There are a number of differing potential production technologies and practices that a farmer can choose from, each with its different risk profiles and different suitability. To make decisions on which technologies and practices to adopt, farmers must be aware and be able to access the necessary information; they must believe that the technology is beneficial; and they must know how to use it effectively, (Bardhan and Moorkherjee, 2011). Farmers tend to be more receptive to information that is easier to access and that are more tailored to their specific context. Therefore, there is need to investigate information provision systems which, in the case of the adoption of novel technology, tailor lessons to farmers' specific contexts and more ably target farmers through information networks, (Davis and Sulaiman, 2014). Digital tools can serve this purpose. They have enabled revival of agricultural extension and advisory services to some extent. This is where the policy makers, development institutions, private sector players, MNOs and fintech companies come in. This was what happened in Kenya, Uganda and some other countries in the Sub Saharan Africa.

Digital Financial Services and Agricultural Value Chain Finance

Value chain by Kaplinsky and Morris, 2000, describes a “range of activities required to bring a product from conception, through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to a final consumer and final disposal after use”. Agricultural value chain therefore describes the range of activities undertaken by different actors/players in bringing agricultural production from the farm to its final consumers, such that at each stage, value is added. It is an important factor in determining a country's trade competitiveness.

A number of models characterize the agricultural value chain and these models are identified by their drivers. There is the producer-driven model – small- or large-scale farmers associations; the buyer-driven model, comprising traders, retailers, wholesalers, processors, exporters, and other traditional market actors; the facilitator-driven model – government and government agencies, Non-Governmental Organizations, NGOs, Development Financial Institutions, DFIs and other

support agencies; the integrated model – lead firms, supermarkets, multinationals. Each model has a purpose, a rationale, and an objective to achieve. The integration of mobile money into Agricultural Value Chains, AVCs, has a lot of benefits to the producers and the rural economy: low cost of transactions; high security of transactions; uninterrupted integration of buyers and sellers, (improved market access); reduced losses and leakages along the chain; immediate and increased frequency of transactions; accountability resulting from the availability of a digital trail; and improved bottom line for all players.

Agricultural value chain finance is the flow of funds to and among the various links in a value chain, (Miller and Jones, 2010). Value chain finance can be internal, (within the value chain), or external, leveraging on chain relationships and mechanisms. New technologies in agriculture and financial services have the capacity to spread the reach and product diversity of value chain finance to smallholders. There are commitment savings accounts for inputs; receivables financing and warehouse receipts. Mobile devices are being increasingly used in helping to unlock an array of new financial products and services that go past the existing traditional offerings to participants in value chains. Value chain actors have become important providers of informal value chain finance, (internal finance) in the absence of the formal financial services. Value chain actors such as off-takers and input suppliers are familiar with the activities of smallholders along the chain, and have an incentive to provide financial services that enable their suppliers to deliver steady quality and quantity. They may provide short-term finance for inputs, working capital, or advance payments for crop deliveries, but these actors face some constraints. Information asymmetries and transaction costs are some of the challenges faced by value chain actors and financial services providers and digital innovations can be exploited to reduce/remove these obstacles. With the aid of digital tools, data associated with sales, payments and seasonality of cash flows among value chain actors can be collated and used in overcoming the barriers to providing credit for smallholders, traders, processors and retailers, (Max and Rossana, 2017).

In Uganda, UN Capita Development Fund, (UNCDF), partnered with a MNO, MTN and a major coffee aggregator to deliver mobile payments to over 10,000 of its coffee grower. The UNCDF experience in Uganda demonstrates the complexity of shifting from cash to digital bulk payments from agricultural buyers to smallholder farmers. The upfront investment cost can be high, and successful deployments require coordination among several disparate partners, (UNCDF, 2016).



Some other countries that have developed a context-sensitive DVCF include; Ghana, the Ghana Agricultural Development Corporation, (GADCO) partnered with Tigo Cash to pilot mobile payment to rice farmers, (Babcock, 2015); in Kenya, M-Pesa has become ubiquitous, (Hansen, 2014).

Technological innovations have made a number of initiatives possible in changing how value chain finance can reach smallholders. Although digital value chain finance (DVCF) is still in its early stages, valuable insights are all the same up-and-coming from this continuously growing space. There are also clear patterns on how digital tools are being incorporated into value chain finance. There are three all-encompassing use cases for digital tools in value chain finance for smallholders: improving the efficiency of financial transactions; overcoming barriers to providing financial services and improving market opportunities.

