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Monetary Practices of Traditional Rural Communities in Ethiopia: Implications for New Financial Technology Design

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With the development of ubiquitous technologies that support the digitization of money, research is needed on how individuals' private life practices are affected by new technological financial systems and how cash-based practices can inform their design. In this article, we report the cash-based monetary practices of one Ethiopian rural community and identify their implications for the design of new financial technology. Particularly, we focus on addressing the question, What characteristic features should go into the design of mobile money application(s) to embody a rural Ethiopian community's money practices in social (marriage and death) and religious contexts? Primary data on everyday practices of the community were collected. Analysis of our data reveals that new financial technology design should support lived experiences such as embedded social meaning, segregated and aggregate money control, restricted money use, identity extension and hiding, refusal and acceptance of donations, disclosed and secret money practices, and assigning aesthetics to money. The article concludes by discussing possible ways of mapping these concepts into financial system design, thus contributing toward the development of cashless transactions and a cashless society.

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CONTENTS

1. INTRODUCTION

In developing countries, financial institutions serve mainly upper- and middleclass individuals living in urban areas. The high cost and risks of running formal financial institutions in rural areas of developing countries have led to the financial exclusion of individuals living there (Collins, Morduch, Rutherford, & Ruthven, 2009; Duncombe & Boateng, 2009; Kristof, 2010; Rutherford, 1999). Rural communities (whether poor or rich) and poor people in urban areas have thus been marginalized by the financial institutions' existing service delivery model. However, the rapid growth and penetration of mobile phone technologies in such countries, coupled with the success history of early mobile-based financial services, have attracted the attention of many telecommunication companies, and development and aid nongovernmental organizations. The list includes organizations such as the United Kingdom's Department for International Development, the World Bank's International Finance Corporation, the Consultative Group to Assist the Poor, the Bill and Melinda Gates Foundation, Innovation for Poverty Action, research centers like the Institute for Money, Technology and Financial Inclusion, standard organizations (e.g., Groupe Speciale Mobile Association), as well as governments themselves. All hope to provide an alternative means to enable rural people get access to financial services, irrespective of their remote locations.

These organizations are urging information technology firms to design mobile devices and software that are capable of providing novel financial technology products. Such financial technologies should enable individuals to access financial services, transact digitally, and store values digitally. This requires a vibrant mobile money ecosystem that engenders liquidity of digital money: the capacity to support money staying digital-without conversion between digital and material forms, as is practiced by most current mobile money platforms. In this case, agent networks—places where individuals change material money to digital (mobile money) and vice versa—can be avoided altogether. As discussed later in this article, excluding such third parties from the money transaction chain has some advantages. However, complete and end-to-end digital transactions and value storage require an understanding of consumers' economic life practices (Jenkins, 2008) that can inform mobile money system design and development.

Researchers (Collins et al., 2009; Duncombe & Boateng, 2009; Kristof, 2010; Rutherford, 1999) claim that mobile phones have had a positive developmental impact on poverty alleviation. For instance, the introduction of mobile phones has enabled individuals to deposit smaller amounts of money remotely, fostering a culture1 of saving and, by accumulation of savings over time, alleviating poverty: The higher the savings of poor individuals, the higher their ability to get out of poverty. Moreover, by enabling such practices, mobile phones have offered rural individuals a way out of saving informally at home, circumventing all associated risks such as theft, loss to catastrophic events (e.g., floods), and emotional/impulsive expenditure (Karlan, 2010).

As a result of developments in mobile technologies as well as the financial inclusion problems of low-income/rural communities, individuals in both developed and developing countries have started to link their monetary practices to mobile technologies in new and innovative ways (Ben-David et al., 2011; Kristof, 2010; Maurer, 2010; Panjwani & Cutrell,

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1. http://www.ghanabusinessnews.com/2013/02/26/mobile-money-can-boost-financial-inclusionsavings-research/

2010; Yousif, Berthe, Maiyo, & Morawczynski, 2012). For example the success of mobile money systems, like GCASH in the Philippines, M-PESA in Kenya, and digital money solutions such as Bitcoin, clearly indicates a promising future for mobile money. This revolution signifies a transformation in which money becomes less material and increasingly digital2 (Kristof, 2010;Miller, Michalski, & Stevens, 2001; Muhammad, 2011), with societies turning cashless as a result (Garcia-Swartz, Hahn, & Layne-Farrar, 2006). With this transformation of money, the need arises for information systems to manage everyday money transactions and practices (Olsen, Hedman, & Vatrapu, 2012). However, if the form of money is changing, then how will consumers' everyday money transactions change, and what type of artifacts are needed in these new circumstances? These questions, previously largely unexplored, are addressed in this article, in the context of a rural community in Ethiopia.

Accordingly, the structure of the remainder of this article is as follows: Section 2 presents a review of the related research; Section 3 details our data collection and analysis methods; our findings and design concepts are outlined in Section 4; possible ways of mapping the identified design concepts into technology design are given in Section 5, and Section 6 concludes the article.

2. RELATED WORK

As has been discussed, the form of money is changing from a material (tangible) form into a digital (intangible) form, which creates opportunities for innovative financial technologies. Although mobile money platforms are a key component of such technologies, their use in rural areas is not without challenges. Accordingly, in the first part of this section we present these challenges in detail.

2.1. Mobile Money Platforms in Rural Areas—Between Successes and Challenges

Existing mobile money platforms represent mobile money as an identifier in the phone's subscriber identity module (SIM), with its associated value stored by the mobile network operator (MNO). The balance on the value account can be accessed via the mobile phone, which is also used to transmit instant transfer or payment instructions. Existing mobile money solutions thus do not store such values on the phone itself; rather, the value is stored at the MNO and accessed through the phone when payment or any other transactions are needed. In this approach, one can imagine how tedious it can be when individuals have to log in to their remote mobile money account each time they want to make a payment or transfer. The case of M-PESA demonstrates this. Here, when a person wants to transfer or pay money, assuming there is digital money in his or her account, the person first needs to log into his or her remote e-money account managed by Safaricom (the MNO) in order to do so. If the account has no value, the individual has to visit an M-PESA agent so that this person can convert his or her cash money into digital money. After this, the transfer or payment can be done between accounts. Logging into remote accounts each time to make payments or to transfer money is a cumbersome task, particularly for

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2. For more elaboration, please read Section 2.4.

face-to-face payments. Moreover, once money is sent electronically from one account to another (person-to-person transfers), in order to use such money, in many cases the recipient is expected to convert it back into material money at a network agent's (cash-in/cash-out) outlet. Indeed, such agent- and SIM-based networks have further challenges:

1. Robbery—because agents are essentially cash-in/cash-out outlets, they usually hold considerable amounts of cash and are vulnerable to robbery.
2. Short message service (SMS)–based technology is not always readily available in rural areas.
3. Loading or withdrawing funds into or from mobile-based accounts requires customers to visit network agents, who are not available at all times and everywhere.
4. Liquidity problems,3 as agents sometimes run out of cash (Morawczynski & Pickens, 2009).

Besides these operational challenges, the interface of current mobile money platforms and the way money is accessed from the system is not user friendly, especially for one particularly widespread rural group in Africa: illiterate users, that is, people who cannot read or write (Woldmariam, Ghinea, & Atnafu, 2014). This is because most interfaces are text based, with money usually being represented as positive rational numbers, for example, $0.98, $12.54, and so on. This form of representing money challenges illiterate individuals because whenever they want to send money to or receive money from someone, they must depend on the honest assistance of people around them. Thus, with current platforms and solutions, illiterate persons cannot engage in their usual cash-based practices. Nonetheless, research has shown that, if illiterate individuals are provided with appropriate technologies and user interfaces, they can use mobile financial technologies (Medhi, Gautama, & Toyama, 2009; Medhi, Ratan, & Toyama, 2009; Morawczynski & Pickens, 2009).
Moreover, a review of the literature in the area of digital money and, in particular, work targeting mobile money reveals that studies undertaken so far have mainly focused on payment architectures based on the banking infrastructure associated with developed nations. For example, the architectures proposed by Guo (2008); D. Kumar, Gonsalves, Jhunjhunwala, and Raina (2010); S. Kumar, Raj, and Rabara (2008); and Vilmos and Karnouskos (2003) are all based in the context of developed nations. These architectures require customers and merchants to have bank accounts, and they all assume that customers are literate. This is at odds with the situation in many developing countries. Indeed, one of the reasons that the most flourishing systems, like M-PESA and GCASH, have been so successful in developing countries is that they do not require their users to have bank accounts—and do not provide them to users, either. Moreover, the fact that MNOs are pushing mobile money solutions over the objections of banks (who wish to maintain their incumbent, exclusive rights to provide financial services) is also a source of disruption, which further complicates issues pertaining to mobile money.

In our research, we focus on Ethiopia. Here, development of technological and financial service infrastructures is lacking, and bank-account-based architectural solutions and approaches are infeasible, as the majority of the Ethiopian poor, be they in urban or rural areas, do not have bank accounts. In addition, mobile payments here face further challenges:

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3. http://www1.ifc.org

1. By their very nature, mobile payments require telecommunication network signals to be available on mobile devices. However, in Ethiopia, this is not always the case, as there are frequent interruptions of telecommunication networks due to electricity cuts. It is also common not to have telecommunication signals and services in underground buildings, or during national and religious holidays, due to network congestion. These factors make existing SMS-based mobile payment architectures and solutions impractical, especially when payment is expected to happen in real time (Kendall, Maurer, Machoka, & Veniard, 2011).
2. Existing bank account andMNO-centric payment models and architectures are also inappropriate for face-to-face payments. The cost of subscribing to payment service providers (mobile network operators, banks, or any other third party) can also be a discouraging factor for people, particularly as most live on less than $2 a day (Kendall et al., 2011).Moreover, there is no need to incur SMS costs for face-to-face payments, as well as micropayments and transfers that happen, say, in shops.
3. Existing solutions tend to consider money as a mainly *homogeneous* item and tend to disregard its context of use, as has been pointed out in the sociology, anthropology, and behavioral economics literature. We elaborate further on this issue in the current section next, as well as in Section 4 of this article.

To summarize, the current situation in developing countries such as Ethiopia is that the majority of the population does not have access to bank accounts, whereas literacy levels among the (especially rural) population are, at the very best, basic. Thus, in this article we argue that existing mobile digital money solutions do not serve rural users and attempt to identify a solution to this challenge. This, however, requires an understanding of how individuals interact and deal with material money, which we now present in more detail.

2.2. Individuals' Everyday Money Practices

Reviewing the social and anthropological literature reveals that individuals have a variety of money-related practices. Accordingly, individuals differentiate between monies based on their source, amount, and purpose, and spend them differently (Douglas, 1967; Zelizer, 1996). For example, money obtained through theft is treated differently from money acquired as salary. Thomas and Znaniecki (1918) remarked that a peasant who sets a sum aside for a designated purpose and then needs some money for a different expense would prefer to borrow it "even under very difficult conditions, rather than touch that sum." Thus, earned money (which the recipient somehow morally deserves) is differentiated from unearned money (derived from windfall or theft). Whether the recipient saves or spends his or her money, and on what she or he spends it, depends on how the money is categorized.

