Academic papers

Innovation and financial inclusion: A review of the literature

Bruno L. Yawe* and Jaideep Prabhu**

Received (in revised form): 12th June, 2015

*School of Economics, Makerere University, Uganda
E-mail: byawe@bams.mak.ac.ug, byawe@yahoo.com
**Judge Business School, University of Cambridge, Cambridge, UK
E-mail: J.Prabhu@jbs.cam.ac.uk; jcp31@hermes.cam.ac.uk

Bruno L. Yawe *is a Senior Lecturer of Economics at the School of Economics, Makerere University. He is currently a Postdoctoral research fellow at the Judge Business School, University of Cambridge under the Cambridge–Africa Partnership for Research Excellence Programme. He is collaborating with Dr Jaideep Prabhu in undertaking a research project titled 'Mobile Money Technology Adoption through Social Learning in Social Networks and its Effect on Financial Inclusion in Uganda'.*

Jaideep Prabhu *is Professor of Marketing and Jawaharlal Nehru Professor of Indian Business at Judge Business School, University of Cambridge. He has published in leading academic journals and has consulted with and taught executives. He is the co-author of* Jugaad Innovation: Think Frugal, Be Flexible, Generate Breakthrough Growth*, described by The Economist as 'the most comprehensive book yet' on the subject of frugal innovation. His most recent book,* Frugal Innovation*, was published in February 2015.*

Abstract

Financial innovation is a major driver of financial inclusion, and its relationship with inequalities in income and opportunities raises some important policy questions. This review covers the following areas of financial inclusion: savings; microinsurance; payments; banking services for the excluded poor; financial literacy; and consumer protection. The review shows that increasing financial inclusion should go beyond the traditional banking sector. This is because mobile network operators have, in most cases, initiated mobile money services, although this is not within the mandate for which they were initially licensed. This has aided the provision of financial services to the majority without bank accounts. There is now competition between commercial banks and mobile network operators, especially when the latter expand financial products on their networks. Partnerships should be established between and among commercial banks as well as between mobile network operators providing mobile money services to fast track interoperability. In most cases, the appropriate institutional and regulatory framework was absent at the inception of mobile money services. Therefore, there is a need for an institutional framework composed of regulators of telecommunications; for mobile network operators as well as central banks to expand financial inclusion without compromising the strategies aimed at eliminating contemporary global challenges such as money laundering.

Journal of Payments Strategy & Systems
Vol. 9, No. 3 2015, pp. 215–228

Keywords: financial inclusion, digital currency, mobile money, big data, financial innovation

MOTIVATION

In 2010, the G20 endorsed Principles for Innovative Financial Inclusion to provide guidance for policy and regulatory approaches.[1] The inability to access financial services prevents consumption smoothing and investment in health, education and income-generating activities, thus limiting growth opportunities for the poor. Therefore, providing access to financial services has significant potential to help lift the poor out of the cycle of poverty.[2]

Innovations to enhance financial inclusion have occurred within mainstream financial industry and within other sectors traditionally not thought to be part of the financial system. This review examines innovations within the financial sector, innovations within the telecommunications sector and innovations at the intersection of the two sectors geared towards enhancing financial inclusion of the unbanked and underbanked.

Financial inclusion, which refers to access to financial services, varies widely across the globe. Even in some advanced economies, survey data suggest that at least 20 per cent of adults have no bank account or other form of access to the formal financial sector. In many emerging and developing economies, the share of unbanked adults can be as high as 90 per cent.[3] Financial inclusion is expected to rise in the coming years, supported by economic development and initiatives by central banks and other policy makers.

The level of development of a country's financial system determines the nature of innovations deployed[4] and the extent to which these financial innovations enhance financial inclusion. Thus, developed and developing countries being heterogeneous means that inclusive financial innovations that work in the former may not necessarily work in the latter. It is worth noting that, even within the developing world; financial innovations that have enhanced financial inclusion in some counties have not done so in others.

This paper is organised into four sections and unfolds as follows. The next section briefly examines the conceptualisation of social exclusion from various perspectives. The third section presents the findings, and the final section concludes.

