Who Are the Users of Digital Innovation for Financial Inclusion? The Case of M-Shwari

Completed Research

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Abstract

In emerging economies, digital innovation has become a driving force of financial inclusion and socioeconomic development. However, who are the users? This simple yet crucial question has often been neglected. This paper argues that in order for a digital innovation for financial inclusion to generate expected outcomes, we need to examine whether the users are the intended users. This paper explores this issue by examining one particular instance—M-Shwari—the mobile-based digital savings service, which is intended to bank the unbanked, low-income population in rural areas in Kenya. In contrast to the expectation, the findings show that M-Shwari is likely to be used by high-income households in urban areas, who are already banked. This paper contributes to the emerging digital innovation and financial inclusion literature by calling for further research toward users in this particular context.

Keywords

Users, digital innovation, financial inclusion, M-Shwari, savings.

Introduction

Digital innovation, enabled by digital technologies, has the potential to transform existing sociotechnical practices, processes, and structures by digitally connecting data, information, and knowledge that were previously disconnected (e.g., Boland et al., 2007; Tilson et al., 2010; Yoo et al., 2010; Kallinikos et al., 2013). Due to transformative potential, digital innovation has become an important enabler of socioeconomic development in emerging economies, especially Sub-Saharan Africa. One emerging research field is digital innovation for financial inclusion (DIFI). A wave of revolutionary mobile financial services have been brought to market to address the longstanding problem of financial exclusion, which is considered as the cause of a series of social problems in emerging economies. For example, M-Pesa in Kenya has been appreciated as a success story in widening financial inclusion and driving socioeconomic development (e.g., Jack et al., 2013; GSMA, 2015; Aron, 2017).

It is widely accepted that technologies per se can hardly make impacts; only in association with users can. Although information systems (IS) are perceived as artifacts that encompass sociotechnical elements such as technologies, data, users, business processes, the construct of users, as opposed to other elements, has not received matched theoretical scrutiny (e.g., Lamb and Kling, 2003). In particular, research on users in relation to digital innovation and DIFI is lacking as the dominant focus of digital innovation literature has been placed on studying characteristics (e.g., Yoo et al., 2010) and impacts (e.g., Boland et al., 2007) of digital innovation. This paper argues that the research on users is of extreme importance in the context of DIFI because if a digital innovation is not mainly used by intended users in an anticipated way, the digital innovation cannot lead to intended outcomes. Based on this premise, this paper is dedicated to addressing the following research question:

Who are the users of digital innovation for financial inclusion?

This paper explores users of DIFI by examining one particular instance: M-Shwari. Building upon extensive mobile money—M-Pesa—infrastructure in Kenya, M-Shwari enables users to have access to and use a number of advanced financial services: deposits, withdrawals, savings, and loan. Among those, this
paper focuses exclusively on the savings service. Although M-Shwari is mainly intended to cater to savings needs of the unbanked, low-income population in rural areas, the knowledge of users, especially whether the underserved group are served by the innovative savings approach, has so far been limited (Cook and McKay, 2015; Mirzoyants-McKnight and Attfield, 2015). To fill the gap, this paper is particularly interested in examining whether or not M-Shwari users are the intended ones.

Based on the dataset collected from the Kenya FinAccess Household Survey 2016, results of descriptive analysis suggest that current M-Shwari users, contrary to the expectation, appear not to be the intended users. The findings show that M-Shwari users tend to be well-educated and have a high level of numeracy and financial literacy. In addition, compared with non-users, the users are likely to be employed, have decent livelihoods and high income with small household size. As for savings devices used, the findings reveal that the previous active savers who use both formal and informal savings approaches are most actively involved with M-Shwari, whereas penetration of M-Shwari among non-savers or unbanked savers remains low. This paper contributes to the literature by cautioning scholars that DIFI might not be used by intended users such that a digital innovation may not lead to anticipated financial and more broadly social ends. This revelation thus highlights the importance of studying users in this particular context.

The remainder of this paper is structured as follows. Section 2 briefly reviews digital innovation for financial inclusion, and argues for the importance of studying users in this particular context. Next, traditional savings options, and M-Shwari, as an alternative digital savings service, are discussed.

**Literature Review**

This section reviews digital innovation and financial inclusion literature, and argues for the importance of studying users in this particular context. Next, traditional savings options, and M-Shwari, as an alternative digital savings service, are discussed.

