



City Research Online

City, University of London Institutional Repository

Citation: Barros Pena, B. (2022). Curb your enthusiasm: The dissonances of digitising personal finance. Proceedings of DRS, 67, doi: 10.21606/drs.2022.302 ISSN 2398-3132 doi: 10.21606/drs.2022.302

This is the published version of the paper.

This version of the publication may differ from the final published version.

Permanent repository link: <https://openaccess.city.ac.uk/id/eprint/28621/>

Link to published version: <https://doi.org/10.21606/drs.2022.302>

Copyright: City Research Online aims to make research outputs of City, University of London available to a wider audience. Copyright and Moral Rights remain with the author(s) and/or copyright holders. URLs from City Research Online may be freely distributed and linked to.

Reuse: Copies of full items can be used for personal research or study, educational, or not-for-profit purposes without prior permission or charge. Provided that the authors, title and full bibliographic details are credited, a hyperlink and/or URL is given for the original metadata page and the content is not changed in any way.

City Research Online:

<http://openaccess.city.ac.uk/>

publications@city.ac.uk

Curb Your Enthusiasm: The Dissonances of Digitising Personal Finance

Belén Barros Pena^{a*}, Bailey Kursar^b, Rachel Clarke^c and John Vines^d

^aQueen Mary University London, United Kingdom

^bIndependent Consultant, United Kingdom

^cNewcastle University, United Kingdom

^dUniversity of Edinburgh, Scotland

*Corresponding author e-mail: b.barrospena@qmul.ac.uk

<https://doi.org/10.21606/drs.2022.XXX>

Abstract: Financial technologies are often credited with empowering the consumer-citizen. The discourse that surrounds them is overwhelmingly positive, emphasising their contribution to speed, efficiency, availability, competition, quality and affordability. These very same technologies, however, also clash against the meanings that we attach to money, and against the things we value in our interactions with it. Through a review of the design literature on money-work, and our own research with people experiencing both mental illness and financial difficulty, we discuss a list of dissonances that result from digitising our personal finances. We hope this discussion will encourage designers to reflect and think critically about financial technologies, and to look beyond the hype currently built around them.

Keywords: financial technologies; digital money; mental health; financial difficulty

1. Introduction

The discourse that surrounds the adoption and spread of financial technologies is generally confident and self-assertive, emphasising their benefits over their drawbacks. By financial technologies we mean a subset of digital technologies that mediate access to, and transactions with, financial information and assets. These are expanding rapidly, their adoption aggressively pushed to citizens (Scott, 2016). Some of them, like cryp-



to currencies and non-fungible tokens (NFTs), are highly visible through ample coverage by mainstream media. Others, like token-based digital cash systems (Dold and Grothoff, 2016), or ongoing explorations of central bank digital currencies (CBDCs) (Chaum et al., 2021), are less conspicuous. A few, like digital banking services, are already well integrated into our daily lives (Barros Pena et al., 2021a).

The adoption of financial technologies has been overwhelmingly portrayed as having a positive and empowering effect on the citizen-consumer. According to this narrative, these technologies will spur innovation, improve the user experience, increase competition, raise quality and lower prices (Zachariadis and Ozcan, 2017). It is assumed that they will also disintermediate financial service provision, allowing people to bypass traditional financial institutions, and interact directly with each other. This “empowered, self-service model” (Nichkasoova and Shmarlouskaya, 2020, p. 440) has been called “a new form of financial democracy” (Nichkasoova and Shmarlouskaya, 2020, p. 438).

Perhaps enticed by the promise of reduced marginal costs per customer (Joyce, 2019), the financial industry seems to take for granted that introducing technology delivers convenience and makes it easier for people to manage their money. There are no doubt benefits to the introduction of these technologies into the domain of personal finance. It is argued that, as money transforms from physical currency into information (Woldmariaam et al., 2016), financial transactions become more efficient, faster, cheaper to execute (e.g. O’Neill et al., 2017), and available at any time and from anywhere (Woldmariaam et al., 2016).