CONCEPTUALISATION OF SOCIAL EXCLUSION

Social inclusion has been examined by various scholars, including sociologists, historians, economists, psychologists and natural scientists. Sociology provides a valuable orientation from which to consider social inclusion, because it illuminates how social integration maintains and manages the ways in which people move about and through their socially stratified worlds.[5]

Financial exclusion is a relatively new concept arising from a variety of interdisciplinary studies of a real-world problem, namely people being unable to access mainstream banking services. From an economic perspective, however, it is primarily a microeconomic problem, ie how certain consumers operate within, and are affected by, financial service markets. For that reason, financial exclusion relates most closely to the economic theory of consumer savings and, in particular, the credit or liquidity constraint concept rooted in the life-cycle model of consumption.[6]

Financial exclusion is a small but significant component of social exclusion. Social exclusion has been explained as having two broad components, namely, economic or structural exclusion (distributional

dimension) and social–cultural (relational dimension).[7] Economic or structural exclusion (distributional dimension) consists of material deprivation and inadequate access to government as well as semi-government provisions ('social rights'). Material deprivation refers to deficiencies in relation to basic needs and material goods; 'lifestyle deprivation'; problematic debts; and payment arrears. Inadequate access to government as well as semi-government provisions ('social rights') implies waiting lists as well as financial impediments and other obstacles to: health care; education (especially of children); housing; legal aid; social services; debt assistance; employment agencies; social security; commercial services such as banking and insurance, coupled with insufficient safety. Social–cultural exclusion (relational dimension) means insufficient social and cultural integration. Insufficient social integration means a lack of participation in formal and informal social networks, including leisure activities, inadequate social support and isolation. Conversely, insufficient cultural integration implies a lack of compliance with core norms and values associated with active social citizenship, indicated by: a weak work ethic; abuse of the social security system; delinquent behaviour; deviating views on the rights and duties of men and women, and lack of involvement in the local neighbourhood and society at large.

FINDINGS

This section presents the findings regarding innovations and how they relate to the financial needs of the financially excluded (unbanked, underbanked, financially illiterate) under the following headings: savings; big data credit scoring; microinsurance; payments; banking services for the excluded poor; financial literacy; and consumer protection.

New information communication technologies (ICTs) are vital in ameliorating financial exclusion. New financial service technologies such as automated teller machines (ATMs) and internet banking reduce bank operational costs and enhance the potential of delivering financial services universally.[8] The more recent financial service technologies such as chip cards offer further potential for reducing bank costs. For basic banking access, these technologies ought to be accessible to low-income people. It is worth noting that internet-based access for people without a computer (or smartphone) or without reliable internet connectivity is not helpful. Ideally, banks should think carefully about the assets and financial needs of low-income people. There is mixed evidence[9] that bricks-and-mortar branches are still vital to all people (low- and high-income people), in part because people still prefer the in-person transaction where there is a human face and voice.

Savings

The assessment of the extent and use of savings among poor households has long been constrained by a limited view of what constitutes savings. 'Savings' are often narrowly defined as monetary accumulations in bank accounts with balances that are held for long periods. Recent empirical work has clarified understanding of the financial lives of the poor — including the use of very short-term savings via a wide variety of mechanisms. The typical participant in Portfolios of the Poor[10] moved much more than their annual income through various financial transactions during the year. Throughout the year, participants continuously build up and draw down very short-term savings balances. Nevertheless, it should be noted that if one looks at the change in their balances on a year-to-year basis, there is usually relatively little increase.

Poor households also often seem to put their long-term savings into other forms of capital. One savings mechanism that is not frequently counted is investing in children's education. In many countries, the returns to education are quite high,[11] and children are expected to use earnings to support the extended family. Investing current income to generate future income via education is therefore a form of saving.

Poor households save by investing in a family-run microenterprise.[12] If these investments in a microenterprise help to secure a steady future income, they can perhaps be considered a form of annuity. Poor households also invest in durable goods, livestock and jewellery. Although these investments are not typically thought of as savings, they are assets that hold value and are often highly liquid (in that they can be exchanged for cash for other valuables) and can be more liquid than a bank account.[13] Whereas research is broadening understanding of the savings behaviour of the poor beyond formal long-term savings, access to more traditional savings products is also expanding rapidly, owing to technological, business model and regulatory changes. Regulatory approval of savings transactions via mobile banking and mobile money could suddenly provide access to formal savings accounts for millions of people.[14]

Simply getting access to a safe box reduced participation over time in group-level saving devices.[15] They stress that, potentially, access to such technology could cause people to exit insurance networks entirely. Group-level pro-poor saving devices include Rotating Savings and Credit Associations (ROSCAs), which are among the oldest and most prevalent saving institutions in the world. These can be defined as associations of men and women who meet at regular intervals and distribute a lump sum of money to one of the members, using funds made up of the variable or fixed contributions of each member of the association.[16] Economic theories suggest that individuals join ROSCAs to finance the purchase of a lumpy durable good, as a response to intra-household conflict over savings or to provide insurance. An alternative hypothesis for ROSCA participation has been proposed:[17] saving requires self-discipline, and ROSCAs provide a collective mechanism for individual self-control in the presence of time-inconsistent preferences and in the absence of alternative commitment technologies.

