Moneywork: Practices of Use and Social Interaction around Digital and Analog Money

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The emergence of various forms of digital money and innovative digital financial services allows stores of value to be created, held, moved, measured, and exchanged in novel ways. Yet the success of these new forms of transactional media is largely dependent on the ways that they are understood as useful and credible as viable forms of exchange, and on how they support the ways that their users interact around them. This article therefore examines interactional work around the use of money in making financial transactions: we call this *moneywork*. We report on an empirical study of the patterns of behavior of users of a mixed media (digital and analog) currency that supports mobile device payments—the Bristol Pound—exploring the impacts of its users' understanding of the systems that underlie these transactions, the technical constraints on their potential for action, their practices of use, and the social interactions that these activities lie within. We draw design implications to support these payment practices.

CCS Concepts: • **Human-centered computing** → *Empirical studies in HCI*; *Empirical studies in ubiquitous and mobile computing*; Empirical studies in collaborative and social computing; Ubiquitous and mobile computing systems and tools; • **Applied computing** → *Digital cash*;

Additional Key Words and Phrases: Digital currency, mobile money, digital payments, financial transactions, digital infrastructure, use practices, social interaction, user interaction, qualitative user study, interaction design, financial services

41

1 INTRODUCTION

In this article, we explore an age-old question of how two parties can come to agree on and verify an exchange of value, while shifting the context of exchange from paper or plastic payment to networked mobile devices. We examine this phenomenon through a study of *ordinary* financial interactions, by which we mean consumer payments between peers rather than institutional financial arrangements, the kinds of payments that are routinely made in everyday transactions, in shops, bars, restaurants, and hairdressing salons. Our aim is to develop insight into how and what

users currently do with the different forms of payment system at their disposal, and why, with the aim of informing the design of future mobile payment systems. To explore this topic from an end-to-end perspective, we derive a *moneywork* lifecycle (cf. Kirk et al. 2006, 2007) to frame the practices that users engage in when working with money around making payments, and utilize this to uncover different forms and patterns of exchange that are shaped by the affordances of the payment systems in use. Moneywork is also a term that has been used within the anthropological literature to refer to the physical work of managing everyday financial tasks (Colavecchia 2008), one that is closely related to our purposes. Our moneywork lifecycle captures the work that users put into these physical and social interactions from the initiation through to the conclusion and audit of payment activities.

Our daily economic lives are conducted through a variety of media, yet there has been little examination of the impact of these media and the infrastructure that constitutes and underpins transactional activities on the understanding, value, and patterns of use that they afford. Perhaps this is because our daily financial transactions are such an ordinary, mundane part of our lives. In the grander routines and rhythms of our everyday lives, the brief act of buying a coffee or buying a magazine risks becoming an unremarkable, trivial event that soon fades as we move on, and the greeting to a shopkeeper or the mechanics of interacting with the payment technology are quickly forgotten. As a counter to the apparent invisibility of these activities, we focus our attention in this article on such ordinary financial transactions. To do so, we investigate the use of an alternative mixed media currency that supports digital and analog formats, allowing us to explore and compare the ways that people select and use different financial media. In particular, we examine user behavior, and the interactional issues that users confront in making financial transactions, following (Mamut et al. 2011) exhortation to pay attention to people's attitudes and behaviors as the key to unlocking the full potential of mobile money.

This research does not take place in a vacuum, and there exists a small body of work in HCI studying the social dimensions of money and finance, for example examining how different and novel forms of payment media shape social interaction (Vines et al. 2012a), how the presentation of alternative financial platforms such as timebanking impacts on social and community relations (Bellotti et al. 2014), and how people practically manage their own and other people's finances (Kaye et al. 2014). This work into the interactional practices of everyday financial activity sits alongside our own wider research program on the use of digital systems for alternative financial service provision. Our prior work in this domain explores social and community ties supported by an alternative currency, showing how the form of mobile payments can impact on users' pleasure and playfulness, on expressions of sociability, on considerations of purchasing practices, and on how trust judgments can shape these interactions (Ferreira et al. 2015b). These findings have been developed into novel financial visualization and payment design solutions (Ferreira and Perry 2015c) that take account of these factors across digital and physical formats. The research presented in this article extends this literature in unpicking the social and interactional aspects of monetary transactions as a processual, interdependent, and highly situated activity, and considers the implications that this has for digital systems design. In this regard, we offer a different perspective here to this prior research, presenting a detailed examination of social and interactional issues through a rich body of new empirical material on transactional activity that exposes a novel design space.

In this article, we provide a transaction framework—a description of the work people do when they make payments—to ground the strands of discussions that center around such moneywork. Our findings show how transactions depend on a long line of preparatory activities preceding the transaction and that also follow it after payment is concluded. We then go on to discuss how these patterns of transactional activity fit within a broader ecology of transactional activities in which

digital and analog forms may play a part, and how moneywork emerges from the interwoven practices around different forms of money and payment.

2 BACKGROUND AND RELATED WORK

2.1 Digital Technologies and Financial Disruption

From early on in the history of computing, digital technologies have underpinned the ways that large institutions have managed payment transactions, from the emergence of payment and ATM cards, online banking and, more recently, banking services on networked mobile devices. This trend of transactions becoming progressively digital and superseding cash (Pritchard et al. 2015; Maurer 2015) is increasingly allowing consumers and end users to act in different ways and for different ends. More recently, these technologies have not simply allowed access to existing banking services, but have offered alternatives to the traditional financial services and models of economic interaction offered by the banks. There are important implications in this for personal financial digital data, which can now be recorded, manipulated, and analyzed with ease (Schwartz et al. 2009).

Digital technologies allowing simple mobile payments to be made through systems such as M-Pesa (e.g., Mas and Morawczynski 2009), and other phone-based payment systems (see, e.g., *wizzit.co.za*, and *gcash.com*) have proliferated and are now commonplace in many places around the world. One interesting feature of their use is how users have appropriated these systems in unanticipated ways, for example, using the M-Pesa as a vehicle for their savings (ibid.), replicating services similar to a bank, and not simply acting as a means of payment. Such systems have been especially visible in the literature on economic transformations for very low-income users in the developing world (e.g., Hughes and Lonie 2007), with HCI-relevant attention paid to their use (e.g., Kumar et al. 2011) and design (e.g., Medhi et al. 2009; Woldmariam et al. 2016). These users are often not bank customers (the "unbanked") and have relatively low levels of literacy, a user group that understandably faces particular interface design issues (e.g., Medhi et al. 2009). In contrast, in the developed world, while mobile payment services such as ApplePay, Venmo, and Android Wallet have received considerable use and media attention, with a proliferation of other banking apps allowing mobile payments (e.g., pingit, mpay, paypal, zapp), to date, there has been substantially less academic interest in their use practices and interaction design. On the other hand, while these "cashless" technologies have been promoted on the basis of their convenience, research also suggests that they require considerable work and hidden labor in their maintenance and use (Pritchard et al. 2015). It seems paradoxical that researchers, developers, and financial service innovators have little published knowledge about the practices that users in the developed world engage in when working with the digital technologies through which mobile money changes hands, or about users' understanding of and interaction with the financial infrastructures that these exchanges are situated within.

The ready availability of digital media for conducting financial exchanges has also invigorated debates around and the use of alternative currencies. Such alternative currencies include cryptocurrencies, local exchange trading schemes (LETS), timebanking, and other forms of scrip money (virtual, local, community, and complementary currencies) that can now be scaled up in ways that were difficult to manage when they existed in a solely paper format. There are a huge range of ways that these digital currencies may be configured, and how digital technologies can enable them. We do not attempt to cover these here, suffice it to say that they exist within often complex social, community, technical, legislative, and regulatory structures that are often largely unique to themselves. Similarly, there are a number of reasons for their use and adoption (see, e.g., Carroll and Bellotti 2015), and a considerable debate about their social (Maurer 2005) and financial relevance

and efficacy (e.g., von Hayek 1975). Because of their typical role outside "fiat" (or government-backed) currencies, there are often limitations on the use of these alternative currencies, and in economic anthropology these are referred to as "special purpose" money, while fiat currencies (£, $, ¥) are called a "universal" or "general purpose" money. While it might be anticipated that universal money might displace "special purpose" money because of its restrictive limitations on exchange, there appear to be conditions in which both can operate within particular "spheres of exchange" (Bohannan and Bohannan 1968). As we will show later on in the article, this is exactly what we see in our exploration of the Bristol Pound; it is the practical operation of these spheres of exchange that concerns us, rather than their economic evaluation.

Historically, the largest part of the technological literature on money has focused on the algorithmic mechanics of financial exchange (the discipline of "financial computing"), with fewer articles addressing its contexts of use, and still less around the topic of exchange interactions in the HCI and CSCW literatures. However, perhaps led by the apparent successes of disruption by the emerging "fintech" (Chuen et al. 2015) industry, and in particular, the attention around BitCoin and MPesa, there is a small but growing body of literature that acknowledges the importance of the interactional phenomena that surround the delivery of financial services through mobile platforms (Donovan 2014). Research has begun to report on the application of digital technologies such as NFC in payments (Ailisto et al. 2009), QR codes (Maurer et al. 2013), the development of digital wallets (Olsen et al. 2012), and an exploration of the challenges and successes with mobile payment services (Hillman et al. 2014; Maurer 2015). Various challenges are seen to face the design and adoption of mobile payment systems ranging from cultural practices of potential users (Arnado 2012), to concerns over privacy (Maurer et al. 2012), to the fast pace of innovation and competition within the mobile payments industry itself (Ondrus and Lyytinen 2011).

The work of Vines et al. (2012a, 2012b) on the use of paper cheques and the expectations and experiences that very elderly people have of them has particular pertinence to our own understanding of the *media* through which payment takes place as it assumes a digitized form. Although their work looks at the experiences of a very particular, elderly user segment, its focus on the materiality of payment offers insights that are especially relevant to our article, such as the role of media in documenting expenditure, handling transactional complexity, collaborative action, and handling issues of trust. Understandably, concerns about trust are a recurrent theme in the literature on digital money and payments (see, e.g., Hillman et al. 2015), but other considerations about the mechanics of making payments in public also raise their head, as (Mainwaring et al. 2008) discuss in their study of digital money payments in Japan, in which adoption is strongly shaped around cultural concerns and experiences. Money, it seems, is intimately bound up with issues of sociality and social interaction.

