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Is Inclusive Digital Innovation Inclusive? An Investigation of M-Shwari in Kenya

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Abstract. Inclusive digital innovations are IT-enabled innovations with the potential to promote inclusive socioeconomic development for the poor and underserved inhabitants of developing countries. This paper inquires about the extent to which this worthy objective has actually been achieved. Specifically, the paper focuses on M-Shwari, the Kenyan mobile savings and credit service. Although members of the development community and other stakeholders might hope M-Shwari to serve poor, rural, and financially underserved Kenyans, the research findings show that M-Shwari primarily reaches wealthier urban inhabitants who are already financially served. These results call for greater scholarly attention to excluded groups when evaluating the impacts of digital innovations in developing countries.

Keywords: Inclusive Digital Innovations, Inclusive Development, Financial Inclusion, Excluded Segments, M-Shwari

1 Introduction

Digital innovations provide digitized services and goods that can be accessed and consumed on a massive scale by circumventing traditional costs and risks associated with physical components and relationships (e.g., Tilson et al., 2010; Yoo et al., 2012; Kallinikos et al., 2013). In the past decade, digital innovations have been leveraged as important enablers of inclusive socioeconomic development (e.g., Avgerou, 2008; Nielsen, 2017). For example, M-Pesa, the mobile financial services in Kenya, has been applauded as a success story in serving financially excluded people and enabling inclusive development (e.g., Jack et al., 2013; GSMA, 2015; Aron, 2017).

The potential benefits of digital innovations are of great interest to scholars, especially those in the field of Information and Communication Technologies for Development (ICT4D). Nevertheless, in his comprehensive literature review, Nielsen (2017) identified a significant lack of empirical and theoretical research on digital innovations *in developing countries*. Although digital innovations offer new opportunities for developing countries, a number of studies reveal the reproduction of old challenges and barriers and the emergence of new ones (e.g., Madon et al., 2009; van Dijk, 2013; Kibere, 2016). Accordingly, Nielsen (2017) queried: "*Will digital innovation become the source of yet another digital divide?*" (p. 7). Obviously, we need more empirical research on the intended and unintended consequences of

particular digital innovations in developing countries (Walsham & Sahay, 2006), and we need to develop a better understanding of how users participate in digital innovations in these contexts (Nielsen, 2017).

In response to that call for future research, this paper attempts to assess the impacts of a potentially inclusive digital innovation. Drawing on the inclusive innovation literature (e.g., George et al., 2012; Foster & Heeks, 2013), we define inclusive digital innovations as innovations with the potential to enable inclusive socioeconomic development. The paper focuses mainly on the excluded inhabitants of developing countries, referring broadly to poor people bypassed by mainstream development (e.g., Heeks et al., 2013). The reason for this focus is our fundamental question about whether digital innovations can truly promote inclusion without being used by those who were previously excluded. Accordingly, the paper addresses this research question:

To what extent do inclusive digital innovations serve excluded segments of developing country populations? Focusing on excluded groups could have important implications for future ICT4D research: The extent to which previously excluded groups employ inclusive digital innovations could be considered an important criterion for evaluating digital innovation success.

This paper answers the research question by looking into a particular inclusive digital innovation: M-Shwari. Building on the ubiquitous M-Pesa infrastructure, M-Shwari was introduced in Kenya in 2012 as an advanced mobile financial innovation offering convenient, affordable, and secure savings and credit services. As of 2015, there were over 10 million M-Shwari accounts, accounting for about 20% of the Kenyan adult population.[1] Despite this remarkable adoption level, the uptake of M-Shwari has been limited compared with M-Pesa (Mirzoyants-McKnight & Attfield, 2015). Given that M-Pesa is considered a financial inclusion success (e.g., GSMA, 2015; Aron, 2017), it is of interest to see whether the less well-known M-Shwari has been similarly successful in reaching excluded segments of the Kenyan population.

Using data retrieved from the Kenyan FinAccess Household Survey 2016,[2] this paper finds that M-Shwari does not effectively reach poor, rural, and financially underserved inhabitants. These findings contribute to ICT4D and mobile financial services literatures by calling for greater attention to excluded groups when examining the consequences of digital innovations in developing countries.

2 Literature

In this section, we discuss inclusive digital innovations in developing countries and analyze M-Shwari as an instance of inclusive digital innovation. Then, we move on to identify the excluded segments that M-Shwari might be hoped to serve.