**Digital Innovation for Financial Inclusion: Lack of Focus on Users**

Compared with traditional information technologies that are separable artefacts featured by fixed, immutable functionalities (Yoo et al., 2012), digital technologies could be embedded into physical components with their capabilities morphed and augmented as needed (Yoo et al., 2010). As a result, digital technologies can make traditional boundaries of products, practices, and processes more fluid, and connect data, knowledge, and physical components that were previously disconnected. Enabled by digital technologies, digital innovation has been argued to have the potential to transform existing sociotechnical practices, processes, and structures (e.g., Boland et al., 2007; Tilson et al., 2010; Yoo et al., 2010; Kallinikos et al., 2013).

With transformative potential, digital innovation is of great interest to the IS community. The emerging literature is predominantly interested in conceptualizing and characterizing digital innovation (e.g., Yoo et al., 2010; Kallinikos et al., 2013; Faulkner and Runde, 2013), and studying organizational impacts of digital innovation (e.g., Boland et al., 2007; Barrett et al., 2012; Lytinen et al., 2016). Nonetheless, the construct of users has not received matched attention. The oversight of users might not be a problem when a digital innovation is studied in organizational context. In this case, as a digital innovation is implemented to achieve a particular set of goals, users (or employees), with a limited degree of latitude, are coordinated to ensure that they use the digital innovation in an anticipated way. However, when a digital innovation is not organizationally situated, users deserve closer attention because such digital innovation potentially involves a massive group of less coordinated human actors with different capabilities and goals. Digital innovation for financial inclusion (DIFI) is of this kind.

The fundamental problem of financial inclusion is distribution. Poor formal financial infrastructure (e.g., low penetration of bank branches, ATMs) is said to be responsible for the limited degree of financial inclusion (e.g., Triki and Faye, 2013; Evans and Pirchio, 2015). Because digital innovation can address the distribution problem by overcoming time-space constraints, it provides a promising digital pathway to

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1 Hereafter, this paper uses the term, M-Shwari, to refer to M-Shwari savings service; unless otherwise noted.

2 https://dataverse.harvard.edu/dataset.xhtml?persistentId=doi:10.7910/DVN/QUTL02

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financial inclusion. Time has witnessed that over the last decade, a growing number of mobile financial services (e.g., mobile money) have been geared toward financial inclusion in emerging economies, especially Sub-Saharan Africa. However, with a dominant focus being placed on adoption (e.g., Mundayega and Matsumoto, 2014; Marumbwa, 2014), usage (e.g., Mbiti and Weil, 2011; Thulani et al., 2014), and socioeconomic impacts (e.g., Jack and Suri, 2014; Chale and Mbamba, 2015), the emerging mobile financial services literature tends to neglect who the users are and whether they are the intended users.

There are at least three reasons to believe that studying users of DIFI is of extreme importance. First, DIFI, as inclusive innovation, is intended to actively include the group who are marginalized or excluded from mainstream development (Foster and Heeks, 2013). To be inclusive, it is crucial for DIFI to achieve that users are the target excluded group. Second, as DIFI is unleashed into the societal context, users tend to be complex social actors, whose autonomy, agency and behaviors are subject to social norms and institutional forces that surround them (Lamb and Kling, 2003). Thus, we need to profile users by taking into account a wide range of socio-demographic characteristics. Finally and most importantly, knowledge of users and their properties serves as the theoretical foundation to sharpen our understanding of usage and consequences of DIFI (Majchrzak and Markus, 2012). It is suggested that users with different properties might use DIFI in different and/or unanticipated ways, which may lead to unprompted and unintended consequences (Majchrzak and Markus, 2012). Taken together, the preceding arguments point to the necessity of studying users and, in particular, examining whether the intended users are the users in the context of DIFI. This paper explores this issue by examining one particular instance, M-Shwari.