Similarly, economic psychologists have recently challenged the purely rationalistic economic definition of modern money, particularly its fungible nature, by suggesting the concept of "mental accounting" to describe the way individuals distinguish between kinds of money. For instance, people treat windfall income much differently from a bonus or an inheritance, even when the sums involved are identical (Hutchinson, 1992; Kahneman & Tversky, 1982; Katznelson, 1997; Lea, Roger, & Paul, 1987; Singh, 1997; Thaler, 1985; Zelizer, 1994, 1997).

By focusing exclusively on money as a market phenomenon, one moreover fails to capture the very complex range of characteristics of money as a nonmarket medium. For example, in gift-giving and gift-accepting practices, gift objects are incorporated into the culture and social life of individuals (Carrier, 1991). Thus, if the items are lost, stolen, damaged, and so forth, they cannot be replaced, as they are unique objects. As Medhi et al. (2011) pointed out, gift monies are more than mere coins, as they have a name, a personality, a past, and even a legend attached to them. Thus, not all dollars are equal (Singh, 1997). It is this individuality that makes these valuable and distinct from abstract bearers of market value. Money varies in its personality, ranging from highly anonymous to highly individualized. It can also differ in the scope of its uses, with general purpose money at one end of the continuum and specialized or restricted money at the other (Douglas, 1967). However, money in the public institutional arena (formal organizations) is attached to rationality, objectivity, and efficiency. Organizations tend to consider money as mainly homogeneous and thus see little need to qualitatively differentiate money.

All the observations in these previous sections indicate that the classic economic definition of money's functions and attributes, based on the assumption of a single, general purpose type of money, is too narrow. This is an issue that the mobile money literature has largely overlooked, and the study detailed in this article would like to explore it further. The underlying premise is that, if individuals have diverse money practices, they need systems customized for the different contexts within which their practices vary.

2.3. The Form of Money Is Changing

Simply observing how money is transferred from one bank account to another, without moving any physical paper money, dictates the separation of physical money from its documentation (information). A money transfer is simply transferring information, or updating account balances. When people deposit money into their bank accounts, banks keep the details. Thereafter, people can make use of bank cards to make payments from their accounts. Moreover, they can also pay money directly into an account, without any need for banknotes or coins. What is actually being exchanged between bank accounts is information represented by numbers. This viewpoint leads us to say that money is information, as stated by previous researchers (Byler, 2004; Gellion, 1999; IBM4; Mas & Sullivan, 2011; Watson, 2014; Wladawsky-Berger, 2011). These studies assert that dealing with money means dealing with information, data, and purchasing power. In bank-based transactions, the form of money is irrelevant; it is rather the relationship between perceived value and purchasing power that is relevant. In a narrow sense, consumer transactions may become easier to conduct if the tangible form of money is dropped and value is represented as purchasing power illustrated by information. Then consumers would no longer have to carry banknotes and coins.

The existence of the majority of the world's money as records on bank data servers also strengthens the view that money is information that can easily be transferred through information technology artefacts. When people make a deposit to their bank account, the material money is always on hand at a financial institution for people

to make a withdrawal or spend it through their credit cards or other mechanisms. When people deposit and withdraw money from their bank accounts, it is the information associated with their account that changes as a result. The money one deposits or withdraws does not bear one's name on it. In this context, money is homogeneous. The information that represents our money is accessible to us from any banking institution through computer networks and systems that connect banks. This is the essence of the electronic form of money, which shows how information and money are becoming closely related.

The introduction of mobile money through systems like M-PESA creates a way of exchanging such digital money easily and widely. Mobile phones are simply additions to the already existing network infrastructure. They facilitate the transition of money's form from material money into digital money. They will continue to do so until a point where digital money is understood and represented as information, at all levels of society, literate and illiterate. When that time arrives, we will have undergone a paradigm shift, a shift in how we view and perceive both information and money (Arafa, Boldyreff, & Morris, 2014; Byler, 2004; Gellion, 1999; Mas & Sullivan, 2011). Further, technology is even enabling us to create entirely new digital currencies (Mas & Sullivan, 2011).

Thus, cash can be removed from the consumer marketplace and replaced with digital information that represents money. But before widespread use of digital money, particularly mobile money, it should first become a universal information utility that is of value to the majority. This, in turn, will require it to scale up and reach critical mass (Mas & Sullivan, 2011) to enable and facilitate cashless transactions in an end-to-end manner.

De-materializing cash and treating it as information will benefit the poor, as they are the least likely to have access to financial institutions, business, and governments (Mas & Sullivan, 2011). Doing so will make it easier to conceal (thereby preventing theft), transport, and deliver money than with physical cash. Such developments will consequently enable individuals to send money to each other any time and to access their bank accounts ubiquitously; businesses to have real-time information about their cash flow; and governments to avoid expenses of and mitigate potential corruption related to administering micropayments programs, social welfare payments, and other similar systems. All can benefit significantly from digital money solutions, and will do so even more when the payment channel becomes a utility that is universal. However, even though the growth of current digital money usage (particularly in the guise of mobile money) indicates its success, the level of literacy it requires should not be overlooked, nor should other potential drawbacks be disregarded, such as the opportunities digital money offers governments and businesses to reward and punish certain groups and behaviors, by gathering, in the absence of safeguards, sensitive behavioral data on a hitherto unprecedented scale.

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4. http://www.ibm.com/smarterplanet/be/en/banking_technology/ideas/index.html?re=spf

The drawback of digital money that is the focus of this article, however, is this: From the viewpoint of an individual's practices, physical money is not homogeneous like digital money, but heterogeneous. It gets its meaning from its context and has different uses based on its different contexts. Its use, allocation, and treatment are all highly related to an individual's social, cultural, and religious practices. To replicate these important attributes, we require research that explores individuals' practices so that appropriate solutions can be designed. This also presents an opportunity for the human–computer interaction (HCI) community to explore the different interactions people undertake with money and to design appropriate innovative financial technologies. The following section reviews and presents studies that have explored this issue.

2.4. Money Practices and HCI

Before 2008 there was a paucity of HCI research studies targeting money and payment technologies. However, after the introduction of mobile money (particularly M-PESA), the HCI community has shown a strong interest in this area, manifested through the recent organization of a dedicated workshop on the topic (HCI and Money) at the CHI conference in 2014. Accordingly, we now document HCI research issues as related to mobile money.

The study and design of digital money requires the understanding of individuals' interactions with money in different contexts (Kaye, Vertesi, Ferreira, Brown, & Perry, 2014). Exploring issues that involve the combination of digital data and new media with monetary and financial interactions is fruitful, as it enables one to build technologies that are suitable to individuals' lifestyle and practice. Conversely, failure to understand individuals' everyday life practices means misunderstanding the requirements for mobile money applications. Understanding the use of money and requirements for applications that handle it goes beyond the understanding of money as another form of data (Wang & Mainwaring, 2008). Money is a social construct of complex psychological and cultural issues (Maurer, 2010; Simmel, 2004; Zelizer, 1996). It is used differently in different contexts for different purposes. So, when new technologies like mobile money enter into private life, social money practices will be affected, and hence when such technologies are created, they need to be socially inclusive (Hertzog & Koepfler, 2014). Thus, an understanding of social5 and technological dimensions alike is imperative. Indeed, there should not be any trade-off between functions and the social and cultural values that mobile money platforms need to encompass (Mainwaring,March, &Maurer, 2008).Moreover, the proliferation of mobile applications brings new issues pertaining to trust and security (Kindberg, Sellen, & Geelhoed, 2004; Panjwani & Cutrell, 2010).

As individuals start using mobile money in their daily life, some HCI researchers are considering interesting research opportunities in this area (Kaye et al., 2014; Wang & Mainwaring, 2008). These authors found issues like interface design as well as information (data) visualization to be challenging topics for the HCI community. Moreover, money digitization brings new interface design challenges for visually impaired as well as illiterate individuals.

In related work, Gunaratne and Nov (2014) expanded HCI and money research to include the embodiment of financial accounting practices and support for users to keep track of their spending and saving behavior. As stated in Section 2.2 of this article, individuals imbue money with social values, whereas the physicality of money also enables one to track how it is getting depleted/spent. Thus, the challenge is to produce innovative technical solutions that account for such values, to influence the spending behavior of individuals so that they can save more and get out of poverty (Karlan, McConnell, Mullainathan, & Zinman, 2010). This raises the need to integrate behavioral finance with HCI. Heyman and Artman (2014) are also proponents of this idea, noting that, by focusing on behavioral finance, HCI research can create designs that have an important impact on peoples' lives, helping them save more, avoid excessive debt, and experience security and stability.

One of the problems of a cash-based economy is that users are unable to trace where money is spent; this makes understanding of spending behavior and patterns challenging, particularly in rural areas. Cash-based transactions create no metadata to show, for example, the flow and direction of physical money. However, digital money enables individuals to control their financial behavior by allowing them to see their monthly cash flows, spending behavior, and to understand high-cost spending categories (Huber & Stevens, 2014). Thus, by making (digital) money inflows and outflows visible, users can reduce costs or can save more. It is such savings and behavioral control that will bring poor individuals out of poverty, as previously highlighted by financial inclusion and development researchers (Collins et al., 2009; Duncombe & Boateng, 2009; Kristof, 2010; Rutherford, 1999).

The aesthetics of money is an important issue in its digitization. Although digital money is often bereft of aesthetic appeal, Mainwaring (2014) maintained that this does not necessarily have to be the case. He claimed that money can be defined in terms of its three functions: as a medium of exchange, as a unit of account, and as a store of value. Money can be beautiful, or seductive, or ugly, and can be judged as good or evil. Aesthetics can powerfully influence the adoption (or rejection) of new monetary technologies. Missing so far is the understanding of digital money's aesthetic potential. Existing monetary solutions and platforms are based solely on money's function, overlooking its aesthetic aspect. Physical money bills have attributes—color, icons or images, serial numbers, existing in bundles, and so on—which together form the aesthetic of money. The challenge is to design technical artefact(s) that can convey or substitute for such attributes.

The aesthetics of money are not only limited to the presence of physical attributes, they also emerge from contexts that alter the meaning of money. For example, the way money is acquired determines its aesthetic values. Earned money has different aesthetic values from stolen money and from money given in the form of prize or award for an outstanding job. According to Mainwaring (2014), a $100 note

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5. For more information on mobile money development potential, adoption, uptake barriers, and practices of rural communities worldwide the reader is referred to http://www.imtfi.uci.edu

awarded to an employee for outstanding performance is more valuable than the same amount she or he gets in the form of a salary: Besides economic value, the award has embedded social values. A study by Kaye, McCuistion, Gulotta, and Shamma (2014) in the San Francisco Bay Area reaffirms this. Their findings show that people have an emotional attachment to their money, use different tools and ways to keep track of their finances, and have heterogeneous and individually and culturally-specific money. Money is thus partly a socially constructed object, as previously stated.