Rotating Savings and Credit Associations have been examined from three perspectives as economic, cultural and social institutions. They are some of the most common informal financial systems found in the developing world, and provide goods or benefits that are missing or underprovided in the community.[18] As a cultural institution, cultural fairness as well as norms affect the optimal organisational design of a ROSCA. The ROSCA is an economic institution capable of providing saving, credit and insurance opportunities. Finally, as a social institution, the ROSCA serves as a social meeting place, a provider of social aid and a way of increasing savings through social learning when saving is difficult. Reciprocity and commitment to the group are essential in order for the ROSCA to be sustainable, and this is mainly achieved though social enforcement. There are saving devices that have developed over time, which are variants of ROSCAs. These include among others: Village Savings and Loans Associations;[19] Savings and Credit Cooperatives; and Accumulating Savings and Credit Associations.[20]

Researchers have tested the effectiveness of self-help peer groups such as a commitment device for precautionary savings. To this end, Kast *et al.*[21] tested the effectiveness of self-help peer groups as a

commitment device for precautionary savings by means of two randomised field experiments among 2,687 Chilean microentrepreneurs. The first experiment found that self-help peer groups were a powerful tool for increasing savings (the number of deposits grows 3.7-fold, and the average savings balance almost doubles). In contrast, a more classical measure, a substantially increased interest rate, had no effect for most participants. A second experiment tested an alternative delivery mechanism and showed that effects of similar size can be achieved by holding people accountable through feedback text messages, without meetings or peer pressure. This finding demonstrates to some degree the complementarity that exists between formal financial institutions and mobile network operators in enhancing saving behaviour.

Big data credit scoring

Credit scoring is the process of assigning a single quantitative measure, or score, to a potential borrower, which represents an estimate of the borrower's future loan performance.[22] New types of data are flowing into the computerised decision-making systems that determine who gets access to credit, and on what terms. This 'alternative data' has the greatest impact on financially underserved consumers, whose creditworthiness is not well described in traditional credit reports. Credit bureaus have begun to receive certain types of mainstream alternative data — such as a consumers' monthly bill payments — that are similar in kind to the monthly credit payments that have long been commonly included in credit files. These data have the potential to expand the accessibility of mainstream credit.[23]

There is no agreement, however, as to what big data actually are. The classic definition is in terms of volume (the sheer size of the data), velocity (the speed with which the data are collected and need to be processed), and variety (the different formats of data) — but there are other definitions.[24] Most discussions suggest that some or all of the following features are found in big data: (i) data volumes are higher than a given organisation is accustomed to processing; (ii) data volumes are larger than can be handled by traditional database technology; (iii) external data that are brought into the business from third-party or public sources; (iv) some of the data may come from social media; (v) a significant amount of data may be highly unstructured (eg voice or video); (vi) various data sets of different types are integrated together for analysis; and (vii) real-time or near-real-time analysis is sometimes required. The Center for Financial Services Innovation[25] noted that big data can be understood as the collection and use of large data sets that can be broadly combined and distributed to identify patterns and create new data based on these insights — known as metavariables — to increase the effectiveness and efficiency of consumer finance products. Hadley[26] noted that advanced analytics using big data sets derived from credit databases can help to achieve the goal of greater financial inclusion. Big data can bring immense opportunity for improving financial inclusion among the world's financially underserved communities.

Microinsurance

Given that the benefits of financial services for the poor are now more universally recognised and accepted, and because microcredit is becoming a common tool in the infrastructure of developing countries, it is useful to look at another beneficial tool for the building of sustainable infrastructure in the developing world. Like microcredit, microinsurance has the potential to aid the lives of the world's poorest people significantly and have a

positive impact on the development of the world's poorest countries. Roth *et al.*[27] define microinsurance as the protection of low-income people against specific perils in exchange for regular premium payments proportionate to the likelihood and cost of the risk involved.

Community-based microinsurance has aroused much interest and hope in meeting health care challenges faced by the poor. Ahuja and Jütting[28] explore how institutional rigidities, such as credit constraint, affect the demand for health insurance, and how insurance could potentially prevent poor households from falling into the poverty trap. In this setting, they argue that the appropriate public intervention to generate demand for insurance is not to subsidise premium, but to remove these rigidities (ie ease credit constraint). Thus, from an insurance perspective as well, their analysis highlights the importance of the poor having the appropriate saving and borrowing instruments.

