

Making Digital Money “Work” for Low-Income Users: Critical Reflections for HCI

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ABSTRACT

This paper adds to the research on digitization and money in HCI. By presenting a case of rickshaw drivers in India and their use of Ola, an app-based taxi service like Uber, and Ola Money, an embedded m-wallet, this paper makes a threefold contribution. First, it shows how cash and digital money are not simply different manifestations of the ‘same’ money for users. They provide distinct affordances and have different meanings and values, yielding rich insights for design. Second, it seeks to highlight the hidden work done by users around making digital money ‘work’ for them. In doing so, it calls for a broader understanding of ‘moneywork’ that goes beyond a temporal analysis, through the concept of ‘mobility work’. Finally, it highlights the role of ‘friction’ in design. Friction is crucial to users’ negotiation of the trade-off between consumption and saving, and can be leveraged to provoke reflection and user-awareness.

KEYWORDS

Awareness, Design, Digital Money, Financial Practices, Friction, Moneywork, Mobility Work, Payments

1. INTRODUCTION

“Do not save what is left after spending, but spend what is left after saving.” - Warren Buffet

This quote highlights one of the central economic decisions that people have to constantly negotiate at individual and household levels, namely: whether to engage in consumption or postpone it for the future. Investment or savings is fundamentally about securing one’s future consumption by sacrificing a little in the present. Because one is giving up something in the present, this decision involves an opportunity cost which is typically compensated in the form of interest or dividend. This interest rate is determined by regulated institutions such as banks in accordance with the inflation and price levels in the economy. For the affluent and salaried classes, this act of juggling between meeting everyday needs and planning for the future (emergencies, vacations, special occasions, retirement planning and so on) is made easy by a steady, stable flow of income along with access to formal financial institutions and their full suite of services such as deposits, insurance, loans and pension plans. The fact that they know how much they have been earning (and spending) so far and how much they will in the future allows people in the higher socio-economic strata to estimate their cashflows and direct them towards varied ends.

This world is quite different from the one inhabited by low-income communities across contexts who experience small, irregular, and uncertain incomes. They are further aggravated by the lack of

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access to reliable, safe, convenient financial products and services to manage their finances. Low-income people carry out large number of transactions but they are small by value. This makes it economically unviable for banks and mainstream financial institutions to cater to low-income groups. Because brick-and-mortar branches are not set up in remote locations as well as areas with a majority of population living below-poverty-line (BPL), large sections of the population in developing regions of the world remain financially excluded. India has the second largest financially excluded population at 19 percent of the total population, after China (Singh & Reddy, 2018). This has made the financial inclusion agenda an integral part of the development apparatus, perhaps best illustrated by the Prime Minister's National Mission on Financial Inclusion. Under this flagship scheme, a record 307.8 million bank accounts had been opened as of December 2017 (ibid).

The Indian government is banking on the 'JAM Trinity' to achieve full financial inclusion in the country. 'J' in the acronym refers to the 'Jan Dhan' bank account opened under the above scheme for all unbanked BPL households in the country. 'A' refers to 'Aadhaar', which is a unique, national ID created for all residents. The creation of such an ID has enabled identification of beneficiaries which is a prerequisite for delivery of social security benefits. Upon such identification, the government uses the bank account created to electronically transfer the said benefits as direct cash transfers. This not only enables targeted delivery of grants but also reduces pilferage and corruption (Jaitley, 2017). A recent report claims that digitizing pension payments reduced leakage by 47 percent due to usage of biometric smart cards in contrast to handing out physical cash (Bhargava, 2018). 'M' refers to 'mobile' phone ownership. India has more than 1 billion mobile phone users, although smartphone owners account for less than half that number (eMarketer, 2018). In order to leverage the massive ownership of mobile phones, the government launched a 'Unified Payment Interface' (UPI) to enable people to access their bank accounts on their mobile devices in an easy, convenient manner, thereby potentially addressing the 'last mile connectivity problem' (Economic Survey, 2016)¹. Whilst the numbers do look impressive and have been necessary first steps, certain ground realities point to the fact that the goals have not yet been reached and there is a long way to go. The Global Findex database figures indicate that roughly half of India's population having bank accounts has not conducted any transactions (deposits or withdrawals) whatsoever in the past year (Bhargava, 2018). Only 5 percent of the population used their mobile devices to access their bank accounts (Sahoo & Arora, 2017), and more than 92 percent of all card transactions were cash withdrawals from ATMs (Saurabh, 2017). These numbers highlight the fact that there is a need to think beyond metrics such as access and ownership in discussing role of technology in financial inclusion.

The Indian government banking on mobile phones is, in many ways, illustrative of the larger trend amongst policy makers, aid agencies and philanthropic foundations to advocate the harnessing of technology for development purposes. In the domain of money and finance, such advocacy has pushed for dematerialization of money i.e. a shift from cash to cashless monetary transactions as playing a key role (Musaraj & Small, 2018). A recent study reported that approximately 300 new mobile money services, that is services that allow users to access fund transfer and payment facilities on their mobile phones, often in the absence of a bank account, have been launched in more than 90 countries (Nelms & Rea, 2017). M-PESA in Kenya has been the largest success story till date, with around 96 percent of all households in Kenya are reported to be using it (ibid). This success, however, has not been replicated elsewhere, for it does not depend merely on technological innovation. M-PESA's massive uptake was shaped by a conducive regulatory framework (Heyer & Mas, 2011), Safaricom's market share in the telecom sector (Mas & Morawczynski, 2009), and close-knit socio-economic networks that constituted remittance flows and other forms of economic exchange (Kusimba et al., 2018). If mobile technology is to work towards achieving financial inclusion in a substantive sense, there is a need to first understand the financial needs and practices of low-income people in a bottom-up manner alongside their use (or non-use) of technology, including smartphones. Based on such a fine-grained understanding, it would be possible to think of novel ways to (re)design mobile technology

as well as the broader ecosystem for better supporting their financial practices and capabilities, and contribute to their wellbeing.