2.1 Inclusive Digital Innovation in Developing Countries

One of the most prominent issues in developing countries is social exclusion, which causes further unequal distribution of resources and life chances (e.g., van Dijk & Hacker, 2003). Central to social exclusion is the lack of access or obstacles to

meaningful participation in social activities and the ability to benefit from mainstream development (e.g., Sen, 2000). Such marginalization is also deeply rooted in the realm of innovation ecosystems. Heeks et al. (2013, p. 2) argued that "*innovations in developing countries have been conventionally associated with inequality, and have little connection or relevance to the low-income majority of the population*." Against this background, growing scholarly attention has been given to inclusive innovation, which focuses on active inclusion of groups who are marginalized or excluded from mainstream development (George et al., 2012; Foster & Heeks, 2013; Heeks et al., 2013).

Over the past decade, digital innovations have been leveraged to promote inclusive development in developing countries. One noteworthy feature of inclusive digital innovations is the provision of digitized services to marginalized or excluded groups in a convenient and affordable way, by alleviating the traditional time, space, and physical constraints on service delivery. In this way, digital innovations can arguably stimulate inclusive development not only by more equally distributing life chances, but also by affording the marginalized the ability to obtain needed resources and thus participate more fully in socioeconomic life.

Mobile financial services have been the first inclusive digital innovations in developing countries and the most successful so far. Mobile financial services employ telecommunication technology and non-bank retail channels to extend the delivery of basic financial services to those who could not be reached profitably with traditional branch-based financial services (GSMA, 2015). Mobile financial services are considered digital innovations because they are enabled by digitally rearranging formerly disconnected sociotechnical elements (e.g., cash, mobile phone, transactional agents) such that users are able to access and use previously unavailable basic financial services. The fundamental novelty lies in the digitization of cash into e-money and the use of mobile phones as the medium for money transfer. Operating with e-money, mobile financial services provide a range of advantages over traditional cash-based services. That is, they relax time-space constraints, reduce transaction costs, and help users avoid financial risks associated with the use of cash (Jack et al., 2010; Aron, 2017). Studies show that use of mobile financial services by financially excluded people has contributed to greater financial inclusion and generated socioeconomic benefits at the household, business, community, and society levels (e.g., Jack & Suri, 2014; Wanyonyi & Bwisa, 2013; Aron, 2017; Demirguc-Kunt et al., 2017).

2.2 M-Shwari: An Inclusive Digital Innovation

To discuss M-Shwari in Kenya, we need to start with M-Pesa, the most successful mobile financial service to date. M-Pesa provides the basic financial service of money transfer via mobile phones. In the six years after its launch in 2007, registered M-Pesa accounts outnumbered the Kenyan adult population.[3] This impressive level of adoption was partly due to the growth of a network of transactional agents (Jack & Suri, 2014) who help users with registration and provide cash-in, cash-out services. In a country with 1,500 bank branches, roughly 165,000 M-Pesa agents were scattered

across the country as of 2016.[4] Building upon this extensive M-Pesa infrastructure, M-Shwari was launched in November 2012 as a joint product of the Commercial Bank of Africa and Safaricom. Beyond the basic money transfer provided by M-Pesa, M-Shwari provides the advanced financial services of savings and credit. M-Shwari enables users to save digitally by transferring e-money between M-Pesa and M-Shwari accounts with no fees.

Like M-Pesa, M-Shwari is an example of an inclusive digital innovation in developing country, mainly because it holds the potential to promote financial inclusion by serving those who have little or no access to savings and credit services. M-Shwari can close the financial services gap created by the poor *formal* financial services infrastructure and limited *informal* financial services options in Kenya. Developing countries tend to have poor formal financial infrastructure (e.g., low and biased penetration of bank branches and ATMs), which leads to low adoption and usage of formal financial services (Triki & Faye, 2013; Evans & Pirchio, 2015). In particular, fewer than 30% of Kenyan households save (and fewer than 20% borrow) with formal institutions (Demirgüç-Kunt et al., 2018). This limited usage level is attributable to financial barriers such as inaccessibility (i.e., geographic limitation), affordability (i.e., minimum opening balance), and ineligibility (i.e., heavy bureaucratic processes) (Beck et al., 2008).