Some microinsurance schemes tailored to rural areas provide useful lessons. For example, a pilot project in India set up by the microfinance institution BASIX and a commercial insurer, with the help of the World Bank, has been providing weather insurance for small farmers to improve their access to credit. This microinsurance scheme is based on a rainfall index. Payments are based not on individual loss adjustments — a costly undertaking not feasible in microinsurance — but rather on whether rainfall measured at a local weather station reaches a certain threshold. The insurance contracts are linked to credit, because the insurance secures repayment of the loans.[29]

Various developments across the global microinsurance sector highlight potential investment opportunities. Key developments include the growth of the market from 78 million lives covered in 2005 to over 2,632 million lives in 2013. Additionally, various innovations in distribution (such as the introduction of m-insurance: insurance sold through and with mobile network operators) have facilitated the provision of microinsurance on a profitable basis.[30]

Microinsurance can help low-income people manage their risks effectively. If microcredit provides the poor with their present financial needs, microinsurance will provide their unexpected and future financial requirements. The Asian Development Bank Institute,[31] however, reports that only 3 per cent of the world's low-income population is covered by formal microinsurance. It is noteworthy that regulators and supervisors in emerging economies have little experience or empirical data to support their role in creating an 'inclusive' insurance market that works effectively for the upper as well as the lower-income segments. Nevertheless, supervisors and other microinsurance promoters (such as insurers, governments, donors, consumer lobbies) note that a more conducive and enabling regulatory environment is required for the development of microinsurance. Many initiatives should be aimed at adapting regulations and laws to support the evolution of more inclusive insurance systems by encouraging existing insurers to serve low-income segments or by allowing microinsurers to evolve and integrate with the formal insurance sector.

Payments

Various payment systems have been developed over time. These include contactless cards, direct debits, credit transfers, cross-border or SWIFT payments, mobile and electronic payments as well as digital currencies such as bitcoin. The continued growth in volumes of electronic payments (e-payments) and mobile payments (m-payments) is putting pressure on all industry stakeholders to rap-

idly adopt these channels. M-payments transactions are expected to grow 60.8 per cent in 2015. E-payments growth is expected to decelerate to 15.9 per cent during the same period. There is a gradual convergence of e- and m-payments as the distinction between the two diminishes.[32]

Bitcoin became a fixture in the world financial news in late 2013 and early 2014. But the 'virtual currency' had been launched five years earlier by computer hobbyists, and in late 2013 the US dollar exchange rate for one bitcoin rose more than fivefold in the space of a few weeks. The market value of one bitcoin, which had begun trading at less than five cents in 2010, briefly exceeded US$1,200.00. The US Senate Committee on Homeland Security and Governmental Affairs held two days of hearings and government regulators testified that algorithmic, stateless currencies such as bitcoin had the potential to play useful roles in the commercial payment system.[33]

Bitcoin attempts to overcome the weaknesses of both fiat and gold-based money by functioning as an algorithmic currency with a deterministic supply and growth rate tied to the rigour of mathematics. Neither government nor other central authority can manipulate the supply of bitcoins. Rather, the currency is governed by cryptographic rules that are enforced by transparent computer code in a decentralised manner. Whilst some enthusiasts have suggested a connection between bitcoin's algorithmic growth rate and the monetary orthodoxy espoused by Milton Friedman, the bitcoin protocol appears to give little or no attention to any optimal monetary growth rate. Instead, it provides for the rate of seigniorage to slow asymptotically to zero by the year 2140, when the last bitcoin is planned to be released and the final total will be fixed at 21 million units.[34]

Money in the modern economy may be thought of as a series of claims, or 'IOUs'. In this sense, deposits held at commercial banks are an IOU, being a liability for the bank and an asset for the account holder. Most money is held as bank deposits, and the principal way that new money is created is through the creation of loans.[35] Whenever a bank makes a loan, it simultaneously creates a matching deposit in the borrower's bank account, thereby creating new money. Banknotes issued by a central bank are also a special form of non-convertible claim, of the physical bearer on the central bank, and are liabilities of the central bank and assets to the noteholder.

In contrast to commonly used forms of money such as banknotes or bank deposits, digital currencies are not a claim on anybody. In this respect, they can therefore be thought of as a type of commodity. But unlike physical commodities such as gold, they are also intangible assets, or digital commodities. Digital currencies have meaning only to the extent that participants agree that they have meaning. That agreement takes the form of a public ledger and a process for how changes to it are made, including the creation of new currency. Not being an IOU or liability of the central bank (or the state) does not prevent digital currencies from being used as money, but it marks an important difference between them and national currencies.[36]

Banking services for the excluded poor

There are various reasons to reform banking, such as improving efficiency, boosting competition and promoting financial inclusion. Banking is important for all people and especially poor people, and banking could be changed — radically or more moderately — to make it more accessible for them. In order to overcome financial exclusion, changes must be made

to bank practice and government policy.[37] To this end, financial institutions must design and provide appropriate banking services to meet the needs of low-income people. Banks can use technology channels such as ATMs), point of sale devices and mobile phones to handle transactions for poor people.