**Traditional Savings and M-Shwari as Mobile Savings**

Since this paper is mainly focused on the savings aspect of M-Shwari, it is necessary to examine how people in emerging economies save. In emerging economies, the level of adoption and usage of formal savings approaches (e.g., bank accounts) is limited mainly due to poor formal financial infrastructure (e.g., Triki and Faye, 2013; Evans and Pirchio, 2015). For example, only about 9% of Kenyan households save with formal institutions (Zollmann, 2014). To achieve savings goals, households turn to a range of informal savings devices, including hiding cash at home, keeping livestock, saving with Rotating Savings and Credit Associations (ROSCAs), and saving with Accumulating Savings and Credit Associations (ASCAs)\(^3\) (Rutherford, 2000; Mas, 2010). Although widely used, informal savings devices often come with risks and costs. For example, ROSCAs and ASCAs are geographically constrained, have a risk of group failure, and suffer limited liquidity (Mas, 2010). Savings at home is neither safe nor protected from the temptation of spending (Banerjee and Duflo, 2007). The common risk associated with informal savings is money loss (Wright and Mutesasira, 2001). In short, there remains the gap between savings demand and limited access to and usage of quality savings service.

To close the gap, M-Shwari was launched in November 2012 as a joint product of the Commercial Bank of Africa and Safaricom. As a value-added savings service based on M-Pesa, previous M-Pesa users can open up M-Shwari accounts in less than one minute, and they can save digitally by transferring electronic money from M-Pesa to M-Shwari accounts with no fees. Because M-Shwari involves cash to a minimum level, it not only helps users avoid risks and costs associated with cash-savings (e.g., theft, loss), but provides a range of advantages over formal and informal savings approaches. The major benefit is concerned with accessibility and convenience. Users can save with M-Shwari anytime and anywhere, overcoming time-space constraints. Moreover, M-Shwari’s reduced need for cash offers security and privacy for users because savings behavior and information is concealed from family members and others, who may not resist the temptation of taking away or spending money as in the case of cash-savings.

So far, the research on users of M-Shwari is scant, with few exceptions. Based on phone interviews with M-Shwari users, Mirzoyants-McKnight and Attfield (2015) showed that the users tend to be young, males and urban dwellers with high education level. But, this finding deserves further investigation due to the following reasons. First, the study only analyzed user profile and therefore failed to compare users and non-users. Second, the sample size (N=283) was small. Third, the study examined a limited set of socio-demographic factors, i.e., factors such as numeracy, financial literacy, and informal savings devices were

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\(^3\) 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 connect money from members, and lend it to its members or other people with interest.
not considered. Although M-Shwari is expected to bank the unbanked, low-income households (Cook and McKay, 2015; Mirzoyants-McKnight and Atfield, 2015), we still know little about users of M-Shwari. Who are the users? Are they the intended users? How are they different from non-users, and in which aspects are they different? This paper is dedicated to profiling the users by examining two aspects: socio-demographic characteristics (of respondent and household), and traditional savings devices used.

**Methodology**

The data was collected from the Kenya FinAccess Household Survey 2016, which is intended to measure the financial inclusion landscape—access, usage, quality, and impact—in Kenya. With respect to savings, this survey documents household usage of the M-Shwari savings service, along with a variety of traditional formal and informal savings devices. Based on the stratified three-stage sampling method, this survey is nationally representative, and therefore the results based on the survey could be confidently inferred to the population (Saigo, 2010). The resulting dataset consists of 8665 observations at the household level.

<table>
<thead>
<tr>
<th>Respondent Characteristics</th>
<th>Obs</th>
<th>Mean</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>8665</td>
<td>37.20</td>
<td>16.57</td>
<td>16</td>
<td>100</td>
<td>Age of respondent</td>
</tr>
<tr>
<td>Marital status</td>
<td>8665</td>
<td>0.60</td>
<td>0.49</td>
<td>0</td>
<td>1</td>
<td>1: Married; 0: Non-married</td>
</tr>
<tr>
<td>Education</td>
<td>8665</td>
<td>2.29</td>
<td>0.87</td>
<td>1</td>
<td>4</td>
<td>1: None; 2: Primary; 3: Secondary; 4: Tertiary</td>
</tr>
<tr>
<td>Numeracy</td>
<td>8665</td>
<td>2.12</td>
<td>0.81</td>
<td>1</td>
<td>3</td>
<td>1: High; 2: Medium; 3: Low</td>
</tr>
<tr>
<td>Financial literacy</td>
<td>8665</td>
<td>1.92</td>
<td>0.80</td>
<td>1</td>
<td>3</td>
<td>1: Low; 2: Medium; 3: High</td>
</tr>
</tbody>
</table>