2.2 Money as A Social Technology

Money is perhaps *the* most ubiquitous technology of *Homo sapiens,* and is a central institution of market economies. As a technology, money seems to work best when it is "taken-for-granted," and when its "value, negotiability and neutrality can simply be assumed" (Carruthers and Babb 1996, p. 1556). Here, the digitalization of money may introduce problems because these taken-for-granted assumptions can become fractured. As financial media and infrastructures have become more sophisticated, the decoupling of monetary value away from a physical exchange of cash toward digitally-mediated transactions can occlude the technological and social complexity involved. One consequence of this is that these assumptions are no longer reliable indicators to help navigate transactional encounters. Digital transactions are often presented to users in commercial marketing as requiring a mere wave of a plastic card or smartphone, in what the payments industry strives for as a "frictionless" payment transfer. However, this techno-utopian viewpoint

neglects the ways in which financial encounters are conceived, initiated, and play out, and can conceal the interpretations and understandings that participants hold about the artifacts and processes that they engage with, all of which form and shape the ways that such interactions take place and choices are made.

Simmel's classic text on the philosophy of money (1900) is a useful pointer in examining economic exchange and the mechanisms that underpin this, in which he considers financial transactions as a form of social interaction. This is a useful way of conceptualizing financial transactions that allows us to move beyond the abstract, a socialized flows of value that are typical of the literature in economics (Zelizer 2011), and set out a grounding for the nascent fields of economic sociology and anthropology. Simmel describes how money lubricates transactions because of the ways that people are able to reflexively use its material, impersonal, and quantifiable features (thus allowing exact calculability, division, manipulation, and comparison) to replace personal relationships with a more restricted form of interaction that references "rational," impersonal, and reciprocal associations. In a parallel to more recent discussions around ties in social media (see, e.g., Burke and Kraut 2014), Simmel argues for a nuanced position that while money scaffolds social relations between trans-actors, it also transforms human relations into interactionally impoverished and detached, objective value exchanges.

Simmels' position has been heavily debated over the last century, but there is a growing consensus that economic practices are embedded in social relations (Granovetter 1985; Zelizer 1994, 2011). In particular, the view that money should not just be seen as *capital,* but as having an "extraeconomic, social basis" (Zelizer 2011) is one that carries increasing weight: the usefulness and value of money—and its concomitant forms of exchange—are socially constructed and locally contingent. Zelizer (1998) points to that ways that transactions are highly dependent on the relational qualities of the parties involved and the content of the exchange: an employer paying a worker a weekly wage is a different category of transaction to a shopper paying for groceries in a small shop. Even though money may be involved in both transactions, the difference lies in the social relations between employer and worker, and between buyer and seller. Similarly, exchanging cash for a good is different to bartering.

As a key form of exchange, shopping itself is understood to be highly contextual and spatially situated, with many such studies also showing the role of social relationships and values (e.g., Miller 1998) playing a part in what might otherwise be considered very ordinary forms of financial exchange. So money is more than a pure and abstract "fact" of value, but shows "remarkably various ways in which people identify, classify, organize, use, segregate, manufacture, design, store and even decorate moneys as they cope with their multiple social relations" (Zelizer 1994). Herein lies a challenge for HCI as a discipline in working to design practically useful and socially-relevant forms of digital money.

2.3 Transactional Terminology and Modes of Interaction

The study of money, value, and the exchange of payment is fraught with inconsistent terminology and conflated concerns, particularly as discussion has moved from the specialist financial literature to other disciplines, including computing, and there is some value in unpicking these for clarification. We recognize that not all authorities hold the same definitions.

The first of these concerns lies in what digital money and digital currency are, and how they are used. Money and currency are commonly used as synonymous terms, although they are slightly different. For the most part, we follow this convention in our reference to their digital counterparts. Money is most commonly defined as a medium of exchange, a measure and store of value, a means of payment, and a unit of account (Carruthers and Babb 1996). Digital money exists when money is expressed in a digital rather than physical medium; most of the banking industry money supply is

of this kind, existing only in digital ledger-based forms. For the purposes of this article, however, we are not interested in digital money as a form of electronic interbank settlement, but in its mundane uses in everyday, non-institutional transactions. Currency is usually described as an instrument that is in active circulation as a medium of monetary exchange, the value or use of which is (to some extent) independent of other forms of currency. We are used to dealing with currency as the bills and coins that we use to pay for things, and convert into a different currency type as we cross borders. As with its non-digital counterpart, a digital currency is subset of digital money,[1] examples of which include BitCoin and other blockchain-enabled cryptocurrencies, as well as some local and alternative currencies.

The second concern around inconsistent terminology relates to the mechanism of digitally mediated transactions, as there is a problem of conflating money as a store of value with the mechanism of its payment. For practical purposes, these are the same when using physical cash, but digital media separate these elements from one another so that the payment process may occur in different ways depending on the technical infrastructure in place. What is often termed "digital money" or "digital cash" can refer to the means of transferring money between bank accounts; we refer to this as digital payment. Digital payment occurs as a money transfer is *processed* through a networked computer system. It may involve a digital peer-to-peer currency transfer, or a more traditional form of money in which the payment activates a "balanced ledger" transfer, as a digital of record of a money transfer is reallocated from one bank account to another (such as credit/debit cards, Paypal, or electronic funds transfer system). By this definition, a credit card is not a form of digital money, but a means of initiating a digital payment between two parties. It is pertinent to consider here that most payments can be considered as falling across two dimensions, those of their transactional media (digital or analog) and user location (co-present or remote). Different forms of payment offer more—or less—suitable mechanisms that allow their users to engage, often in different ways, with different interactional features, in their financial interactions. For the purposes of this study, we have a particular interest in co-present transactions rather than remote payment, as remote digital forms have had a longer history of development and use in institutional and consumer forms.

In the study that forms the basis of our empirical work, we explore how one form of digital money is used—the Bristol Pound. Aligned with our definitions above, this is a form of digital currency that offers a specific form of payment processing. In order to better understand its use, we therefore turn now to describe how it operates and its contexts of use.

3 SETTING AND SYSTEMS

3.1 The Bristol Pound

The Bristol Pound (£B) is a local, complementary[2] currency in use in Bristol, England (Population: 432,500; the 6th largest city in England). In many ways, its infrastructure and deployment mirrors other forms of alternative currency in the literature, with several parallels to the well-known US-based Ithaca HOURS currency (see, e.g., Maurer 2005), which has been highly influential in driving the adoption of local currencies, not least the Bristol Pound, which may account for many of these similarities. As of June 2015, around £B1million had been issued, with over 800 businesses listed

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[1]There is not universal agreement on this. There are well-rehearsed arguments around the extent to whether digital currencies can be described as a true form of currency, mostly based on concerns about their fungibility (mutual interchangeability), and whether they should instead be classes as goods (see, e.g., Meyer 2014).
[2]The terms "local," "alternative," "community," and "complementary" currency are used synonymously in this article; this is not to say that their proponents use these terms so flexibly, with variations often used to mark ideological differences, regional variations, and political intent (Maurer 2005).

as members. It was launched in September 2012 by the Bristol Pound Community Interest Company (CIC) who administers it as a not-for-profit social enterprise. They have registered physical premises in the center of Bristol from where a team of individuals conducts the day-to-day tasks of running the currency. We refer to this core team at the CIC as the "Bristol Pound team."

The founders of the Bristol Pound intended it to be used as a means of encouraging local businesses, and keeping money in the Bristol area, strengthening community bonds, and contributing to ethical and environmental benefits (www.bristolpound.org). This intended use is reflected in the self-reported spending figures from a Bristol Pound member survey taken shortly before the findings reported in this article (see, Ferreira et al. 2015a for a brief summary). On average, members used the Bristol Pound for 14.1% of their weekly spending ($n = 150$). Its use ranged from several times a day (less than 1% of users, $n = 156$), every day (5%), a few times a week or less (38%), and less than once a month (32%), with Bristol Pounds most commonly spent on eating out (85% of respondents reporting this), groceries (66%), and travel (64%). While it is not the purpose of this article to focus on a quantitative analysis of these figures, they give an indication of its patterns of use.

The interviews and the open questions from the Bristol Pound member survey provided further insights into participants' impressions of spending Bristol Pounds and their motivations for participating in the scheme to contextualize users' practices. Many users explicitly professed holding common values with the Bristol Pound CIC, such as ensuring that local businesses thrived and local communities were sustained (Ferreira et al. 2015b). Our own interactions with Bristol Pound users from interviews and survey data show a similar pattern to Collom's (2011) online membership survey on motivations to use community currencies. Collom identified key factors for adoption in users wishing to improve the local economy, act on their personal values, convictions, or beliefs, create a better society, help build local community, contribute to the quality of local life, and to be part of a larger movement for social change, and our own data reflects this closely. Alongside these ideological and social factors, Bristol Pound users also echoed Bellotti et al.'s (2015) findings on peer-to-peer systems in that they expected the Bristol Pound to also provide useful additional services whilst increasing value and convenience. In these respects, the £B technology offered a different form of service to the traditional banks and traders often offered discounts of up to 10% for Bristol Pound users, giving an additional incentive.

The currency itself is both paper-based and digital. Transactions occur in printed notes (in denominations of £B1, £B5, £B10, and £B20), SMS on any mobile phone, or online via an electronic account similar to a bank account. Printed notes are accessed from a number of businesses at various locations in the city (known as cash points). Anyone can exchange sterling for £B notes free of charge, but once sterling has been exchanged for £B notes, the notes cannot be exchanged back into sterling. Payments by SMS and online differ from this access model in that they require an electronic Bristol Pound account. Eligibility to open an electronic account is granted by the Bristol Pound CIC, subject to certain rules based on membership type. Exchanging electronic £B for sterling is possible—by withdrawing Bristol Pounds from an account as sterling—but this incurs charges. £1 sterling is equivalent to £B1 and businesses in the city trade in Bristol Pounds on a voluntary basis.

Membership of the Bristol Pound scheme falls into two categories: *Individual* and *Trader*. Businesses can become trader members, and therefore maintain a Bristol Pound account, if they are considered by the Bristol Pound team to be locally owned and operated. Individuals may become members and granted accounts if they reside or work in Bristol, and we refer to individual members and traders members as either "users" or "members." Users may also be non-members, but only if they are making or taking payments with paper media, as digital payments require formal membership to access these secure services.
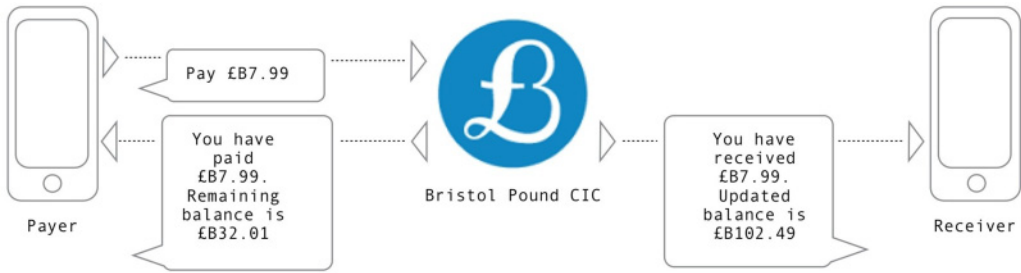
Fig. 1. Txt2Pay payment process.