Financial technologies also increase the visibility of cashflows and of individual financial behaviour (Woldmariaam et al., 2016). For the general public, they provide immediate and convenient access to personal financial information (Woldmariaam et al., 2016). For the financial industry, transactions leave trails that enable automated and more precise credit rating calculations, i.e. the estimation of someone’s likelihood to pay back their debt and therefore the level of risk attached to lending activity (O’Neill et al., 2017; Hulikal Muralidhar et al., 2019). For public institutions, digital transactions increase transparency and help fight corruption (Woldmariaam et al., 2016; Musaraj and Small, 2019; Scott, 2018).

The digitisation of finance is also credited with contributing to financial inclusion in at least two ways. First, by lowering the cost of service provision, financial technologies expand the reach of formal financial services to new areas and populations previously excluded from them. Second, the electronic trails left by digital transactions help low income groups build a financial history, join the credit rating infrastructure and thus become eligible for formal lines of credit (Hulikal Muralidhar et al., 2019).

However, these technologies also have adverse consequences for citizens. For instance, the automation of credit rating calculations feeds financial exclusion and penalises the most financially vulnerable (Ingham, 1999; O'Neill et al., 2017), as it enables the redirection of bank lending towards higher income and therefore safer groups (Leyshon and Thrift, 1995). Musaraj and Small (2019) wonder whether the accumulation of transaction records constitutes a path to financial inclusion or an alarming threat to privacy.

In this paper, we synthesise and discuss a series of dissonances between the purported benefits of financial technologies, and the outcomes their deployment brings for citizens. Underpinning this work is a review of the predominantly qualitative design research that has studied “moneywork” (Colavecchia, 2009; Perry and Ferreira, 2018), a concept that describes the hidden labour (Kameswaran and Hulikal Muralidhar, 2019; Hulikal Muralidhar, 2019) people must undertake in order to engage and interact with money.

These studies of moneywork include our own research, which was carried out in collaboration with people who live under the “double trouble” (Topor et al., 2016, p. 201) of mental illness and financial difficulty (Barros Pena et al., 2021a; Barros Pena et al., 2021b). Our participants trialled a new financial third-party access mobile application for 90 days. During that time, they completed a diary study that opened and closed with semi-structured interviews (Barros Pena et al., 2021a; Barros Pena et al., 2021b).

Our research on financial third-party access and financial collaborative practices contributed insights about the individualising tendencies of financial technologies to our literature review. Our participants’ experiences of mental illness and financial difficulty also provided a “critical lens” (Barros Pena et al., 2021a) for the examination of the design of existing financial technologies, and inspired the list we present in the next section.

2. The Dissonances Resulting from Digitising Personal Finance

Dematerialisation is perhaps the most obvious and better studied aspect of digitising finance. Research has shown that the disappearance of physical artifacts impacts our relationship with money (Vines et al., 2011), affects our sense of control (Dunphy et al., 2014b), impairs our ability to compensate for technology’s shortcomings (Hulikal Muralidhar et al., 2018; Panjawi et al., 2013), and undermines collaborative practices around finance (Panjawi et al., 2013; Kumar et al., 2011; Vines et al., 2012b; Dunphy et al., 2014a). In this paper, we will focus instead on outcomes from digitisation that have received less scrutiny. These include: i) the focus on efficiency; ii) the removal of friction; iii) reduced flexibility; iv) increased

visibility of financial behaviour; v) additional moneywork; vi) shifts in control and agency; and vii) the individualisation of finance.

2.1 The Focus on Efficiency

The transactional approach to financial technologies that is characteristic of the Global North brings with it a focus on efficiency (O'Neill et al., 2017). In this context, the main driver of design becomes making transactions as fast and efficient as possible for all involved (O'Neill et al., 2017). The emphasis is on speed (O'Neill et al., 2017), seamlessness (Mainwaring et al., 2008), anytime anywhere access (Hulikal Muralidhar, 2019), and ease of use (Heyman and Artman, 2014). The drive for efficiency aims to demonstrate that financial technologies are more convenient than the alternatives. This convenience, however, remains questionable.

