

Association for Information Systems AIS Electronic Library (AISeL)

Research-in-Progress Papers

ECIS 2016 Proceedings

Summer 6-15-2016

FACILITATING FINANCIAL INCLUSION USING ICT: LESSONS FROM M-PESA AND E-ZWICH

Stephen Agyepong

University of South Africa, stephenagyepong@gmail.com

Hossana Twinomurinzi

University of South Africa, twinoh@yahoo.com

Follow this and additional works at: http://aisel.aisnet.org/ecis2016_rip

Recommended Citation

Agyepong, Stephen and Twinomurinzi, Hossana, "FACILITATING FINANCIAL INCLUSION USING ICT: LESSONS FROM M-PESA AND E-ZWICH" (2016). *Research-in-Progress Papers*. 67.

http://aisel.aisnet.org/ecis2016_rip/67

This material is brought to you by the ECIS 2016 Proceedings at AIS Electronic Library (AISeL). It has been accepted for inclusion in Research-in-Progress Papers by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

FACILITATING FINANCIAL INCLUSION USING ICT: LESSONS FROM M-PESA AND E-ZWICH

Research in Progress

Agyepong, Stephen, University of South Africa, Johannesburg, South Africa, stephenagyep-
pong@gmail.com

Twinomurinzi, Hossana, University of South Africa, Johannesburg, South Africa,
twinoh@unisa.ac.za

Abstract

Financial inclusion is a priority in most developing countries. While the inclusion approaches may differ, the primary aim remains enrolling the unbanked into the formal economy. This paper adopts Critical Realism as a lens to compare the efforts of two inclusion models; M-PESA from Kenya and e-zwich in Ghana. The findings reveal that while both models do not provide the infrastructure for people to build trust, the enrolment successes of both models differ significantly.

Keywords: Critical Realism, e-zwich, financial inclusion, mobile money, M-PESA, trust

1 Introduction

The United Nations (UN) eight millennium goals with the accompanying fifteen targets (MDGs) in many respects guide the development agenda of most developing countries (DCs). Financial inclusion comes under the eighth goal and target 8A to: "... Develop a global partnership for development: Target 8A: Develop further an open, rule-based, predictable, non-discriminatory trading and financial system" (United Nations, 2006). Both Ghana and Kenya are signatories to the MDGs. In Kenya, the financial inclusion platform that has stood out, M-PESA was launched in March 2007 as a public-sector challenge grant from U.K. government's Department for International Development (DFID) (Hughes & Lonie, 2007). In Ghana, e-zwich was launched in 2008 (Bank of Ghana, 2008a) with one of the primary goals to create the first biometrically regulated cashless economy in the world (Breckenridge, 2010, p. 642). While M-PESA has been globally recognized as successful, the success of e-zwich has been questioned. This paper seeks to compare and contrast the two inclusion models with a view to drawing some lessons for e-zwich. Specifically, the paper seeks to answer the following primary research question: "How can e-zwich be made more relevant for the small merchant and the unbanked to facilitate financial inclusion in Ghana?"

The remainder of the paper is structured as follows; section 2 presents the literature review on the theories underpinning the research Information and Communication Technology for Development (ICT4D) and Critical Realism (CR), financial inclusion and issues that the unbanked have to contend with such as identification, creditworthiness and trust; section 3 describes e-zwich; section 4 describes

M-PESA, section 5 compares and contrasts M-PESA and e-zwich, section 6 presents the findings, and section 7 concludes the paper.

2 Literature review

2.1 Approaches to ICT for development (ICT4D)

The notion of development is contested. According to the modernisation theory of economic growth, Gross National Product (GNP) or Per Capita Income (PCI) is a valid measure of human development. Development economics on the other hand considers human development as being concerned with human well-being and freedoms. The latter notion of development focuses on building individual capabilities (Sein & Harindranath, 2004). There are two different paradigms within development economics: (1) the economic, social and environmental vulnerabilities approach and (2) the capabilities approach (Loh, 2013). The vulnerability approach views development in terms of the insecurity of the well-being of individuals, households or communities in the face of a changing environment (Moser, 1996). A low opportunity for social mobility, such as reduction of asset possession, constitutes social vulnerability. Economic vulnerability refers to a low economic opportunity, such as family income below the poverty line. Environmental vulnerability is demonstrated by exposure to natural disasters, such as human activities which make a country's natural surroundings susceptible to hostile environmental threats, for example, surface mining in several places in Ghana that contaminate local drinking water. ICT has been shown to mitigate the vulnerabilities, for example, McNamera (2003) described a framework to reduce healthcare vulnerabilities (Loh, 2013).