**Household Characteristics**

| Residence                  | 8665 | 0.44  | 0.50 | 0   | 1   | 1: Urban; 0: Rural               |
| Gender of head             | 8665 | 0.73  | 0.44 | 0   | 1   | 1: Male; 0: Female                |
| Household size             | 8665 | 4.39  | 2.49 | 1   | 20  | Number of household members      |
| Schooling children         | 8665 | 1.90  | 1.84 | 0   | 14  | Number of school going children  |
| Income earners             | 8665 | 1.25  | 0.76 | 0   | 6   | Number of income earners         |
| Income sources             | 8665 | 1.52  | 0.77 | 1   | 7   | Number of income sources         |
| Monthly income             | 8665 | 1.6×10^4 | 1.8×10^5 | 0 | 1.5×10^7 | Income in a month (unit: KSh)       |
| Poverty                    | 8665 | 0.21  | 0.40 | 0   | 1   | 1: Above poverty line; 0: Below poverty line |
| Vulnerability              | 8665 | 2.51  | 0.62 | 1   | 3   | 1: High; 2: Medium; 3: Low       |
| Wealth                     | 8665 | 0.00  | 1    | -1.36| 3.20| 1: Low; 2: Medium; 3: High       |

**Savings Devices**

| Sav_msh | 8665 | 0.14 | 0.35 | 0   | 1   | 1: Save with M-Shwari; otherwise, 0 |
| Sav_bank | 8665 | 0.09 | 0.20 | 0   | 1   | 1: Save with bank; otherwise, 0   |
| Sav_post | 8665 | 0.02 | 0.12 | 0   | 1   | 1: Save with postbank; otherwise, 0 |
| Sav_sacco | 8665 | 0.11 | 0.32 | 0   | 1   | 1: Save with SACCO; otherwise, 0  |
| Sav_mfi  | 8665 | 0.03 | 0.17 | 0   | 1   | 1: Save with microfinance; otherwise, 0 |
| Sav_asca | 8665 | 0.14 | 0.34 | 0   | 1   | 1: Save with ASCAs; otherwise, 0  |
| Sav_rosca | 8665 | 0.51 | 0.46 | 0   | 1   | 1: Save with ROSCAs; otherwise, 0 |
| Sav_gof  | 8665 | 0.08 | 0.27 | 0   | 1   | 1: Save with a group of friends; otherwise, 0 |
| Sav_fam  | 8665 | 0.06 | 0.25 | 0   | 1   | 1: Savings given to family/friend; otherwise, 0 |
| Sav_sp   | 8665 | 0.36 | 0.48 | 0   | 1   | 1: Savings in secret place; otherwise, 0 |

**Table 1. Summary Statistics and Description of Variables**

In profiling users of M-Shwari, this study analyzes three groups of socio-demographic factors: 1) respondent characteristics; 2) household characteristics; and 3) savings devices (see Table 1). The primary research method is descriptive analysis. In the IS research, descriptive analysis is particularly useful and even favored for studies that describe emerging phenomenon of interest when very little is known about the phenomenon (Gregor, 2006). As this paper mainly aims to describe and analyze users of an emerging digital innovation in its early stage, descriptive analysis is sufficient, and more importantly, descriptive research is well accepted in the IS community (e.g., Soh et al., 2006). When the analysis involves continuous variables, this paper employs t-test and Kolmogorov-Smirnov test (K-S test). Whereas t-test is used to test whether mean values are significantly different between two samples (users vs. non-users), K-S test, as a nonparametric test, is used to determine whether the two samples come from the same distribution. The summary statistics are reported in Table 1.
Results

The results are reported regarding three groups of factors: 1) respondent characteristics; 2) household characteristics; and 3) savings devices. Out of 8665 households, 1245 households (14.4%) report that they currently save with M-Shwari.

**Respondent Characteristics: M-Shwari Users vs. Non-users**

![Figure 1. Respondent Characteristics: M-Shwari Users vs. Non-users](image)

Figure 1 compares respondent characteristics of M-Shwari users (left half) versus non-users (right half). The figure shows that compared with non-users, M-Shwari users tend to be younger, with over 80% under 40. The users are found to have a higher education level: whereas over 70% of users have secondary and tertiary educational achievement, the corresponding percentage for non-users is only above 30%. Similarly, M-Shwari users possess higher numeracy and financial literacy than non-users. Yet, there seems no difference regarding marital status. These results are somewhat expected as prospective users with a higher level of education, numeracy and financial literacy are more likely to be aware of the innovative digital savings service and realize its benefits.