In addition to the aesthetic of money, the materiality or physicality of cash has a great role to play, particularly for elderly people. For example, Dunphy, Monk, Vines, Blythe, and Olivier (2013) showed how the materiality of money enabled aged people in the United Kingdom to control and manage it. Vines, Blythe, Dunphy, and Monk (2014) also bring the importance of materiality to the fore, observing that the materiality of cash money makes money control and transfer easy, and it helps elderly people to count, hide, and transfer it. Moreover, physical cash is perceived as secure by old people, as it has an immediate material presence that is not afforded by electronic finances. Electronic banking, however, has for the most part ignored the power of these material and social qualities.

Another related study by Vines, Dunphy, and Monk (2014) revealed that, for controlling purposes, individuals keep different collections of physical cash differently, very much akin to operating multiple bank accounts. Cash can be separated and placed in different jars, where one can "see" how much is left of specific types of bills. Even young participants in the study valued cash for its restrictive qualities, as its materiality alerts people to how much they are spending (as opposed to credit cards). The other interesting result of the study is the fear of theft. People hide money from other family members in a jar or under their bed. One respondent said, "I just wouldn't necessarily want to share that information with other family members. I don't want them to know how much I'm earning and what I'm spending it on." The design implications thus identified are (a) separation of money—a common practice among participants was separating cash into different physical or mental "pots," enabling them to see how much money they have spare, and (b) hiding of money—hiding is another important money practice to safeguard money, primarily against theft (although it may also be done for other reasons, e.g., avoiding unwanted requests for money from the family).

In conclusion, existing digital banking technologies and platforms inadequately support the complex financial practices of consumers (Dunphy, Vines, Monk, Blythe, & Olivier, 2014). To design innovative financial products or services, the understanding of local economies, of cultural, social, physical, and digital interdependencies as related to individuals' everyday lived experiences, is imperative (Pantidi & Ferreira, 2014). Physical money is associated with many important phenomena, like segregated keeping, its material role and aesthetics, and its emotional and social values, all of which are important issues to be considered when digitizing money and designing applications for it. These spawn challenging and interesting research themes for HCI communities to engage in, such as digital money interaction design research, systems that influence the financial behavior of individuals, and interfaces for aged and illiterate individuals.

Accordingly, based on the characteristics of material money and the everyday practices of individuals using it, further study and analysis is called for when designing systems that enable end-to-end digital transactions,6 *without material-digital conversion*, requires. This will increase digital liquidity, whereby mobile money can stay digital. In this way, it will be possible to increase the number of places where a mobile money user can make mobile payments. So, if we wish to avoid converting digital money into material money and vice versa, we need to study and understand how individuals interact with cash money in their everyday life under different contexts and environments, as previously suggested. Having a clear understanding of how rural people use material cash money enables us to identify what should go into the design of such technologies, as it is important that such solutions enable individuals to do the same kinds of things they do with banknotes and coins. Thus, the purpose of this article is to uncover requirements for the design of digital money systems. This is to say, the article addresses the following research question:

RQ1: What characteristic features should go into the design of mobile money application(s) to embody a rural Ethiopian community's money practices in social (marriage and death) and religious contexts?

To address this research question, we went to the field and studied the lived experiences of a community in rural Ethiopia. The following section describes the methods we used in our research process.

3. RESEARCH METHODS

3.1. Research Approach Selection

Many of the private life practices that individuals engage in are not formal. Thus, their procedures are not documented, and it is not easy to guess about them or anticipate future needs and demands. In such cases, it is important to consider the everyday lived experiences and values of individuals under study. Thus, as ethnography enables us to understand users, their environments, and their interaction, making possible the design of new products and services (Berg, Taylor, & Harper, 2003; Millen, 2000), we have applied this qualitative method over other data collection and analysis alternatives.

3.2. Study Site

The study was conducted among rural people in Oda Lencho Keblle in the Arsi woreda (district) of the Oromia region of Ethiopia. The site was selected given the familiarity of one of the authors with how the community is living, as well as with its cultural and religious practices. The research site has a population size of more than 1,000 heads of households who are

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6. As stated in Section 2.1, under current mobile money platforms, in order to spend mobile or digital money, this needs to be converted back into cash. When an individual wants to send money through mobile money, one has to convert it into digital (mobile money). Such changing of cash into digital money and vice versa is done by those running the agent networks.

exclusively dependent on traditional farming for subsistence. Their income derives from the sale of cereals they produce once a year and sales of cattle. Their farming is entirely dependent on rainfall, which varies from season to season. Whenever rainfall varies in its timing and amount, it impacts crop yields significantly, as reported anecdotally by the informants. Christians, hailing from the Amhara and Oromo people, make up the majority of the inhabitants of the study site.

The study site has poor infrastructure in many respects. Typical problems center on the difficulty of getting access to financial institutions and services. Indeed, there are no financial institutions (banks, insurance companies) within a 35-km radius. Thus, if individuals want to deposit their money, they have to travel a minimum of 70 km (round trip) and often have problems getting transportation for the return journey. This discourages individuals from saving with banks; consequently, they prefer to keep their savings at home, even though hanging on to it also has its problems. For instance, people could end up spending money on items perceived as wasteful, like tobacco and alcohol. The other infrastructure problem is access to education at all levels. In particular, primary school students need to undertake a daily round trip journey of more than 17 km to attend their local institution. As a result, both students and their families prefer not to go to school at all.

Nevertheless, individuals do have access to mobile telecommunication services (this, in an area lacking fixed line telecommunication facilities). The informants of this study indicated a high demand for (and use of) mobile phones. Yet they frequently encounter problems with recharging their mobile battery and buying airtime, as there is no service provider nearby. Irrespective of these challenges, mobile phones are nonetheless promising solutions for financial inclusion.

3.3. Data Collection

Data were collected over 3 months in 2010 and 2012 through semi-structured interviews and discussions (systematically addressing a series of questions, which are listed in the Appendix) with 50 key informants (43 male, seven female), who are popular and respected members of the community, trusted by the community to share their knowledge and experience on the culture, religion, economic systems, and traditions in general. These people are considered a “human library”: They tell stories and are knowledgeable about traditions, how things were done in the past, and how things are changing. They are also called upon to pacify and settle disputes among individuals in the community. However, when asked about their age, they are unable to specify exact birthdates and accurately give their age; rather, they associate their birthdates with events (e.g., “I was born during the fall of this and that regime, during this and that government empowerment”). Of interest, birthdates are not documented even nowadays in this community. None of the interviewees had received any formal education, and illiteracy was self-reported. Thirty-six respondents spoke both Amharic and Oromifa, 10 Amharic, and four Oromifa. Moreover, as banks and microinstitutions are located far from this community, none of the interviewees had any previous banking experience.

Data were collected predominantly on Sundays. This day is preferred, as informants had more free time for interviews and discussions. Discussion times varied between 1.5 and 2.5 hr per informant. Discussion questions, developed initially in English, were translated into Amharic or Oromifa prior to the interviews, depending on the particular language of the informants. The same researcher conducted all interviews and was fluent in all three languages. When interview answers given by participants needed clarification, the researcher would probe

further, as appropriate. All discussions were audio recorded. Besides this, whenever it was deemed necessary, video recording as well as photographs were captured. For the focus of this article, observation—the best field study approach (Ekelin, Elovaara, & Mörtberg, 2008; Malone, 1983)—is particularly suited. So, in addition to the 50 semistructured interviews, contextual interviews in the field, observation of money practices, and task or action analyses were performed. All recorded interviews were transcribed in the respective local language and then translated into English for analysis purposes.

3.4. Data Analysis

Data analysis is a systematic search for meaning, which allows researchers to see patterns, identify themes, discover relationships, and generate theories (Hatch, 2002). The nature and purpose of this study is to investigate financial practices in relation to individuals' social, cultural, and religious practices. Hence in this article we employ the open coding method of the grounded theory methodology, whereby responses and discussions with informants for a particular discussion question are compared against one another in a search for similarity and differences. This technique is recommended to identify design concepts or themes (Vines et al., 2014). Once complete, the analysis ended up with lists of possible design concepts/themes. For simplicity, findings are grouped into two cases: (Case 1) money practices in religious contexts and places, and (Case 2) money practices for social relationships. In the next section, for each of these cases, we discuss the practices and some design implications. After this, in Section 5, we then map those implications to design concepts and possible technology (system) design.

4. MONEY PRACTICES IN AN ETHIOPIAN RURAL COMMUNITY

4.1. Case 1: Money and Religious Practices—Findings and Design Implications

Information communication technology has already proved its success in religious contexts in different guises such as using church poems as mobile ring tones, disseminating religious information through websites, and selling of digital religious books (Bell, 2006; Muller, Christiansen, Nardi, & Dray, 2001). This attracts technology firms to manufacture computational devices that support religious practices, producing religion-specific technologies and experiences. Similarly, exploring money and religious practices reveals innovative product design and development ideas. For instance, since ancient times, people have given money to the church for different reasons, such as during times of economic crisis, when individuals experience hardship, or when they are unable to fulfill their dreams. Thus, money plays a significant role in the religious practices of individuals.

Accordingly, in this section, we document the practices of individuals as related to money in the context of the Ethiopian Orthodox Christian religion. This information enables us to examine how the introduction of new technologies like mobile money affects existing religious practices and money interactions. The objective is to identify design implications for mobile money information systems that support everyday religious practices. This is because, if we ignore exploring such contextual practices, we shortchange both our own experiences of the technology itself and our understanding of what it could mean for others. Let us therefore first understand why people give money and then report the practices of religious money giving.

Analysis of the ethnographic study on individuals' lived experiences revealed a number of everyday money practices that could be fascinating design challenges. Descriptions of the practices and associated design concepts follow. The reader should note that the practices and design concepts are found to overlap across contexts. This is to say, a practice could well be the same for both literate and illiterate users; moreover, it could also be practiced under religious and social contexts alike. So, in the following, some of these concepts are raised redundantly to be discussed in relation to different contexts and section and subsection headings (e.g., money segregation practices, tangibility/material role of money).

Identity Extension versus Hiding

Individuals are motivated by different factors to donate money. The factors that motivate individuals include the need to consolidate bonds with other people, the need to be known as a benefactor by one's community, and the need to be happy and make gifts (Aaker & Akutsu, 2009; Satchell & Graham, 2010). In most of these cases, church giving is not disclosed and is not registered or documented, what we name *self-extension*.

When a person donates money to the church, it can take the form of a "visible or invisible" practice, a term coined by Star and Strauss (1999, p. 10). Although this concept appears to be different from identity extension and identity hiding, as per the practices of research respondents, they all have similar meanings and implications. Interviews and discussions with respondents indicated that when the amount is minimal, individuals do not want to reveal their identity by registering their name or by being called aloud by master of ceremony. In this case, they are anonymous. Yet the action of giving is visible to all people present. However, the visibility or invisibility of either the amount of the gift or the action of giving varies from person to person. This concealment is also for the entourage, not for the person receiving the gift. In so doing, concealment helps the gift-giver not to feel embarrassed when giving small amounts; conversely, it also means that the giving person will not be seen as showing off (when she or he gives large amounts of money).