Escobar (1985); Esteva (1992); Haq (1995); Sen (1999) have criticised the modernization theory of development as something done to people instead of involving them. Sen (1999) proposed the capabilities approach to development which prescribes five distinct freedoms: political, economic facilities, social opportunities, transparency guarantees, and protective security. The central tenets of the capabilities approach are the capability of the individual to lead whatever life they have reason to value; and that the "end of development" should be to develop the human (O'Hearn, 2009). This work guided the design of the United Nations Development Programme's (UNDP) Human Development Index (HDI). HDI uses GDP, in addition to life-expectancy, adult literacy and educational enrolment, to measure positive change (Loh, 2013).

Loh (2013) explains that both vulnerability and capability paradigms can be applied to the same development project; and "suggests the acceptance that all of these viewpoints will and should continue to coexist within the realms of the academic and practitioner communities for the benefit of this new and emerging field called ICT4D." This paper has an inclination towards both approaches.

2.2 Critical Realism

Philosophy helps humans to gain knowledge about their environment and their belief systems and make sense of the belief systems of others. Our view of reality underpins what we consider valid knowledge and this in turn informs our theoretical perspective and methodology. A person's philosophy may affect what this person regards as reality and what is not reality; what is seen and what is not seen. It also helps to show what shapes their view of reality. This paper adopted a Critical Realist philosophy to compare M-PESA and e-zwich.

CR is philosophy of science that offers a three layer stratification of reality – real, actual and empirical. The real refers to social structures, natural objects, material artefacts such as M-PESA and e-zwich, and conceptual entities such as language, opinions, and goals that exist independent of our perception of them. The real generates events/outcomes that constitute the actual layer, such as the observation by IMANI, the poor patronage of e-zwich point of sale (POS) terminals and the resulting in-

convenience of Ghanaian merchants having to service and power-up machines that were effectively useless (IMANI, 2010). These events/outcomes, however, may or may not be observable. The empirical, consists of the portion of the actual that is observed. CR illustrates how our perception of the real is necessarily fallible as it depends on our interpretations of what we see. This means that the Critical Realist researcher needs to understand the organizational effects/outcomes associated with introducing new structures (e.g., new payment framework). How events occur can be viewed as understanding the generative mechanisms associated with these structures. The mechanisms can be uncovered using retrodiction (Volkoff & Strong, 2013, p. 820).

2.3 Critical Realism: The root causes for exclusion and needs

The real refers to social structures, natural objects, material artefacts, and conceptual entities such as language, opinions, and goals that exist independent of our perception of them. In the next subsections, the real context in which e-zwich exists is identified.

2.3.1 Identification of individuals

The ability to identify individuals is a pre-requisite for opening bank account and access to credit. The primary barrier to formal financial inclusion is know-your-customer (KYC) requirements of financial institutions, that is birth certificate, passport, driver's license, and social security number to show identity and other documents, which are much lower for the mobile banking services. 90 percent of unbanked adults would not be able to meet basic KYC requirements for a bank account (CGAP, 2011).

Hughes & Lonie (2007) explain Vodafone considered using POS and magnetic stripe cards but went against the idea because of cost, maintenance issues, scalability and accessibility reasons. It was explained, "there was not a hope that the poorer and more remote areas could afford to participate." However, in Ghana, where identification of individuals, is a problem a biometric smart card was necessary. At the start of the twenty-first century Ghana was failing to issue birth certificates to more than 70 per cent of its people (Breckenridge, 2010). Kenya was failing to register 19 percent of her citizens born in the urban areas and 43 percent of those born in the rural areas by 2003 (UNICEF, 2003).