The requirement here is to identify the pain points, (obstacles) along agricultural value chains that relate to finance and thereafter to explore the digital tools that can be employed to address the financial products and services being digitized. Digital roles along a typical agricultural value chain can reduce the need for buyers to deliver and disburse cash in rural areas; reduce the need to establish branches or send loan officers to remote areas to disburse funds or collect repayments, thus improving the competence of transaction; allow for flexible payments and aggregate demand for inputs; bring buyers and farmers together for more transparent market opportunities; aggregate farmer production to reduce procurement costs and make the most of sale price; use data on production records to secure receivables financing for farmers; allow payments to be made to farmer wallet/account upon delivery, (Max and Rossana, 2017).

Of importance here is how to explore the innovations that have the capacity to expand the reach of value chains themselves. This is vital for value chain finance to make impact on the smallholders that have no access to financial services. This is to say that innovations with respect to DVCF should be context-sensitive.

Although Value Chain Development was one of the key programmes under the Last Administration's ATA, and even currently under the Green alternative, the researcher did not come across any context-sensitive innovative package for DVCF as was seen in countries like Kenya, Uganda and Ghana, etc. Since the new federal Agricultural Promotion Policy (APP) – also known as The Green Alternative focuses on solving the

core issues at the heart of limited food production and delivery of quality standards, FMARD could consider partnering with innovators and Development Financial Institutions, DFIs to see the possibility of a DVCF that will be beneficial in the selected crops/agri-businesses. A conscious government enabled private sector-led approach is desirable.

Role of Digital Finance in Financial Inclusion

The World Bank, (2014) defined financial inclusion to include both access to and usage of appropriate, affordable and accessible financial service. The International Telecommunication Union, ITU defined financial inclusion as the sustainable provision of affordable financial services that bring the poor into the formal economy, (ITU, 2016). Thus an inclusive system would encompass a range of financial services that offer opportunities for accessing and moving funds, growing capital, and reducing risk. Such services should be offered by banks and other traditional financial services organizations, or by non-bank providers.

Financial inclusion has become topical in the discourse of poverty reduction in all regions of the world, especially developing countries. The Consultative Group to Assist the Poor (CGAP) reports that currently, the world's poor live and work in an informal economy characterized by lack of access to a bank, savings account, debit card, insurance, or line of credit, which compels them to rely on informal means of managing money such as family and friends, cash-on-hand, pawn-brokers, moneylenders, burying in un-marked areas in the farm, or keeping it under the mattress- options which in most cases are insufficient, ineffective, risky, expensive, and unpredictable, (Olayinka, et al, 2016). It is important to improve the ability of the poor to transfer money but mobile transfer services cannot capture the full potential of mobile to enhance financial inclusion, when treated in isolation.

In Nigeria, approximately 40% of the adult population is financially excluded, with majority in rural areas, particularly in northern Nigeria. Amidst a growing population, the challenge is that the high volume of financially excluded Nigerians has not abated despite regulatory interventions such as rural banking and the establishment of community banks that transitioned to microfinance banks (MFBs), all aimed at alleviating poverty in rural areas. These institutions were set up to create store of value for underserved customers, and to provide line of credit to grow their businesses. Their inability to deliver further widened the inequality gap and worsened the challenge of financial exclusion. The resulting regulatory interventions since 2011 have embraced the reach and ubiquity of mobile telephony



and telecommunications services in support of digital financial services (DFS), yet mobile money has not made any reasonable impact in the economy, particularly to the poor masses. The Central Bank of Nigeria, CBN, sees digital financial services, DFS, as a tool to achieve effective financial inclusion in Nigeria. This was the focal point of the summit on financial inclusion held on December 8th, 2016, in Lagos (CBN, 2017). The CBN governor, Mr. Godwin Emefiele disclosed at the summit that DFS has the potential to add about 46 million, into the formal financial system by 2025, adding that this would benefit agencies of government. By digitizing cash payments government agencies would reduce leakages and boost transparency in financial dealings. He posited that DFS transcends physical barriers through the use of abundant electronic channels to particularly reach the underserved, rural areas. He recognized the enhanced cooperation with the Telecom sector towards deepening uptake of DFS in Nigeria and charged industry players to scale up innovations that leverage the mobile platform for financial inclusion of excluded population in the country (CBN, 2017). Recently, the CBN in collaboration with the deposit money banks launched an initiative called Shared Agent Network Expansion Facilities, (SANEF). This initiative was aimed at empowering 500,000 agent networks with a capacity to offer 50 million Nigerians who are under-banked such financial services as cash-out, funds transfer, cash-in, airtime purchase, bills payment, among other things, (This Day Newspaper, 2018). However not much has been heard about SANEF since it was launched in April 2018.