It is therefore not surprising that Kenyan households, especially those excluded, rely on a variety of *informal* financial services (e.g., Rutherford, 2000; Jack & Suri, 2014), i.e., hiding cash at home, keeping livestock, saving or borrowing with friends, and saving or borrowing with ROSCAs and ASCAs[5]. Although these approaches can work, they involve costs and risks (Karlan et al., 2014). The noteworthy shortcomings of ROSCAs and ASCAs concern geographical constraints and limited liquidity (Mas, 2010). Saving at home is neither safe nor protected from the temptation of spending (Banerjee & Duflo, 2007). The general risk associated with informal savings is money loss (Wright & Mutesasira, 2001). In addition, the current microcredit services in Sub-Saharan Africa are criticized for inefficient loan repayment, high interest rates, and ineffective provision to target groups (Stewart et al., 2010).

The insufficient and ineffective provision, operation, and distribution of traditional savings and credit services are in part due to excessive use of cash (Radcliffe & Voorhies, 2012). However, the savings and credit services of M-Shwari involve cash to a minimum level, offering a number of advantages. The major benefits of M-Shwari are accessibility and convenience. M-Shwari allows users to receive personalized savings and credit services anytime and anywhere via their phones, overcoming the time-space constraints of traditional financial services. Moreover, M-Shwari's reduced need for cash offers security and privacy for users as no one can find out how much is saved or borrowed (Cook & McKay, 2015; Mirzoyants-McKnight & Attfield, 2015). Thus, M-Shwari has the potential to provide advanced financial services to the previously underserved and to advance inclusive development by enabling the poor to live productive lives, achieve stable livelihoods, and plan for the future.

2.3 Excluded Population Segments

From the point of view of M-Shwari's commercial operators, the first priority is make a profit from inclusive digital innovations (Qureshi, 2013). However, from the perspective of the inclusive innovation and development communities, what really matters is the extent to which an inclusive digital innovation actually fulfills its promise of inclusion for poor and marginalized population segments. With advancement of ICT, excluded groups have received increased scholarly attention. For example, in the digital divide literature, studies shed light on those with low socioeconomic status, who lag behind in terms of accessing and using ICTs. (e.g., van Dijk & Hacker, 2003; Dewan & Riggins, 2005). Also, in the inclusive innovation literature, Forster and Heeks (2013, p. 335) defined inclusive innovation as the inclusion within some aspect of innovation of groups who are currently marginalized. Similarly, George et al. (2012) argued that inclusive innovative activities should target individuals in disenfranchised sectors of society. In their conceptualizing inclusive innovation, Heeks et al. (2013, p. 4) contended that "*an innovation is inclusive if it is adopted and used by the excluded group*."

So, who constitute the excluded segments that members of the inclusive innovation and development communities might hope M-Shwari to serve? The mobile financial services literature provides some insights. However, that research focuses on the socioeconomic characteristics of *actual* users. The common finding is that households who are better educated, affluent, banked, and living in urban areas are more likely to use mobile money transfer services like M-Pesa (e.g., Jack & Suri, 2011; Mbiti & Weil, 2011; Munyegera & Matsumoto, 2014). M-Shwari, as a more recent phenomenon, has received little attention, with two exceptions. Cook and McKay (2015) and Mirzoyants-McKnight and Attfield (2015), drawing on the interviews with M-Shwari users, showed that users tend to be young, male, and urban dwellers with a high level of education. Although those findings are informative, they do not tell us whether and to what extent *excluded population segments* are among the actual users. By contrast, this paper focuses on the gap between whom M-Shwari currently serves and whom the development community would hope the innovation to serve.

Exclusion is a multidimensional concept (Prahalad, 2012) that varies across inclusive digital innovations. Therefore, it needs to be contextualized in a particular research setting. Three socioeconomic factors—poverty, residence, and the degree of financial inclusion/exclusion—are of particular interest to financial inclusion scholars for the study of the financially excluded (e.g., Demirgüç-Kunt et al., 2018; Jack & Suri, 2014; Sahay et al., 2015; Triki & Faye, 2013). Drawing on that literature, we consider the excluded segments in this paper to be the poor, the rural, and financially underserved Kenyan households.