2.3.2 Rating financial history (creditworthiness)

Credit score has been devised to represent an individual's creditworthiness. Credit score is now regarded as one of the most important measures of an individual's creditworthiness, used by banks, mobile phone companies, insurance companies, credit card companies and even government agencies to evaluate the potential risk posed by lending money to consumers. It helps determine who qualifies for a loan, at what interest rate, and maximum amount of the credit. It may even be used to determine which customers are likely to bring in the most financial reward to the lender. The following elements go into the determination of a credit score: payment history (35%), amounts owed (30%), length of credit history (15%), credit mix in use (10%) and new credit (10%) (Wells Fargo, 2015).

2.3.3 Trust

Trust has been identified as a vital component of any financial arrangement especially when it has to do with credit and payment. Chenault (2009) asserts "my second takeaway is that, at its core, the payments business is dependent on a very basic element - trust" and Martin (2013) explains it succinctly "not the metal, but trust." Trust is made up of identification, to meet Know Your Customer (KYC) requirements of financial institutions; and financial history to build creditworthiness; that allow finan-

cial institutions to believe in someone (trust) to give credit (McKnight & Chervany, 2000). In this paper trust and credit are used interchangeably. The e-zwich requirement for fingerprints for all transactions is an essential element for establishing trust but not the only thing; a history showing previous credit and a pattern of repayment is requisite in establishing creditworthiness. The research postulates, lack of trust, which has basic elements of identity and financial history, is one of the major factors that could be contributing to the exclusion of the unbanked from the formal financial institutions in Ghana.

2.3.4 The unmet financial needs of small merchants and the unbanked poor

Current inclusion model has been exclusive to the urban and middle class. E-zwich and current mobile money products in Ghana continue to cater mainly to the urban middle and upper classes to the exclusion of lower income groups (Poku, Adu, & Osei-Asibe, 2014). Mobile money (MM) has only been successful in creating more financial avenues for the banked but it is yet to become an important tool for the unbanked in Ghana. In Ghanaian urban areas, 61 percent of adults have formal financial products, while in rural areas only 26 percent do (Dzokoto & Appiah, 2014, p.40-41). Even though 83 percent of the banked has a transactional product, only 31 percent carried out transactions using these products. It can be deduced that, a sizeable percentage of the banked population is therefore underbanked (CGAP, 2011).

Opportunity for large remittances and payments has been limited and costly. In 2014 more than \$2.0 billion came into Ghana in the form of foreign remittances for individuals. Remittance fees averaged 19.0% for Ghana (World Bank, 2013). Clearly, there is an opportunity for a low cost service provider in the remittance space.

The main problem of the small merchant, and the poor unbanked is that they have a need to make large or lump-sum payments due to whatever reason – planned, accident, emergency, etc. but lack the means to fulfilling this need. By lump-sum it is meant an amount one cannot normally afford at a moment's notice given one's source of income. For example, a GHc2000 school fees for one's ward, for a person making GHc400 a month. There are 3 ways to make such lump sum payments – pay in advance, pay now, and pay later.

The income stream of the elderly is unpredictable and the unbanked have varied ways of managing their income. Rutherford, 1999; Wilson, Harper, & Griffith (2010) describe how poor people in various countries around the world manage their money and the financial services available to them. The following three financial services – savings, loans and insurance were identified as available to the poor. The various formal and informal financial institutions made up of deposit collectors, money-lenders and savings groups that serve the poor are also described. CFI (2015) describes how the income of the elderly is unpredictable and varied; and the financial services available to help them cope with old age and how they use these services to their benefit. The report identified pension as the main financial service the elderly needs the most.

Saving groups have been identified as a way to help the poor and the old meet their unmet financial needs, that is, savings, credit, insurance and pension. The researchers postulate that savings groups can be efficient mechanism to help the unbanked establish credit as members encourage each other and the aggregated savings make micro-payments more efficient. Furthermore, savings groups when organized into associations can facilitate social action and change (Rutherford, 1999; Wilson et al., 2010).

2.3.5 Branchless Banking (BB)

BB represents a significantly cheaper alternative to formal branch-based banking that allows financial institutions and their commercial partners to offer financial services outside formal financial institution premises by using delivery channels like retail agents and mobile banking. BB use has the potential to substantially increase the financial services outreach to the unbanked (Bank of Ghana, 2008b). Agency banking describes an economic model whereby a bank partners with retail agents such as shops, stores and pharmacies to extend financial services and products to their clients (Botsio, 2014).