Branchless banking refers to the use of information communication technology to deliver financial services to low-income people beyond traditional banking channels and making use of non-bank retail agents. Because of the high operational costs associated with bricks-and-mortar bank branches, branchless banking is a potential avenue to explore to enhance financial inclusion.[38]

Some banks have supported the development of micro-entrepreneurs, who have hitherto been excluded from the traditional banking system. To this end, YES BANK of India developed several simple but effective financial inclusion tools to streamline access to capital for micro-entrepreneurs. For example, the bank noticed that there was no viable solution in the market for credit appraisal of micro-entrepreneurs who neither maintain formal business records nor file business details with authorities. The bank developed the Credit Appraisal Toolkit: an Excel-based data analysis tool that compares details orally provided by a micro-entrepreneur applying for a loan against those collected earlier from his or her peers for a better and faster credit approval decision. More importantly, YES BANK's inclusive model — fuelled by jugaad innovation — is profitable.[39]

Financial literacy

Financial skill/literacy is the ability to understand how money and the economy work, how people earn or make money, and how they invest and use it to help themselves and others. Many advantages arise from improvement of financial skill, and it follows that financial skill can result in economic growth. All people, irrespective of their socioeconomic background, have financial literacy needs. Financial literacy helps people to meet their life and financial goals.[40] Understanding household budgeting, expenditure control, future planning and effective decision making about investments can aid persons from a broad range of backgrounds. Formal financial institutions are obligated to ensure the financial literacy of their clients.

Financial inclusion is an international policy priority, and demand-side initiatives including financial education have an important role to play in helping individuals to access and use appropriate, formal financial products. Low levels of financial inclusion are associated with lower levels of financial literacy.[41] The need for better informed and financially literate consumers has been prompted by the proliferation of complex financial products in the market, the growing number of people reaching retirement, the shift towards personal responsibility to fund retirement, and the advent of electronic and internet banking.[42] Financial products are now increasingly difficult to assess for people unfamiliar with basic financial and economic concepts, and thus the performance of financial products is almost impossible to predict in an informed way. Thus, education is needed for financially literate, knowledgeable and informed consumers.

Kurihara[43] empirically examines whether or not financial skill causes economic growth, and shows that financial skill brings growth compared with other skills (eg English and information technology); however, financial skill does not necessarily shrink the economic divide. Financial skill plays a role in most theories of persistent inequality.

Consumer protection

Consumer protection and financial literacy enhance improved efficiency, transparency, competition and access to retail financial markets by reducing information asymmetries and power imbalances among providers and users of financial services. Rapid progress toward widespread financial inclusion must be appropriately complemented with 'checks and balances' that ensure a responsible provision of financial services and products.[44] Financial literacy coupled with consumer protection and capability can support financial inclusion. This can be done by encouraging competition, which leads to more cost-effective and higher-quality products, and by increasing consumer confidence and reducing risk when purchasing financial products and services. This is because they know the appropriate remedies when things go wrong.

Competition policy represents an important part of consumer protection. This is because healthy competition among providers rewards better performers and increases the power that consumers can exert in the marketplace. Appropriate consumer protection regulation, credit market infrastructure and legal provisions for the orderly discharge of excessive debt burdens (personal bankruptcy) can reduce the need for political interventions in the credit market, which are prone to introduce additional distortions into the credit market. Consumer protection is particularly useful if there are gaps in financial literacy and financial capability. Legal and regulatory protections can extend across the product life cycle by influencing the way products are designed and marketed to consumers, promoting the disclosure of fees and interest when products are purchased, and specifying mechanisms for redress and appropriate collection procedures if problems arise.[45]

CONCLUSION

Financial inclusion is of great relevance to the development agenda, including the post-2015 framework. It can contribute to poverty reduction and economic and social development, particularly for women and youth. This importance has also been increasingly recognised by international fora such as the G8 or the G20, with the latter endorsing nine principles for innovative financial inclusion. Similarly, a network of financial regulatory authorities from several developing countries committed to policies and regulations towards financial inclusion by adopting the 'Maya Declaration'.[46]

In 2009, a workshop on 'Promoting Financial Inclusion through Innovative Policies' was jointly organised by the Asian Development Bank Institute, Asia Pacific Economic Cooperation (APEC), APEC Business Advisory Council and the Alliance for Financial Inclusion (AFI), in collaboration with the Foundation for Development Cooperation, the Inter-American Development Bank (IDB), and the International Finance Corporation (IFC). The workshop deliberated on solutions identified by the Alliance for Financial Inclusion.

The AFI is a global network of policy makers in developing countries whose roles are: (i) facilitating dialogue and cooperation among policy makers in developing countries to share and develop their knowledge of cutting-edge policies; (ii) providing policy makers with grants to develop and implement their chosen solutions; (iii) connecting policy makers with the right partners across the value chain; and (iv) keeping members up to date with the latest authoritative research from around the world, supported by research commissioned by AFI and its members.