3 Methods

To identify the impact of M-Shwari on excluded segments of the Kenyan population, this paper employs set diagram analysis. In social science, set diagrams are

particularly useful for studying the intersections among the different categories to which social actors belong (Mahoney & Vanderpoel, 2015). This paper uses this technique to graphically represent the overlap between actual users of M-Shwari and previously excluded groups in terms of poverty, residence, and traditional financial inclusion. Data was retrieved from the Kenyan FinAccess Household Survey 2016. This survey is the fourth in a series of surveys (2006, 2009, and 2013) that measure financial inclusion in Kenya. Because M-Shwari was launched in late 2012, this study used Survey 2016 to capture the users and usage of M-Shwari. As this survey is nationally representative, the associated results can be confidently extrapolated to Kenyan population (Saigo, 2010). We sampled data on the usage of a variety of financial services and the socioeconomic factors of interest. The resulting dataset has 8,665 observations.

As discussed above, three factors were used for set diagram analysis: poverty, residence, and degree of financial inclusion. While *residence* (urban versus rural) is readily available, we need to construct variables to show 1) whether a household lives above (or below) the poverty line and 2) the extent to which a household is financially included (or excluded). It is estimated that about 50% of Kenyan population live below the poverty line.[6] To reflect that fact, we created a binary variable—*poverty*—by using $0.50 per day per capita as the cut point. 46% of respondents were thus identified as poor.

Table 1. Summary statistics and variable description

Variable	***Mean (SD)***	***Min***	***Max***	***Description***
M_Shwari	0.14 (0.35)	0	1	1: use M-Shwari; otherwise, 0
M_Pesa	0.71 (0.45)	0	1	1: use M-Pesa; otherwise, 0
Poverty	0.54 (0.50)	0	1	1: above poverty line; otherwise,0
Residence	0.44 (0.50)	0	1	1: urban; 0: rural
Served	0.70 (0.46)	0	1	1: financially served; otherwise, 0
Underserved	0.08 (0.28)	0	1	1: financially underserved; otherwise, 0
Unserved	0.22 (0.41)	0	1	1: financially unserved; otherwise, 0

In the financial inclusion literature, the degree of financial inclusion (or exclusion) is measured by considering a household's usage of formal and informal financial services (e.g., Triki & Faye, 2013; Demirguc-Kunt et al., 2018). Following this tradition, this study constructed three mutually exclusive variables: *served*, *underserved*, and *unserved*. A household is termed *served* if the highest level of reported usage of financial services is through service providers that are regulated and supervised by regulatory agencies (i.e., commercial banks, post banks, etc.). When a household's highest level of financial services usage is through unregulated forms of structured provision (i.e., ROSCAs, moneylenders, shopkeepers, etc.), we count the household as *underserved*. Finally, if households have little or no access to the aforementioned financial services, we regard them as *unserved*. Summary statistics and variable descriptions are reported in Table 1.

4 Results

The results of our set diagram analysis are shown in Fig. 1. In the figure, the upper, middle, and lower panels compare and contrast different segments assessed by three factors: 1) above vs. below poverty line; 2) urban vs. rural; and 3) served vs. underserved and unserved. The right-hand panel accordingly represents the excluded segments. Each *white* circle shows the size of the segment (as % of respondents); e.g., 53.6% of households live above the poverty line. Each *lined* circle then represents the intersection between M-Pesa users (as % of respondents) and the segment; e.g., 35.5% of respondents are M-Pesa users *and* live in urban areas. Similarly, each *dotted* circle captures the overlap among M-Shwari users (as % of respondents), M-Pesa users, and the segment; e.g., 4.7% of respondents are M-Shwari users who use M-Pesa and live in rural areas. Overall, 70.9% and 14.4% of respondents use M-Pesa and M-Shwari, respectively.