2.3.6 Digital Currency and Blockchain

Current banking and financial services arrangements is such that those who can least afford it are charged the most because of perceived risk. The average cost of sending money from South Africa is 15%, Saudi Arabia 4.13%, and USA 6.04% (World Bank, 2015a). However, it costs in excess of 24% to transfer money from Ghana to Nigeria (World Bank, 2015b). Digital currency, using block chains, promises to reduce the cost associated with payments. It is free to transfer funds from anywhere to anywhere with Uphold, a digital currency company, which uses blockchain technology to secure transactions (Roberts, 2015). Digital currency is an electronic based medium of exchange. A block-chain is a secured public ledger, an accounting system, that stores all transactions submitted to a dedicated network (Swan, 2015).

3 E-zwich: The World's First Biometric Money

E-zwich offers deposit taking financial institutions (universal banks, rural banks and savings and loans) a platform to interoperate. The capability to authenticate in real time or offline ensures that e-zwich services can be accessed in all parts of the country whether or not the area has good communications network. Transactions such as cash deposits, cash withdrawals and sales, can be completed offline and therefore these transactions are possible in the remotest part of the country (Bank of Ghana, 2014). The fingerprint authentication benefits from the highest security standards because any transaction that involves the transfer of funds requires fingerprint verification of the cardholder. The benefit of this system is that even if the card is lost or stolen no one else can use it and no funds will be moved from their account. An advantage is improved security; however, it comes at the cost of driving away a lot of micro-payments and those without access to e-zwich POS devices.

H1: The thesis postulates the need to define some threshold where transaction amounts below the threshold are exempted from the fingerprint requirement.

4 M-PESA Overview

M-PESA is a payment system which, by all accounts, has been successful and doing so well in Kenya (Economist, 2013; Morawczynski, 2011; Mugambi, Njunge, & Yang, 2014). M-PESA lets people deposit, send, and withdraw funds on their mobile phones. Mobile money transfer may be described as the use of a mobile device to send and receive monetary value. This definition does not specify the intended use of the transfer. Mobile payment refers to the use of a mobile device to “initiate, authorize, and confirm an exchange of financial value in return for goods and services” (Carton, Hedman, Damsgaard, Tan, & McCarthy, 2011). Mobile payments mostly occur in the context of person-to-business (P2B) and business-to business (B2B) transactions, while money transfers are often made from person to person. Mobile money refers to both a transfer and payment (Mugambi et al., 2014, p.17).

4.1 Factors Leading to M-PESA’s Growth

The Kenyan presidential election of December 2007 was disputed; leading to violence and more than 600,000 displaced. Physical movement of goods and money across the country sometimes became impossible. The accompanying shortages caused prices to increase whilst money became difficult to access and circulate. This great demand for cash helped accelerate the adoption of M-PESA as it “instigated new usages for the M-PESA application” (Morawczynski, 2011).

M-PESA is convenient, fast, secure, accessible and above all cost less when compared with the competition. And these advantages were the driving force in favour of its adoption at the individual level (Mugambi et al., 2014). Therefore, the thesis makes the following hypothesis:

H2: Making the loading of cash unto e-zwich free will increase the adoption and use of e-zwich

Government regulators initially allowed M-PESA to proceed without formal approval on an experimental basis. This decision gave impetus to the service’s launch and growth. At the time, 50 percent of Kenyan households didn’t have bank accounts and high unemployment necessitated the need for money transfer, and these together provided a ready market for a service like M-PESA (Mugambi et al. 2014). The service also benefited from network effects, that is, the more people who used it; the more it made sense for others to sign up for it (Economist, 2013).

5 Compare and Contrast M-PESA and E-zwich

This section compares and contrasts M-PESA with e-zwich given the reality identified above using CR. Items 1-3 of Table 1 below describes how each system provides the necessary infrastructure for the unbanked to build trust.