Digital payments can be defined as a payment alternative to cash- including domestic and international transfer of funds. Such payments have often served the purpose of introducing its beneficiaries to the financial system for the first time and provides an opportunity to offer accounts to both traditional formal bank accounts or payment cards such as e-wallets, with its stored value services to the unbanked for savings or payment (World Bank, 2014).

Digital payments benefit both the sender and the receiver. A lot of potential benefits are on the offer by moving from cash-based payment to digital payment. These include: a reduction in the cost of disbursing and receiving payments; an increased privacy of payments; an increased control over the funds received; an increased individual risk management capacity; an increase in the security of payments by eliminating the vulnerability of recipients to street crimes as would be the case with cash

payments; increased transparency of payments and making leakages less likely; a reduced incidence of concomitant crimes; increased speed of payments, and an entry point into the formal financial system for some individuals, (World Bank, 2014).

Improvements in the payment sector have led to the development of electronic payment service providers that are able to facilitate formal payments even in the absence of accounts. Examples of such payments are over-the-counter (OTC) payments, mobile money payments and payment cards.

Digital payments can take different forms, depending on who initiates the transaction, i.e. who is the sender and who the receiver is;

- i. Person-to-Person (P2P),
- ii. Government-to-Person (G2P),
- iii. Business- to-Person (B2P),
- iv. Business-to-Business (B2B).

All forms of payments can benefit the agro-entrepreneur and make for a more robust financial interaction all the way from the bottom to the top and vice versa. It is a known fact that the most untapped market for banks and MNOs is the smallholder farmer. Access to this large market segment can be obtained through mobile payments.

Mobile money can serve as a platform to transform entire economies as it can be applied across commerce, health care, agriculture, and other sectors. Wherever there is a wireless phone service, mobile money

services can be deployed, thus helping to overcome distance and lack of branch offices in rural areas, (Kevin, 2012). At the basic level, mobile money is the delivery of financial services, including payments (e.g. person-to-person transfers); finance (e.g. insurance and credit); and banking (e.g. transactions and account balance enquiries), using a mobile device such a mobile phone. In practice, a range of alternatives are available, from sending text messages to transfer value, to accessing bank account details through the mobile internet.

Digital Financial Services and Gender gap

Although the subject matter is not on gender, it will not be out of place to mention that digital financial services are of benefit to women. According to the World Bank, women comprise the majority of Nigeria's unbanked, with only one-third of the Nigerian women owning a bank account. This translates to 33.33 percent of Nigerian women, leaving 66.66 percent unbanked



(World Bank, 2014). Some factors hit women more than men with respect to owning a bank account: inability to travel to bank branches, limited financial literacy and inadequate proof of identification, etc.

In recognition of this limitation, a non-profit financial platform called Stellar and the fintech service provider, known as Oradian launched a mobile money platform to enable women in rural Nigeria transfer money to one another, (CBN, 2017). Another of such innovation in Nigeria is the "one woman, one ID card" project lunched by UN women in collaboration with Zamani Foundation, Master card and the National Identity Management Commission. The project was geared towards reducing the number of women without a form of personal identification and providing women with finance and business training. This also is financial inclusion on a gender perspective, but the question is how many women benefited from these and are they still benefiting from it? Or was it just one of those efforts that endless successfully than previously hoped? It is expected that these efforts will go a long way in contributing to increased access to financial services by women and the attainment of the targets set in the National financial Inclusion Strategy, (CBN, 2017), if properly put in place and the appropriate machineries established.

Risks associated with Digital Finance

Risk is an important component of our everyday life. There is need to recognize risks within mobile money systems and how they influence the demand for, and supply of, services. A typical retail banking environment has its associated risks that is the Bank Model. Emphasis here however is on those added risks by the mobile channels and associated agencies. Lake 2013 categorized these risks as follows:

Systemic Risk: This is the type of risk that can cause a collapse of or a substantial damage to the financial system.