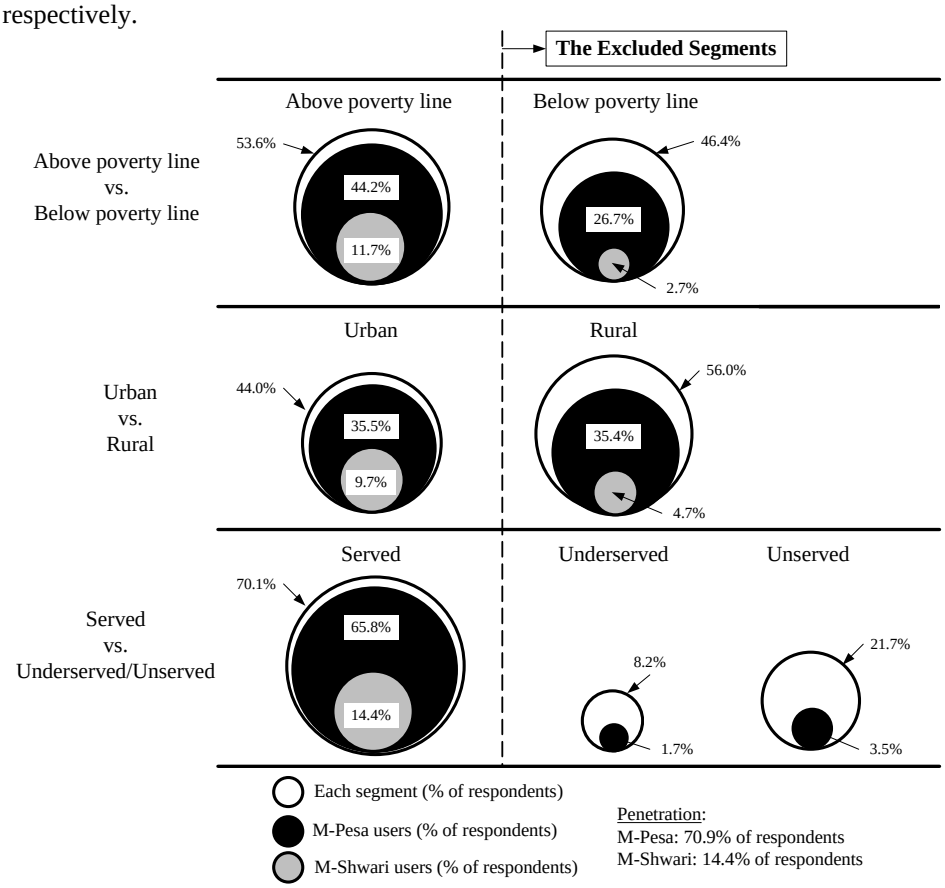


Fig. 1. M-Shwari usage among the poor, rural, and underserved/unserved segments

This figure supports two key observations. First, M-Shwari users tend to live above the poverty line and in urban areas. Consider the upper and middle panels. Whereas M-Pesa (the lined circles) is widely used by Kenyan households regardless of poverty

and residence, M-Shwari (the dotted circles) is predominantly used by urban households with decent livelihoods. A majority of M-Shwari users (11.7% out of 14.4%) live above the poverty line, and two thirds (9.7% out of 14.4%) live in urban areas. The biased distributions reveal that M-Shwari fails to reach poor, rural households.

Second, *none* of the underserved and unserved respondents has so far been served by M-Shwari. The lower panel shows that 70.1% are identified as the served, and most of them are M-Pesa users. This result resonates with the finding in the literature that *basic* mobile financial services, such as M-Pesa, have contributed to the deepened financial inclusion by turning the formerly underserved and unserved into the served (e.g., Aron, 2017). Nonetheless, it is surprising to note that the *advanced* M-Shwari service is exclusively used by the already-served, and, accordingly, *none* of the previously excluded households—about 30% of respondents—has participated in M-Shwari.

To sum up, when we zoom out and compare the left-hand and right-hand panels, it is clear that M-Shwari (the dotted circles) primarily serves wealthier urban inhabitants who are already financially included. By contrast, the excluded segments—the poor, rural, and financially underserved and unserved—have thus far hardly been served by M-Shwari at all. We can therefore conclude that the advanced M-Shwari service has not yet contributed to inclusive socioeconomic development to the same extent that the more basic M-Pesa service did.

5 Discussion

Responding to the research call of Nielsen (2017), this paper contributes to the ICT4D literature by showing that a focus on excluded segments can be used to assess the real impact of an inclusive digital innovation. Despite the remarkable adoption rate of M-Shwari (about 20% of the Kenyan adults), the findings reveal that M-Shwari does not yet reach the excluded segments of the Kenyan population. This is not to argue that M-Shwari is not a good service, nor that it is commercially unsuccessful. Indeed, M-Shwari deserves credit for providing savings and credit services to those who would otherwise have limited access to those services in an affordable, convenient, and secure way. Rather, the point here is that financial inclusion and inclusive development may *only* be fully achievable when digital innovations actually serve excluded groups.