First, in the case of payments, it is not clear that digital forms of money are more convenient than cash. According to Scott (2018), cash is familiar, accessible and easy to use. Once in your hand, it requires no prior configuration or setup: no need to open a bank account, register for Internet banking, download mobile apps, wait for and activate a debit card, or configure a mobile wallet in advance. Cash does not impose upper or lower limits for transaction amounts, and it is accepted almost everywhere (Scott, 2018).

Second, convenience is not an intrinsic characteristic of any financial instrument, but a “contextual property” (Scott, 2018, p. 150) that emerges in combination with supporting infrastructures and people’s circumstances. Scott (2018) points out that “it is possible to engineer inconvenience and irritation by deliberately making cash harder to use” (p. 150), for instance by withdrawing the branches and ATMs necessary to access it. For some of Vines et al. (2011) eighty somethings, “going to the bank in person” (p. 69) was more effective than transacting remotely by phone or the Internet. Convenience, therefore, is at least partially subjective, co-constitutive, and relational.

Third, the convenience narrative raises the question of convenience for whom. People seem to believe that financial companies deploy technologies mainly for their own benefit, and not necessarily for their customers’ convenience (e.g. Hulikal Muralidhar, 2019; Vines et al., 2012a). Corroborating this perception, Blumenstock et al. (2015) found that digitising salary payments through a mobile money service delivered “immediate and significant cost savings” and was clearly beneficial for the employer and the mobile operator, while having “only muted effects” on employees’ wealth and well-being.

The notion of financial technologies as an efficiency mechanism that can deliver faster, cheaper transactions is, according to Ferreira and Perry

(2019), “a very partial perspective” (p. 122). It neglects important aspects of financial behaviours and interactions, such as “the extra-economic functions of money and the meanings and values” (Hulikal Muralidhar, 2019) that people attach to it. Designing for efficiency also has cascading effects, one of the most damaging being the removal of friction (Hulikal Muralidhar, 2019). From the perspective of our participants, who lived on low incomes and struggled to control their spending, efficiency in payments stopped being a feature and became a bug. We further discuss the negative implications of the removal of friction in the next section.

2.2 The Removal of Friction

The focus on efficiency in the design of financial technologies results in one-click purchases and just-wave-something payments, with the perception of removing friction from our financial interactions. Ferreira and Perry (2019) go as far as to consider “frictionless” one of the core affordances of digital money. Lack of friction is present in both obtaining credit and spending (Harper et al., 2018). The consequences of easy and instant availability of credit include, for instance, the “credit card premium” (Prelec and Simester, 2000, p. 5), an increase in the willingness to pay by credit card rather than cash when customers are instructed to do so. Mobile credit services in the Global South such as M-Shwari in Kenya have also been associated with increasing levels of indebtedness (Kusimba et al., 2017). Meanwhile, frictionless payment systems result in “invisible spending” (Mainwaring et al., 2008, p. 24), which can erode awareness of our own consuming habits (Mainwaring et al., 2008; Lewis and Perry, 2019), and undermine control over our personal finances (Hulikal Muralidhar, 2019).

The disappearance of friction brought about by the digitisation of finance affects us all, but it is particularly onerous for those living with mental illness (Harper et al., 2018). This is due to the fact that impulsive and compulsive behaviours, as well as comfort spending, are common symptoms in mental health conditions (Harper et al., 2018; Richardson et al., 2018; Richardson et al., 2017). As a result, the negative effects of the absence of friction can be better appreciated through the experiences of people living with mental illness. For our participants, financial technologies like contactless payments became “a danger zone” (Barros Pena et al., 2021a), and lack of friction prompted the development of personal strategies to add resistance in both borrowing and spending. These included handing over money to others for safekeeping, seeking bank accounts without overdraft services, using prepaid debit cards, and letting online shopping carts “rest” overnight rather than paying immediately.