3.2 Txt2Pay

Txt2Pay (T2P) is the platform that enables business and individual Bristol Pound members to conduct transactions via SMS. It is implemented on the Cyclos platform (cyclos.org), which is widely used for mobile and online banking by commercial banks internationally, as well as social enterprises (such as the Bristol and Brixton pounds). T2P is a type of mobile money transfer in which business members and individual members can exchange electronic £B, irrespective of their mobile network operator. There is one mobile phone number to which all SMS payments are sent. When a member pays another member by sending an SMS text message, the payer transfers the amount in electronic £B from their account to the payee's Bristol Pound account (see Figure 1). SMS texts are charged by mobile network operators at their standard rates and the payee incurs charges when receiving electronic £B via T2P.

The texts used to initiate T2P exchanges have to be formatted correctly to enable payment over a phone that has been registered with the account holder on the T2P system. When making a payment, users have to compose an SMS text in the format: "pay <PIN> <TRADERNAME> <VALUE>." In this case, PIN would be the sender's unique 4 digit T2P passcode, the TRADER-NAME is the recipient's unique £B account, and VALUE is the amount of Bristol Pounds to be exchanged. In shops and restaurants, TRADERNAME was usually displayed prominently on the cashier's desk for easy access. Errors in pin or tradername entries would result in failed or misdirected payments, while value errors resulting in under- or over-payment would require some form of manual resolution between the parties involved.

4 METHOD

4.1 Study Design, Approach, and Participant Selection

The broad aim of the study was to examine the activities and understandings surrounding people's use of money in financial transactions. Its purpose is to allow designers to reflect on and support these patterns of use, practices, understanding, and values in digitally augmented media. Our participants were Bristol Pound (£B) users and registered members with the £B CIC. Participants often remarked on £B transactions as "novel" and "different," making what is familiar, strange. Drawing on people's experiences around the use of the £B—a *different kind* of currency—allowed for a more critical examination of taken-for-granted assumptions underlying how we do transactions and, more generally, money. A similar defamiliarization approach was employed by Bell et al. (2005) in designing domestic technologies. This approach also parallels Maurer's (2005) investigations into alternative currencies and Islamic banking, in which close examinations of particular financial systems are argued to provide a universality of reach and analytic potential that extends to generalize to the wider environments that these are enacted within.

Table 1. Demographics of the 18 Interview Participants

Age		Gender		Membership Type	
Median	46	Male	9	Individual	14
Youngest	25	Female	9	Trader	3
Oldest	69			£B team	1

We report on findings from a combination of interviews and ethnographic observations conducted over the course of 2014–15 in Bristol (UK) to explore the behavior, patterns, and practices around £B use in context. Participants included individual members, traders (trader is the term used by the Bristol Pound team to denote sellers of goods and services, as well as the business members of the Bristol Pound CIC), and the Bristol Pound team administering the currency. The qualitative findings reported here are primarily based on formal interviews, with the data and analysis supplemented by additional activities (not directly reported here) through the authors' personal shopping experiences of using £B, observation of £B transactions, and ad hoc interviewing. The formal interviews were conducted with 18 participants. Of these, 17 participants were contacted on the basis that they agreed to be interviewed as part of a survey run previously by the £B CIC. In addition, one member of the £B team, the trader manager, was formally interviewed. Table 1 shows the demographics of interview participants.

All of the interviews reported here were with users who were members of the £B scheme, as they had access to the txt2pay system as well as paper money. This would allow us to explore use practices in which our participants had a choice of payment mechanisms available to them. We categorized respondents into higher (>10% of their spending) or lower spenders (<5% of spend) in £B, approximately split evenly between both groups. In addition, participants were deliberately selected from a range of backgrounds, ages, and income groups, and split evenly across gender, allowing us to get a broad range of views and patterns of £B use.

Interviews were either carried out face-to-face in a café setting, their workplaces, or via Skype (two), audio recorded and later transcribed for analysis. While interviews were semi-structured and open-ended allowing the interviewer to follow topical trajectories, questions probed a number of areas: (1) what motivated them to use the £B; (2) what they purchased with £Bs; (3) what advantages and disadvantages they associated with using £Bs; (4) their plans for using £Bs; (5) how £B use was different to pounds sterling; (6) where they spent their £Bs; (7) what their impressions of txt2pay were, and whether they trusted it; (8) how their financial activity had changed since using the £B; (9) what problems they had faced using the £B, txt2pay and other payment systems; and (10) what improvements would motivate them use the £B more. They were also asked to describe the last 10 transactions that they had made using the Bristol pound, and these instances were then further probed.

All interviews were audio recorded and transcribed for analysis. Table 2 shows the participants and their interview codes. For reference, participant codes are structured as follows: i for interview data, BP to identify the respondent in this study of the £B), u/t/a for their user type (user/trader/£B team), and a number acting as a unique identifier.

4.2 Analysis

Working through specific examples of participants' recent spending, we constructed themes around how interviewees used T2P and the printed £B, problems with payment, and the ways that they understood, used, and distinguished between the digital and analog forms of £B in transactions.

Table 2. Participant Codes and Details

Code	Age Band	Gender	Occupation	Education	Spend
[iBPu01]	20−40	M	Professional	n/a	Low
[iBPu02]	40−60	M	Professional	Tertiary	Low
[iBPa03]	20−40	M	£B team	Tertiary	High
[iBPt04]	20−40	F	Professional	Tertiary	Low
[iBPu05]	40−60	F	Manager	Tertiary	Low
[iBPu06]	20−40	M	Professional	Tertiary	High
[iBPu07]	40−60	F	Professional	Tertiary	High
[iBPu08]	20−40	F	Professional	n/a	n/a
[iBPu09]	Over 60	F	Homemaker	Tertiary	High
[iBPu10]	20−40	F	Student	Tertiary	Low
[iBPu11]	40−60	M	Professional	Tertiary	High
[iBPu12]	40−60	F	Professional	Tertiary	High
[iBPu13]	Over 60	M	Professional	Tertiary	Low
[iBPu14]	40−60	F	Volunteer	Tertiary	Low
[iBPu15]	40−60	M	Professional	Tertiary	High
[iBPt16]	20−40	M	Professional	n/a	n/a
[iBPu17]	20−40	F	Manager	Secondary	High
[iBPu18]	20−40	M	Manager	Tertiary	High

Our analytic approach was data-driven such that the themes that emerged from our iterative scrutiny of the data were grounded in examples from our interviews and field notes. The data was scrutinized for descriptions of behaviors in relation to the T2P and printed £B transactions. Patterns in the data were identified and named following the thematic process (Braun and Clarke 2006). In the findings that follow, we do not attempt to quantify the qualitative data, but rather examine *how* and *why* these concerns are of relevance to our analysis: verbatim quotes from interviews here are used not as evidence or proof, but as illustrations of reported events and to enable the participants' "voice" to come through. Where individual instances of data that are of sufficient interest to report are discussed in the analysis, these are noted where relevant. Participant quotes are labeled according to their identity codes in Table 2.

5 FINDINGS: TRANSACTIONAL WORK

Here, we return to our original research question to ask how people *do* transactions. A useful analytical approach is to consider the work people do when they transact as a sequential description of the activities and artifacts involved. This serves as grounding for the subsequent discussion regarding the meanings people assign to their transactions. The transaction-related activities can be functionally grouped as pre-transaction, at-transaction, and post-transaction, and although these activities do not always have clear boundaries, this is a useful breakdown in that it loosely separates the transactional elements of preparation and alignment, settlement, and disengagement and closure. These activities have been charted out in Figure 2, showing some of the key elements and their relationships, divided into the three phases within the transactional cycle. Arrows within the diagram represent potential paths through the cycle and identify the sequential order of activities identified by our participants. The following sections articulate how participants described each of these activities and explore the relationships and dependencies between each of the stages and of their components. As this is an empirically derived life-cycle, this is not intended to be a
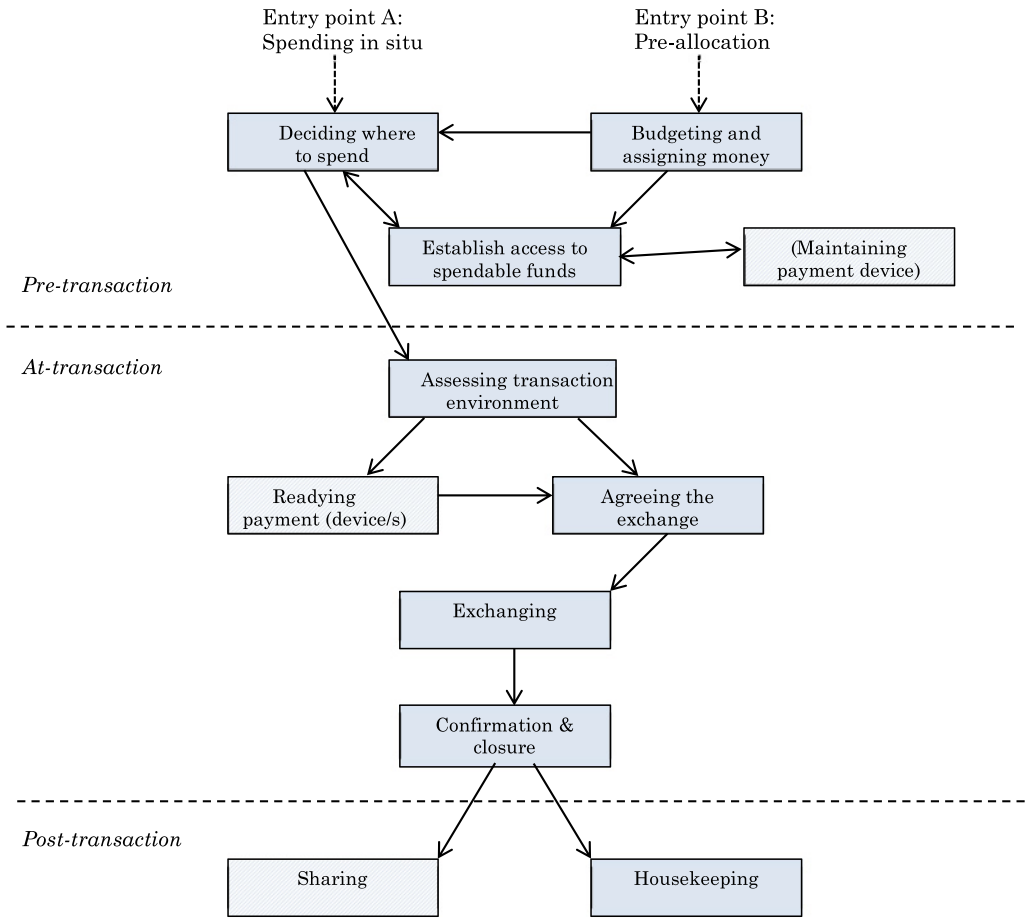
Fig. 2. Moneywork lifecycle relationships (slashed shading denotes digital-only activities).

systematically complete picture of moneywork, but to explore and describe the interactional practices identified from our fieldwork in detail.