		M-PESA	e-zwich
1.	Identification of individuals	<ul style="list-style-type: none"> Individual is not uniquely identified. Mobile simcard identification 	<ul style="list-style-type: none"> Individual uniquely identified. Biometric fingerprint identification
2.	Rating financial history (creditworthiness)	<ul style="list-style-type: none"> Transaction history is captured by both. However, transaction history does not qualify as financial history because they lack categorization which ties these transactions together to show a history of previous credit and a pattern of repayment. The history helps create some level of creditworthiness that is used by some financial institutions. 	
3.	Trust	<ul style="list-style-type: none"> Both help build some level of trust by providing means of identification and creation of creditworthiness. 	
4.	The unmet financial needs of small merchants and the unbanked poor	<ul style="list-style-type: none"> Makes provision for the unbanked to save money, buy insurance, contribute towards pension and provides means of payment other than by cash. More successful in meeting the financial needs of small merchants and the unbanked poor in Kenya. Stores the value as e-float with a custodial bank. Transaction can only be com- 	<ul style="list-style-type: none"> Allows the unbanked to save money, buy insurance, contribute towards pension and provides means of payment other than by cash. The POS fingerprint requirement means a great many small merchants are not able to use it. Stores the monetary value on the e-zwich card, which is issued by a bank. Transactions can be completed

		pleted online	both online and offline.
5.	Branchless Banking	<ul style="list-style-type: none"> Both make use of retail agents such as shops and gas stations who provide support and cash-in/cash-out services to customers. 	
6.	Digital Currency and Block-chain	<ul style="list-style-type: none"> Both systems rely mostly on traditional financial institutions to function therefore depriving their customers the benefits of blockchain e.g. cheap international money transfers. 	

Table 1. Comparing M-PESA with e-zwich using Critical Realism.

6 Findings

M-PESA and e-zwich have helped with getting the unbanked people accounts where they are now able to send and receive money and other financial services. Both provide some form of identification and electronic history that helps to build trust (Realini & Mehta, 2015, p. 193-200). However, these are not enough, the payments and savings transactions are already being captured; what is needed is just a little work to tie all these transactions together to provide financial history, which all financial institutions can depend on. Both financial inclusion systems on their own or together do not provide the entire infrastructure for people to build trust and create a sustainable financially inclusive system. Most unbanked, even when they have MM accounts, will not meet KYC requirements. At some point in time, the unbanked will have the need to do large payment but will lack the capacity to do so and thus a need for formal financial institutions. Cost was found to be a major determinant for adoption, e-zwich charges to load money on to the system, M-PESA does not. Remittance fees is excessive; there is an opportunity to design a low cost service, using blockchain, to reduce cost and make electronic money attractive to a great majority of Ghanaians. Agents were found to be one of the success factors for M-PESA; involving small merchants and churches will facilitate the adoption of e-zwich.

E-zwich can be made relevant for the small merchant and the unbanked when there are services that help them reduce transaction cost, build trust; reduce their vulnerabilities and build their capacities to enjoy more freedoms. The research postulates that e-zwich, so far, has not been used to help address the needs of a great majority of the Ghanaian population and hence it's slow adoption. E-zwich's requirements for POS and fingerprint authentication, for every transaction, has meant a great many small merchants and their customers have been excluded from its usage.

7 Conclusion

The research sought to glean lessons from the successes and failures of M-PESA and e-zwich to build a better model. The paper described the unmet financial needs of small merchants and the poor unbanked in Ghana as; saving, credit, insurance (health, life and property), pension, a system that supports micro payments, assumes the only means of communication and processing information is via the mobile phone and means of payment other than by cash. The paper described how e-zwich, compared with M-PESA, has failed to provide critical value-added services and could therefore be a cause for the slow adoption of e-zwich. Specifically, the identified barrier to formal financial institution is postulated as lack of trust: government's KYC policy (identification among them) and lack of financial history (creditworthiness).

Further research will seek to investigate hypotheses H1 and H2; and understand the effect of the main obstacles that were identified (trust). The lessons learned are expected to contribute to the building of a sustainable financial inclusive model in Ghana's emerging economy.