**Household Characteristics: M-Shwari Users vs. Non-users**

M-Shwari users appear to be urban dwellers. While 67% of users live in urban areas, only 40% of non-user households locate in urban regions. The results of t-test and K-S test reveal that the users, on average, tend to have smaller household size and fewer school going children (Table 2). As opposed to non-users, the users have a greater number of income earners, and a greater diversity of income sources.

<table>
<thead>
<tr>
<th>Household Size</th>
<th>Users</th>
<th>Non-users</th>
<th>Overall</th>
<th>t-test</th>
<th>K-S test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shwari users</td>
<td>4.39</td>
<td>4.49</td>
<td>4.49</td>
<td>-0.68***</td>
<td>-0.12***</td>
</tr>
<tr>
<td>Non-users</td>
<td>3.81</td>
<td>4.49</td>
<td>4.39</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Schooling Children</th>
<th>Users</th>
<th>Non-users</th>
<th>Overall</th>
<th>t-test</th>
<th>K-S test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shwari users</td>
<td>1.95</td>
<td>1.95</td>
<td>1.95</td>
<td>-0.37***</td>
<td>-0.10***</td>
</tr>
<tr>
<td>Non-users</td>
<td>1.58</td>
<td>1.95</td>
<td>1.60</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Income earners</th>
<th>Users</th>
<th>Non-users</th>
<th>Overall</th>
<th>t-test</th>
<th>K-S test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shwari users</td>
<td>1.25</td>
<td>1.25</td>
<td>1.25</td>
<td>0.21***</td>
<td>0.09***</td>
</tr>
<tr>
<td>Non-users</td>
<td>1.43</td>
<td>1.43</td>
<td>1.43</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Income sources</th>
<th>Users</th>
<th>Non-users</th>
<th>Overall</th>
<th>t-test</th>
<th>K-S test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shwari users</td>
<td>1.52</td>
<td>1.52</td>
<td>1.52</td>
<td>0.23***</td>
<td>0.12***</td>
</tr>
<tr>
<td>Non-users</td>
<td>1.72</td>
<td>1.72</td>
<td>1.72</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Monthly income</th>
<th>Users</th>
<th>Non-users</th>
<th>Overall</th>
<th>t-test</th>
<th>K-S test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shwari users</td>
<td>16092</td>
<td>16092</td>
<td>16092</td>
<td>10133**</td>
<td>0.35***</td>
</tr>
<tr>
<td>Non-users</td>
<td>14635</td>
<td>14635</td>
<td>14635</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: standard errors in bracket; *** significant at 0.01; ** significant at 0.05; * significant at 0.1.
analysis suggested, M-Shwari users, with favorable demographic and socioeconomic factors, appear to have a higher monthly income than non-users (Table 2).

![Figure 2. Poverty, Vulnerability, and Wealth](image)

High income is expected to contribute to livelihood. This study considered three dimensions of livelihood: 1) poverty, 2) vulnerability, and 3) wealth. The poverty line is defined as the international poverty line, which is $ 1.90 per head per day. With monthly income, we can determine whether a household is living above or below the poverty line. As for vulnerability, respondents were asked to report how often (e.g., often, sometimes, rarely, never) his or her household suffered vulnerable situations (e.g., gone without enough food to eat, gone without medical treatment, child sent home for lack of school fees, etc.), based on which a vulnerability index is established: most vulnerable, vulnerable, and least vulnerable. The survey also provides a household wealth index, by aggregating data on household assets, access to utilities, and living conditions. Figure 2 plots distribution of the three dimensions of livelihood across users and non-users. This figure clearly shows that compared with non-users, M-Shwari users are more likely to live above the poverty line (45% vs. 17%), less likely to experience vulnerable situations (73% vs. 55%), and they are, on average, more affluent than non-users (62% vs. 24%).