6   PRE-TRANSACTION

Pre-transaction covers the activities around making decisions to spend, and the preparations necessary for users to be in a position to undertake transactions. Two entry points (a and b) are shown in Figure 1, each corresponding to how the initial decisions to spend are made, the first (a) spending in situ, in which spending choices were made when confronted with a want or need (for example, purchase of a snack when out and about), the second (b) corresponding to transactional decisions shaped by the pre-allocation of money for particular purposes or choices (e.g., paying regular bills, allotting funds for specific purposes). While this may seem an arbitrary distinction, the examples from our data below illustrate key differences, and the impacts that these make on user practices.

   As we show, a significant amount of preparatory work is needed before transactions using either digital or analog money are possible. The work involves making money available to use in a transaction, accounting for the money, and assigning money to various uses, making selections regarding where to spend, making selections as to what form of money to use in the exchange, and

preparing supporting devices so as to be ready to make the exchange. In each activity, the medium of exchange selected for the transaction is not trivial. The form that the transaction takes in the exchange depends on the specific and appropriate pre-transaction activities having been carried out at an earlier time. Each of these pre-transaction themes substantiated by our data is described below:

6.1 Spending In Situ: Deciding Where to Spend

Although the £B was accepted in a significant number of places, the majority of businesses in Bristol do not take £B payments. This meant that when choosing to use the £B, participants needed to make decisions about *where* to spend them. This sits within a long-running problem for users of non-sterling methods of spending, such as whether payment is possible with cheques, credit cards, time-based currencies, or more contemporary forms, such as ApplePay or BitCoin, all of which shape decisions about spending choices. In this respect, the £B is little different, although the motivations to use and choose where to spend are likely to be different to users' choices for other payment forms. Our data shows that participants made decisions and provided justifications in a variety of ways about where to spend their money. Given that our interviewees were all members of the Bristol Pound CIC, we expected that their decisions on where to spend should straightforwardly fall into two categories—either supporting a local, independent business, or something else, in which case they would not be able to use their £Bs. In line with our initial expectations, participants explained that supporting the businesses holding their values was a factor in their decision-making about where to spend. Yet participants also expressed highly contingent decisions nuanced by issues of convenience, preference, quality, assumptions about the business, and opportunities for entertainment. For [iBPu12], their preference for shopping at a local business over a supermarket was tempered by its location:

> *…convenience. Whilst we try not to go to supermarkets there are certain things like you think "Oh, I've run out of such and such and it's a half an hour walk to our preferred shop versus five minutes to Waitrose or the Co-op." [iBPu12]*

Paradoxically, the £B CIC's call to shop locally would have meant that for this user, they would have had to inconvenience themselves by going to a less local destination. What we can see here is that our participants were flexible about their choices and weighed up their spending decisions according to factors other than payment type—they were not purely ideological in their decision-making. In line with this point, our participants commonly reported a loosely defined ordering in the factors driving decisions about where they spent, which typically took priority by ranking of quality, convenience, and ethicality, followed by price. Some also expressed their assumptions about the business and the products they sell as influencing whether they would consider even seeking out the business as a destination to spend their £Bs at:

> *"If it was a bookshop or music shop in that instance I probably wouldn't look on the Bristol Pound website because I'm not quite sure how easy it would be for them to find suppliers and things. Depends what I'm looking for really." [iBPu18].*

Some goods do not seem to lend themselves to being able to meet the commitments of the Bristol Pound membership criteria, such as here being locally sourced, and would not, therefore, appear to warrant an attempt to shop there. It is perhaps instructive to note that this is not actually the case, as several music and book shops are members. However, some users clearly held the view that certain categories of purchase will not be eligible for spending the currency on, and so these purchasing selection criteria might be relaxed as other payment types can be called into play.

As might be expected, our participants' consumer activities were interwoven with other social activities (documented extensively elsewhere, e.g., Miller 1998), and this could impact on their choices of where to spend. However, in one case in particular, the choice of payment occasionally helped shape our participants' spending destinations: they would deliberately choose Bristol Pound member businesses as a means of entertaining their visitors:

> *"…when I've had outside visitors coming to stay in Bristol and I've had a choice of places to go, I've normally taken them there because it's kind of fun to show off A, a great Bristolian place, and B, paying by text message and have them go "Oh what are you doing?" is quite fun." [iBPu18]*

Here, they were both using the entry criteria for membership of the Bristol Pound as a means of identifying a unique (by the membership criteria of independent ownership) location or event, as well as the novelty of making payment. Where this differs from the earlier selection criteria is the notion of the *experience* in both respects: their orientation to the affective experience of other people through simple reference to the media of transaction, and by extension, its incumbent infrastructural constraints (i.e., that the purchase would be bound by the £B CIC membership entry criteria).

Having done the work of making decisions on where to spend their £B, users may have some more work to do if they are to go ahead with their spending. One of these decisions is whether they have funds available to spend in their account.

6.2   Budgeting and Assigning Money

Spending choices were sometimes driven by the availability of having money to spend or of decisions about allocating limited available funds, rather than the previous driver of simply seeking places to spend. Indeed, from our data, we saw that individuals regularly planned spending (in all currencies they used) to pre-allocate their funds in advance of their transactions, and many participants described practices particular to their budgeting and assigning their Bristol pounds. One feature of transferring sterling to a £B account for spending by Txt2Pay was that it could not be converted back to sterling. Rather than seeing this as a problem of its fungibility (i.e., interchangeability), some participants described how they deliberately utilized this constraint as a means of transforming their own behavior:

> *Putting X amount each month into Bristol Pounds means I know I'm going to be spending that locally. That's committed I'm not going to switch it back. [iBPu12]*

As this participant notes, their £B could only be spent locally, and on products from vendors that had been endorsed by the Bristol Pound CIC, acting as a form of forcing function on their patterns of consumption. This was occasionally problematic, as users' initially anticipated budgets could be upended by circumstance. They could also find themselves with too many £B if they were recipients of large payments in £B. For example, when questioned about choosing between using sterling cash and TXT2PAY, this participant's practice was to try to use up their £B:

> *"If I've got money in the account I will try and use that first. Don't want that money sat there and not be able to get to it and use it." [iBPu05]*

Similarly, as participants moved on from one transaction to the next, they reported monitoring account balances to avoid running out of £B. In the case where their last transaction had exhausted their £B accounts, participants may be required to exchange more sterling for £B—either electronically, by paying sterling into their £B accounts, or by exchanging for printed £B. The following

participant explained how he maintained a particular balance in his £B account to ensure sufficient funds for paying his annual lido membership:

> *"So sometimes I don't spend anything in Bristol Pounds and other times I spend quite a bit more and generally with a view to having five hundred and fifty quid for May next year when my Lido membership becomes due. So if I end up going out and spending a hundred pounds, I'd probably put those hundred pounds back. I try to let it build up to that so that it doesn't come as a shock when my membership does come due."* [iBPu18]

Here, we begin to see ways that prior decisions to spend ethically met resistance against the practical concerns of keeping personal savings available for spending. However, participants seemed to distinguish between this committed money and their other regular money, and described how they used this in similar ways to adding credit to a secondary savings account or a pre-paid spending card. These Bristol Pounds were clearly demarcated as "special money" (Zelizer 1994) from the ways that participants understood normal spending practices, and this was even occasionally articulated explicitly by participants:

> *"It's kind of like free money. It's not, but because it's been put aside it's not coming out of the current account"* [iBPu18]

This seems to be very different from the participant seeing the £B simply as a different payment mechanism; the nature of these "put aside" funds indicate that this money is understood as having been spent already, and so is valued in a different way. One of these participants went as far as to describe this difference more explicitly, stating that even if she was "skint" (i.e., having no money), she could always "rely" on her Bristol Pound account; this is an odd distinction, as here the £B is contradictorily still described as a form of money:

> *"If I'm skint I'm always like "Great I've got forty quid left in my Bristol Pound account, I can go out for dinner." It's almost like a savings account in my head. It is like a separate thing."* [iBPu17]

Unlike the negative perspective of e-money giving rise to people losing a "sense of money" (Mainwaring et al. 2008), the £B, possibly as it is only a small proportion of peoples spending, seems to be viewed more positively, with clear attention being paid to its monetary value and to the opportunities and constraints that it offers.

6.3 Establishing Access to Spendable Funds

Our data illustrates that having sufficient £B to transact with requires significant effort that, if neglected due to forgetfulness or the inconvenience of making currency conversions, could lead to its users running out of transactable funds. Particularly when they were planning to spend or make purchases, they needed to check that sufficient funds were available, and if necessary, to move money around to cover these anticipated transactions. This is known already, and is extensively discussed with reference to moving money between bank and credit accounts (see, for example, Kaye et al. 2014), but the management of different currencies, different institutional banking mechanisms (Bristol Credit Union), and the particular features of the technologies involved, made this rather different to the kinds of activities more usually noted around domestic money management practices (ibid.).