With this aim, this paper presents the findings of an ethnographic study conducted with auto-rickshaw drivers in Bangalore, India, which examined their work and financial practices, and their use (or non-use) of mobile technology for financial transactions. Through their use of Ola, a peer-to-peer taxi hailing service similar to Uber, which includes an embedded mobile wallet called Ola Money, this paper aims to show that ‘mobile money’ as an ‘anytime, anywhere’ solution to the financial problems of low-income communities is a result of a gross, simplistic understanding of their complex financial management practices. The discourse on ‘mobile money’, in focusing on certain factors such as speed, ease-of-access and convenience, has neglected certain others such as the extra-economic functions of money and the meanings and values attached to it by users, as well as the importance of ‘friction’ in designing mobile financial services in enabling people to engage in reflection before transacting with their money. The mixed use of cash and digital money might be more pronounced in cash-driven economies like India, in contrast to less-cash economies like Sweden or Denmark (where most transactions happen via cards or mobile phones). Recent studies (Pritchard, Vines & Olivier, 2015; Perry & Ferreira, 2018) have examined the use of digital money in the developed world, along with the effects of digital monies in terms of elimination of cash payments in public transport or the shift from cash to digital payments in grocery stores. This paper, by examining the use of digital money in the developing world (where it is a more nascent phenomenon), provides key insights that both extends as well as provides some parallels and contrasts with earlier work. A direct comparative analysis of countries like Sweden and India in the same paper would be really valuable, but it is beyond the scope of the present paper. The arguments around ‘friction’ or ‘seamful design’ for user reflection and awareness, the mobility work done to make digital money usable and so on – are insights that are relevant for developed contexts as well, and are not really dependent on the study being conducted in a cash-driven economy. The paper is structured as follows: the next section presents a brief overview of the related work on money and moneywork, mobility work, and mobile money services; in the third section, the setting that was studied and methodology will be described; in the fourth section, key findings from the field study are presented, followed by a more conceptual discussion of money, technology, and the role of friction or seamful design in supporting user awareness. The paper concludes with some implications for designing digital technologies and services for financial transactions.

2. RELATED WORK

2.1. Money: More than a Means of Exchange

Money has been understood to perform three main functions in mainstream economics: first, it acts as medium of economic exchange; second, it represents a store of value; third, it provides a unit of account (Carruthers & Babb, 1996). The evolution of money as a medium of exchange has been attributed largely to the limitations of barter system, which requires a ‘double coincidence of wants’ for exchange to happen between two parties (Maurer, 2015). The fact that money, in one form or another, is a legal tender (i.e. formally recognized by a country’s national government as a valid means of exchange and payment) and enjoys universal acceptance illustrates that it is a socially constructed artefact. “Money is embedded in social practices and has situated social meanings and uses that are constantly (re)negotiated” (Zelizer, 1994). It is also a “system of relationships, a chain of promises, and a record of people’s transactions with one another” (Maurer, 2015, p. 46). It is, therefore, important to explore the social meanings, uses, and roles of money in analyzing how technology changes human interaction with money and the implications it has for users’ monetary practices. In his analysis of digital payment technologies, Maurer (2015) argues that, when money is viewed as a means of payment, the technologies and practices around money come to the fore and the process of how it circulates from one person to another leads researchers to deal with the question of infrastructures

(ibid). However, his focus on payments does not allow Maurer to examine the implications of money assuming different roles and meanings for different stakeholders in a given setting, which is a goal of the present paper. Such an analysis can not only help understand user practices better but will also provide insights on the broader ecologies at play within which digital money technologies are situated.

2.2. Digital Money: Promises and Shortcomings

Recent years have witnessed an increased use of digital technologies, especially mobile-based, for financial transactions, especially in the Global North. For instance, MobilePay in Denmark, which is a smartphone-based payment application launched in 2013 by seven Danish banks in collaboration, was used by more than 2/3rd of the Danish population in 2017 (Ring, 2017). In Sweden, cash accounted for only 2.5 percent of all transactions (by value) in 2017 (Sahoo & Arora, 2017, p. 13). Nonetheless, no country has become completely cashless and cash continues to persist. In the case of low-income groups in the developing world, factors such as lack of access to formal financial institutions, banking services, or internet have resulted in financial management practices and arrangements mainly around cash. Previous studies have pointed to limitations and costs involved in using cash such as issues of safety (Dalinghaus, 2017), effort involved in transportation (Maurer, 2015) and counting, difficulty of always obtaining the exact change and so on (Kumar, Martin & O'Neill, 2011). Digital money technologies have been promoted with the promise of overcoming the limitations of cash- or even card-based transactions by making the act of payment fast and secure (Balan et al., 2009, Sahoo & Arora, 2017, Mukherjee & Goyal, 2017). The Gates Foundation (2012), tying cashless transactions to the goal of financial inclusion, has argued that “because most poor households conduct most or all of their transactions in cash [it] perpetuates the poor’s marginalization from the formal economy...” Digitization of money, in this context, is seen as a prime example of technology providing solutions to the problems of financial exclusion and poverty (Musaraj & Small, 2018). However, this dominant narrative misses out several important questions such as the business models and market forces driving digital money technologies. For all their limitations, cash transactions are settled at par between the parties involved. In contrast, users pay a fee for cashless transactions (such as the service charges levied by Visa and MasterCard), which leads to questions such as: who decides the price and on what basis; who bears the costs – whether it is shared between a vendor and customer or not; or do digital money technologies provide yet another means of profiting from users’ personal data; what consequences does one’s payment stream becoming visible to one’s friends and acquaintances have for user practices (for instance, Venmo). These questions have formed the crux of recent discussions around infrastructures of money (Maurer, 2015, Musaraj & Small, 2018, Acker & Murthy, 2018).