The visibility or invisibility of the amount varies based on the presence (or absence) of people around a person. This is partly due to the different aspirations of individuals; for instance, people do not want to be seen as giving a lot or too little, remarked one respondent. These behaviors and actions are, therefore, not visible. On the other hand, there are cases and conditions when a person does want to make some behaviors and actions visible to others, perhaps by informing the chief of the ceremony about his name, amount, and what motivated the donation. The latter can be considered as self-extension, whereas the former can be considered as self-hiding. Such informal analysis of individuals' aspiration is a good input to new technology design (Gaver, Dunne, & Pacenti, 1999). Moreover, from the church's viewpoint, calling aloud the name of benefactors is also considered an indirect way of encouraging others to follow suit. During the time of religious holidays, church officials prefer the use of church cloths and umbrellas as an easy way of collecting gifts and donations from participants. Figures 1 and 2 illustrate this. By using such items, individuals can easily donate or contribute any amount they wish, without expressing who they are or telling the public that they are giving to the church. We call this practice *identity-hiding*, as the identity of benefactors and the amounts donated are not documented. Once money is collected, a group of appointed individuals counts the total contribution from the crowd, and the master of the ceremony announces it back to those in attendance. Unlike individual donations, this total is documented.

If money is digital, say in the form of mobile money, individuals can give their gifts remotely, without the involvement of middlemen, who otherwise play a key role in cash gift-giving practices. We are interested in how such practices of self-extension

FIGURE 1. Upside-down umbrella to collect money donations.

FIGURE 2. Church cloths to collect money donations.

in cash gift-giving practices. We are interested in how such practices of self-extension and how the role of middlemen could be affected with the change in the form of money. So, the takeaway from this is that, even though individuals can be motivated by different factors to donate, some want to extend their identity, whereas others don't, which we call identity extension/hiding; this is a design implication for digital money solutions. Accordingly, new systems should be flexible and tailor-able to accommodate these implications.

Embedded Social Meaning and Restricted Use Designation

During hardship, crisis, social, and economic problems, individuals pray to deities and religious icons. When individuals request assistance from deities, they promise to give gifts in return. A promise of giving gifts can take different forms, such as offering cattle or money as part of the transaction. Whatever the individual promises as part of the transaction, from that time onward, the promised items become "special." If the item is money, then it will be kept separate from other money. According to the local language of the studied community, this money is called "yeselet genzeb," which means "promised money," and an individual cannot use it for personal consumption. It must be kept separately and cannot be replaced with other money of similar type and equal economic value. The underlying reason given by respondents is that, "as I promised to give to God in return for my request, there is no need to change my promise… I have to respect my words too," said one informant. Thus, in order not to use God's money unintentionally, people prefer to keep promised money separate. However, if the promise is made simply, without specifying certain money items, individuals can fulfill their promises by giving from whatever monies they have. In this case, an individual has no need of keeping money separate. One further point highlighted by respondents is that promising something in return for divine favor can be considered as a contract. Thus, we understood that individuals have a moral obligation to deliver on their promise if, and only if, the request was fulfilled. As such, if a person concludes that the request is unfulfilled, then there is no moral obligation to keep the promise.

Moreover, money promised to the church will not be used for other things (restricted use designation), even in cases where the need for money is urgent. Individuals associate such money with memorable events (be they bad or good). Such monies are a means to settle their promise to God and will not therefore be used under any circumstances, stated research respondents. A promised $10 worth of money is thus not equal to another $10 of money, as the former has a supplementary value embedded onto it: the promise to give it to the religious icon. Much in the same vein, it is said that not all dollars are equal (Singh, 1997), to reflect that some categories of money have values other than economic ones incorporated therein, usually being cultural, social, or religious.

Respondents were also asked whether gift recipients use gifts for the specific, intended use or not. Accordingly, the majority of the respondents indicated that they buy what the giver intends the money for, that is, memorable items that enable them to remember the gift giver. A respondent stated, "Gift is respect and I will use it to buy the item I am told to buy." Furthermore, almost all respondents stated that they are not willing to pass on such money gifts to any other third party:

> "I want to remember that person, this is a special gift to me; someone's presents cannot be given to others. Passing it over to a third party implies that I am not

> interested in the gift. I need to remember the person. Gifts are respectful, it is 'my' gift given for something special, the person gave me a gift not to show that he is wealthy but to help me and to remember him. It has special meaning for me, because the person gave it to me to use."

Thus, such gifts are considered irreplaceable and cannot be substituted with money of equal economic value. Gift money embodies a symbolic meaning to its recipient that is not present in other money.

The fact that money has different symbolic *meanings*, which vary according to the different settings of use, is well known in sociology research (Zelizer, 1989); one observes meanings such as church money (money reserved to be given to church), wife money (money to be given to the wife for domestic expenditure), and so on. In particular, religious money has a restricted use and will be placed separately from other money (Figure 3). Thus, its handling and use is different from other money categories. For illiterate individuals, we came to understand that such differentiation is only possible as the result of money's material characteristics (Figure 3); they keep and differentiate money by placing it in separate places, such as jars, pockets, and money boxes.

Furthermore, suppose that a university student receives a $100 prize at the end of the academic year for his or her extraordinary performance in front of his friends, classmates, families, and invited guests. This money is richly symbolic in many ways and is called special money (Zelizer, 1994). What made this money special? One way through which the symbolic significance of this money is highlighted is the context in which it is presented. As the centerpiece of a public, ritualized event, the occasion marked the money. The food served, the clothing worn, the president who presented, the speeches made, and the photos taken all attested to the importance of what this particular sum of money stood for. This amount signals that we should appreciate its symbolic value rather than its exchange value. Here, the amount matters not for what it can do for the student but for what it says; and one of the things it does describe is their dedication as a student whose extraordinary performance has been recognized. Indeed, the $100 may not buy items of significant value. However, it says something about the student and will consequently develop a special meaning. Hence, the design implication we can draw from this is that new financial technology design and development must accommodate such practices of assigning intangible social values to money.

Dirty versus Clean Money: Aesthetics of Money

We have also found that respondents label and categorize money into "dirty money" and "clean money", to use their words. For the research respondents, dirty money refers to money that is collected through theft, whereas clean money is money earned as the result of an honest task or selling of one's assets. Moreover, our respondents were categorical that dirty money cannot be used for church-giving. People keep dirty money segregated and spend it as quickly as possible. This is in line with the findings of Mainwaring (2014), according to whom the aesthetics of money refers not only to its material format but also to the way it is acquired. Thus, the aesthetic value individuals attach to money depends on how that money is acquired.

FIGURE 3. Church promised money kept separate.

Obligation to Contribute

Our data also confirmed that Orthodox religion followers in Ethiopia have an obligation to contribute 10% of their earnings to the church (i.e., the tradition of the tithe). This money is called "asrat bekurat," which is biblically declared for every Christian Orthodox individual. "Ten percent of their earnings do not belong to them and should be given to church," stated one informant. They also stated that "when we give this to God, what we do on earth will be blessed, and we will get value from God." The difference between these two (promised church money and obligatory money contribution) is that, in the case of promised church money, individuals are particularizing a specific bill (i.e., uniquely identifying it) and make it part of the transaction, whereas contributions that do not involve a promise can be made from any lump sum of money an individual owns.

Uncounted Church Giving

We also learned that individuals give money to churches whenever they visit them, be it during weekends or religious holidays. During these days, the amount of money they give is usually small in its economic value. Giving during these days is usually through a designated locked vault called "mudye mitswat" (Figure 4). In principle, individuals will not count how much they give, but in reality they know the amount to give. The reason as told from research informants is that "God says when your right hand gives, let your left hand not see it." Such gifts or donations are not recorded or memorized. The other theme we identified in this study is that it is not a common practice to expect change from a donation.

As can be seen from Figure 4, the vault is usually placed outside of the church buildings but within the church premises, so that individuals who are visiting the church can place their donations in it. Once in a while, authorized people open it and collect the donations. The role of this device can inspire the design of hardware and software from the point of view of the church.

FIGURE 4. Mudye mitswat.

In conclusion, from a money digitization and individuals' everyday money practices perspective, we deduce that practices such as embodied social meaning, identity extension/ hiding, and aesthetics should be addressed in new financial technology designs. Failure to support such practices might result in rejection of developed artifacts.

4.2. Case 2: Money Practices and Social Relationships—Findings and Design Implications

Having documented money practices of individuals in religious contexts, we now turn our attention to describing money practices of individuals in the context of social and informal gatherings. Possible design concepts are extracted from practices such as weddings, birthdays, and funerals. For simplicity's sake, the section is further divided in two: (a) money transactions in times of hardship, such as death, and (b) transactions at times of joy, such as weddings. Next we describe the practices and some of their design implications in more detail.

Edir

Social support is most often associated with "strong" social ties, which tend to be made between kin, neighbors, and intimate friends. These ties generally provide individuals with emotional and expressive support, as well as certain forms of instrumental help like loans. To assist one another during death, individuals observed in our field study created formal associations called "edir."

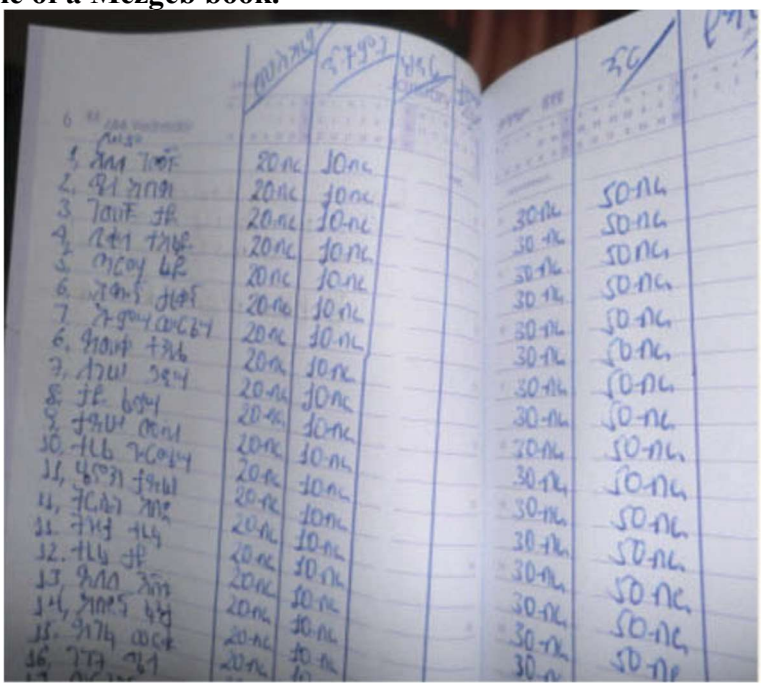
Although edirs have features common to most Rotating Credit and Savings Associations (Besley, Coate, & Loury, 1993; Dupas, Green, Keats, & Robinson, 2014), they also have characteristics that set them apart. First, separate edirs are established to be used exclusively for men and exclusively for women. Second, monthly contributions are not exclusively cash based—for both male and female edirs, members can make monthly cash and/or in kind (e.g., food, drink, wood, labor) contributions, the amount of which varies from month to month, depending on the number of deaths among families of the members of the edir. Last, the funds of the edir are used only in times of death to assist the bereaved member family.