Workarounds that purposely create fiction have also been uncovered by other design studies. For instance, Snow et al. (2016) describe a money tin devised by one of their participants that could only be accessed with a can opener, and where the difficulty of getting to the money inside helped spending control. Rickshaw drivers being paid with mobile money explained how the delay in payments arriving into their bank accounts, and the inconvenience of having to visit an ATM in order to withdraw funds, helped them save (Hulikal Muralidhar, 2019). Setting barriers to access in order to support saving is the rationale behind the lockable “pots” now offered by many of the mobile-only banks (Welch, 2018).

As observed by Hulikal Muralidhar (2019), friction “is crucial to users’ negotiation of the trade-off between consumption and saving”. Through the lens of those trapped in the cycle of mental illness and financial difficulty, lack of friction morphs from a symbol of convenience and choice into a deeply problematic feature, one that requires urgent attention from designers.

2.3 Reduced Flexibility

An additional effect of digitising financial service provision is the removal of flexibility. As observed by O’Neill et al. (2017), the digitisation of financial workflows requires their formalisation, turning them into rigid step-by-step processes. The humans in non-digital financial workflows are capable of introducing a degree of flexibility that “is notoriously hard for digital systems to do” (O’Neill et al., 2017, p.764).

In the Global North, these “human elements” (O’Neill et al., 2017, p.765) that make flexibility possible “have been designed-out” (O’Neill et al., 2017, p.765) through the widespread introduction of financial technologies. Woldmarian et al. (2016) also remark on the homogenising effects of financial technologies in general, and of mobile payments in particular. This is what the UK Financial Conduct Authority has described as the streamlining of consumers in product design, financial processes and systems (Coppack et al., 2015). The standardisation of customers in this manner results in the inability to accommodate the non-standard needs of people in financial difficulty (Coppack et al., 2015).

The importance of flexibility in financial service provision has been highlighted by both researchers and policymakers. Flexibility matters independently of the degree of economic development and the reach of formal financial services. In the Global South, the most financially vulnerable need flexibility (O’Neill et al., 2017; Collins et al., 2009) in order to manage irregular, unstable incomes (Collins et al., 2009), and to cope “in times of trouble” (O’Neill et al., 2017, p.764).

In our Global North, the UK Financial Conduct Authority has identified the chronic lack of flexibility of financial firms as one of the fundamental barriers to providing appropriate service to customers who find themselves in financial trouble (Coppack et al., 2015). These customers included our participants, who exemplified the well-documented association between mental illness and financial difficulty (e.g. Elbogen et al., 2011; Jenkins et al., 2008; Ljungqvist et al. 2016; Richardson et al., 2017).

Given how intractable flexibility has proven to be for digital technologies, designing digital financial services and tools that mimic and deliver human-like flexibility becomes one of the biggest design challenges in this domain.

2.4 Increased Visibility, Traceability and Transparency

Ferreira and Perry (2019) list being dataful and transparent as two of the affordances of digital money. Financial technologies transform money into information, and digital financial transactions leave electronic trails (Hulikal Muralidhar et al., 2019) that generate vast amounts of data. This data becomes available to those who own or manage the financial technologies we use, for instance banks, payment companies, and “fintech” enterprises; as well as to government institutions and tax authorities (Ferreira and Perry, 2019). Some of that data is also accessible to financial technology users (Ferreira and Perry, 2019).

It is argued that this wealth of financial data creates transparency (Ferreira and Perry, 2019; Musaraj and Small, 2019; Hulikal Muralidhar et al., 2018), both at individual and institutional levels. Users can access information about their finances at any time and from anywhere, seeing when and where their money goes and how it is spent (Woldmariam et al., 2016). Accumulated over time, transaction data builds up individual financial histories. These histories make people visible to financial service providers, who use them to assess creditworthiness. Having a financial data history is now a necessary condition for accessing formal lending (Hulikal Muralidhar et al., 2019; Hulikal Muralidhar et al., 2018). Financial transaction data also increases the traceability of cash flows, reducing opportunities for corruption, financial crime and tax evasion (Woldmariam et al., 2016; Musaraj and Small, 2019; Hulikal Muralidhar et al., 2018; Ferreira and Perry, 2019).