2.3. Moneywork

The physical as well as social infrastructures that make digital financial transactions possible often remain hidden from the users, just like the regulatory frameworks around them (Nelms & Rea, 2017). The costs of choosing one mode of payment over another also remain hidden, as the above discussion indicated. Recent studies have also sought to unfold another crucial aspect that has remained hidden for some time: the work that goes into making digital money ‘work’. Perry & Ferreira (2018) define ‘moneywork’ as “the interactional work around the use of money in making financial transactions” (p. 33:1). Based on a transactional framework, they draw a three-part distinction between pre-, at- and post-transactional work done by different parties in order to successfully conduct a transaction. A sequential analysis of the activities, actors and artefacts involved in conducting transactions will provide insights on how they are accomplished in practice (Muralidhar et al., 2018). However, the work done around digital money goes beyond interactions and transactions. The collaborative work involved in making digital money ‘usable’, meaningful and trustworthy for low-income, low-literate users was documented by O'Neill, Dhareshwar & Muralidhar (2017). In their study of loan workflows in resource-constrained settings, they point to the wider socio-technical ecosystem that had been put in place that, in turn, enabled adoption and use of Airtel Money by rickshaw drivers.

2.4. Mobility Work

Users engage in different forms of moneywork. Whilst the ‘digital articulation work’ that they perform in terms of charging their devices and getting them ready for payment offers important insights for design (Perry & Ferreira, 2018), a sequential analysis does not pay enough attention to the spatial aspect of moneywork done by users. For instance, in their study of smart cards usage in public transport in Japan, Mainwaring, March & Maurer (2008) found that it was fairly common for users to run out of balance unexpectedly because they had no way of knowing how much e-cash they had on their smart cards. Similar findings were reported more recently in the UK (Pritchard, Vines & Olivier, 2015). Insufficient balance on their smart cards meant that they were not allowed to enter city buses in London, where cash payments were stopped altogether. Users could not recharge their smart cards from anywhere and at anytime from anywhere. Similarly, Airtel Money users in India had to go to designated Airtel Money centers to convert cash into e-value before conducting transactions with it (O’Neill, Dhareshwar & Muralidhar, 2017). The users in all these cases had to engage in ‘mobility work’ (Bardram & Bossen, 2005). ‘Mobility work’ is defined as the ‘efforts involved in moving about people and things as part of accomplishing tasks’ (ibid, p. 131). Mobility work describes the work involved in ‘achieving the right configuration of people, resources, place and skills in order to accomplish tasks’ (ibid, p. 136). The exact whereabouts of people and artefacts have to be assessed, in practice, by moving around and locating them. The spatial and temporal rhythms have to be considered by users as well. For instance, low-income users in UK found that they could not recharge their Oyster cards at all places at all times (Pritchard, Vines & Olivier, 2015). Similarly, Airtel Money users found that not all Airtel centers offered Airtel Money facility (O’Neill, Dhareshwar & Muralidhar, 2017). The concept of ‘mobility work’, therefore, provides a useful lens to examine mobility in terms of why, when and how it occurs. Through the case of Ola Money usage by auto-rickshaw drivers in Bangalore, this paper demonstrates that mobility work is a crucial component of moneywork that offers key insights for designing mobile technologies for financial transactions.

3. SETTING AND METHODOLOGY

Ethnographic research has proven immensely valuable in HCI and CSCW domains, since participant-observation and interviews are powerful ways of eliciting the interrelatedness of actors, activities and artefacts (Randall, Harper & Rouncefield, 2007). This paper draws on the data from the observations of 12 Ola drivers and semi-structured interviews of 13 Ola drivers. Participant-observations lasted for around 7-8 hours a day whereas the interviews ranged between 30 and 90 minutes. This data was collected as part of a larger ethnographic study of auto rickshaw drivers in Bangalore, India, during March-July, 2015. The findings from the observations in relation to work practices have already been analyzed in Ahmed et al. (2016). The Ola Money interviews were specifically conducted to probe into certain recurring themes that had been noticed during the previous interviews around the use of Ola. Observations and interviews were conducted in Kannada, the official language of Karnataka state, by the author, along with two other collaborators. The contribution of this paper is a focus on the financial needs and practices of rickshaw drivers and their use of Ola, especially Ola Money, a mobile wallet that facilitates cashless payments between passengers and drivers.

Participants were recruited from Peace Auto, an organization working for auto rickshaw drivers’ rights and better working conditions². Informed, verbal consent was obtained from all participants, obtaining additional consents separately for recording interviews and taking photographs. The interview guideline covered topics ranging from driver demographics and driving experience to financial practices (income, savings, use of cash, non-cash modes of money, bank accounts and so on) and use of mobile technology. Data was collected through field notes, audio tapes, and photographs. The interviews were translated and transcribed into English.

At the time of data analysis, field notes and interview transcripts were documented, and analyzed together in order to identify themes of relevance and importance. Working through specific illustrations

and instances of drivers' practices and use of Ola (Money), themes were constructed around how they organized their financial lives, how Ola Money was situated within a larger ecosystem, benefits and problems with Ola Money, and perceptions and experiences around cash versus cashless modes of transactions. Patterns in the data were identified and categorized following the thematic process (Braun, Clarke & Terry, 2012). Before discussing the findings, the setting and the participants' background will be briefly introduced, so that the reader has a sense of the social and economic contexts within which they operate.

3.1. Auto-Rickshaw Sector in India and Participants' Background

The auto-rickshaw sector in India, similar to the taxi sector across countries, is male-dominated. Although rickshaw drivers do not fall below the official poverty line of about USD 2 a day, their financial circumstances are nonetheless vulnerable. More than 70 percent of the auto rickshaw drivers in the country do not own their vehicles (Natarajan & Abdullah, 2014, CiSTUP, 2012). They rent them at an average of 200-300 INR (USD 3-4) per day, without ever acquiring the capability to own one. They are unable to purchase a rickshaw of their own for two main reasons: first, they lack sufficient money to purchase one by paying the full amount³; second, because they have been historically financially excluded with no access to bank accounts, they do not have a financial history based on which they can obtain a credit rating and apply for a loan.