To administer the edir, members nominate respected and relatively educated persons

as their chairperson and secretary to serve the association for 1 or 2 years. When a death happens among members of the edir association, money and/or in kind contributions are taken from the chairperson and given to the family of the deceased to support them during this period.

Each month, edir members gather at a fellow member's home (on a rotating basis), hold a discussion, and pay in their monthly contributions. The host of this gathering will prepare food items and local alcoholic drinks. Discussions focus on issues like deaths, new members, and departing members, and monthly contributions are collected. These are recorded in a book called "mezgeb" (Figure 5), which contains the lists of members and their monthly contributions
In the process, the chairperson collects the contributions while the secretary keeps the documentation in the mezgeb. At the end of the meeting, these two individuals cross-check the contributed cash/goods against the record, calculate the total contributions made, announce the amount to the gathered members, and sign on the

FIGURE 5. Sample of a Mezgeb book.



mezgeb (which closes the contribution for the month, preventing latecomers from contributing after the meeting has ended, i.e., "timed payments"). Absent members are marked with an X and are required to supplement their contributions accordingly in the following month. Later, the chairperson consults the book records and announces where the meeting is going to be held the following month. In respect of cash-based practices, we call this theme *segregated cash control*, that is, separating cash from its associated documentation.

At the end of the meeting, close friends or relatives leave the host's residence and invite one another to their respective homes (often for all the remaining hours of the day). After accepting such invitations, individuals usually find themselves having spent too much (because of their emotions at the time), which they tend to regret afterward. As a result, some members avoid coming to the meeting themselves and send delegates (usually their children) to pay their monthly contributions. This is not without problems, though. When children are delegated, sometimes they lose the money, sometimes they use it, and sometimes they have the money

stolen, said a respondent. Although information communication technology offers a solution to these problems, in that it can be designed and developed to enable such individuals to make their contribution remotely, this comes at the expense of the opportunity to acquire social capital through being visibly present or having one's delegate be present, as per the responses we got from respondents.

Membership of the edir may be revoked due to the nature and place of a member's work (e.g., a member starts to work in another village, or indeed in multiple villages, as is the case with rural health extension workers, who travel from village to village), physical inability, or repetitive abuse of rules and regulations, such as the inability to pay monthly contributions or having problems with other members. In the event of revocation due to regulation abuse, the edir provides a written letter detailing the person's behavior, effectively blacklisting him or her so that other edirs will not accept the individual, should that person seek membership elsewhere.

From a financial technology design perspective, we find it interesting to further explore what would be the implication of separating the real cash money from the document that records it. What would the implications of putting signatures on the record be? What would the implications of late and remote contributions be? What do a rotating chairmanship and secretary imply? These perhaps might be addressed by using dedicated and specialized software solutions that incorporate these accounting practices of the edir.

Money That Is Not Counted in Front of Others: Personal Assistance

Besides the financial assistance described in a previous section made by the edir association, in the case of death, individuals extend their support by giving cash directly to families of the deceased. The amount varies depending on the beneficiary's financial need and closeness of their relationship.When this study was conducted, amounts usually ranged from 5 birr[7] to[8] 100 birr, depending on the financial position of the benefactor. The beneficiary uses this cash as a means to measure his or her reputation and community standing. This money is called "yazentega", according to respondents. This concept appears to be similar to the concept of identity hiding, described above. However, these two concepts are different. The case of not counting money in front of others in yazentega is a clear case of identity extension, as the person giving money does not want to make it public but wants nonetheless to let the recipient remember who the benefactor was. This is in contrast to anonymous church donations, for instance.

Moreover, unlike the case of the edir, in the case of yazentega, the amount and name of the person giving money is not formally documented on paper by the beneficiary. Even the person giving the cash does so in a somewhat informal manner. In this case, the beneficiary and the benefactor do not count this money in front of others. However, when the beneficiary is alone, s/he will count it and memorize the amount. As this transaction is not formally recorded on paper, the beneficiary is expected to remember who gave what amount, so that this gift is returned sometime in the future. This is a form of reciprocity, as described in (Mauss, 1922).

According to research respondents, there are many reasons for not recording the giving and receiving process of yazentega: (1) not wanting to show off in front of many people; (2) the fact that, as the gifts are made at different times and places, the beneficiary may not be able to easily record them physically; (3) the concern that if the amount is relatively small, individuals giving money will feel a sense of shame seeing it recorded; (4) if the money given is going to be recorded, individuals having no money will feel shame; and (5) because, in principle, this gift is

not necessarily reciprocal. Yazentega is given anywhere (at the individual's home or at church during burial time) and any time after the burial. In some circumstances, this could be more than a year after the death of a person; for example, where individuals have insufficient time available to travel from a distant location.

When individuals are handling over the yazentega, they say "egziabher yatsngh" which means "may God give you the strength to forget the death." In turn, the receiving person says "bealem yemeles," meaning "I wish your gift repaid on joyful events". This dialogue indicates that the gifts are not generous, but rather a sort of promise is made between individuals, in which gifts for funeral events can be repaid in the future during other events like weddings, birthdays, and college graduation. This is precisely why the receiving individual is expected to memorize the amounts received and who gave it to them. From these practices, we can understand how the giving-accepting of money helps as a means of communication by enabling individuals to express their feelings. Thus, we derive the implication that new financial technology design must be sensitive to these types of dialogues, expressions, and practices.

Refusal to Accept Money Gifts

In principle, one does not refuse yazentega gifts. But if one does, the refusal is interpreted in different ways. One interpretation is that refusal shows the existence of a dispute between the deceased and the would-be giver (living person). Parties to a dispute promise not to accept any gifts in the name of each other. Thus, when one of them dies, his or her relatives respect the oath of the deceased and refuse to accept yazentega gifts from the one with whom he or she had the dispute. The second interpretation, although rarely the case, is that relatively richer individuals sometimes refuse gifts from others. In cash-based transactions, rejecting money is accomplished by refusing to take the money when offered in person or, in some cases, returning it after the delivery is made. However, if refusal is due to the wealth of the intended recipient, the community considers this as an insult, akin to the research findings of (Kochuyt, 2009). In this case, thwarted givers assume they have been undermined and, as a counter-action, the community will alienate the refuser from social affairs. As a result, in this context, one tends not to refuse money gifts from poorer individuals irrespective of how wealthy one is. Thus, everyone has both a moral and practical obligation to accept yazentega and to repay it back, unless refusal is as the result of strained relationships between individuals. In general, such categories of gifts are considered to express one's feeling towards the victim. One of the respondents said: "it is the attitude of the individuals, not the money that matters". Therefore, a lesson which can be learned from the lived experiences of our study participants is that the design of digital money systems and associated financial technology should allow individuals the practice of money gift acceptance and refusal.

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7. Birr is the Ethiopian currency. Currently, 1USD is equivalent to 20.25 Birr.
8. Money can now be potentially created outside traditional channels (e.g., commercial/central banks), very much like Bitcoins.

Reciprocal Gifts

Although the yazentega gift is not recorded and repayment is in principle optional, the transacting individuals expect repayment in the form of reciprocity. In practice, inhabitants of this research site indicated that they expect their previous gifts to be reciprocated later on. If an individual fails to repay, they risk losing their reputation and community standing, not to mention jeopardizing relationships and inviting gossip. However, if failure is due to financial incapability and a good relationship exists between the parties, then the person may be given tasks to repay the yazentega gift through labor or though intangible assets such as gratitude, esteem, and loyalty, as reported in previous work (Lebra, 1975). In this scenario, richer individuals recognize their power over the poorer, in which case such gifts imply subordination (Zelizer, 1996).

According to the rule of reciprocity, the nature and volume of the countergift determines the balance of power between the two individuals. If the return is smaller than the initial gift or when one reciprocates in an immaterial way (such as through gratitude or loyalty), one indicates one's acceptance of being dependent on the other. However, limited financial resources among some individuals can leave expectations for reciprocity unmet, generating increased tension and potentially leading to dissolution of relationships. This means that maintaining a balance of reciprocity is important in sustaining a relationship (Dominguez & Watkins, 2003). The fact is that, unless individuals give something in return, their relationship will be harmed. Social gift giving is, therefore, a pre-requisite for maintaining good relationships (Kochuyt, 2009). So, an implication for technology design is that perhaps the incorporation of systems that can remind individuals to reciprocate gifts and, in doing so, sustain their good relationships, will be valuable for this population.

Money Giving Through Delegates

Regarding attendance of individuals at funeral ceremonies, this study has investigated two possible cases. The first is one in which physically able individuals should visit families of the deceased immediately upon hearing of the death and participate accordingly; the second covers situations where one is working or living away, in which case they need to visit the bereaved family within a reasonable period, typically within 2 months. In such cases, money sent through delegates is not acceptable, as individuals give more credit and value to the physical presence of a person rather than any money they give through delegates. Hence, irrespective of distance, individuals who can afford to do so must be physically present and express their condolences to the family of the deceased directly. However, for someone living outside the village, their physical presence may be costly due to transportation and related expenses. Although these individuals value the physical presence of someone on such occasions, they will still expect the usual money gift (yazentega) through delegates. Accordingly, it will be interesting to discover whether new technology designs like SMS-based money systems could address the needs of individuals in such cases.

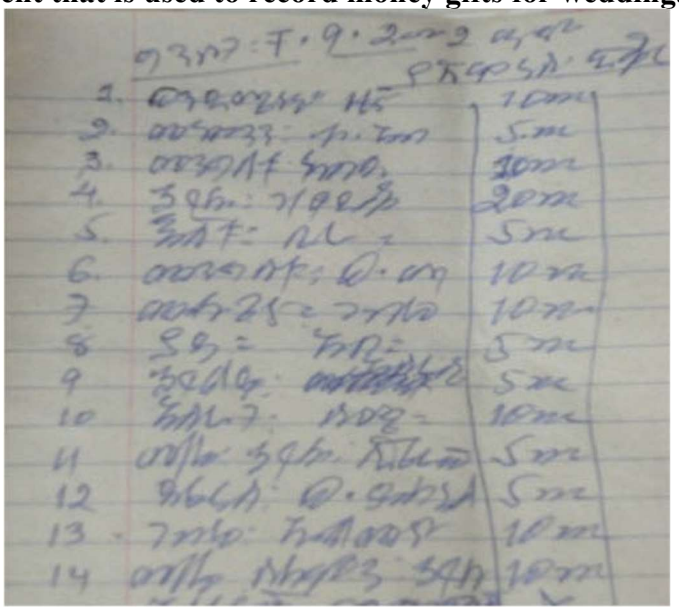
Temporary Separation and Aggregation

We have also learned that money received in the form of yazentega and money to be delivered through delegates are kept separately from the rest of the money the beneficiary owns, which enables the beneficiary to easily calculate how much is received from the community. Once they know the total, however, they then pool this money with other money and use it.