Operational Risk: This occurs when one of the participants is not able to effectively operate their business. It is a product of failed in-house procedures, people, systems or external events.

Reputation Risk: This has to do with the image of one of the stakeholders, the mobile system, the financial system or the image of a specific product.

Legal Risk: This relates to risk of unforeseeable lawsuits, judgments or contract that could disrupt MFS business practices.

Liquidity Risk: This results from the inability of a bank or MFS provider or agent to meet cash obligations upon demand.

The above risks affect the supply side of the mobile money services majorly but they have impacts also on the clients/customers by paving way for fraud, loss of fund/difficulty in recovering them, and erosion of users' confidence, etc.

A qualitative survey of nine countries by McKee, Kaffenberger, & Zimmerman (2015) finds that when consumers perceive or encounter problems within mobile money systems that expose them to risk, their trust, uptake and use of such services decrease. In Bangladesh, Philippines, and Uganda, a MicroSave review on consumer concerns reports that DFS customers are primarily concerned with service downtime, agent illiquidity, fear of sending money to the wrong number, and the charging of unauthorized fees by agents (Wright, 2015b). A Consultative Group to Assist the Poor (CGAP) focus note, which analyzes consumer research findings from 16 countries, Nigeria inclusive, comes to similar conclusions (McKee,

Kaffenberger, & Zimmerman, 2015). It was found that consumers are concerned about user interfaces that are difficult and confusing, poor customer recourse, nontransparent fees and terms, fraud/hacking into accounts, and insufficient data privacy and protection. These risks become even more serious for individuals with limited or no financial or other literacy in the language used in the mobile services. The mobile financial services industry makes use of agent banking on the supply side thus introducing operational and technical risks, such as fraud and system failures. Consumer protection regulations are therefore primarily concerned with mitigating different forms of risk with a bid to achieve a win-win platform for all participants (Alliance for Financial Inclusion, AFI Mobile Financial Services Working Group, 2014).

Because mobile financial services involves both the telecommunication industry and the financial industry, there is need for cooperation and collaboration of both sectors for effective risk management, bearing in mind that there is a trade-off between risks and potential over-regulation. Priorities should be such that are proportionate to actual risks and are also safe, sound and sustainable for low income clients.

Risk Management Strategies.

Advocates of consumer protection are of the opinion that the task here is to develop regulations that promote innovation and access, while still offering an acceptable level of protection to the consumers (Mauree & Kohli, 2013). To achieve this balance, AFI opines that a regulatory framework should be such that strikes a balance also between the increased benefit that MFS



offers to consumers and the risks that may be encountered from both the demand and the supply side. This can be achieved if regulators are able to ensure that minimum proportionate risk standards are in place, while still allowing for innovation (AFI Mobile Financial Services Working Group, 2014).

In Nigeria, the Central Bank has the oversight function of maintaining financial systems stability together with the primary regulatory and supervisory oversight of DFS, including mobile money. Introduced in 2011 and finalized in 2015, two operating models for mobile money services were proposed – bank-led and non-bank led. Other regulatory authorities active in the ecosystem include the Nigerian Deposit Insurance Corporation (NDIC) for deposit insurance and National Communications Commission, NCC for telecommunications services (such as value added services and infrastructure). Alongside periodically renewable licenses obtained from CBN, Mobile Money Operators, MMO must obtain a unique scheme code from the Nigeria Inter-Bank Settlement System (NIBSS), and register unique short codes from NCC. Even though the guidelines do not explicitly demand pass through insurance, the deposit scheme security protects consumer deposits from MMO dissolution. In all, these frameworks and guidelines help create conducive environment for the systematic introduction, governance and management of mobile payment services.

Central Banks in some African countries seem to embrace a Mobile Network Operator, MNO- led approach to regulation, which places most of the regulatory responsibility on the MNOs. This approach was motivated by the leadership of M-Pesa in Kenya with its attendant success story. However, there are some exceptions. Countries like Nigeria, Egypt, Ethiopia and South Africa have a bank-led approach, and coincidentally, these countries have not made any remarkable progress with DFS at least on a national and pervasive scale.