**Savings Devices: M-Shwari Users vs. Non-users**

It is of substantive interest to examine how M-Shwari users differ from non-users in terms of savings devices used. To this end, this paper analyzes three aspects of savings: 1) number of savings devices, 2) specific savings devices, and 3) savings portfolios. As for the number of savings devices used (Figure 3), it is found that M-Shwari users often use additional savings tools. Over 50% of users employ at least 2 other approaches, whereas only 30% of non-users have two or more approaches, regardless of the formal or the informal. It is, therefore, less likely that M-Shwari is used as the only, or even the primary savings tool for users; rather, a majority (84%) of M-Shwari users reportedly use at least one other device for savings.

![Figure 3. Number of Savings Devices Used](image)

Figure 4 describes usage of specific savings devices across M-Shwari users vs. non-users. In general, the figure reveals that M-Shwari users tend to be more active savers with respect to all existing savings devices, be it formal or informal. As for formal savings, whereas 7% of non-users save with a bank, the number is 19% for users. The similar pattern can be observed as to informal savings. For example, 43% of users participate in ROSCAs, while less than 30% of non-users save with the informal savings group. In addition to formal savings and informal savings groups, M-Shwari users also tend to save more actively in secret places at home (e.g., under the mattress, in tin can).
Taking one step further, this paper considers household savings portfolios. The goal here is to examine how M-Shwari users differ from non-users as to the degree of being banked (formal savings). In this context, a savings portfolio, as the aggregate measure of household usage of savings devices, is used to gauge how households are included, or excluded, regarding formal versus informal savings devices. As shown in Table 3, four savings portfolios out of 9 alternative savings options are constructed: 1) Only_formal (a household only uses formal savings), 2) Only_informal (a household only uses informal savings), 3) Both (a household uses both formal and informal savings), and 4) None (a household does not use any of the savings devices). Figure 5 describes distribution of these savings portfolios, and penetration of M-Shwari in each savings portfolio among users and non-users. Penetration is calculated as the ratio of the number of M-Shwari users to the total number of households in each savings portfolio.

Out of 1245 M-Shwari users, 10% only use formal savings; 44% only rely on informal savings; and 30% use both formal and informal savings. The rest of the 16% are found to be solely using M-Shwari. As for non-users, the usage level of formal savings is low (6%), and almost half of them (46%) only use informal savings.
savings devices, with 37% being excluded from either the formal or the informal. It appears that M-Shwari is most attractive to households who only rely on informal savings (Only_informal). However, when we consider penetration (the histogram in green), it reveals another aspect of the story. The highest penetration occurs in the group of households who currently use Both savings portfolios (30%). M-Shwari also seems to be attractive to households who solely rely on Only_formal savings portfolios (22%). It is somewhat surprising that penetration of M-Shwari in Only_informal users remains low (14%), and that M-Shwari appears not to be the silver bullet for non-savers (7%).

In short, the above analysis suggests that compared with non-users, M-Shwari users are active savers because they tend to use multiple savings devices, and they do actively save with all specific savings devices. More importantly, the analysis of savings portfolios reveals that M-Shwari users are well banked as high penetration of M-Shwari occurs in the group of households who use both formal and informal savings (Both), and those who solely rely on formal savings (Only_formal).

Discussion

Given the lack of research focus on users of digital innovation for financial inclusion (DIFI), this paper explores this issue by examining M-Shwari—the digital savings service intended to promote savings especially for low-income households in Kenya. However, the findings are somewhat contradictory to the expectation. This paper shows that compared with non-users, M-Shwari users have a higher level of education, numeracy, and financial literacy. In addition, the household users tend to be employed, live in urban areas, and have decent livelihoods and high income as opposed to non-users. In terms of the degree of being banked, non-savers are found to be least likely to use the digital savings service. Rather, the previously banked savers, who use both formal and informal savings or solely rely on formal savings, are most actively involved with M-Shwari. The findings together suggest that M-Shwari so far has not reached the target audience to the extent as expected.

The core contribution, therefore, of this paper is that a DIFI might not be extensively used by the intended users, despite its intention of including the excluded group. This provides two important theoretical implications. First, a DIFI being used by the unintended audience might lead to unintended consequences. The findings point to the possibility that M-Shwari, if no policy interventions, might run the risk of turning the savings landscape into being polarized. Put differently, the previously banked, active savers might become more active and benefit from the digital savings service, whereas non-savers are likely to remain excluded either from traditional savings mechanisms or from the emerging digital savings service than they were before. A DIFI is always expected to narrow the gap by including the excluded group; yet, the digital innovation, if not well managed or controlled, might play a limited or even negative role in facilitating financial inclusion.