However, the promises of data-enabled visibility, traceability and transparency have not yet come to pass. As observed by Lewis and Perry (2019), accessing our own financial data “is not always simple” (p. 11), and the ways in which such data is presented to us are not always suitable for our needs (Lewis and Perry, 2019). Compared to the companies and institutions that hoard our financial data, our own ability to scrape, combine,

interrogate and interact with that data is still rather limited (Lewis and Perry, 2019). Overall, the introduction of financial technology demands from us “additional effort in mapping information within and across digital, physical and social resources” (Lewis and Perry, 2019, p. 13).

Additionally, automated credit rating calculations based upon personal and financial data feed financial exclusion. They enable the redirection of formal lending towards higher income and therefore safer groups (Leyshon and Thrift, 1995), and penalise the most financially vulnerable (Ingham, 1999; O’Neill et al., 2017).

Finally, financial data is of an extremely sensitive nature (Ferreira and Perry, 2019). Much can be gleaned from it about our “whereabouts, associations and lifestyle” (Chaum, 1983, p. 199). Together with health information, money is considered one “of the most private areas in personal communications” (Singh and Cassar Bartolo, 2004), and we exhibit strong non-disclosure preferences when it comes to finance. While we often share health information with qualified professionals to enable better care, we tend to “assert control” over our money affairs “by giving as little information as possible” to financial institutions (Singh and Cassar Bartolo, 2004). Indiscriminate financial data collection by third parties clashes against entrenched social norms regarding the appropriate flow of financial information (Nissenbaum, 2011). It also brings the threat of financial surveillance, “financial censorship” (Scott, 2018, p. 154), data theft and misuse.

Our participants living with mental illness described their struggles with the monitoring of personal financial data. Delays in card payments appearing on bank account statements hindered participants’ awareness of their own financial status, and introduced doubt and uncertainty to the information reported by digital tools (Barros Pena et al., 2021a). Accurate and up-to-date financial monitoring may be particularly important for our participants, who had to cope with reduced incomes and struggled to rein on their spending. As a result, some of them felt the need to develop their own personalised ways of tracking money (Barros Pena et al., 2021a).

In addition, always-on availability of financial information had unintended consequences, with positive balances and remaining credit becoming a temptation to spend (Barros Pena et al., 2021a). As in the case of friction, the claimed transparency (Ferreira and Perry, 2019) of financial technologies delivers “unwanted effects” (Morozov, 2013, p. 68), and should be carefully managed (Ferreira and Perry, 2019). Transparency in financial technologies must be treated not as an end in itself, but as an “instrumental value” (Morozov, 2013, p. 80), i.e. a means to enable the more important goal of financial well-being (Hulikal Muralidhar, 2019).

2.5 Re-Allocation of Labour

While digitising financial services can streamline certain aspects of money management, it also generates new forms of work. Studies across varied locations and contexts, for instance mobile money use in Japan (Mainwaring et al., 2008), cashless payments in London's bus network (Pritchard et al., 2015), and loan collections through mobile software in India (Hulikal Muralidhar et al., 2018), have revealed the "hidden labour" (Pritchard et al., 2015, p. 914) required by financial technologies.

The moneywork required by financial technologies burdens those living with mental illness, who often struggle to muster the motivation to tackle their financial affairs. In the case of our participants, some of the additional tasks they had to undertake in order to engage with financial technologies included updating payment details in a myriad of e-commerce services whenever bank cards expire, cancelling or changing direct debits when moving bank accounts, trawling through dozens of options in price comparison websites to find a suitable deal, negotiating the quirks and glitches of cashback sites, and experimenting with an endless stream of new financial tools and services (Barros Pena et al., 2021a).