Although having adequate spendable funds applied to both digital and physical £B, most users' concerns around this topic applied to digital money for purchases made with Txt2Pay, as £B notes were typically utilized less frequently. To access £B notes, users would have to go to a physical

location in the city, and as a result, many pointed out the inconvenience and effort required to get them:

> *"I'm a very, very busy person and my life is just full up with stuff and if I've got to physically go somewhere to collect the Bristol Pounds then it's just an extra task. So it's so much easier if I've got my mobile in my pocket to just use Txt2Pay." [iBPu07]*

For most users, it was simply more convenient to use digital £B instead of printed notes. However, this effort cost of physically getting to a "cash point" to convert currency into notes was not completely avoided by using T2P. Once an account has been set up, ongoing work needs to be undertaken to ensure that it has sufficient £B in credit for future transactions. This requires that more £B is deposited into the account from their Bristol Credit Union account as they are spent. As none of our non-trader participants were directly paid in £B (in the form of salaries or wages), and only very few used the credit union as a primary "bank" account, this required some form of action:

> *"Yeah if you're using the Txt2Pay, especially, you need the money in the account. Unless you put all your money in the credit union and then shift that over to Bristol Pounds, which at the moment because big companies, or any companies wherever you're getting paid, they pay into your big bank, NatWest, RBS, or whatever, there is that additional step." [iBPu01]*

So here, even before they put money into their digital £B account, this user described having to go through an additional step of regularly adding money into their credit union account; in this study, only traders were directly paid in £B, leaving most people needing to manually manage these transfers. Here, participants described various practices around "topping up" their accounts. Some chose to do this automatically on a regular basis (e.g., via standing orders), but even this required fine-tuning to adapt it to changing patterns of spending:

> *"It is the same amount every month. So I just set an amount. I imagine that it would go up the more I use it. It has done already." [iBPu17]*

Others managed this manually as and when they needed to make funds available:

> *"I tend to do it once a month after payday. I have thought about setting up a standing order but I quite like that flexibility." [iBPu12]*

Many participants found this flexibility of access to funds in their account to be important. As we can see in the quote above referencing "payday," with limited total money (in any currency) it was not just that people were worried that there they would not have enough £B, but also that they do not wish to have too many, as this was likely to impact on their ability to make other payments that could not be paid in £B.

Most Txt2Pay users did not have to rely on guesswork or estimations of how much money they had left in their accounts. After every Txt2Pay transaction, an SMS containing the updated balance would be sent to the account holder—notably, a service that is not available to most UK bank account holders. Our participants talked about how the figure they saw in the SMS helped them not only monitor whether their £B balance was low and needed a top up, but also helped them assess their levels of spending:

> *"text to find out the balance of your account... When I notice my balance is low, I think I must have spent loads. It makes me think I should increase the amount, because obviously I'm spending it more." [iBPu17]*

Several users also described how they would keep these text messages on their phones so that they could check their balances to see if they had sufficient funds to make purchases later on. This, of course, depended on the phone being maintained in a state that would allow them to assess this.

6.4 Maintaining the Payment Device

The mobile phone is the primary payment device for digital Bristol Pound transactions. For a digital transaction to be successful, extra steps may be required in addition to ensuring funds are available, in the work that is required to maintain the payment device so that it is usable for digital transactions. This is work that if neglected prior to the transaction, could create barriers to performing transactions with the payment device. At a basic level, this included ensuring that their phones had sufficient call time or credit on them to send payments, but there were occasions that required more substantial action to be taken, especially when this necessitated behavioral changes to their previous routines and practices. Some of the participants described their changing relationship with their phones, which (and echoing other changes in the ways that the smartphone app ecosystem now shapes our lives) were no longer just communication devices, having become the way they accessed cash and make payments:

> "I didn't really ever regard my phone as…I wouldn't worry if I went out and left it at home because I don't use it that much. But since the £B that is how I get cash or make payments." [iBPu12]

Having left the phone at home was not the only problem with access. Participants also talked about the breakdowns that occurred during transactions as a result of a lack of attention to whether the mobile phone was in a usable state before the transaction occurred. Examples included losing or forgetting to charge the phone, and breakage; and this was not just a problem exclusive to buyers, as the lack of maintenance of the traders' phones could also impact transactions:

> "The only other thing is, sometimes the place that accepts them will lose the phone, so they can't confirm, but you can just show them your confirmation and they will accept that. Or if their machines are down, then they say you can't use it." [iBPu17]

While traders without phone access sometimes accepted these payments (see also Ferreira et al. 2015b), this was not always possible, resulting in an aborted purchase, or payment through another media. This lack of access to the payment system through device problems is a serious problem in a store environment with multiple possible cashiers. Indeed, this is a rather different case to the multiuser electronic point of sale payment systems which also operated in many of the stores accepting £B. Phones are small, fragile, battery operated, mobile, and valuable, leading to many potential opportunities for them to become unusable. If the shop's Txt2Pay account is registered to a personal phone and this device is not currently accessible to the person taking payment, the payment confirmation text cannot be easily verified. Conversely, where these are not personal phones (perhaps owned by the store), and not the direct responsibility of their users, they can break ("One of our sim cards broke so we can't accept payments on that phone" [iBPt16]), fail to be regularly charged, or just go temporarily missing in the upheaval of shop floor activities ("a problem with their phone, where they've not charged it or they can't find it." [iBPu12]). As we have noted, participants sometimes recalled workarounds for these situations, including the purchase of additional phones (iBPt16). However, this further points to the role and importance of the preparatory *work* that needs to be done in maintaining payment devices (and of managing their failures) to enable transactions.

7   AT-TRANSACTION

Once the specific and appropriate pre-transaction activities have been performed, the work involved in performing a face-to-face transaction can now be carried out. There are a variety of decisions that transactors need to make at this stage: which currencies will they be able to use; should they use digital or analog payments; and how should they manage social interactions around the exchange? These at-transaction activities comprise of assessing the environment in which the transaction is to take place, readying the payment device, agreeing on the transaction, performing the exchange, and finally confirming and closing down the encounter. The themes substantiated by our data are described below.

7.1   Assessing the Transaction Environment

The settings in which transactions took place impacted on how our participants chose to pay, with notes or digitally, debit or credit, or sterling or £B, and they reported on various ways that they assessed the transactional environment before making decisions about how best to progress payment. Participants who wanted to conduct their transactions using paper £B or T2P had to first assess whether the business or shop they were in accepted £B, especially if they had not yet bought anything there previously using the currency. In many cases this was driven by visual resources, such as looking for a physical sign, but on occasion it might progress to asking the shop attendants, although, in this case this was reported as being contingent on the participant's local financial and contextual circumstances:

> "If they don't have a sign, I'm going to pay them in ordinary pounds. If there's a long queue I'm not going to start faffing around. (Interviewer: You wouldn't ask?) No, I wouldn't ask, I don't care that much. I might ask if I didn't have any sterling pounds in my pocket. But if they don't have a sign I assume they probably don't and I wouldn't offer." [iBPu18]

While there is a social barrier for this participant in causing delay for others ("faffing around," cf. (Mainwaring et al. 2008) on avoiding commotion), in part, this avoidance of asking may map onto the relatively low statistical likelihood of the store taking £B: most shops in Bristol are *not* trader members. There is a recognition by the participant here that paying in £B was not an absolute moral duty ("I don't care that much"), and that they could make choices on how to pay. Nevertheless, this participant recognized that the local financial circumstances might come into play if they did not have sterling on them: using £B might be their only way to make a purchase when this would otherwise not be possible, and in these cases it might be worth asking. Indeed, asking was occasionally regarded as reasonable because signage relied on traders maintaining it, which was not always the case:

> "you have to ask because you don't see anything obvious: "Can I pay in Bristol Pounds" and then they say, "Yes you can but we haven't put the sign up yet" [iBPu05]

One further assessment of the transaction environment in its broader sense was recorded by several participants relating to transactional costs. Most of the participants had a sense that the digital payment carried some transaction costs for the trader, although this understanding was not always clearly articulated or accurate. In the spirit of supporting local businesses and communities, some users chose to transact in cash or through T2P to avoid these charges being levied on local sellers. This concern with transaction costs and the means of payment was explicitly not the case (for this group of users) when transacting with businesses they assessed as corporate or multinational in their outlook—an assessment supported by the formal selection criteria for £B membership by the

£BCIC. The main reason given for this flowed from these users' interests in supporting the local community and economy; indeed, this interest was one of the key reasons many gave for their adoption of the currency.

So, an awareness of the payment context is a necessary element of how transactions are enacted, whether to progress at all, and if so, how they should approach paying. We have shown examples where work was done in interpreting temporal and social aspects of the context (to assess the likelihood of causing delay or of delaying others), of interpreting visual cues as to the likelihood of acceptance, and assessing the cost implications for traders. Where there is ambiguity or a pressing need to use the currency, additional work must be done by users in deciding whether to inquire further about this, and how to progress the transaction.

7.2   Readying Payment (Devices)

Although Txt2Pay payment required two devices, as a sender and a receiver of the payment SMS, readying the device was primarily seen as a task for the person making payment. To a degree, this may have been due to traders being busy, often engaged with other customers, and with little time to spend in advance of a payment. It also reflected a deliberate aspect of the design of the payment process, so that for the recipient, the technical work[3] of approving payment only involved them examining the content of a text received after payment had been made. This placed the onus of readying the payment device (assuming that the payment device maintenance had been successful) on the person paying.

Once satisfied that their £B would be accepted at this trader, participants described the preparations that they would do to minimize the time spent at the point of sale in the hope that their transaction would not take longer than necessary, following the theme established in the section above. This might be in setting up the device itself in readiness for making a payment text:

> *"I've got a really old phone so it's a little bit slow. And I try and make sure I'm in my texts before I go into the shop or I go to the counter." [iBPu12]*

Sometimes this also involved preparation to minimize the creation of content within the transactional event, so that only previously indeterminable information would need to be added to the payment text message at the till:

> *"When I did it just now, I typed out the text before I'd been served. What I will do is write the text and then ask what is the trader name and what is the cost." [iBPu17]*

While it may not be as extreme as the Japanese aversion to the social embarrassment of meiwaku (meaning annoyance, disorder, or commotion) in using payment methods that might be considered as "timewasting" (as reported by Mainwaring et al. 2008), aspects of this are evident. This also echoes the user's assessment of the transactional environment (Section 6.5): whether there was a queue or a form of interaction that might not be reasonable to extend under the circumstances. Our data clearly indicates that for £B users in the UK, a concern with causing annoyance around delays also shaped our participants' expectations of acceptable payment practices, and the preparatory work that they performed to orient toward these normative expectations.

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[3]Note that we also recognize that there may be non-technical work performed by the trader in assessing their approval of a potential transaction, through assessments of the person paying's age, presentation, and conduct to determine the likelihood of a possible fraudulent payment.

7.3   Agreeing the Exchange

When participants reached the point of sale, but before initiating the transaction itself, they would need to agree on, or be made aware of, the conditions for a successful exchange. The infrastructural and technical issues in making payments using the £B, and in particular, the Txt2Pay system, meant that many payments did not just need preparation on the part of the payer (Section 7.2), but required interactional work to be performed between the parties to ensure a smooth transaction. This typically relied on social and conversational interactions to ensure likelihood of an unproblematic transfer and to smooth problems prior to their attempting to make payment. In some ways, this is typical of many types of payment, such as checking whether a trader takes payment cards, that their payment equipment is operational, or if there is sufficient change for breaking large denomination notes—details that can only become known at this time. An example of this can be seen in the use of £B notes in a café by a participant:

> *"I went into Joes and I offered a fiver [a £B5 note] and she said, this is before they had gone for Txt2Pay, and the lady said "Oh nobody pays with those anymore, and we can't change a fiver"." [iBPu13]*

However, for Txt2Pay users, this work involved users reaching agreement on whether they could meet commonly agreed criteria. For example, the buyer and trader often needed to negotiate issues around charges, the current state of the payment technology being used, and other conditions impacting on how the exchange of the money for goods could take place. As a typical example of one such encounter reported, the vendor had placed a minimum payment value on transactions:

> *"There's only one place where I've tried to use Txt2Pay and they said they have a five pound minimum. But they use [xxx] credit cards anyway so that wasn't a problem." [iBPu18]*

As a result, where participants had at first anticipated using the digital currency, for example, the particular circumstances may require that they use cash or other payment media instead.