References

- Bank of Ghana. (2008a). Annual Report. Retrieved February 11, 2015, from http://www.bog.gov.gh/privatecontent/Publications/Annual_Reports/2008.pdf
- Bank of Ghana. (2008b). Guidelines For Branchless Banking. Retrieved July 18, 2015, from [http://www.bog.gov.gh/privatecontent/Monetary_Policy/2008/August/regulatory framework for branchless banking.pdf](http://www.bog.gov.gh/privatecontent/Monetary_Policy/2008/August/regulatory_framework_for_branchless_banking.pdf)
- Bank of Ghana. (2014). Payment Systems in Ghana. Retrieved February 8, 2015, from http://www.bog.gov.gh/index.php?option=com_content&view=article&id=1720&Itemid=146
- Botsio, M. (2014). Pioneering Financial Inclusion in Ghana. Retrieved July 5, 2015, from <https://www.giz.de/en/downloads/giz2014-en-pioneering-financial-inclusion-ghana.pdf>
- Breckenridge, K. (2010). The World's First Biometric Money: Ghana's E-Zwich and the Contemporary Influence of South African Biometrics. *Africa*. <http://doi.org/10.3366/afr.2010.0406>
- Carton, F., Hedman, J., Damsgaard, J., Tan, K.-T., & McCarthy, J. B. (2011). Towards a Framework for the Evaluation of Mobile Payments Integration - Research@CBS. In *Proc. 5th European Conf. on Information Management and Evaluation* (pp. 84–91). Academic Publishing. Retrieved from [http://research.cbs.dk/portal/en/publications/towards-a-framework-for-the-evaluation-of-mobile-payments-integration\(643051f2-aeb9-4a5e-a772-e2d7215e7a63\).html](http://research.cbs.dk/portal/en/publications/towards-a-framework-for-the-evaluation-of-mobile-payments-integration(643051f2-aeb9-4a5e-a772-e2d7215e7a63).html)
- CFI. (2015). Aging and Financial Inclusion. Retrieved May 25, 2015, from <http://www.centerforfinancialinclusion.org/fi2020/mapping-the-invisible-market/aging-financial-inclusion>
- CGAP. (2011). Advancing financial inclusion to improve the lives of the poor. Retrieved March 11, 2016, from <http://www.cgap.org/publications/technology-program-country-note-ghana>
- Chenault, K. (2009). The Future of Consumer Payments: An Insider's Perspective. In *Moving Money: The Future of Consumer Payments*.
- Dzokoto, V. A., & Appiah, E. (2014). Making Sense of Mobile Money in Urban Ghana: Personal, Business, Social and Financial Inclusion Prospects. Retrieved March 1, 2015, from http://www.imtfti.uci.edu/files/docs/2014/dzkoto_final_report_feb2014.pdf
- Economist. (2013). Why does Kenya lead the world in mobile money? Retrieved March 23, 2015, from <http://www.economist.com/blogs/economist-explains/2013/05/economist-explains-18>
- Escobar. (1985). *Encountering Development: The Making and Unmaking of the Third World*. Princeton University Press. Princeton, New Jersey.
- Esteva, G. (1992). Development. In W. Sachs (Ed.), *The Development Dictionary: A Guide to Knowledge as Power* (pp. 6–26). Zed Books.
- Haq, M. ul. (1995). *Reflections on Human Development*. New York, New York: Oxford University Press, USA.
- Hughes, N., & Lonie, S. (2007). M-PESA: Mobile Money for the “Unbanked” Turning Cellphones into 24-Hour Tellers in Kenya. *Innovations: Technology, Governance, Globalization*, 2(March), 63–81. <http://doi.org/10.1162/itgg.2007.2.1-2.63>
- IMANI. (2010). Ghana's National Payment Platform May Become A Colossal Waste of Resources. Retrieved February 11, 2015, from <http://www.ghanaweb.com/GhanaHomePage/NewsArchive/artikel.php?ID=176327>
- Loh, Y. A. (2013). Approaches to ICT for development (ICT4D): vulnerabilities vs. capabilities. *Information Development*, 31(3), 229–238. <http://doi.org/10.1177/0266666913513198>
- Martin, F. (2013). *Money: The Unauthorised Biography*. London, Great Britain: Random House.
- McKnight, D., & Chervany, N. (2000). What is Trust? A Conceptual Analysis and an Interdisciplinary Model. *AMCIS 2000 Proceedings*. Retrieved from <http://aisel.aisnet.org/amcis2000/382>
- McNamera, K. S. (2003). Information and communication technologies, poverty and development : learning from experience, 1–100. Retrieved from <http://documents.worldbank.org/curated/en/2003/01/5158768/information-communication->