It seems clear that "Cashless brings work" (Pritchard et al., 2015, p. 914). Although we no longer need to visit our local bank branch to pay our bills or transfer money, financial technologies place new demands on us that cancel out some of their purported efficiencies.

In addition, some studies suggest that financial technologies shift responsibility and work from the institutions that deploy them towards those who use them. For instance, in the case of London buses, the withdrawal of cash payments meant that passengers "had to place considerably more effort into the production" (Pritchard et al., 2015, p. 914) of the new payment system. The use of London transport cards demands that travelers regularly add money to their cards; verify they have enough credit, and enough cards, since the London transport system does not enable card sharing and strictly enforces one card per traveler.

O'Neill et al. (2017) concluded that digitising loan repayments "puts the majority of the work of paying on the payee" (p. 764). In their study of the digitisation of salary payments through mobile money, Blumenstock et al. (2015) found that the employer's significant savings "stemmed from a shift in responsibility for cash transport costs from the employer to the employee". These findings bring up once again the question of for whom are these financial technologies delivering convenience.

2.6 Changes in Control and Agency

The previous section described how financial technologies shift responsibility and labour from those who deploy them to those who use them. An additional displacement occurs when digitising finance: one of control and agency. Financial technologies can shift control of processes, workflows and interactions towards the technical systems, undermining the agency of human actors (Hulikal Muralidhar et al., 2018). This can be appreciated in the experiences of those who live precariously.

Studying the financial practices of people living on a low income, Vines et al. (2014) show how digital banking often means payments are instant and irrevocable, seeking to influence people to pay bills quickly and regularly. This design disrupted their participants' prioritisation practices, removing their ability to delay certain payments when necessary. Instant and irrevocable digital payments interfered with these participants' "fine-grained control of irregular, unpredictable incomes" (Vines et al., 2014, p. 508). It is no wonder that, in Vines et al.'s (2011) research into eighty somethings, "the desire to keep tight control of their finances meant resisting digital technology" (p. 68).

The anxieties caused by irrevocable, automated payments could also be appreciated in the practices of our participants. In an effort to retain control, they constantly checked for payment due dates, changed them to suit their personal flows of cash, and kept separate bank accounts to avoid these payments taking funds earmarked for other purposes (Barros Pena et al., 2021a).

The shifting of control from the human actors to the financial technologies is, according to Ferreira and Perry (2019), one of the "effects of intermediation" (p. 126). As private financial institutions and their infrastructures step between transacting parties, those parties lose autonomy in terms of "setting the rules of the value transfer" (Ferreira and Perry, 2019, p. 127). Those rules are determined instead by the technologies that intermediate the transaction, the institutions who own and deploy them, and the regulatory framework under which they operate. Through intermediation, financial technologies, and by implication their designers (Ferreira and Perry, 2019), contribute to the financial disempowerment of human agents.

2.7 The Individualisation of Finance

Our research with people living with mental illness brought into sharp relief the individualising effects of financial technologies. Prior design literature has briefly remarked on this matter. For instance, Pritchard et al. (2015) observe that digital banking and payments "operate on the basis of a single authenticated account holder" (p. 915), which puts them at odds with money sharing practices. Vyas et al. (2016) mention how technology

design has treated finance “as a personal and individual phenomenon” (p. 1787), with most mobile apps assuming “that only one person is responsible for managing money” (p. 1787).

Like most online services, digital banking assumes that each account “will only be accessed by one person, ever” (Adams and Williams, 2013, p. 15), enforcing “a strict one-to-one relationship” (Adams and Williams, 2013, p. 15) to access control. Digital banking enshrines this strict individualisation through its terms and conditions (Adams and Williams, 2013). Sharing digital banking credentials with someone else constitutes a breach of the bank’s terms of service, and cancels all fraud protections (Edgar et al., 2017). Logging into someone else’s digital banking, even if just to provide help with minding money, is immediately considered a “fraudulent behaviour” (Edgar et al., 2017, p. 13). Digital banking effectively enforces individuation, penalising any attempt to bypass it.