7.4   Exchanging

At the point of sale, exchange involves the buyer transferring payment to the trader, and denotes the moment at which ownership changes in the case of a good, or some kind of contractual obligations are fulfilled in the case of a service. This is the point at which the £B technology is intended to provide a secure and trustworthy means of transferring money between the users' accounts. However, as the Txt2Pay exchange relies on a number of interacting social, physical, and technical components, this is a key point at which trouble can occur, made all the more interactionally pressing as this is the critical point at which transfers of value and ownership occur. Participants talked about how they do their exchanges using £B, and what can happen at this stage.

Typically, the transfer process was described as relatively quick. However, several users expressed concern with its slow speed compared to other forms of payment and the perceived problems this caused other customers. For traders who were worried about the effects on their customers, this was seen to generate mild frustration, although this was still considered a minor concern:

> *"Because sometimes it's quite slow at the till, especially if customers aren't that okay with what's going on, then it can be a bit frustrating. But it doesn't really take much longer than a credit card or a debit card transaction at the terminal there, so it's not bad, and like I say there's always something to talk about." [iBPt16]*

It is interesting to see here that talk is used as a means of smoothing these transactional latencies. Customers also noted speed of exchange as a concern, although again, talk between customer and trader was repeatedly described both as a means of socially bridging exchange delays, as well as something that they enjoyed. Of course, different contexts for exchange make for different expectations of latency and different ways that they are handled. For example, in farmers' markets and coffee shops speed was not a concern, while in groceries, where social pressures not to delay others were greater, users noted worries that they should be using less temporally invasive forms of payment. However, in general, T2P was considered to be sufficiently quick for its users' needs, although waits could occasionally be considerably longer, with ranges described from a typical 20 seconds, up to the longest of 2 minutes.

More than simple payment delays, exchange is the point at which problems can emerge, either from data entry mistakes, misunderstandings, problems with sufficient funds being available in user accounts, or infrastructural failures. Unlike most other forms of electronic payment (such as a credit card), £B payments using the mobile phone require the user to enter payment details about the sum and the recipient's account, rather than the trader or their payment system doing this. Although infrequent, manually entering details on a mobile phone could lead to errors, as in this case:

> "if you get something wrong like the first time I did it, ages and ages ago, I put the wrong pin number in, I could not remember which pin I should use, and it comes straight back, saying, error, this is the wrong information this is not the right account or pin, and I just entered it again. So yeah, I think it is quite easy." [iBPu17]

While in this case, this mistake could be easily remedied with an automated SMS message reply providing feedback allowing a successful second attempt, not all users were able to remedy errors, and had to fall back on other methods:

> "Sometimes I just can't remember what comes first, whether it's my pin number or whether it's the amount or whether it's their username. Sometimes they will have a little sticker or poster up near the till where you can see… yeah, because I didn't enter the data in the right order. Actually I gave up and paid with regular money." [iBPu07]

Here, we see that because of problems in formatting the payment SMS message, the user eventually abandoned this attempt to use T2P and made use of a workaround with another form of payment in "regular money." Another user reported a problem with making an overpayment:

> "The only problem I had once was someone told me the wrong price and then they had to give me the difference back in change." [iBPu17]

Rather than resolving this with a more complex technical request for repayment though the £B system, a simpler workaround was achieved via a cash repayment. Obviously, for much larger sums (for example, the user accidentally adding zeros), this would likely be implausible; in the case of the £B, our data shows that most users' accounts (although not traders) held relatively small amounts of money, and would not be able to withstand very large payment withdrawals, resulting in a failed payment. Technology itself could also be a factor in payment failure, and was especially problematic when other workarounds for exchange were not available:

> "It only let me down once when there was no phone signal and I didn't have any other money. [Interviewer: Reason?] It was a Sunday and I generally don't have much cash. If I knew where was going take Bristol Pounds and quite likely Txt2Pay, then that's what I would rely on." [iBPu06]

7.5   Confirming and Closing the Exchange

For the exchange to be considered successful, payment has to be seen to have been made before the buyer can leave the shop with the goods. A payment with printed notes requires that the money is handed from the payer to the payee such that the money is visibly and tangibly transferred to the possession of the payee. With digital payments, the movement of the money is invisible at the time of payment, and can only be confirmed to have reached the payee in indirect ways, such as a transaction number on a receipt, for example. In the case of the Txt2pay transaction, an SMS is sent to both payer and payee to confirm that the money has been deducted from the account of the payer and has been added to the account of the payee. In our studies, a timely confirmation was considered as very desirable. Most of the time, this was the case:

> *"The confirmation comes through quite quickly, you're not stood around waiting for 5 minutes and they can't serve anybody else" [iBPu17]*

However, although they were proportionally infrequent, delays occurred commonly enough for most of our users to comment about this, and the issues that this threw up for them. With delayed confirmations, traders indicated that they were concerned that they might risk giving away goods or services for free, and users were concerned that they might be seen to be trying to fraudulently claim payment, or if a payment failure had occurred, actually taking goods that they had not paid for, leaving them morally compromised, with a possibly difficult conversation on their next encounter with the payee. One trader described how she was nervous about both of these conditions:

> *"I always have that nervousness. Whenever I do it, I think it's never going to come through on their phone and then the payment's going to come out of my account, and the same the other way around." [iBPt04]*

Although it was a worry for users when these messages were absent, workarounds were used to smooth over these events and to maintain a transactional flow. While the receipt of a payment might not be forthcoming, recipients could also draw on other resources to assess the payment process. While the senders' text messages were not a proof of payment, these could help support judgments about receipt:

> *"On one occasion where it was taking a rather long time, they were in a debate with a colleague about whether it would be ok to just go by my text or if that was going to give them problems" [iBPu12]*

In this instance, the participant described how staff taking payment (who were employees) discussed her own text message as a means of assessing payment; here this was complicated by whether this might leave them personally exposed for their lack of a formal proof of payment. The same participant also described how the lack of proof of receipt was not necessarily a result of mobile network failures, and that this had occurred to them previously:

> *"… where they've had a problem with their phone, where they've not charged it or they can't find it. But I'll just show them my confirmation text and that's been fine as well. They make a note of the transaction number that comes up in my text. Others just look at it. They can see that there's a payment that says I've paid. I guess that works for them. In all the time I've been shopping there they've never changed the practice." [iBPu12]*

As described above, the confirmation text here did provide some form of accountability to the recipients, in that it included a transaction number that could be referred to later on as an accountably *checked* record of payment, as well as mapping these payments into any inventory or sales management systems in use. Integration of T2P payments into the Bristol Pound's IT network systems also made checking payment receipt via other methods a plausible option if a networked device was readily available, if the seller might be exposed to significant financial risk, or if transactional speed was less of an issue:

> *"Yes and it's been really good. Like I said about the SIM card, if it ever collapses on us I think we just go online and check on the BP account and there it is, sitting there already, because it is so instant, so there are no worries on that one." [iBPt16]*

In this way, multiple views on financial data that could be accessed through this digital connectivity supported connection across accounts, allowing failures in one part to be checked against another part in real-time.

8   POST-TRANSACTION

Post-transaction activities comprise of the activities that people undertake following their purchases, and included housekeeping activities around their payment systems, preparing for their next transactions, and sharing information about their purchases. These took place both in the location of transactions immediately after they concluded, as well as at different times, away from the transaction space. These deal with matters arising from individual transactions, in maintaining payment accounts and devices, and interacting with others about the transaction process or their purchases.

8.1   Housekeeping

Although it may seem self-evident, transactions involve movements of money, which is economically important to users, carrying with it worries about financial mismanagement, overspending, loss, and fraud. Although not essential to performing the exchange itself, some participants described undertaking additional transactional work after making a payment to prevent fraudulent use of their account if their phone were to be stolen:

> *"I do a text and I immediately delete the thing with my password in so if I lost my phone there's no record in there for somebody to go and pay." [iBPu12]*

This activity makes clear sense to do immediately, and in situ, to prevent anyone accessing their account. This information deletion occurred despite the fact that many of the participants doing this already had passcode locks on their mobile phones (though not all), and it points to an attempt to achieve a higher degree of security on their accounts than through simple access control. This security-oriented practice understandably shows similarities to the security arrangements of online and app-based banking services which do not hold their passwords in such a retrievable format. From these users' perspective, it would seem to make sense for fully secure use of T2P to require this message deletion to mirror their banking interactions.

   As with a bank account, to make full use of the £B account it needs to have sufficient funds in it to spend. The balance appearing in confirmation texts following purchases helped users to see their balances, and determine whether their accounts needed topping up. As these texts did not include secure account details, they did not necessitate deletion like payment texts, and they were readily visually available with the users' other text message without the need for logging into a secure area. Sometimes this information was just used for a general awareness of tracking how much was available to spend:

> *"That's how I keep track of that one [account]. I'll just keep a general eye on the balance." [iBPu12].*

For other users, these text messages were used in a more instrumental way to manage their spending on a daily basis without their being required to log into their online account to track spending on their balance sheet:

> *"I keep track by the texts. I can keep all the texts in my phone. So I can see what I have spent and where. I'm not sure if you go on my credit union account it will probably tell me. I have not checked it [...] You can go on a shopping spree and spend three hundred pounds without realising it, but with this it tells you, you have only fifty quid left." [iBPu17]*

Such texts allowed these participants to gauge how much money was left in their account through the lightweight and easily accessed mechanism of looking at their text messages, on a device that was, for the most part, always present and which was regularly being scrutinized for other purposes. Most other forms of payment do not support this kind of immediate and detailed feedback, and this information was valued by participants.

8.2   Sharing

That people share digital content online is not a novel finding, and Bristol Pound members were no exception. Twitter, for example, hosts a large number of tweets about £B spending (and to a less degree, receiving) on social media, ranging from bus tickets, food and drinks, local taxes, plumbing, gardening, massage, and electricity bills to name a few, mirroring our own participants' reporting on their activities. Our interviewees especially noted these relating to their payments with T2P, possibly as a consequence of the common platform for T2P payment and social media on their smartphones.