The AFI identified a number of 'solutions' for facilitating greater access to financial services: agent banking; mobile

banking; diversifying providers; reforming public banks; financial identification, and consumer protection.[47]

(i) *Agent banking (or 'branchless banking'):* Innovative policies and regulations can facilitate partnerships that enable non-bank agents to provide distribution outlets for financial services, agents such as post offices, retail commercial outlets, lottery kiosks and pharmacies. To promote this scheme, regulation needs to be 'proportional' to allow agent banking to progress within reasonable level of risk for the involved parties.

(ii) *Mobile banking:* There are over a billion people in emerging markets today who do not have a bank account, but do have a mobile phone. Mobile technologies and services can facilitate access to financial services, such as cash deposits and withdrawals, third-party deposits into a user account, retail purchases, over-the-air prepaid top-ups using cash in the user's account, transfer of cash or airtime credits between user accounts and bill payments. Mobile phone banking presents challenges to regulatory capacity, as it cuts across various regulatory domains, including banking; telecommunications; payments systems; and anti-money laundering.

(iii) *Diversifying providers:* Regulatory reform can lower barriers for start-up institutions and the development of various financial products geared to low-income clients. Policy instruments must be designed to promote new entrants without distorting the market.

(iv) *Reforming public banks to improve access to finance:* State banks can be reformed and managed such that they contribute to financial inclusion, but through commercially sustainable financial services. National Development Banks can play an important role in promoting and expanding financial inclusion through three channels: innovation in financial products; innovation in financial processes; and strengthening its interconnectivity with the rest of the financial system, including commercial banks. Increasing financial inclusion requires, in part, including and addressing both the innovation in financial products and financial processes as important channels for promoting financial access and inclusiveness.

(v) *Financial identification:* Many people lack a 'financial identity', which constrains their access to formal financial services. Many poor people even lack personal identity, such as having no birth record. Financial identity can be created by drawing on people's transaction history as a financial asset. Regulatory frameworks need to adopt a flexible approach to supporting the generation of financial identity, facilitating information sharing in the initial stages of development and introducing protective measures during the later stages that involve large-scale information processing.

Biometric ATMs are a new innovation for targeting the unbanked population. Using thumbprint and voice guidance in ATMs reduces literacy requirements to a considerable extent. Establishing the identity of a rural depositor through biometrics makes it possible for illiterate or barely literate people to have access to formal financial services. A simplified menu on ATMs coupled with possible audio guidance in local language enables easy use for rural masses.

(vi) *Consumer protection:* Consumer protection policies are necessary to address

technical and delivery security, reduce predatory lending and increase disclosure of information, facilitate efficient dispute settlement, enhance data protection and improve comparability of offers. The key elements are transparency, fairness, responsibility and fair recovery practices. But financial literacy is low in all developing countries (and many developed countries), which means that financial education must also be pursued in parallel with consumer protection.

Enhanced saving is the shortcut to accessing loans. The usage level of mobile money, and how it has accelerated financial inclusion among the rural communities has been investigated in an emerging economy: namely, Zimbabwe.[48] The findings show that the use of mobile money by the unbanked rural people is very high, especially for sending and receiving remittances. But the saving and loan aspects of mobile money were not very popular. Users were still relying on their traditional methods of saving and borrowing. The implications are that the service providers need to increase their awareness programmes targeting this specific market to encourage them to migrate from traditional ways to safe and secure way of saving their meagre income; more so, that their saving patterns will determine their access to loans.

Because personal characteristics and the external environment can affect the financial functioning and well-being of children and youth, who are the future of all societies, efforts geared toward financial inclusion should take note of the following individual and structural theories:

(i) *Theory of planned behaviour:* Children and youth may be more motivated to save when they receive support and encouragement from adults and recognise that saving can help them achieve goals.
(ii) *Developmental perspective:* Children and youth should be taught about and exposed to financial services in developmentally appropriate ways based on cognitive and psychological stages of development.
(iii) *Social learning theory:* Financial knowledge as well as other forms of knowledge are influenced by observation of the actions and attainments of others, especially including families, which are among the earliest and most robust influences on a child.
(iv) *Theory of possible selves:* Children and youth who are brought into and learn about the financial system at a young age may be better able to envision economic participation and engage in the financial world.
(v) *Behavioural economics:* Financial systems should be designed to reflect real human behaviour.
(vi) *Institutional theory:* Structures must be in place to allow children and youth access to beneficial financial education and services.[49]

Acknowledgments

The authors gratefully acknowledge financial support from the Cambridge–Africa Partnership for Research Excellence (CAPREx) Program and the Alborada Research Trust. Additionally, they thank the anonymous reviewers for helpful feedback. The usual disclaimer applies.

References

(1) Access through Innovation Sub-Group of the G20 Financial Inclusion Experts Group. (2010) 'Principles and Report on Innovative Financial Inclusion', available at: http://www.gpfi.org/publications/principles-and-report-innovative-financial-inclusion (accessed 5th March, 2015).