- technologies-poverty-development-learning-experience
- Morawczynski, O. (2011, July 4). *Examining the adoption, usage and outcomes of mobile money services: the case of M-PESA in Kenya*. The University of Edinburgh. Retrieved from <https://www.era.lib.ed.ac.uk/handle/1842/5558>
- Moser, C. O. (1996). Confronting crisis: a summary of household responses to poverty and vulnerability in four poor urban communities, 1–36. Retrieved from <http://documents.worldbank.org/curated/en/1996/03/18664836/confronting-crisis-summary-household-responses-poverty-vulnerability-four-poor-urban-communities>
- Mugambi, A., Njunge, C., & Yang, S. C. (2014). Mobile-Money Benefits and Usage: The Case of M-PESA. *IT Professional*, 16(3), 16–21. <http://doi.org/10.1109/MITP.2014.38>
- O’Hearn, D. (2009). Amartya Sen’s Development as Freedom: Ten Years Later. *Policy & Practice - A Development Education Review*, 8, 9–15. Retrieved from <http://www.developmenteducationreview.com/issue8-focus1>
- Poku, K., Adu, J. K., & Osei-Asibe, B. (2014). Cash Mobilization in Ghana: An Empirical Evaluation of the Effectiveness of E-Zwich Smart Card. *Advances in Social Sciences Research Journal*, 1(6), 1–14. <http://doi.org/10.14738/assrj.16.489>
- Realini, C., & Mehta, K. (2015). *Financial Inclusion at the Bottom of the Pyramid*. FriesenPress.
- Roberts, D. (2015). Bitcoin Startup Bitreserve Changes Name and Moves Beyond Bitcoin. Retrieved October 17, 2015, from <http://fortune.com/2015/10/14/bitreserve-bitcoin-uphold/>
- Rutherford, S. (1999). The Poor and Their Money: An Essay About Financial Services for Poor People. Retrieved April 19, 2015, from <http://www.microfinancegateway.org/library/poor-and-their-money-essay-about-financial-services-poor-people>
- Sein, M. K., & Harindranath, G. (2004). Conceptualizing the ICT Artifact: Toward Understanding the Role of ICT in National Development. *The Information Society*, 20(1), 15–24. <http://doi.org/10.1080/01972240490269942>
- Sen, A. K. (1999). *Development as freedom*. Oxford: Oxford University Press.
- Swan, M. (2015). *Blockchain: Blueprint for a New Economy*. “O’Reilly Media, Inc.”
- UNICEF. (2003). UNICEF fact sheet: Birth registration. Retrieved July 25, 2015, from <http://www.unicef.org/newsline/2003/03fsbirthregistration.htm>
- United Nations. (2006). Building inclusive financial sectors for development. New York: United Nations.,.
- Volkoff, O., & Strong, D. (2013). Critical Realism and Affordances: Theorizing IT-Associated Organizational Change Processes. *Management Information Systems Quarterly*. Retrieved from <http://aisel.aisnet.org/misq/vol37/iss3/10>
- Wells Fargo. (2015). How to Calculate Your Credit Score. Retrieved November 11, 2015, from <https://www.wellsfargo.com/financial-education/credit-management/calculate-credit-score/>
- Wilson, K., Harper, M., & Griffith, M. (2010). *Financial Promise for the Poor: How Groups Build Microsavings*. (K. Wilson, M. Harper, & M. Griffith, Eds.). Sterling, VA: Kumarian Press.
- World Bank. (2013). African Migrants Could Save US\$4 Billion Annually On Remittance Fees. Retrieved March 18, 2016, from <http://www.worldbank.org/en/news/press-release/2013/01/28/african-migrants-could-save-US4-billion-annually-remittance-fees-finds-world-bank>
- World Bank. (2015a). Bank capital to assets ratio. Retrieved May 23, 2015, from <http://data.worldbank.org/indicator/FB.BNK.CAPA.ZS>
- World Bank. (2015b). Massive Drop in Number of Unbanked. Retrieved December 27, 2015, from <http://www.worldbank.org/en/news/press-release/2015/04/15/massive-drop-in-number-of-unbanked-says-new-report>