All the drivers in this study were male with an average age of 38.5 years, which is representative of the larger auto driver population (CiSTUP, 2012). All participants were proficient in multiple languages, often Kannada, and at least one other language such as Tamil, Telugu, and Hindi. Some could understand English. Almost all of them had basic phones without access to internet. They had an average driving experience of around 13 years, and reported a daily mean income of 600-800 INR (approx. USD 9-12), after deducting everyday vehicle-related expenses like fuel, rent, and maintenance, with only one or two participants reporting that they earned more than 1000 INR (approx. USD 15). They found their daily earnings to be typically sufficient for managing everyday necessities but were inadequate to enable saving up (for emergencies or the future). Eight out of thirteen drivers interviewed were sole earners, whereas ten of them had children studying in school or college. These demographic factors directly impacted their financial circumstances, particularly their capability to accumulate savings in the medium- to long-run. For instance, when probed on savings in bank accounts, driver P13 said, *"I have a minimum balance in there [account] now. About a year and a half ago [...], that was the last time I made my transaction there. However much I make, I take it home and it gets used up."* Another driver P5 stated, *"Almost 95 percent of the drivers break even. They are not able to save. The remaining 5 percent who save are those with other earners in the family or live in a house of their own."* Regardless of the empirical accuracy of the statement, what is important is the financial vulnerability that it illustrates, which is echoed by other participants in the study as well as previous studies. With no cushion to weather exigencies and little governmental support, auto rickshaw drivers' financial situation is precarious.

4. FINDINGS

The auto rickshaw drivers in Bangalore present an interesting case to understand financial management practices and the role of mobile money, because, even though they are officially above the poverty line, their financial precariousness requires them to constantly strategize and make sure that they earn enough. They need to have a steady inflow of income to manage their everyday basics such as gas and food, whilst planning for and working on pooling resources for larger expenditures such as medical emergencies and school fees.

4.1. Managing Finances

The interviews with drivers revealed that managing finances at a household level is accomplished in practice by different members coming together, usually spouses in case of nuclear families and others (elders, in-laws) in case of joint families. They have to coordinate to manage their limited, unstable finances and run the household, even in households with clear gendered divisions of labour along patriarchal lines. Three main scenarios emerged with respect to financial management: drivers solely managing all money matters; drivers handing over almost all their earnings to their wives who are responsible for management (with drivers retaining only a small amount for gas and other vehicular expenses); shared responsibility between spouses (or different household members in case of larger families). Household financial management involves estimating income flows for meeting various expenses. Drivers, based on their needs, set themselves a daily target income. At the same time, they are quite conscious of the fact that they might not be able to meet their daily targets without fail every day. Because the number of passengers they get on any given day is unknown, there is considerable uncertainty as to how much they earn per day. This, in turn, impacts their morale. Driver P9, for instance, said, *“Not being able to meet a target makes us tense [...] we have our financial commitments [...] and if we don’t earn enough, we won’t be able to meet any of them.”* Drivers often find themselves overworked at around 12-14 hours per day, which also leads some drivers to a resignation of their earnings to fate or luck. To quote driver P7, *“I begin my duty at around 7:30-8 AM and end the day by 9 PM. I do not set myself a target [...] I am content with whatever God provides me.”*

Drivers engage in savings and borrowings in a variety of ways through both formal and informal channels. Whilst some of the participants, especially the sole earners, felt that they did not earn enough to be able to ‘save’, they nonetheless engaged in ‘earmarking’ money for specific short- and long-term expenses such as loan repayment, school fees and so on. Some drivers reported that they were part of rotating savings and credit associations (or ROSCAs)⁴ and set aside a specific amount daily or weekly towards that. A few reported saving up through both ROSCAs as well as bank accounts. Driver P6, for instance, stated, *“I regularly transact in the bank – every now and then, I deposit around 500-1000 INR (approx. USD 7-14) and withdraw [...] I save up money through chits too. I pay 3000 INR (approx. USD 42) every month towards that.”* Yet others indicated that they did not trust informal channels and only saved through either cash at home or in their bank accounts. Irrespective of the channel, what the interviews illustrated was the rich financial activity that rickshaw drivers conducted and the mix of instruments they used in managing their household finances. Small sums earmarked for day-to-day needs and other short-term expenses were typically saved in the form of physical cash at home. Larger sums of money earmarked for loan repayment or school fees were deposited in the bank account or in the ROSCAs.

Although all drivers in the sample owned a bank account, a majority of them did not transact with it regularly. This was more due to a lack of sufficient money than any logistical difficulty in accessing a bank branch or using an account. Those that did, typically deposited and withdrew as and when needed, indicating that there was not any serious accumulation of savings in the mid- to long-run. A majority of the participants reported having between 500-1000 INR (approx. USD 7-14), with two having 6000-7000 INR (approx. USD 85-100) in their bank account. Those who had the Prime Minister’s Jan Dhan account, which they termed the ‘zero-balance account’, appreciated it for multiple reasons. Because the government had mandated the banks not to foreclose these accounts on grounds of maintaining inadequate balance, drivers felt that it gave them more flexibility in using it. At the same time, they reported that they did maintain some nominal balance (of 500-1000 INR i.e. USD 7-14) and never let it actually become zero. That the account enabled them to receive LPG subsidies from the government in the form of direct benefit transfers was a second benefit that they liked.

4.2. Ola Money: Benefits and Challenges

Ola Auto was launched in Bangalore in late 2014, several months before the Prime Minister's Financial

Inclusion drive was flagged off. At the time of joining Ola, the company opened a bank account for all its drivers and provided each with an ATM card. Passengers could pay for their rides via cash or Ola Money, an embedded mobile wallet on the Ola app. Ola disbursed drivers' digital earnings (i.e. fares paid through Ola Money) and incentives through an electronic bank transfer. Using the ATM card, drivers could withdraw it from their Ola bank account. The following section describes the impact of Ola Money on drivers' financial practices.