(2) Pande, R., Cole, S., Sivasankaran, A., Bastian, G. and Durlacher, K. (2012) 'Does Poor People's Access to Formal Banking Services Raise their Incomes?' EPPI-Centre, Social Science Research Unit, Institute of Education, University of London.
(3) Mehrotra, A. and Yetman, J. (2015) 'Financial Inclusion: Issues for Central Banks', *BIS Quarterly Review*, March, pp. 83–96.
(4) Boot, A. W. A. and Thakor, A.V. (1997) 'Banking Scope and Financial Innovation', *Review of Financial Studies*, Vol. 10, No. 4, pp. 1099–1131.
(5) Allman, D. (2013) 'The Sociology of Social Inclusion', SAGE Open, January–March, pp. 1–16.
(6) Fuhrer, J. C. (1992) 'Do Consumers Behave as the Life Cycle/ Permanent-Income Theory of Consumption Predicts?' *New England Economic Review*, September, pp. 3–14.
(7) Jehoel-Gijsbers, G. and Vrooman, C. (2007) 'Explaining Social Exclusion; a Theoretical Model Tested in the Netherlands', The Netherlands Institute for Social Research, The Hague.
(8) Buckland, J. (2012) 'Hard Choices: Financial Exclusion, Fringe Banks, and Poverty in Urban Canada', University of Toronto Press, Toronto.
(9) Castro, D., Atkinson, R. and Ezell, S. (2010) 'Embracing the Self-Service Economy', Information and Technology Foundation, available at: http://www.itif.org/files/2010-self-service-economy.pdf (accessed 2nd March, 2015).
(10) Collins, D., Morduch, J., Rutherford, S. and Ruthven, O. (2010) 'Portfolios of the Poor: How the World's Poor Live on $2 a Day', Princeton University Press, Princeton, NJ.
(11) Lau, L. J., Jamison, D. T. and Louat, F. F. (1991) 'Education and Productivity in Developing Countries; An Aggregate Production Function Approach', World Bank Policy Research Working Paper Series No. 612.
(12) Dupas, P. and Robinson, J. (2012) 'Savings Constraints and Microenterprise Development: Evidence from a Field Experiment in Kenya', NBER Working Paper No. 14693.
(13) Collins, D. *et al.*, ref. 10 above.
(14) Alexandre, C., Mas, I. and Radcliffe D. (2010) 'Regulating New Banking Models that can Bring Financial Services to All', *Challenge* Magazine, Vol. 54, No. 3, pp. 116–134.
(15) Dupas, P. and Robinson J. (2013) 'Why Don't the Poor Save More? Evidence from Health Savings Experiments', *American Economic Review*, Vol. 103, No. 4, pp. 1138–1171.
(16) Lasagni, A. and Lollo E. (2011) 'Participation in Rotating Savings and Credit Associations in Indonesia: New Empirical Evidence on Social Capital', Working Paper No. 5/2011 Serie: Economia e Politica Economica.
(17) Gugerty, M. K. (2005) 'You Can't Save Alone: Commitment in Rotating Savings and Credit Associations in Kenya', available at: http://www.sscnet.ucla.edu/polisci/wgape/papers/2_Gugerty.pdf (accessed 2nd March, 2015).
(18) Sandsør, A. M. J. (2010) 'The Rotating Savings and Credit Association — An Economic, Social and Cultural Institution', unpublished Master of Economic Theory and Econometrics thesis, University of Oslo.
(19) Brannen, C. (2010) 'An Impact Study of the Village Savings and Loan Association (VSLA) Program in Zanzibar, Tanzania', unpublished BA thesis, Wesleyan University.
(20) Center for Social Development (2013) 'Conceptual Development of the CYFI Model of Children and Youth as Economic Citizens', *CSD Research Review*, No. 13-03.
(21) Kast, F., Meier, S. and Pomeranz, D. (2014), 'Under-Savers Anonymous Evidence on Self-Help Groups and Peer Pressure as a Savings Commitment Device', Working Paper 12-060.
(22) Federal Reserve Bank of Atlanta (20010, 'The Diffusion of Financial Innovations: An Examination of the Adoption of Small Business Credit Scoring by Large