Money Practices During Marriage

When families plan the marriage of a groom and bride, they invite local communities and friends to attend the wedding ceremony. The invited local communities usually give money gifts to families preparing the wedding. Unlike death (which happens suddenly), gifts for marriage are prepared in advance, are somewhat bigger, and are obligatory for a person to repay at any other social event of their choice. This gift is consequently recorded on paper (see Figure 6). To this end, two individuals who are able to read and write will be assigned (temporarily) the responsibilities of recording the amounts given and names of the givers: one records the transaction, and the other handles the cash. These individuals usually sit in a visible area near to the gate of the ceremony hall. At the end of the ceremony (which can run for up to 3 days), these two persons cross-check the collected cash against the record and hand the document and the cash over to the families of the newlyweds. The document typically contains information like the event name (i.e., wedding), date, list of gift benefactors, and amounts given.

FIGURE 6. A document that is used to record money gifts for wedding.



This document is used for different purposes: (a) to keep a record of who gave what amount, so that the newlyweds can repay (reciprocate) accordingly sometime in the future; (b) to identify whether a previous recipient has reciprocated or not; and (c) to get this task done by others (the two assigned individuals) in order to allow families preparing the wedding to focus on other tasks rather than engaging in these money matters. There is some similarity between

Figures 5 and 6. The only difference between them is that the former is a formal document that could rotate among other members (as the chairmanship and secretary change), whereas the latter (Figure 6) is an informal document that is used by an individual as a reminder and control mechanism. Such reminders are helpful mainly if there is a considerable time gap between receiving a gift and its reciprocation. Whenever such illiterate individuals want to refer to the record, they rely on literate individuals to read for them. In conclusion, with a view toward digitizing money and thinking of features of new financial technology design, such informal accounting practices need to be considered.

Designated Money Use

Relatives of the groom and bride give different gifts to help the newlyweds in their future life together. These often include clothes, kitchen materials, fragrances, and money. These gifts are decorated with special gift paper, and the person or group giving the item writes a message on it. Such writings enable the beneficiary to identify who gave what and review the messages and wishes of their colleagues and friends. This practice follows the concept of self-extension (as described in Case 1 of this article). The giving and receiving of these gifts usually involves some ceremony (Carrier, 1995). Gift-givers want to let beneficiaries know how much they gave, together with their messages, wishes, and sometimes the purposes for which the money needs to be used. We named this concept "designated use." By doing so, they want beneficiaries to identify who has done what for their marriage. The question that therefore comes to mind is, What does this elaboration of meaning with physical decoration imply for money gifts, given the digital nature of money? How individuals extend themselves and express their wishes are both ideas for further design exploration.

Safekeeping With Friends

As our research respondents have no access to financial institutions, they use their social relationships to save money outside their homes. They do this for different reasons: (a) fear of theft, (b) fear of misuse, (c) fear of loan request, and (d) fear that their family will demand money for unnecessary expenditures. Thus, many individuals prefer to save money with other individuals whom they are close to and whom they trust. Rutherford (1999) stated that keeping cash safe can be a difficult task for the poor, and thus they are in need of safe places for keeping their savings. The person receiving money for safekeeping puts it separately and treats it differently, similar in manner to what Zelizer (1989, 1997) described. That is, the person keeps the money separately so that she or he does not use it in the hope of replacing it before the person who gave it needs it back. Moreover, the informants of our study indicated that, from their religious and cultural viewpoint, a person who uses the savings of others will not get rich. The person holding the money also fears that the owner may claim this money any time, which would cause the person to be ashamed if they have used it and are unable to replace it. A danger also exists where the person fails to provide the money on demand, the owner can criticize the person in public.

Furthermore, respondents indicated that individuals holding the savings of others need not even touch the money in question, not even if they need to break a larger banknote in their possession into smaller ones available from the savings of others in their possession. Again, this practice informs a design concept named restricted money use. As illustrated, this problem

emanates because the rural illiterate do not have access to financial institutions, where they can save money. New mobile-based financial solutions might address this issue with appropriate design features.

No Spending on Wednesdays and Fridays

Another interesting financial behavior that we observed is that there are individuals referred to as "magicians," by the local community, who do not spend their personal money on some days (Wednesday and Friday), thinking that if they do so, they will lose their wealth. Even if they are forced to spend on those days, they do so by borrowing from others.

4.3. Concluding Remarks

It is to be remarked that some of the concepts and or practices do overlap in different contexts. For example, individuals have the practices of self-extension and/or hiding, not counting money in front of others, and so on, both in religious contexts (Case 1) and social practices (Case 2).

The takeaway from both cases is that incorporating everyday money practices into the design of new financial technology may benefit rural users. Addressing these various practices associated with the materiality of money, such as rejection, labelling, and separating money based on its source and purpose, could be useful and appreciated by users, and a system that attempts to take these beliefs and practices into account may well be an advantage, To this end, in the following section, we highlight possible ways of mapping the concepts into technological system design.

5. MAPPING DESIGN IMPLICATIONS TO DESIGN CONCEPTS

As some of the design concepts have overlapping purposes, we have grouped and treated them aggregately, as addressing one concept potentially enables us to address another related concept.

5.1. Embedded Social Meaning, Segregated Control, and Restricted Money Use

Embedding social meanings and values within money refers to an intrinsic and personal labeling and allocation of money for different purposes. This is based on different factors such as the amount of money, source of money, and purpose for which money is intended to be used. For example, a student who has $100 from a university professor for his outstanding academic performance treats it differently from the regular money he gets from his parents. The former has an embedded social value on top of its economic value. Such social value embodiment is managed by keeping it in a separate place, perhaps in a dedicated pocket. Keeping money separately at different places like clothes pockets enables individuals to clearly differentiate and treat money differently.

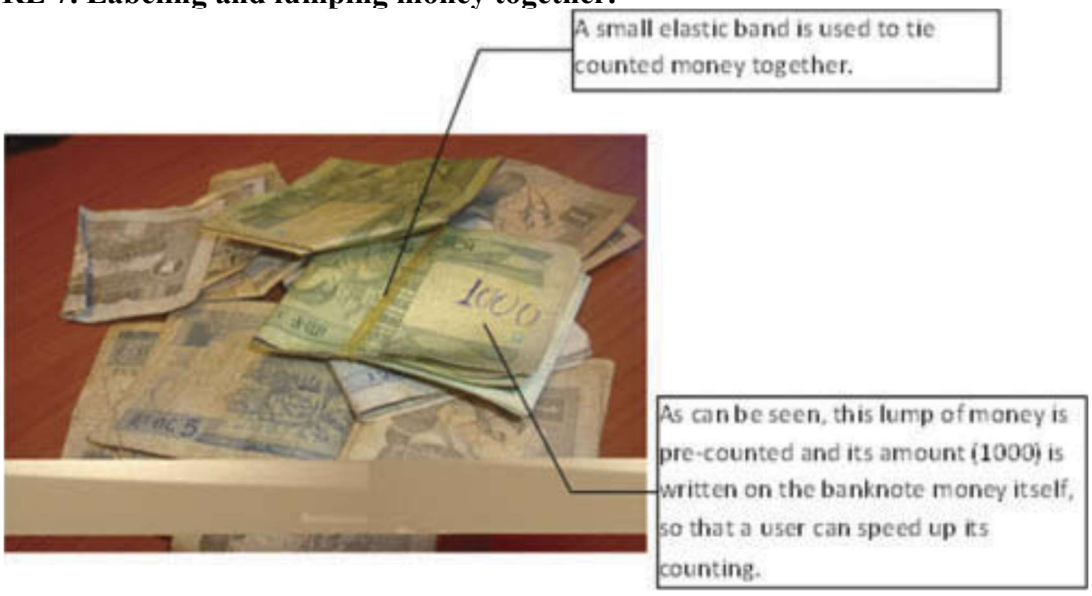
As far as money digitization is concerned, this implies that techniques and tools should be designed that help individuals distinguish between different money, based on these factors. The use of electronic folders and sticky notes as reminders have already proved their worth in assisting individuals in managing information (Mistry & Maes, 2008); sticky notes can be used

to tag and track objects, as cues/reminders, and can be searched and located. Differentiating folders with different colors would make them distinguishable for illiterate users. As was discussed in the two cases reported in Sections 4.1 and 4.2, issues like keeping money in separate places and restricted money use both reflect and depend upon individuals memorizing different money categories.

Following Mistry and Maes (2008), we propose the use of electronic colored folders and sticky notes. So, when thinking how these practices can be mapped into digital money technology design, it is important to preserve the capacity for money differentiation, labeling, restricting, and reminding that some money category is for restricted use.

The use of annotation and sticky notes is already practiced by research respondents in their money management activities. For example, Figures 7 and 8 depict how research respondents are already using notes (written on the bank note itself or on an attached sticky note) and bands for the purposes of grouping counted money. As researchers we wanted to directly map such practices into digital money environments. We feel the use of such memory aids would enhance users' understanding about the system rather than proposing icons, which users might not be familiar with. For example, in Figure 8, an individual might write the purposes for such money, attach it to the money, and send it through someone to another person to do some shopping.

FIGURE 7. Labeling and lumping money together.



Note. **If a user wants to pay out 1020 birr, she or he can simply pick up the money tied together (as indicated here) and count 20 more 1 birr notes.**

FIGURE 8. Sticky notes in practice: Labeling the sum of money with its intended purpose.

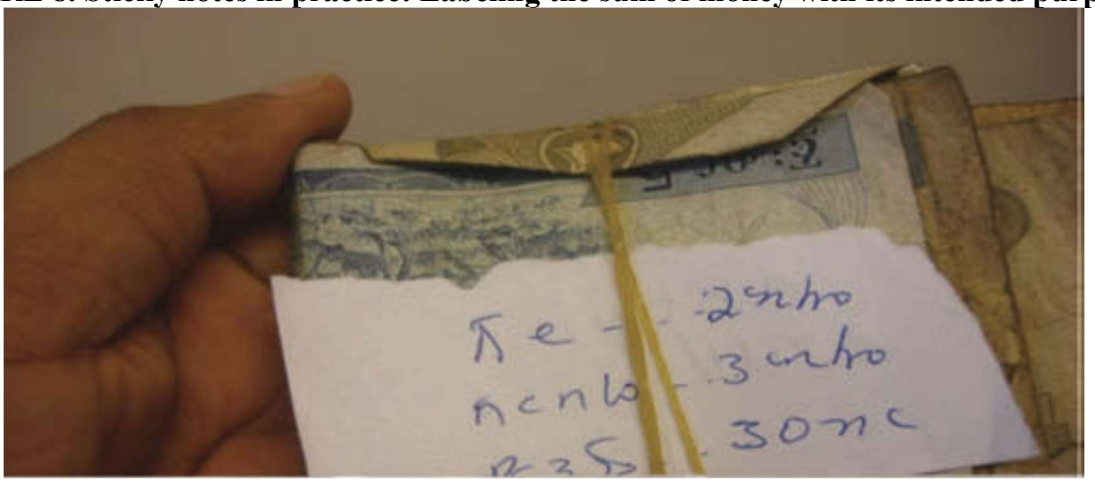


**FIGURE 9. Colored money folders with sticky notes showing the category of money (from top
down: church, family, shopping, gifts).**

From this, it appears that sticky notes application can be further explored for the design of digital money systems. In particular, their application in labeling digital money folders and keeping money segregated. They can be programmed and attached to money folders so that they send reminders about what the money is intended for so that users will not spend money on unintended and unplanned matters. The use of sticky notes can thus significantly aid the experience of digital money management by users. It is our belief therefore that sticky notes (which could be audio based or text based) could play a significant role in enhancing the experience of illiterate individuals. Figure 9 details a high-level design example.