After the adoption of Ola, drivers' incomes changed from being exclusively earned in cash to a mix of cash and digital monies. The passengers they got off the streets paid solely by cash whereas Ola customers paid via cash or Ola Money. Participants indicated various estimates on the number of Ola customers paying via Ola Money, ranging from 10-20 percent to about half (reported by a driver who stated that he got around 4-5 Ola rides on average per day). In other words, only a small fraction of earnings were via digital payments. Drivers also had varied perceptions of when they were able to access their digital earnings in their bank account. Their responses indicated that Ola took anywhere between a day or two to almost a week to transfer the amount. What this illustrates is that drivers lacked clarity about this. The majority of participants were aware that they could check their digital earnings on the Ola app itself, although two reported that they could not and had to go to the bank or an ATM to check their balance.

Whilst the drivers received payments digitally, they could not *use it* for any financial transactions digitally. The bank account into which they received their digital earnings was not fully transactional either, and could only be used for withdrawals. In effect, drivers believed that Ola had created these bank accounts for its own convenience, namely to facilitate disbursement of cashless payments and transfer of incentives to its drivers at scale. When probed about their preference for Ola Money versus cash, drivers expressed mixed opinions that illustrated certain advantages as well as disadvantages of both. For instance, driver P6 said, *"I like getting paid in cash rather than passengers paying through the Ola wallet because I will need the money for my daily expenditure"*. Whilst two drivers reported being indifferent between cash and digital payments, there were some who indicated that Ola Money helped them 'save' because of its lack of immediate availability. To quote driver P3, *"With Ola Money, the amount goes into my wallet which gets saved up. If it is cash, it is spent away [...] Before Ola, I would have to struggle for two days just to earn my weekly (loan) payment amount. With Ola, I just have to set aside 200-300 INR per week. The rest of the money is paid with the money that is saved over the week in Ola wallet."* What is important to note in this context is that Ola Money's acceptance by rickshaw drivers was itself shaped by certain other factors such as how much the driver had earned in cash that day. Because Ola Money would not be transferred to their bank accounts immediately, drivers were particular about receiving a majority of payments by cash. Driver P12 sums it up succinctly: *"I don't mind being paid by either but if everyone starts paying with Ola Money how will we send money home and take care of other expenses? If 2-3 people pay by Ola Money in a day, it is fine."*

Drivers remained inevitably dependent on cash for a number of reasons. Firstly, they operated in a cash-driven economy. The networks they participated in – the canteens they frequented, the ROSCAs they were part of, the debt they had to repay, everyday purchases – operated around cash. Furthermore, the fact that Ola did not make their digital earnings available in real time, which allowed them to 'save' because of delayed access, also meant that their money was not accessible to be channeled towards day-to-day basics. Finally, drivers' incomes were daily, small, and unpredictable. The lack of a stable, steady flow of income meant that their financial planning and strategies were very much contingent and had to be recalibrated on a day-to-day basis. In situations where drivers were reluctant to accept digital payments from passengers, they reported that they would negotiate the mode of payment beforehand and try to persuade the passenger to pay by cash. Driver P3 who said that he preferred Ola Money over cash, for instance, said, *"They will let us know on the way or at the time of booking that they are going to pay by Ola Money. It's good that they do this because*

it's not right to go to the pickup address and then fight about cash or Ola Money." This illustrates that Ola Money 'worked' for the drivers mostly because it comprised a small proportion of their daily earnings. Digital payments, in this case, supported savings only incidentally because of the delayed access and the work involved in converting it to cash through an ATM. It was not by design. When probed on how often they withdrew their earnings from the bank account, drivers had a mixed set of responses. Some drivers reported that they withdrew regularly, for instance weekly or once in two weeks, whereas other reported withdrawing as and when needed. None of the participants reported withdrawing all of it immediately as soon as they received it in their accounts, however.

5. DISCUSSION

The findings indicate that the mediated electronic bank transfer system, through which drivers received their digital earnings, offered a mix of benefits and problems to them. The case was a unique opportunity to compare cash-based financial practices with digital payments at the same time, in contrast to the case with Uber drivers in the Global North where they received only digital payments by default. This enabled an interrogation of some key issues around the multiple meanings, uses and roles that money assumes in the financial lives of low-income communities, the work done around *making* digital money 'beneficial' and 'usable' by users, and the implications of friction or seams for designing digital money technologies, particularly in relation to supporting user awareness.

5.1. Money: Negotiating Multiple Meanings and Uses

In economics, money is seen to have three key roles or functions: it acts as a medium of economic exchange i.e. a means of payment; it represents a store of value; and it is a unit of account (Carruthers & Babb, 1996). In the discourse on mobile money, often there is a conflation made between these different functions of money. Such a conflation can be conceptually problematic even though empirically it might be referring to the same physical cash, for money as a store of value does not mean the same as money as a medium of exchange to the users. In the global push for deployment of 'mobile money' for financial inclusion, perhaps best illustrated by the Gates Foundation's exhortation that "cash is the enemy of the poor" (Gates Foundation 2012)⁵, what is often advocated is, in fact, a greater use of mobile payments, which refers to the use of mobile technologies, devices, and services for making peer-to-peer transfers, bill payments, airtime recharges, and so on. Even in the case of M-PESA in Kenya, which is the biggest success story of mobile money till date, users ended up using it as a channel for savings was an unanticipated consequence, pointing to the fact that users can appropriate technologies in artful, unintended ways (Kusimba et al., 2018). Mobile payments is, therefore, quite different from mobile banking which refers to the adoption of mobile technology as a store of value, either as a substitute to a bank account or as a supplement to one. Mobile banking is typically deployed for low-income, low-literate users who do not have access to a bank account (Mas & Morawczynski, 2009, Medhi et al., 2009). In a recent study conducted amongst manual rickshaw-pullers in New Delhi, Nandhi (2018) found that access to affordable, convenient mobile banking enhanced their ability to save, particularly in comparison to earlier practices such as keeping cash at hand. Mobile technology, in this case, acted as a 'digital money-guard' in more than one sense: first, they deemed it safer than keeping cash on person; second, they reported that it helped them avoid spending it away on something or the other⁶ (ibid).