Banking Organizations', Working Paper 2001-9.
(23) Yu, R. (2014), 'Knowing the Score: New Data, Underwriting, and Marketing in the Consumer Credit Marketplace A Guide for Financial Inclusion Stakeholders', Ford Foundation New York.
(24) Capgemini (2012) 'Big Data: Next-Generation Analytics', Capgemini, available at: https://www.capgemini.com/resources/big-data-next-generation-analytics (accessed 20th August 2015).
(25) Center for Financial Services Innovation (2015) 'Big Data, Big Potential: Harnessing Data Technology for the Underserved Market', Center for Financial Services Innovation, Chicago.
(26) Hadley, T. (2014), 'Harnessing Big Data and Big Data Analytics to Improve Financial Inclusion', available at: http://www.experian.com/blogs/news/2014/09/13/big-data/ (accessed 21st May, 2014).
(27) Roth, J., McCord, M. J. and Liber, D. (2007) 'The Landscape of Microinsurance in the World's 100 Poorest Countries', *Microbanking Bulletin*, No. 15, pp. 9–14.
(28) Ahuja, R. and Jütting, J. (2004) 'Are the Poor Too Poor to Demand Health Insurance?', *Journal of Microfinance/ESR Review*, Vol. 6, No. 1, pp. 1–21, available at: http://scholarsarchive.byu.edu/esr/vol6/iss1/2 (accessed 20th August 2015).
(29) Wiedmaier-Pfister, M. and Klein, B. (2010) 'Microinsurance Innovations in Rural Finance', Focus 18, Brief 12 International Food Policy Research Institute, Washington, DC.
(30) Leach, J., Ncube, S. and Menon, a. (2014), 'Exploring New Frontiers: The Potential of Impact Investments in Microinsurance', available at: http://www.microfinancegateway.org/library/exploring-new-frontiers-potential-impact-investments-micro insurance (accessed 2nd March, 2015).
(31) Asian Development Bank Institute (2010) 'Promoting Financial Inclusion through Innovative Policies', available at: http://www.adbi.org/book/2010/10/14/4089.financial.inclusion.innovative.policies/ (accessed 3rd March, 2015).
(32) Capgemini and The Royal Bank of Scotland (2014), 'World Payments Report 2014', Capgemini and The Royal Bank of Scotland.
(33) Yermack, D. (2013) 'Is Bitcoin a Real Currency? An Economic Appraisal', National Bureau of Economic Research Working Paper. 2013 No. 19747.
(34) *Ibid*.
(35) McLeay, M., Radia, A. and Thomas R. (2014), 'Money Creation in the Modern Economy', *Bank of England Quarterly Bulletin*, Vol. 54, No. 1, pp. 14–27.
(36) Ali, R., Barrdear, J., Clews, R. and Southgate J. (2014), 'The Economics of Digital Currencies', *Quarterly Bulletin*, Q3.
(37) Buckland, J. (2012) 'Hard Choices: Financial Exclusion, Fringe Banks, and Poverty in Urban Canada', University of Toronto Press, Toronto.
(38) Pickens, M., Porteous, D. and Rotman Parker, S. (2009) 'Focus Note: Scenarios for Branchless Banking in 2020', CGAP and Department for International Development, London.
(39) Radjou, N., Prabhu, J. and Ahuja, S. (2012) 'Jugaad Innovation: Think Frugal, Be Flexible Generate Breakthrough Growth', 1st edn, Jossey-Bass, San Francisco, CA.
(40) Buckland, J. (2012) 'Hard Choices: Financial Exclusion, Fringe Banks, and Poverty in Urban Canada', University of Toronto Press, Toronto.
(41) Atkinson, A. and Messy, F. (2013) 'Promoting Financial Inclusion through Financial Education: OECD/INFE Evidence, Policies and Practice', OECD Working Papers on Finance, Insurance and Private Pensions, No. 34, available at: http://dx.doi.org/10.1787/5k3xz6m88smp-en (accessed 25th February, 2015).
(42) Capuano, A. and Ramsay, I. (2011) 'What Causes Suboptimal Financial Behaviour? An Exploration of Financial Literacy, Social Influences and Behavioural Economics', Research Report of the

Centre for Corporate Law and Securities Regulation, The University of Melbourne.
(43) Kurihara, Y. (2013) 'Does Financial Skill Promote Economic Growth?' *International Journal of Humanities and Social Science*, Vol. 3, No. 8, pp. 92–97.
(44) World Bank (2013) 'Global Survey on Consumer Protection and Financial Literacy: Results Brief Regulatory Practices in 114 Economies', The World Bank, Washington, DC.
(45) World Bank (2014), 'Global Financial Development Report 2014: Financial Inclusion', World Bank, Washington, DC.
(46) UNCTAD (2015) 'Trade, Remittances and Financial Inclusion', UNCTAD Submission to the Thirteenth Coordination Meeting on International Migration, New York, NY, 12th–13th February.
(47) Asian Development Bank Institute, ref. 31 above.
(48) Thulani, M., Chitakunye, P. and Chummun, B. Z. (2014) 'Mobile Money as a Strategy for Financial Inclusion in Rural Communities', *Mediterranean Journal of Social Sciences*, Vol. 5, No. 25, pp. 217–224.
(49) Center for Social Development, ref. 20 above.