Participants indicated that these posts to social media were especially likely to be made when they or their friends had just performed or received their first T2P transaction, or they were the first to use T2P in that shop. This phenomenon of claiming "first to spend" was something that participants reported as pertinent even when not posting on social media (e.g., "There's a veg shop up in Wells Road and I was the first one to spend Bristol Pounds there." [iBPu06]). Our participants' use of Twitter appears to be a similar practice to the formal process of "checking in" and, in particular, unlocking achievements such as badges on FourSquare.com [4], some tweets even evidenced with a link to a photograph of the event.

Indeed, a large corpus of similar "just made… first time" posts from members and traders can be found with a simple Twitter search, indicating that this practice is unexceptional. That these are made visible on Twitter, a public platform, and call out the @BristolPound username, in addition to personal "handles" (usernames), also suggests that these posts are for more than simply the consumption of their smaller group of followers and friends in their own identity management practices (Cramer et al. 2011), but also have a public purpose as an announcement that is tied to the Twitter site associated with the Bristol Pound. To an extent, these blur public and private behavior (cf. Guha and Birnholtz 2013), as while posts are addressed to private individuals, they are also evidently designed for public consumption, in a format that is aligned with the aims of the £B CIC. They promote the currency and T2P, and make visible both the user's "ethical" credentials to a Twitter audience as well as making otherwise partially invisible interactional potential of the city visible (i.e., in this case, that these traders take payment in £B or T2P). That such check-ins are likely to relate to impression management is known, but in this case, these users are publicly broadcasting about their private financial transactions (which are not normally open to

inspection), and do so in a promotional form that exposes the visibility of the traders that the £B payment was made with. This seems not just to be "a tool to supplement their offline social goals" (ibid.), but also to supplement the offline goals of both the trader and the £BCIC as well.

9 DISCUSSION AND DESIGN CHALLENGES

9.1 On Moneywork

The situated nature of moneywork means that the factors in our analysis should not be seen as exhaustive, and the various configurations of individuals, technologies, and physical spaces shape its contingent nature. However, the trajectories through the pre-, at- and post-transaction sequence depend on decisions and events at various points along the sequence. For example, it is not possible to perform a digital transaction unless the buyer has deposited £B into their account before the transaction, so that the account contains sufficient funds for the transaction. Similarly, it is not possible for a buyer to perform an analog transaction unless they already have in their possession the necessary printed money (of any currency). Participants may select the form of transaction based on their experiences of how long that transaction would take and whether that form of transaction would fit with the current state of the environment in which they are transacting. Perceptions about the speed of the transaction depended on the individual performing the transaction, e.g., the speed at which they could enter text on their mobile phone, as well as environmental factors such as long queues of people at the point of sale. Decisions to carry out digital or analog transactions based on a sense of transaction duration could be made long before the actual transaction takes place, or it could be the outcome of encountering a busy shopping environment. Unanticipated contextual factors do play a role here, however, our data shows how participants were also making deliberate choices to meet their particular interests and circumstances, to fit with their lifestyle choices, around the anticipated transactional duration, and the avoidance of imposing transaction costs on others or social embarrassment to themselves.

In developing an analysis of moneywork that extends beyond the empirical data presented here, we acknowledge that there are limits to which generalization can be made, and that the moral, ethical, and social agenda of the Bristol Pound CIC is likely to provide a different set of use concerns to those of other forms of digital money. Taking cryptocurrency as an extreme example where the moral, ethical, and social dimensions may differ to the £B, for example in underpinning a dark web drug deal, there is likely to be a chasm in the users' orientations and interests. Yet even here, the moneywork cycle offers insights that capture valuable aspects of the transaction; take for example the post-transactional work of housekeeping. In this case, clearing up the user's system to remove incriminating evidence of the transaction (e.g., deleting browser history and unencrypted keychain wallet codes) would seem to be one plausible outcome. In this respect, it is useful not just to look at the specific activities we observed and report here. We can also look at the ways in which our participants made sense of, and acted around, the phases of the moneywork cycle to draw from their practices and intents to consider how these may extend across different financial systems and settings (cf. Maurer 2005). We are also mindful of the extent to which direct comparisons can be made across contexts, and we do not attempt to suggest that the specific findings apply to different forms of digital currencies or payment technologies, or that these settings are equivalent. We do not claim that across contexts, user activities are likely to be "the same," but that they may share some common properties. In this respect, where we extend the implications of our analysis on the Bristol Pound beyond our own data, we explicitly identify how, and why we do so, with the caveat that this is an extrapolation from our findings, and is not directly empirically evidenced.

Our findings illustrate key elements of the work around making payments—what we call moneywork—with the Bristol Pound, and shows how transactions emerge out of the complex

socio-digital-material landscape that users operate within. In the findings above, we show how transactions are embedded in a set of interrelated interaction practices that take place within an activity stream constituted by user practices before, at and following transactions. In this, we echo a finding from (Mainwaring et al. 2008), that "Keeping e-money running smoothly required work from people who use it"—and our analysis reinforces their point strongly, while also showing that this interactional work has strong sequential dependencies in enabling or shaping subsequent transactional activities. However, our data emphases many different kinds of work, some taking place in public through social and visible encounters, while other forms took place out of the payment setting or through solo interactions on phones. Such moneywork is variably achieved by individuals as well as cooperating parties, co-present as well as remote, alone as well as in the presence of others, and is dependent on both systemically integrated as well as co-opting heterogeneous social and digital infrastructures. The arrangements of people and technology in this view of moneywork, along with the way the digital and physical merge, divide and overlap, corresponds with the hybrid ecologies described by Crabtree and Rodden (2008), identifying articulation work, fragmented interaction, and seamfulness as critical to co-operative interaction in environments that connect physical and digital features.

9.2   Framing the Transactional Ecologies of Moneywork Design

To understand where the challenges for conceiving and designing digital transaction systems that support moneywork lie, we draw on three features of interaction in hybrid ecologies (ibid.). They offer a view into interaction that takes place across the social and physical worlds that participants are situated within, and the digital landscape that mobile financial transactions are conducted through. Here, attending to, and unpacking these features allows us to abstract and generalize from our observations to consider how other forms of money, technology, or contexts might interact with one another, with relevance for their future design.

Just as physical and digital elements have affordances which constrain and make possible certain kinds of action, digital and analog currencies constrain, and enable possible actions. These do not just shape the mechanics of the transaction itself, but how the entire moneywork cycle around it unfolds. In the interests of performing a successful transaction, we observed people doing work at every stage—communicating, adjusting, and coordinating as required by the particular circumstances they found themselves in. In explaining the co-ordination of group work, Strauss defined *articulation work* as "the specifics of putting together tasks, task sequences, task clusters—even aligning larger units such as lines of work and sub-projects—in the service of work flow" (Strauss 1988, p. 168). Articulation work allows individuals to distribute and align tasks and to organize and integrate those tasks in a meaningful way in order to get work done. Similarly, our data shows the role of articulation work in performing transactions; this occurred between transactors (e.g., articulating the method of payment, communicating about problems) and in financially enabling the transaction process (e.g., topping up, budgeting). However, we also observed another type of articulation work here—*digital articulation work*—in which users carried out work in various phases of the moneywork cycle in order to use their digital devices in the transaction, such as charging their devices and readying devices for payment. Looking at the articulation work that people have to do around making digital money work for them offers real insights into the potential for automation and the need for retaining human skill and judgment in solutions.

We also showed that participants in a transaction need to pull together a diverse set of technical components to make payments, and connect people with different access to knowledge and informational resources, resulting in extremely fragmented interactions. The different transactors therefore need to employ uniquely configured and non-standardized mechanisms for interaction to collaborate around a successful exchange; there is a degree of interactional asymmetry around

transactional interactions that needs to be managed through reference to the participants' existing competencies, shared understandings of the normative process of exchange, and the information that is, or can be, made available to both parties. Because money is involved, sharing some of this knowledge or information has the potential to be financially damaging. In this respect, such fragmented ecologies are especially problematic, as a requirement to share, or to make information available to both parties, may permit fraudulent transactions or access to information that one user considers to be private or sensitive.

Our representation of transaction work also encompasses a discussion of seams, the "connections, gaps, overlays and mismatches within and between physical, digital and social space" (Rudstrom et al. 2005). Our participants' accounts of transaction work illustrate how the transactors creatively navigated their often disconnected physical, digital, and social spaces. Switching or choosing between the digital and the analog transaction was not merely a matter of smoothing over technical breakdowns or limitations, but was also planned for, anticipated and carried out in ways that were meaningful or useful to the individuals transacting. In financial interactions, seamless (or in the language of the payments industry, "frictionless") interactions can remove or limit both a user's agency (the ability to act independently of other people or things) and control (of how and what content changes hands) over the moment-by-moment progress of a transaction. The seams that we have documented in transactions often appeared to flag up and offer moments of interactional reflection. They provided opportunities to change the pace, format, conversation, and mode of payment amongst other things. These seams may mean more money*work* is necessary to make a transaction, but this can carry value for users in extending the opportunities and choices open to them.

As we have shown, users need to do a considerable amount of work to enable successful transactions, pulling together a diverse and fragmented set of social and technical components, against a backdrop in which their transactional encounters expose rifts in the physical, digital, and social components of their interactions that need to be reconnected for them to carry out their everyday activities. Understanding the nature of moneywork and user practices offers us a way into enabling more effective solutions through developing designs that are sensitive to these conditions.

9.3 Design Implications

Drawing from our analysis of the performance and practices of moneywork around in making payments with the Bristol Pound, it is possible to pull out useful and tractable implications that can be generalized to future forms of digital money and payment systems that could enhance and improve users' transactional experiences. While there is evidence that the Bristol Pound provides some of its users with new ways of transacting and interesting or useful ways of enabling interactions, it also presented notable limitations and problems for some of our participants. Moreover, it is likely that in the future we will see a wide and varied set of technology solutions that allow a broad range of digital currencies to be transacted with different properties and functionalities, and their designs are likely to afford different financial and transactional practices, all of which will impact on their use and usefulness to transactors. Based on our findings and drawing inspiration from the moneywork lifecycle, we suggest a number of challenges and opportunities as design implications for digital and mixed media currencies.