The predominant focus given to money as a medium of exchange at the expense of money as a store of value has led to a concomitant attention on mobile payments at the cost of mobile banking. The question of how low-income users make payments has taken precedence over studies that explore how mobile technology, with or without a bank account, can help low-income users accumulate savings in the mid- to long-run. Such accumulation of savings can provide much-needed cushion and help weather the uncertainty that looms large over their lives. Savings can help build the financial capabilities of low-income communities in the long-run. The case of Ola drivers, in line with this

discussion, illustrates that money can take on different roles and meanings for the different stakeholders involved. For the Ola passengers, Ola Money is primarily a means of payment for their rides. For the platform, the bank transfer system through which Ola Money is disbursed is, again, a medium of exchange. However, for the drivers, in addition to being a mode of payment, Ola Money assumes a different role i.e. that of a store of value, albeit inadvertently so. The fact that cash is earmarked for everyday needs whereas money stored in a bank account or earned from Ola is for expenses that required some pooling of resources implies that cash and digital money cannot be treated simply as different manifestations of the 'same' money for users. They not only provide distinct affordances, but also have different meanings and values associated with them.

Furthermore, it is imperative to acknowledge the extra-economic, social aspects that are constitutive of money (Zelizer, 2011). In other words, money is closely tied to issues of sociality and economic practices are embedded in social relations (Zelizer, 1994, O'Neill, Dhareshwar & Muralidhar, 2017, Perry & Ferreira, 2018). For instance, some participants chose to save in a ROSCA, instead of a bank account. Participation in such ROSCAs is not merely about flexibility of payments but also about convenience of obtaining microcredit in return, which is easier when compared to a bank. Furthermore, social pressure and expectations around reciprocity have been shown to ensure that ROSCA members do not default (Kiiti & Mutinda, 2018). This, in turn, plays an important role in engendering trust on the part of members in the system. Whilst saving up the same amount in a bank account is not inconvenient per se in comparison, it is more difficult, if not impossible, for low-income groups to obtain credit or loan from a bank directly. The absence of a credit rating coupled with the high risk of default makes banks reluctant to lend (Bhattacharya & Singla, 2007, Collins et al., 2009, Banerjee & Duflo, 2011, Mehra et al., 2018, Muralidhar et al., 2018)⁷. Even if it is possible, the formal, institutionalized way of approving a loan is cumbersome and highly ineffective when it comes to meeting certain unexpected expenditures such as medical emergencies. As a result, insofar as they transacted with their bank accounts regularly, rickshaw drivers' activity was limited to deposits and withdrawals as and when required.

5.2. Making Digital Money 'Work'

The decoupling of economic exchange and the physical transfer of cash towards technologically-mediated transfers can have important implications for the financial practices of users, as previous research has indicated (Pritchard, Vines & Olivier, 2015, Perry & Ferreira, 2018). The representation of cashless payments in advertising and publicity campaigns as 'swift' entailing merely a wave of a card or a code on a mobile phone is fallacious. The 'anytime, anywhere access' metaphor falls apart when user practices are examined, which reveal the substantial work that goes into making digital money 'work' for them (Mainwaring, March & Maurer, 2008, O'Neill, Dhareshwar & Muralidhar, 2017). The attempt to make payments 'frictionless' or 'seamless' is illustrative of technological utopianism that ignores the multifarious ways in which financial transactions and practices are embedded within larger social and digital infrastructures. An inquiry into users' sensemaking processes and practices as they negotiate these different infrastructures will shed light on the opportunities and challenges that exist in designing usable, useful digital technologies that enhance users' wellbeing.

The adoption of Ola by rickshaw drivers entailed new forms of 'moneywork' (Perry & Ferreira, 2018). For instance, drivers performed articulation work in which they called up the passengers to verify their pick-up location, their willingness to wait for a couple of minutes, and check drop location before picking them up. The occasional negotiation over cash versus Ola Money was part of this work. A sequential analysis of moneywork in terms of pre-, at-, and post-transactional work performed by users is instructive in terms of providing insights on the trade-off between formalization and the need for retaining human skill, discretion and flexibility in designing solutions (Muralidhar et al., 2018). However, the present case indicates that there is an important spatial dimension to the moneywork people do when using digital money, especially low-income users. Ola drivers, for instance, had to go to an ATM or a bank branch for withdrawing their Ola earnings. Previous research on mobile money

corroborates this. For instance, M-PESA users in Kenya had to go to M-PESA agents each time they wanted to convert cash to e-value and vice-versa (Mas & Morawczynski, 2009). A similar finding was reported in case of auto rickshaw drivers using Airtel Money in India (O'Neill, Dhareshwar & Muralidhar, 2017). Whilst prior to adoption of Airtel Money, drivers perceived issues around usability as potential barriers, post-adoption, the main problem they experienced was locating Airtel Money centers that would perform cash-to-digital conversion. Exact whereabouts of such centers had to be assessed by moving around and finding them. Mobile money adoption, then, as these examples illustrate, entails not only articulation work on the part of users but also new forms of mobility work. The concept of mobility work is useful to understand why, when, and how mobility occurs (Bardram & Bossen, 2005). Mobile money, therefore, results in a reconfiguration of the mobility of users and thereby creates new forms of mobility work.