The findings have several theoretical implications. First, we should never take it for granted that potentially inclusive digital innovations will *always* reach excluded segments, even when they build on earlier innovations that succeeded in deepening inclusion. M-Pesa in Kenya was successful in reaching the previously excluded people and in enabling socioeconomic development (e.g., Jack et al., 2013; GSMA, 2015; Aron, 2017). Given the massive M-Pesa user base, it is plausible to think that M-Shwari, building on M-Pesa, would achieve the similar outcomes. However, this paper provides evidence that this is not true for M-Shwari at least as of now. In evaluating the socioeconomic implications of digital innovations in developing countries, we believe, future scholars should determine the extent to which excluded

groups are actually included, without being misled by impressive total adoption statistics.

Second, the findings point to the *potential unintended consequences* of inclusive digital innovations. One may argue that, as M-Shwari keeps diffusing, the gap between the included and the excluded will decrease over time and the latter will ultimately become served. However, it seems unlikely that the "better off" will stop increasing their lead or that the "worse off" will catch up to narrow the gap (van Dijk & Hacker, 2003). Instead, as mobile financial services advance requiring a higher level of digital skills and financial literacy, the gap is likely to persist or even expand (van Dijk, 2013). Put differently, the previously excluded segments are as likely to lag behind and remain marginalized as they were before. Set diagram analysis revealed that, whereas the previously served continue to be actively engaged with M-Pesa and M-Shwari, only a minor portion of the underserved and unserved are M-Pesa users and none of them use M-Shwari. These findings suggest the possibility that M-Shwari, without compensating interventions, might stagnate or reverse earlier gains in the Kenyan financial inclusion landscape, allowing the rich to get richer and the poor to get poorer.

Third, the findings of this paper raise an important theoretical query: *Do inclusive digital innovations provide for or divide the populations of developing countries?* Digital innovations hold the potential to be inclusive by affording users the ability to leapfrog traditional constraints and deploy previously inaccessible socioeconomic resources. In the case of M-Pesa, former excluded users are able to use e-money transfer services in a convenient, secure, and affordable way, circumventing traditional costs and risks associated with physical cash. The success of M-Pesa is partly attributable to the ease of use of the financial services (e.g., Jack & Suri, 2011). However, when advanced digital innovations like M-Shwari require complicated financial knowledge (e.g., about savings and credit instruments) and digital skills, they might further marginalize excluded segments. Inclusive digital innovations might *widen* existing divisions rather than narrow them through provision.

As for future research, this paper calls for theorizing about *how* and *why* inclusive digital innovations might sometimes fail to reach excluded segments. One promising theoretical lens is provided in the digital divide literature: Households with better material, cognitive, and social resources are more able to take the lead in using ICTs, while others lag behind (e.g., de Haan & Rijken, 2002; van Dijk & Hacker, 2003). Instead of just focusing on differences between users and non-users, we need to focus on the segments of developing country populations who continue to be excluded despite the hopes and expectations of the development community. Various factors could be at work here. It could be as simple as a potential M-Shwari user not having an M-Pesa account or not being aware of M-Shwari service. But it could be a deeper issue, such as not having money to save, lacking digital and financial skills, having a status quo bias, or having technology-related fear and trust issues (e.g., Kim & Kankanhalli, 2009). Other factors such as technical design and user interface design (i.e., visualization, relevancy, and complexity of information and services) also deserve attention (e.g., Cotten & Gupta, 2004). Obviously, as Nielsen (2017)

advocated, more research is needed to address the challenges as well as the opportunities of inclusive digital innovations in developing countries.

6 Conclusion

In conclusion, inclusive digital innovations offer new opportunities for developing countries to achieve inclusive development. But inclusive development may only be possible when excluded segments of the population can make effective use of inclusive digital innovations. By examining a particular innovation, this paper made the case that inclusive digital innovations do not always promote greater inclusion. The findings redirect our attention toward excluded segments and toward the potential unintended consequences of digital innovations in both theory and practice.

Endnotes

1. http://www.cgap.org/blog/top-10-things-know-about-m-shwari
2. http://fsdkenya.org/dataset/finaccess-household-2016
3. http://data.imf.org/?sk=E5DCAB7E-A5CA-4892-A6EA-598B5463A34C
4. Ibid.
5. ROSCAs refer to groups that regularly collect money from each member and give it to one person in turn; ASCAs refer to groups that regularly collect money from members, and lend to its members or other people with interest.
6. https://www.unicef.org/kenya/overview_4616.html

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