DFS providers in countries like Nigeria, DRC, Kenya and Tanzania are required to include information concerning pricing, fees, and other terms imposed on customers when they apply for a license to issue e-money from their separate central banks. This is so that consumers are not kept in the dark as to cost of transaction. The down side of it is that at the point of deployment consumers may lack the financial literacy needed to understand satisfactorily, the services being offered.

The regulatory responsibilities include; a mandate on transparent communication of costs to consumers; prohibition of Terms and Conditions, (T&Cs) that waive consumer rights; a mandate for regulators to regularly review provider T&Cs; mandate security policies for DFS providers; mandate training for agents, etc., (Leigh, et al).

Funds can be diverted or stolen on account of a malfunctioning system, security weaknesses and human error, etc. Thus there is need for regulation to specify clearly who bears responsibility or liability for loss of funds and other harms to consumers and under what circumstances.

Policy Implications

Responsible finance as a concept is geared towards the supply of financial services in a way that, given the products, processes and policies, there is an equilibrium between the interest of the customer, (in this case agro-entrepreneurs) and those of the providers. The authors therefore put forward the following recommendations:

Government should create the enabling environment for a private sector-led approach to digitizing value chain finance. Like the Ghana and Uganda experience with rice farmers and coffee farmers respectively, FMARD can partner with relevant private sector players who wish to engage in effective and profitable business at the Base of the Pyramid, BoP.

There is need for a comprehensive survey of smallholder farmer households in the country with a bid to ascertain the percentage that owns a mobile phone and those that have a mobile account. This will help the government to make better negotiations with DFI, MNOs, and other partners, with the bid to accelerate digital financial inclusion and adoption in Nigeria especially in the agriculture and food sector. The small holder players could be clustered and put into segments depending on what they grow, their market engagements as buyers/sellers and how those markets are organized. Interventions can then be built around the identified pain points in a way that is context-sensitive. In building or designing interventions, the approach should be that of cooperation and partnership for effective sectorial coordination and should be devoid of gender bias.

Government should make a conscious effort to revive the e-wallet scheme by putting appropriate safeguards to eliminate or reduce to the barest minimum, the challenges identified on the course of the deployment of the scheme.



Internal control measures should be spelt out to protect against fraud, disruptions, reputational risk and operational risk by ensuring adherence to business processes for all participants especially on the supply side. This is a key to balancing business risk. The internal control department should be charged with the duty of ensuring that correct procedures are being used in terms of transactions, account opening (where necessary), and branding standards. This is important for customer confidence and loyalty.

In other to increase customer security assurance, providers of digital financial services should be able to come forth with trustable products that cannot be hacked. It is common knowledge that most confidential electronic card details are conspicuously printed on electronic cards, e.g. card serial number and expiry date. But these have to be completely hidden from public sight so as to guard against fraud especially, when electronic cards are misplaced or stolen. Automated Teller Machine should be developed to use biometric verification for authentication in other to ensure that fraud and loss of funds is totally eliminated.

It has been observed that the effectiveness of the digital financial services ecosystem may be constrained by such factors as: a weak regulatory framework; poor coordination; and insufficient agent network among other things. There is therefore need for review of regulations and guidelines and training of CBN and Nigerian Communications Commission, (NCC) staff; building of more agent networks by the providers of DFS; agent training; and training of agro entrepreneurs on mobile literacy. These are key to building customer confidence, loyalty and independence.

The rapid spread of mobile phones is the game changer that makes these opportunities possible. Interventions can be built around select agricultural business models to capture the benefits that mobile financial services can offer to agro-entrepreneurs. Improving the ability of the poor to transfer money is beneficial but should not be treated in isolation so that the full benefits can be reaped in the economy.

Conclusion

The benefits of DFS are enormous if the environment is right and the associated risks are mitigated appropriately to achieve a win-win position for all stakeholders. DFS in addition to offering an opportunity to boost financial inclusion has the capacity to enable large productivity gains across the economy. From improving the efficiency of input supplies (e-wallet), to improving household resilience to shocks, (digital payments), provision of timely information to

smallholder farmers (e-extension), improving market opportunities, improving the efficiency of financial transactions, overcoming barriers to providing financial services, (DVCF), and creating new business models, etc., the average agro-entrepreneur stands to benefit from digital financial services.

Three building block shave been identified to be essential for capturing the benefits of Digital finance: a robust and broad digital infrastructure; a dynamic and sustainable financial-services market; and financial products people prefer to existing alternatives- product fit.

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