Standardization and interchangeability: When designing many forms of payment, designers often strive to accomplish standardized methods of exchange that are "media neutral" so that payment can be made in different ways (cash, card, NFC) to achieve the same transactional outcome, i.e., successful payment. In many cases, this is a valuable and useful goal as it simplifies and speeds payment at the point of purchase. However, approaches to standardization that attend to and prioritize the moment of exchange also gloss over some of the complexity in people's financial lives that

is evident in the broader view of moneywork that we have presented. Different forms of payment and different forms of money need not be simply seen as different but equivalent "pots" to draw from interchangeably, but inherently may have different qualities and implications and are not just substitutes for one another. At an obvious level, credit and debit cards have different financial implications for both customers (deferred payment, interest payments) and traders (transaction fees). At the lower end of the payments scale, loose or small change transactions have only minor implications for mistakes made, while the use of some payment media such as cheques have political and systemic implications (see also Vines et al. 2012a) for the industry. Zelizer (2011) points to aspects of this in her discussions around "special money", albeit, limited to her commentary around the use of a single currency and money medium. Nevertheless, her work identifies that money holders do not always see money as an abstract store of value that is interchangeable, and that the constraints of the media in which money is held in can (although not always) be seen by its users as a valuable feature. A "one size fits all" digital payment ecology might offer the advantage of speed and consistency, but it could also steamroll market innovation and user appropriation for emerging and niche applications. As we have seen in the ways that discussions emerge from its use in our data, being seen to make and take payment in the Bristol Pound is not a dispassionate choice, and it also brings into play and exposes the unique financial architecture that underpins the Bristol Pound, in which, for example, checking on account balances and topping up is necessary to maintain its functionality.

Liquidity awareness and movement: Following on from the previous point above, splitting spending money into different forms of currency or money in different accounts requires users to be aware of how much money they have access to in its different forms so that it can be transferred at a suitable time for practical purposes. Users may already do this to an extent with different bank and credit card accounts; however, as we note with our £B users, different currencies are often not directly interchangeable or exchangeable. Our data shows that some users may wish to use a particular form of money up first, and most reported a need to be aware of when their £B account required topping up due to the unpredictability of their spending. Moving funds around between accounts is therefore not always a simple matter in which automated account transfers triggered by balance changes (technically known as "sweeps") are likely to provide a suitable solution to many of its users. This sensitivity to financial account movements is known to be true for lower income groups (Kaye et al. 2014; Vines et al. 2014), but here with the £B, we see a need for this kind of awareness across a more diverse group including affluent participants due to its transactional particularities and use practices. There are two design opportunities here. First, giving users a greater awareness of their liquid financial status would allow them to determine which forms of payment were most suitable and accessible for use, or to enable them to prepare for moving capital between different accounts, media, or currency types in time for it to be of practical use. Second, providing users with simple ways—at both the levels of mechanical interaction and account pre-configuration—of managing financial movements between accounts that are sensitive to the kinds of practices and needs identified in our data would seem an enabling and valuable functionality.

Burdensome financial tracking: Lightweight approaches to tracking spending were valued by £B users, to check on their account balances directly before or after making a purchase, or for keeping a general eye on whether accounts needed "topping up." Notification of payment and account balance without requiring secure login to a dedicated account (in the case of the £B by SMS), offered users a simple and safe way to do this with near-immediate feedback, and which could be easily revisited. This is highly instructive for interaction design: mobile payment apps that require users to log in place a burden on users to check their details. Similarly, phone notifications that disappear after being reviewed do not support the users' peripheral awareness of their balance, or allow them to easily locate and check their details. Moreover, the use of text/SMS as an everyday

tool for users means that these payment details are easily reviewed and incidentally available to users as they go about their ordinary activities. We do not suggest that SMS texts are the most suitable vehicles for this information, but that the characteristics of their use and embeddedness into users' other device practices offer suggestions as to other methods for making their financial information readily available to them.

Payment preference notification: Knowing what kinds of payment methods are accepted by traders often requires £B users to physically ask about this, and as we have seen, this can sometimes present social barriers to its use. Current methods of traders informing customers about the different transactional methods available for use (including the £B, but other methods also) involve visual media such as posters and stickers, not all of which are easy to display or visible. Where users might have multiple means of payment and currencies, providing them with an automated set of payment possibilities for a given trader or venue might be of value. This could, for example, be achieved through the use of wireless, Bluetooth or RFID to signal permissible forms of digital payments.

Multi-user dependencies: For the £B, as with most kinds of electronic payments systems, digital wallets are used for both making *and* receiving payments between spender and recipient. This requires two devices to be in working order, and as we have shown, it was not always possible to guarantee that both devices were ready to operate in these states however prepared one of these users had been in maintaining their own device. Current workaround practices by £B users based around showing payment confirmations are in use, but these are inherently problematic and potentially open to abuse. Here, lies an opportunity to explore ways in which wireless access or battery power (two key points of failure) might be shared across devices so that transactions can progress. Sharing battery is an area that has had some recent developments (e.g., Worgan at al. 2016), but it is also possible to envisage a system in which a single device could be utilized for both purposes (i.e., sending and receipt of funds), for example using biometrics to allow online validation of the non-owner of the device to transact or assess the validity of a transaction.

Transactional visibility: So-called "frictionless" payments are intended to speed the process of payment and to decrease the interactional effort required in payment, and form a key part of the industry rhetoric around payment technology futures. In contrast, the £B's T2P payment process was by no means frictionless and required a considerable amount of preparation and social interaction to configure the technology and transactional environment. Yet while the moneywork lifecycle exposes the considerable effort required to enable a T2P payment, some aspects of this configurational effort were repeatedly reported by participants as worthwhile and valuable to them (see also Ferreira et al. 2015b). These primarily concerned the creation of opportunities for social and community interactions. Users reported enjoying talking with others as they made their payments, as well as instrumentally using talk to assess characteristics about the other transactor (for example, their trustworthiness) or to communicate their interest in the use of the £B as a means of payment. They also valued this visibility as a performative means of *being seen* to be paying with the £B, both for those that they were with or to others nearby. This visibility allowed users held to be held accountable for their actions, and in turn, people could use these as opportunities to frame their own actions so that they could be seen to be acting considerately, and thereby framing appropriate impression management. Such transactional visibility is by no means ideal for all forms of payment, and may be of specific relevance to the moral, ethical, and social backdrop to £B use. However, it is likely that using payment processes as an opportunity for communication and impression management may carry additional value to its users across a wider set of circumstances, and these may be relevant for purposes that could even be antithetical to the £B values. This might include enabling conversations that open opportunities for the vendor to advertise a new product or service, or for impression management, to demonstrate a payer's financial literacy, wealth,

or trustworthiness, so transactional visibility may not be uniquely beneficial to the £Bs payment context.

Social consumption and sharing: The consumption of products can be highly performative. While it is not a novel observation that people may make grandiose and flamboyant statements of personal wealth through their conspicuous consumption, we saw subtler and more nuanced forms of performativity than this in purchasing activity from our data. Being seen to know shops that take payment in Bristol Pounds, or showing others that their payments had been made in this currency may have a social value to its users. Such spending need not be about displays of wealth, but about the person making a payment visibly exposing the consumption choices that they have made. For the Bristol Pound, this might be about communicating ethical or community values, but in another context, this might equally be about showing an orientation to religious, dietary, frugality, or other lifestyle choices. Allowing some aspects of these payments for noteworthy purchases, events, traders or places to be made visible, rather than hiding them (for example, through connections to social networking services, or gamifying this through sharing comparative statics with other users) could be considered advantageous. This has already been pioneered by venmo.com, which supports limited public sharing; while considered a valuable approach, its implementation has also been the target of concern, not least about over-sharing and opening up users' lives to closer inspection than its users might have imagined (Levenson 2014) through data mining to determine detailed transactor relationships and user's purchasing preferences (Khanna 2015). Notwithstanding these concerns, to invisibly select a method of payment from an anonymous digital wallet would diminish some of the unique affordances that give rise to the opportunities that our £B users reported. However, as we have seen with the £B CIC, the system owners may actively discourage some of these possibilities, if they consider that they diminish their brand, or diffuse their vision for what they see the system as achieving. Nevertheless, payment *privacy*, one of the mantras of the cryptocurrency movement, could be relaxed if handled sensitively where it offers design opportunities that may be of value to users.

10 CONCLUSIONS

If, as financial anthropologists and sociologists suggest, financial transitions are seen as a means of co-ordinating social and community relationships through the exchange of value (Simmell 1900; Zelizer 1994; Granovetter 1985, 2005; Maurer 2015), we can see that the mechanisms used to enact payment can also support different ways of achieving this co-ordination to produce and shape these relationships. In this respect, Maurer's exhortation that money is not just a means of exchange and a store of value, but a "system of relationships, a chain of promises, and a record of people's transactions with one another" (2015, p. 46), and the moneywork lifecycle that we flesh out here illustrates this and shows how this plays out in use. Moreover, understanding digital currency use, and more generally, digital money, involves much more than simply examining the point of payment, given the ways that practices around these media extend across a wider span of everyday life than simply the transactional one. Where the use of a particular currency unit, say, for example, boar tusks (see Zelizer 2011) scaffolds interaction through their physical (tusks are heavy and durable) and material properties (they are non-uniform and indivisible), their cultural (only used by "women") and symbolic (exchanged for "women's" goods) acceptability, and at a known exchange rate (as boar are rare and hard to catch), the interaction between the transacting parties is highly bounded. These constrain the range of possible ways that the exchange of value can be conducted, understood, and be rendered as a credible outcome. Digital currencies have very different form, yet may hold some similar properties. Indeed, we can design them to disrupt or manipulate the ways that transactions are co-ordinated and the nature of the social interactions that surround currency transactions.

Our concern in this article has been to articulate key features of the ways that money is practically used as a means of payment in everyday financial interactions, and the work that is needed in order to make these transactions successful—*moneywork*. Our primary interest here lies in the deployment of mobile technologies to enable transactions, drawing on empirical data around the use of one instantiation of a form of money (the Bristol Pound), using text messaging (T2P) and physical tokens as a medium enabling payment. While we have illustrated the concept of moneywork through the discussion of the £B systems, this is can be productively leveraged as a driver for thinking about the development of a broader set of mobile transactional services serving the ecology of related activities that make up moneywork. In the study, we have shown how the conduct of transactions using the £B are highly contingent on the settings within which they occur, locally organized, shaped by events that happen long before the transaction, and result in outcomes and maintenance activities that that continue long after the transaction itself. What we can see from our analysis is that, in their everyday practices, people traverse an ecology of interlinked money-related activities, and exploit the respective affordances of the technologies and social resources that they have at hand to enable the unfolding transactional demands that they encounter. The most fundamental insight here is that digital payments cannot be seen as independent of the rest of the moneywork cycle. An orientation to interaction within the moneywork lifecycle foregrounds problems, opportunities, and a sensitivity to considerations around practice that carry implications for design that extend across a variety of potential forms of digital money and payment technologies.

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