Second, this paper calls for theorizing how and why a DIFI might not be intensively used by the intended users. In this line, a sociotechnical perspective will be useful. According to this view, a DIFI in the societal context can be perceived as a sociotechnical network rather than a simple tool, and users are treated as complex social actors. We can envision several sociotechnical factors that affect adoption and usage of DIFI. On the social side, a factor that hinders the target users from using M-Shwari could be as simple as that they do not have the money to save. But some factors may be complicated, involving psychological issues. For example, as Kim and Kankanhalli (2009) suggested in their study of user resistance to IS implementation, the target audience may have status quo bias that they perceive traditional savings devices as the default options, and the indisposition to change may prevent them from using M-Shwari.

On the technical side, we need to unpack the technical properties of a DIFI, which affect adoption and usage. The comparative case, mobile money, could illustrate this point. Mobile money, a money transfer service, is hailed as a success story in financially including the excluded group (GSMA, 2015; Aron, 2017). According to critical mass theory of interactive media (Markus, 1987), one alternative explanation of the success is that mobile money is an interactive medium such that urban users usually persuade rural recipients to register with the service (Morawczynski and Pickens, 2009), and in a similar vein, neighborhood effects are observed (Sekabiria and Qaim, 2017). However, it appears not to be the case for M-Shwari mainly because M-Shwari is not an interactive medium. That is, persuasion and neighborhood effects in M-Shwari might not be as profound as in the case of mobile money. In addition to interactivity, other factors such as technology-related fear and trust (e.g., Pavlou, 2003) deserve further investigation.
The findings provide practical implications for stakeholders of financial inclusion. To avoid potential savings polarization, service providers, banks and policymakers should work in concert to encourage adoption and usage among the intended users. For example, financial literacy and M-Shwari training program can be launched to help the intended audience in rural areas appreciate the usefulness of the digital savings service and benefit from it. Additionally, M-Shwari could be tailored to be more attractive to the excluded group, for example, by providing tiered interest rates. Most importantly, the stakeholders should establish critical knowledge of the factors that hinder adoption and usage of M-Shwari, and devise policies that help remove barriers down the road.

This paper has some limitations. First, this study does not consider other M-Shwari financial services, especially loan. The loan aspect of M-Shwari is found to affect participation rate among the target audience, as FSD (2016) observed that a change made in credit scorecard in May 2014 increased loan acceptance rate from 40% to 47% among applicants with poor background. Second, because this paper uses descriptive analysis, the impacts of socio-demographic factors on adoption and usage of M-Shwari can hardly be established. Third, generalizability of the findings might be limited as this study is conducted in the context of M-Shwari in Kenya. Due to the limitations, the findings should be interpreted with caution by relating to the savings aspect of M-Shwari in Kenya. Also, the limitations reveal future research avenues. One direction is to conduct inclusive research by incorporating the loan aspect of M-Shwari. Also, users of DIFI deserve further investigation in other contexts, i.e., Tanzania where M-Pawa, the M-Shwari like savings service, has been launched. As suggested, to realize intended financial inclusion implications, we need to theorize the processes and mechanisms by which target users do and do not use DIFI. Finally, usage and consequences, be it intended or unintended, of DIFI present another territory to be tapped in future.

**Conclusion**

Digital innovation, enabled by digital technologies, has the potential to widen financial inclusion and address the associated social problems in emerging economies. However, it seems hardly possible that we understand usage and consequences of such digital innovation without placing a matched focus on users. In particular, if financial inclusion implication of a digital innovation needs to be realized, the presupposed condition is that it should be widely used by intended users. By examining one particular digital innovation—M-Shwari, this paper shows that M-Shwari is not mainly used by the intended users, suggesting that we should not take for granted that digital innovation for financial inclusion will always reach the target audience on its own. If research focus is not geared toward better understanding of users, we may fail to seize the opportunity to take advantage of digital innovation for financial inclusion.

**REFERENCES**


Users of Digital Innovation for Financial Inclusion: M-Shwari