5.2. Money Gifts: Acceptance and Refusal

As reported in the ethnographic data analysis, sometimes individuals refuse to accept money gifts for different reasons (e.g., moral sentiments, when the gift has a negative and degrading social implication, if an individual feels the money is "dirty money," or when the gift is materially insignificant). In the cash-based gift economy, individuals refuse by returning the gift straight to the benefactor. In the context of the digital money economy, where there is a possibility of giving remotely through wireless technologies, such as SMS or Near Field Communications (NFC), a transaction could occur without an individual's consent, much in the same manner as receiving an unsolicited e-mail message. In this respect, one might delete such an e-mail message straight away, without looking into its details—one will not resend the message to the original sender. However, we do not expect individuals to delete money received in this way, as this might give the sender the impression the recipient has accepted it. Rather, we need to think of a way that individuals could return the money to the sender; the practice of gift refusal thus poses an interesting design challenge.

From the observations and analysis we made, before refusing a money gift, an individual will consider the source, the purpose, and/or the amount of the gift. Based on this information, an individual can then reject or refuse a gift. So, from a design perspective, one possible way to address this is the use of an electronic money folder that temporarily holds any incoming e-money. Afterward, the user can identify the source, amount, and purpose of the money so that this person can add it to his or her other money (accept) or return it to the source or sender (reject). This means that, when digital money is exchanged among individuals, that metadata comprising the source of the money, the amount, and its purpose need to accompany digital money transfers. Based on these metadata, users can screen and possibly reject unwanted money gifts.

In respect of gift giving, designers might think of specialized applications that could be used to collect and record gifts. Let's assume that a mobile phone with such a specialized application is given to an individual who is situated at the entrance to the ceremony hall; alternatively the phone alone might be placed there. When invited guests arrive, they can give their gifts from their mobile phone to the one placed near the gate with the express purpose of collecting such gifts. Moreover, the application also records the identity (via the SIM card number of the donor phone) and the amount given by each benefactor, thus fulfilling the role of an electronic gift register (in other words, an electronic version of the document depicted in Figure 6).

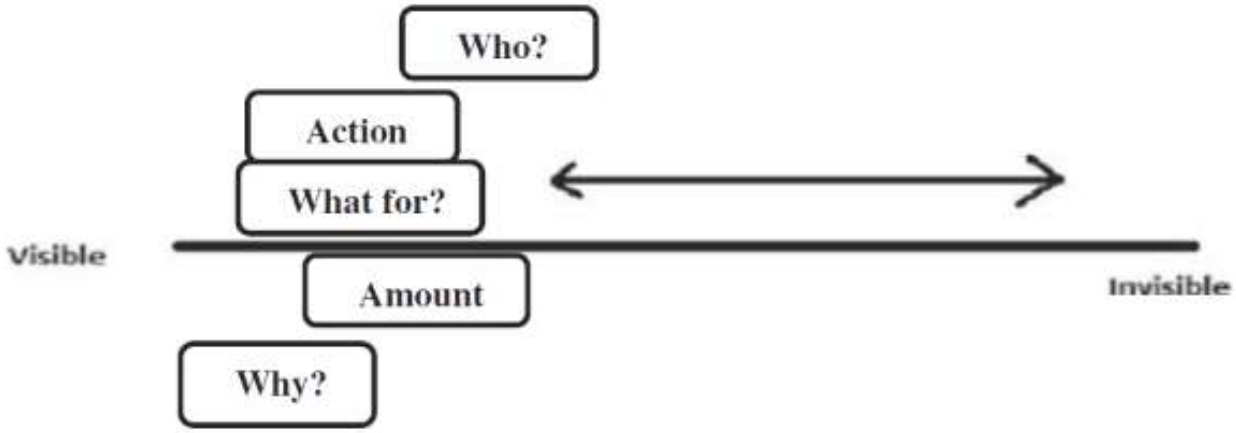
In the context of funerals, for those individuals who otherwise cannot physically visit the bereaved one due to transportations costs, a possible solution might be the sending of ersonalized "e-yazentega" that can be sent in the form of an SMS containing a condolence message, as well as a monetary gift. Although such technologies can have a positive impact on maintaining the social bond among people who live in different geographic areas, such an approach might well be perceived as too impersonal and informal by the bereaved individual. Whether this is indeed the case is an open question, to which only subsequent research could give an answer.

5.3. Disclosure versus Secrecy, Visible versus Invisible, Identity Extension versus Identity Hiding

From our research, we understand that there are no money-related practices and actions that are 100% visible or invisible. Rather, almost all practices fall somewhere on a visibility continuum, as depicted in Figure 10. The important thing to ask and analyze is, What exactly is visible and to whom is it visible? How do practices become visible or invisible? Understanding such everyday practices helps to inform the design of digital money systems.

Context is an important factor in studying visibility and invisibility (Star & Strauss, 1999). In some contexts the *act* of giving is visible, whereas the *amount* is not.

FIGURE 10. Aspects that may be made more or less visible in different customary money practices.



In other contexts, both the *act* of giving and *amount* are visible, and both of these are situated along the visibility continuum (Figure 10).

In everyday money practices, an individual may be interested to make his or her gift giving action visible while keeping the amount of gift invisible; alternatively, he or she can make both the action of giving and amount (in)visible. In this document, the terms *visible, identity extension,* and *disclosure* refer to the practice of making visible the action of giving and receiving and/or the amount to be known and seen by the public and/or other people around. This depends on the means of recording and celebrating the practice. On the other hand, terms like *invisible, secrecy,* and *identity hiding* refer to practices of not recording, not publicizing, and/or not letting people around know and see either the action of giving and/or the amount given.

As just outlined, the relation between visible and invisible practices is a complex matrix, with an ecology of its own. Thus, systems that support digital money practices need to be flexible and customizable along the continuum line so that users can comfortably adjust the settings of money applications. Moreover, the notion of secrecy implies that things are known differentially among different actors, usually because those who hold the secret deliberately withhold it from others. In this article, the concept of secrecy does not refer to cooperation in ill-doing; rather, it refers to practices and actions that are not visible to others. The concept, as it applies to this article, indicates an individual having a different personality and face, based on different contexts.

Indeed, this concept falls under the general category of *social identity*, a field in which Boyd (2002) did seminal work. She claimed that internal identity is entirely constructed and maintained by the individual, whereas social identity is perceived externally, relying not on the intention but rather on the effective expression and perception of an individual's self-presentation. Whereas one's social identity emerges from one's internal identity, its manifestation is read in light of the body conveying it and the situation in which it is being conveyed. The environment thus plays a crucial role in the production and perception of one's social identity.

While interacting socially, people are aware of and react to the feedback that they receive from other people in an environment. They adjust their body posture, their facial expressions, and their general self-presentation. These adjustments are made not to be artificial but to convey appropriate social information about the situation. As best articulated by Goffman (1949), all social interactions can be seen as a series of interactive performances, where the actors are constantly altering their self-presentation, based on their assumptions about what is acceptable in this situation and the reactions that they receive from others. People perform aspects of themselves to generate specific impressions, often so that others will perceive them in a positive light. As previously indicated, this theoretical reflection has a direct relationship with money practices.

The important thing is to identify what is needed to be disclosed and/or needed to be kept secret. So, systems for digital money should enable individuals to adjust the level of financial information they reveal/disclose based on context. From a technical system design perspective, designers can address this challenge by enabling individuals to configure the system as per their contextual need with appropriate privacy management (Lederer, Beckmann, Dey, & Mankoff, 2003). Failure to consider such visible/invisible practices in the design of digital money systems will seriously reduce their likelihood of being accepted.

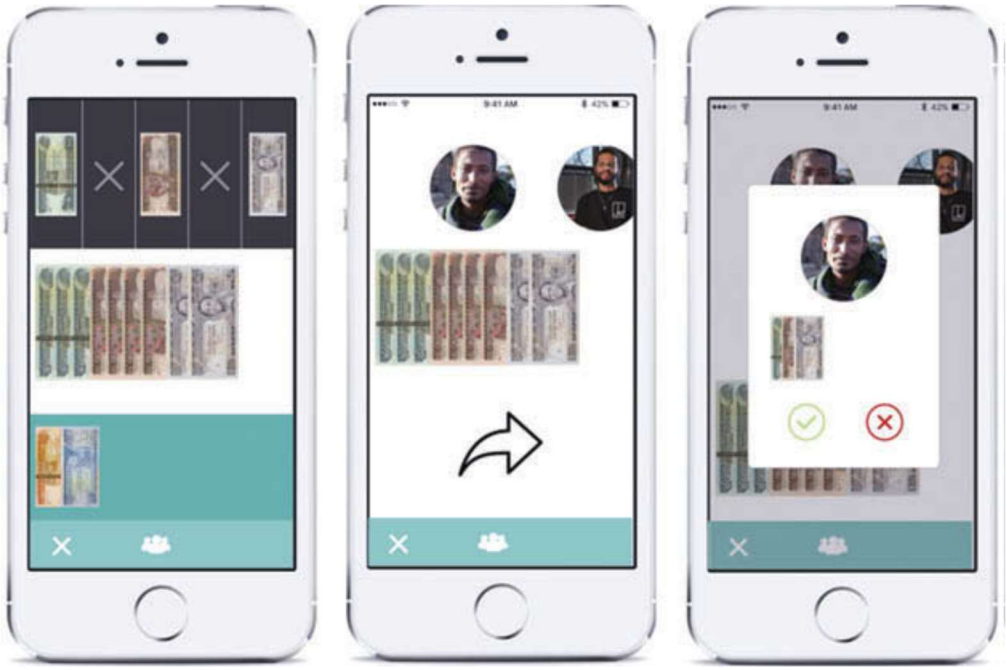
The very purpose of identity extension and/or hiding is to make visible/invisible to the receiver and his or her entourage the acceptance of money between two individuals. In practice, we propose that such customs can be addressed by the donor disclosing/hiding his or her identity through making the SIM card number visible or anonymous at the time of gift giving. Moreover, if visibility is what is desired, the entourage can be alerted to the donation being made by the physical actions associated with wireless transfers through NFC and Radio Frequency Identification.