Digital money design should support money management practices of users without introducing new or additional burdens (Mainwaring, March & Maurer, 2008). What exactly counts as 'burden', however, varies across contexts and user groups. In the present case of rickshaw drivers using Ola, the adoption of Ola was accompanied by an inevitable adoption of Ola Money. This, in turn, led to new forms of mobility work on the part of drivers as discussed above. Prior to joining Ola, their customer base comprised of passengers picked up off the streets exclusively. Because all payments were made by cash, there was no question of drivers visiting ATMs or banks regularly, at least not because of passengers. With Ola, they had their first experience of digital payments which was electronically transferred to their bank accounts. Had they been allowed to 'use' their Ola Money wallets in the same active, transactional sense as customers, then any visit to ATMs or conversion of money from digital to cash would have been out of their own volition and not by necessity. That said, given that such platform intermediation indirectly and unintendedly allowed them to 'save' and digital money acted as a 'money-guard', the new mobility work it entailed cannot be characterized as a 'burden' per se. Rickshaw drivers, owing to the very nature of their jobs, are mobile for the most of their working day, except for very small coffee or chai breaks. Locating ATMs or even bank branches to withdraw some money into cash is not a great challenge for them. What they did find troublesome was the fact that Ola did not make the transfers happen in real time or at least by the end of the same day. They unequivocally opined that it would provide them with the choice of deciding whether or not to withdraw based on their needs and exigencies. Bank transfers should, therefore, occur in real time so that drivers are in better control of their finances and decide what they want to do with their earnings. This will not necessarily reduce any friction and result in immediate withdrawals. None of the participants indicated that they withdrew all their digital earnings as soon as they were transferred to their accounts. This is in contrast to Blumenstock et al. (2015)'s findings from Afghanistan. In a randomized control trial of the impact of digitizing salary payments, they found that using mobile money for transferring salaries benefited the organization (in terms of cost reduction and so on) more than the recipients, who withdrew all of their money into cash and went back to their old ways of managing finances.

5.3. Friction: Creating a Space for Reflection

The paper also argues that the Ola Money wallet should be made 'usable' for the driver in the same sense as the customers. Whilst customers also engage in moneywork in terms of loading money onto their mobile wallet or ensuring they have sufficient physical cash at the time of taking a ride, their work is assisted and potentially mitigated by a range of affordances at their disposal. They can link their bank account, credit- or debit-card and also authorize automatic top-up whenever they run out of Ola Money balance. Drivers, on the other hand, are forced by design to withdraw their earnings as cash in order to use it. They can neither use the bank account for anything other than a withdrawal (such as savings, deposits, and transactions such as remittances) nor the mobile wallet at places that accept cashless payments (for instance, gas stations). Making the Ola Money wallet 'usable' similar to the bank account will not necessarily risk an erosion of Ola Money's role as a digital money-guard

because India is still largely a cash economy, with less than 10 percent of all transactions by value conducted digitally (Mukherjee & Goyal, 2017, Sahoo & Arora, 2017, Saurabh, 2017). Given the socio-economic networks that rickshaw drivers are part of and operate within, not many places that they visit accept digital payments beyond gas stations. In other words, the friction is not lost as the majority of their transactions will still take place by cash.

Additionally, as a design suggestion to support users' financial awareness at the time of conducting transactions through mobile devices, relevant information can be provided. Such information to users at key 'teachable' moments has been argued to have an impact on user practices, stimulating reflection (Mehra et al., 2018). For instance, in a recent study exploring consumer interaction with coffee provenance data when using an autonomous coffee machine, Tallyn et al. (2018) found that features related to 'environmental impact' and 'social responsibility' on the user interface triggered a process of reflection amongst the consumers, wherein they thought about the lasting impact of their coffee consumption practices. Presenting key information on coffee provenance *at* the time of purchase created a cognitive load on the users, leading to a conflict between the need for a quick coffee whilst on a break and the long-term consequences of their own choices in terms of sustainability (p. 20). Whilst the cognitive dissonance did stimulate some introspection amongst the users initially, the repetition of such information every time he/she ordered a coffee was perceived as disruptive rather than informative (ibid). However, what is significant for analysis here is the idea that friction can be beneficial and sometimes even necessary to support awareness amongst users interacting with digital technologies. In Tallyn et al.'s study, one of the goals was to create awareness amongst coffee consumers about sustainability and environmental impact (ibid). In the present study, the proposed design suggestion might support financial awareness amongst users who use cashless modes of payments for financial transactions. 'Invisible spending' caused by frictionless payment systems such as contactless cards and credit cards has been shown to reduce users' awareness of their own spending habits (Mainwaring, March & Maurer, 2008). Whilst friction can create a conflict by slowing down the process of completing a transaction, it also creates a space for reflection by lending visibility to spending and state of finances at the time of making the transaction. Furthermore, strategic deployment of relevant information during key at-transaction moments (such as displaying bank account balance before a transaction is approved) can make the user experience less disruptive and more informative⁸.

The case of Ola drivers illustrates that users engage in reflection and perform a needs-based assessment before withdrawing their money from a bank account. The existence of these seams, whilst entailing some mobility work to be done by the drivers, also indirectly enabled financial awareness and reflection. Similar benefits can be argued for Ola customers as well, not just the drivers. Ola, by devising a mobile wallet that requires customers to load e-cash onto it before using it for transactions (and withdrawal of the same for drivers), has introduced seams. Ola also sends notifications to the customers whenever they are running low on their Ola Money balance. The work they have to put into loading money onto the wallet at regular intervals can help them be aware of their spending for Ola rides. In contrast, Uber requires its customers across contexts to link their credit or debit card to their Uber account and automatically deducts the ride fares⁹. The implications of these design choices for users go well beyond Ola and Uber. A mobile wallet, similar to a smart card used in buses, metros and so on in the developed parts of the world, requires users to regularly load money onto it and therefore helps mitigate 'invisible spending', in contrast to a payment interface that merely links a user's card or bank account, in promoting a faster, seamless experience, can actually lead to an erosion of friction to a point where users are not fully aware of their own spending and experience a loss of control over their finances. The design choices made such as a mobile wallet versus a payment interface illustrate that - how money is understood by the designers and the roles they envisage for money - can have significant implications for the design and usability of digital money systems.