5.4. Material Property of Money Bills: Counting, Changing, and Identification

As we digitize everyday artifacts, we need to understand the necessary and desirable material properties of these artefacts and the way in which we convert them into their digital equivalent. What should the structure of digital money be, given the monetary practices of illiterate users (given their counting, changing, and differentiating money bills based on color)? One possible property of digital money is to sustain important properties of material money. For example, the color of banknotes enables illiterate users to differentiate between different values, whereas their materiality enables illiterate individuals to know how money is depleting as they keep on spending. Materiality also enables illiterate users to count money and know their balance at hand. So, these properties need to be sustained in digital money system design. Failure to consider these properties implies that illiterate individuals will not be able to identify currency bills and thus will be unable to determine their balance.

The materiality of money thus poses yet another design challenge for financial technology systems designers and developers. If money is digital, how can illiterate users identify money bills? How can they count and make payments? How do they know their balance at hand? For these design concepts and challenges, we propose what we think is an appropriate solution, illustrated in Figure 11, namely, the use of

FIGURE 11. Screenshots from a developed prototype showing from left to right: Interface for selecting money; Interface for selecting contact and transferring money; Interface for confirmation amount and contact to transfer money to ("X" means "undo").



photos of money bills, to identify among bills and dragging and dropping to count money. Moreover, in addition to sustaining material properties, we can also endow digital money with additional properties and overcome the shortcomings of material money, as outlined in our previous work (Woldmariam, Ghinea, Atnafu, & Grønli, 2014).

5.5. Aesthetics and Money

From the ethnographic data analysis and the literature, we understand that individuals' relationship with money has an aesthetic value or dimension. This implies that money digitization (and by extension, mobile money) goes beyond the issues of interface design and background system design. As indicated by Horst and Taylor (2014), the aesthetics associated with digital money include the mobile phone itself, the infrastructure that it depends on, the back-end operations, the agents who sell mobile money services, the television and print advertisements, and the instructional leaflets that companies give to account holders. This way of treating money aesthetics is based on mobile money applications and platforms, where cash-in/cash-out agents are involved. However, in addition to aesthetics related to the appropriate technological infrastructures, as indicated by Horst and Taylor (2014), we claim that designers

FIGURE 12. Summary of Design Concepts, Their Mapping, and Challenges They Raise for Users With Low-Literacy Levels (L^3 users).

	Design Theme	Possible Mapping Techniques	Open Questions/Design Challenges
Case 1 (Section 4.1)	Promised church money	Separate & dedicated e-folders	What is the most appropriate folder metaphor for L^3 users?
What metaphors should be used for specific designations (church, shopping, dirty money, etc.)?			
	Embedded social meaning		
	Restricted use		
	Dirty vs. clean: money aesthetics	Separate e-folders	Are metaphors specific to certain cultures?
	Materiality properties	Sustaining metadata of money bills, as outlined in (Woldmariam et al., 2014).	What metadata is relevant for L^3 users?
	Identity extension-hiding	Adjustable settings of the application or hardware	Easy to use configuration settings for L^3 users
	Obligation to contribute	Embedded reminders (alerts) in a software application.	How to design easy to set reminder alerts for L^3 users?
	Uncounted church giving	A natural user interface, as stated by Woldmariam et al. (2014), to enable individuals to easily pick up money bills and donate to church.	What is a natural user interface for L^3 users?
			Is NFC a candidate technology?
Case 2 (Section 4.2)	Segregated money control: Edir	A separated and specialized edir application that allows users to manage membership, make monthly contributions, calculate balances, schedule where to meet the next month, and e-signatures so that an edir can be closed (sealed).	How does one design an easy to use accounting app for L^3 users?
			How does a rotating edir chairmanship impact the app?
			Is NFC a candidate technology?
	Reciprocity of gifts	Embedded reminders (alerts) in a software application.	How to design easy to set reminder alerts for L^3 users?
	Facilitating remote payments	Remote payment or transfer mechanisms. An SMS-based transfer is a good candidate for this.	How to design such payments in the case of yazentega? Would they be accepted or seen as crass?
	Money not counted in front of others	The use of private mobile phones addresses this concern and design concept easily. An individual can count without revealing what s/he is doing	Easy to use configuration settings for L^3 users

Figure 12. *Continued*

Refusal of acceptance	By pooling all incoming money into a common temporary money folder in which the user can examine who is sending, for what purpose, and how much. After this, s/he can decide either to reject it (return it to the sender) or accept it and aggregate it with other money.	How can one graciously refuse mobile money gifts?
Money giving through delegates	With SMS technology, the involvement of middlemen can be avoided.	Easy to use configuration settings for L^3 users
Management of marriage money gifts	Similar to edir, this can be addressed through a specialized and separate application. Again, such an application should be capable of registering names of gift givers and amounts given, calculating the total, and closure (e.g., via e-signature).	How does one design an easy to use accounting app for L^3 users?
Money saving by entrusting it to others	Mobile money systems and SMS-based telecommunication infrastructures obviate the need to entrust other individuals with money to be saved.	Easy to use configuration settings for L^3 users. Money is being created outside the banking system.[8]
Wednesday & Friday: No spending	By using reminders (alert) mechanisms	How to design easy to set reminder alerts for L^3 users?

need to address aesthetic issues of mobile money itself, that is, digital money on the cellular phone. This aspect is overlooked and should be addressed. In the absence of mobile money agents, where individuals are able to transact, store values, and transfer values digitally without converting into cash at agents, the issue of money aesthetics is a pressing one and presents another design challenge for HCI community.

We claim that those concerned with the aesthetics of digital money need to do more with respect to representations of money itself, as well as regarding how individuals differentiate among types of cash, among categories of purpose, and how they attach social and cultural values to money. For example, we have reported the concepts of "special money," "dirty money," and "clean money," which are associated with money aesthetics. How do individuals keep money they receive illegally (dirty money) separate from money received as salary (clean money)? Previous studies do not explore this design challenge adequately.

We believe that the issue of digital money aesthetics can be considered by addressing the issues of segregated money management, with the help of differentiated digital money folders and use of sticky notes so that individuals are able to keep different money categories separate. Moreover, we offer alternative ways of digital money representation and hence aim to maintain the aesthetics of money (e.g., by associating aesthetics through metadata inscribed on banknote icons, hidden security means, encoded colors, etc.).

Our research also highlights the need for personalized digital money systems. By placing a user's needs in the center of interaction processes, a personalized information system can overcome the "one-size-fits-all" paradigm and enable individuals to operate according to their own interests (Loeb, 1992; Reis & Carvalho, 2012). The design of such systems is therefore influenced by the objectives of users, their preferences, and their characteristics, and by the user's context. The difference in the practices and needs of individuals mandate the requirement for tailored systems that can be adjusted based on attributes, such as identity, preferences, and cultural norms. Thus, when designing mobile money systems, designers need to keep in mind the flexibility of systems so that users can adjust according to their preferences and cultural practices. To this end, Figure 12 summarizes concepts we have identified, and their possible mappings to design solutions, and provides open questions/design challenges that such mappings raise.

6. CONCLUSION

Previous HCI research has not explored individuals' private interactions with money, which hinders possible innovations therein. Thus, this article challenges the HCI community to explore possible innovations in the areas of digitizing and interacting with digital money. Given the current mobile money solutions and platforms, the work reported in this article, particularly through its reflections and observations on the structure of digital money and the design of mobile money systems for rural Ethiopian users with low levels of literacy, contributes to the HCI literature.

By presenting a case study on how individuals interact with money in the context of religious and social practices, this article identifies implications for the design of mobile money information system applications. Thus, it is our hope that the article will inspire and provoke research in the areas of dematerializing money and digital interactions in different religious and social contexts from an illiterate/low-literacy individual's perspective. By doing so, this study can also extend the focus areas of information systems research. Accordingly, the article

contributes toward advancing theory and practice of innovative systems development, in particular to encompass rural users with low (or no) literacy. It also addresses an emerging and important topic for the HCI community to work on and enrich the field. Moreover, our research also gives rise to important questions about who gets to decide what "value to people" looks like, what "legitimate uses" of money are, and so on. So, although it opens a design space, on one hand, it also opens a potentially thorny set of values-in-design questions on the other.

Some limitations of our work need to be noted. The case study on which the article is based took place in Ethiopia, so any generalization to other countries with different money characteristics and practices must be made with care, although this research may suggest certain types of beliefs, values, and practices to look for. Our data were mainly collected from male household leaders who participated in the interviews conducted as part of our studies; the use of money among female members of the community was not studied, nor were relatively more complex financial practices in the rural community such as microfinancing. Although we focused only on specific identified practices of the study site (donations, gifts, setting aside and dedicated uses), we did so as these are currently greatly underappreciated in comparison with, say, financial practices of female individuals or, indeed, microfinancing. Our proposed design principles are preliminary; indeed, at this stage, how they will be perceived/received/adopted by the studied community are important open questions for future work. Last—but certainly not least—our analysis targets only one potential category of users for whom digital money is a challenge; generalizations to other categories of excluded users, such as the visually impaired, warrant further study.

Nonetheless, we have thus tried to focus on everyday money interactions of a certain population of individuals and identified novel design implications for the development of new financial technologies that enables end-to-end digital transactions. These include concepts like money aesthetics, segregation and labelling of money, gift refusal and rejections, disclosure and secrecy practices, embedding social meanings to money, material properties of money bills, money counting, and identification issues. Even though we have attempted to map these concepts into technological system design, we hope that the HCI community can take these highlighted issues and design aspects further, as they are both provocative and inspiring.

NOTES

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APPENDIX. Interview Questions

The following are the interview questions used in the study.

Social relationships and payments

1. Why and how do people create social relationships?
2. Why do you make social payments?
3. What kind of social payments are you making in the community?
4. How do gifts for marriage differ from gifts from death?
5. Are such gifts obligatory (reciprocal)? Are there any factors which affect the reciprocity?
6. What items are given as gift at weddings, births, funerals?
7. How and why do gifts vary?
8. Does geography (distance) affect social relationships?
9. When will the relationship or contract will terminate
10. What do gift givers receive in return of their generosity?
11. What do you feel if distant people do not show up on funeral and or marriage events?
12. How do you attend an event if it is far away?
13. Can you delegate people to give your gift on your behalf?
14. According to your culture, is it necessary to show up on such events?

Money saving and social relationships

1. Where do you keep/deposit your savings?
2. If you had a financial institution (e.g., bank) close to you, would your savings behavior change?
3. Do you save money at some individuals? Tell us the benefits and challenges of doing this.
4. What do you think are the challenges of saving with banks?

Money management

1. What monies (items) are used to give for church, funeral, marriage?
2. How does your community keep and or manage these monies
3. Describe the practices of money management (giving and accepting of money gifts for weddings, funerals, for deities).
4. How is this kind of money used?