6. CONCLUSION

In trying to make digital money systems faster and more ‘convenient’, digitization of money should not be limited to an instrumental focus on speed and seamlessness¹⁰. Otherwise, it risks leading to an erosion of digital money’s role as a money-guard, which is crucial especially for low-income users. The focus in this paper has been to highlight the multiple roles and meanings assigned to money by users, which can have significant implications for the design of digital technologies for financial transactions as well as for how they are appropriated by users in practice. The paper has also sought to expand the framework of ‘moneywork’ beyond transactional work to include work done when money is understood as a store of value, not just a medium of economic exchange. Whilst a sequential analysis of the work done by different actors during pre-, at-, and post-transactional moments is useful, in paying attention to the temporal aspects of moneywork, it misses out on the spatial dimension of moneywork. This paper, by introducing the concept of ‘mobility work’ into the moneywork framework, seeks to fill this gap. Digital money reconfigures mobility of users and therefore entails new forms of mobility work. Furthermore, and counterintuitively, the fact that money is not immediately available is what enables digital money to take on the role of a money-guard for low-income users. This highlights the need for more nuanced understandings of access, and, therefore, any conflation between access and immediacy should be avoided. Similarly, fine-grained analyses of mobile money are necessary in terms of specifying what functions, meanings and values are being investigated in particular contexts, for they can produce different results and interpretations. Perhaps the most fundamental insight from this paper is that digital money cannot be examined independently from the broader social, digital and financial infrastructures of which it is a part. As HCI researchers and designers, it is important to be reflexive about to what end mobile technologies and services are being developed¹¹. Designing mobile technologies for financial transactions ought to result in greater financial autonomy and awareness amongst users, whereby they are supported in the process of making informed decisions.

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ENDNOTES

¹ The government can create a unique ID for everyone along with a bank account. However, the fruition of such efforts is ultimately determined by how accessible such benefits are for the intended beneficiaries. This is termed as the ‘last mile connectivity problem’ (Economic Survey, 2016). Mobile phone ownership has been claimed to greatly help in making service delivery more accessible and affordable, with the Government of India pushing for digitization of citizen services (such as making the necessary information available on a smartphone application, enabling citizens to submit applications and forms and so on).

² The author, along with other collaborators from Microsoft Research India, has been working with organizations such as Peace Auto and Three Wheels United for more than four years. Their field agents played an important role initially in facilitating access to the driver community for conducting the ethnographic study, which subsequently led to an intervention described in Mehra et al. (2018) and Muralidhar et al. (2018). The long-term, sustained engagement with the driver community has been key to maintaining trusted relationships.

³ An auto-rickshaw costs around 200,000 INR (approx. USD 3000).

⁴ ROSCAs (Rotating Savings and Credit Associations) are member-owned collectives which pool resources through members’ regular savings. Part of this aggregate amount is saved in a bank account opened on behalf of the collective and managed by one or more members (and sometimes a dedicated staff member). Rest of the amount is lent as microcredit to members depending on their needs. Because this takes place in a rotating basis, every member can access a larger sum that he/she can individually save up and repay through small, flexible installments. ROSCAs, also known by other terms such as SHGs (Self-Help Groups) have been shown to be pivotal in enhancing women’s financial autonomy and contributing to women empowerment in low-resource settings (Parikh et al., 2006, Collins et al., 2009, Ratan et al., 2010, Banerjee & Duflo, 2011, Maurer, Musaraj & Small, 2018).

⁵ The Gates Foundation has argued that “because most poor households conduct most or all of their transactions in cash [it] perpetuates the poor’s marginalization from the formal economy...” (ibid). Digitization of money is seen as a prime example of technology providing a solution to the problems of financial exclusion and poverty. See Musaraj & Small (2018) for a detailed discussion this.

⁶ This is not to discount the immense work put in by EKO, the mobile banking service provider in this case, in maintaining its retail network of agents, the transaction records, handling the deposits to the bank account, and so on, and thereby acting as a crucial intermediary between the bank and the rickshaw-pullers (See Nandhi 2018). For a discussion of work done by such intermediaries in this space, see O’Neill, Dhareshwar & Muralidhar (2017) and Muralidhar et al. (2018).

⁷ This ‘credit-gap’ has led to the emergence of microfinance institutions and other intermediaries to cater to the needs of low-income communities, who act as bridge between formal financial institutions and

beneficiaries (Muralidhar et al., 2018). Mehra et al. (2018) outline how the collaborative work they do with the beneficiaries can be supported by technology. Muralidhar et al. (2018) analyze the implications of designing mobile applications for such an intermediated, collaborative use.

⁸ Western Union money transfer does this, for example. A user can send money via two methods: using a debit/credit card or a secure, payment gateway. The key advantage with this second method, in contrast to card, is that a user can ensure that he/she will be left with sufficient balance after making the fund transfer. Just before confirming a transaction, the bank balance is displayed which enables the user to reflect upon the amount he/she has chosen to transfer. The bank account balance is accessed by the gateway after due authentication by the user, of course. Such a display of information will have to be enforced strategically in order to work as frictional or seamful, rather than providing the user with the option of looking at the balance.

⁹ In India, however, Uber also permits cash payments from customers as it is a cash-driven economy.

¹⁰ Conflation between convenience/ease-of-use and speed/seamlessness should be avoided as a starting point. Additionally, introduction of seams to provoke reflection amongst users should be carefully designed so as to ensure that it does not make the experience disruptive.

¹¹ Incorporating enough flexibility is a must for users to manage the trade-offs between meeting their day-to-day basics and saving for the future meaningfully. It will thereby support financial autonomy, helping users retain control over their finances.

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