Our research suggests that financial technologies are exacerbating this tendency to individuate our finances in general, and financial hardship in particular, by placing responsibility on individuals (Barros Pena et al., 2021a). They do so through a relentless focus on optimisation, and by disregarding and preventing financial collaborative practices.

2.8 The Focus on Optimisation

The vast majority of “fintech” tools targeting consumers seem intent on helping us make the most of our money. This includes comparing products and services “to ensure you find the best deal for your needs” (Sewraz, 2019); strengthening “your credit history (...) by reporting on-time rent payments” (CreditLadder, n.d.); assisting with budgeting by showing us where we spend our money and identifying “areas for improvement” (Emma, n.d.); getting us to save “no matter your paycheck’s size” (Money Box, n.d.); or helping us understand our financial circumstances and giving us debt advice if needed (Tully, n.d.).

As useful and convenient as they may be, these digital services never question whether the resources being optimised are actually sufficient to cover someone’s needs, whether accrued debts are fair or should be contested, or whether the transaction data they are collecting indicates financial hardship and, if so, how to address it. In their drive for optimisation, these fintech tools effectively transfer all responsibility for financial well-being to the individuals who use them.

Some design research on money has fallen prey to these individualising tendencies. For instance, Woldmaria et al. (2016) believe that our main design challenge consists on how to create “technical solutions” capable of influencing individual spending behaviour, and that encourage us to “save more and get out of poverty” (p. 482). According to these authors,

saving and self control “will bring poor individuals out of poverty” (Wold-mariam et al., 2016, p. 483). In another example, Heyman and Artman (2014) make an impassioned call for designers of financial technologies to heed the learnings from “behavioural finance”, which provides “knowledge of how people make their financial decisions”. According to the authors, the ultimate goal of these technologies should be helping their users make better financial decisions, so that they can save more, avoid debt and achieve financial security and stability; as if financial security and stability depended exclusively on users themselves, with institutions and policies playing no part in the matter.

When technology reinforces the individuation of finance, it draws attention away from the role that institutional factors play in our financial well-being. Hulikal Muralidhar (2019) alerts us to how the predominant narrative that portrays financial technologies as a solution to financial exclusion and poverty “misses important questions such as the business models and market forces driving digital money technologies”. The focus on optimising income also ignores that financial difficulty is “a multidimensional systemic social issue” (Forchuk et al., 2017, p. 249). The progressive withdrawal of government support, benefits and subsidies; a financialised economy increasingly reliant on debt; precarious labour markets (Davies et al., 2015); lack of access to suitable and affordable financial tools and services; and the fundamental contradiction in banking between pursuing profit and the measures that would truly help those struggling to make ends meet (Harper et al., 2018) are some of those institutional and structural factors that contribute to financial difficulty. All of them take a back seat while designers of financial technologies concentrate on optimising scant and ever diminishing resources.

Prioritising optimisation also means we are paying less attention to the other design issues currently present in our financial technologies, such as the restrictions on financial collaboration.

2.9 Disregarding and Preventing Financial Collaborative Practices

The systematic individualisation of finance clashes against our communal and collaborative instincts in our interactions with and through money. Evidence of the tensions between the individualising tendencies of financial technologies and the collaborative behaviours of human actors can be found scattered across the design literature on money. For instance, they can be observed in the informal third-party access mechanisms deployed by those who need support with money management. These include people living with mental illness (Murray, 2016). Informal mechanisms for financial third party access (Barros Pena et al., 2021b) such as sharing PINs

and Internet banking credentials, handing over bank cards to others, giving signed blank cheques and withdrawal forms to trusted helpers (Tilse et al., 2005), and using joint accounts for support and oversight purposes (Murray, 2016), fly in the face of the assumptions about money as strictly personal that underpin the design of existing financial services and technologies.

Numerous other examples exist across radically different contexts. For instance, although ATM machines are conceived for individual use, De Angeli et al. (2004) revealed the importance of collaborative practices during the initial stages of ATM adoption in India. Talhouk et al.'s research (2020) uncovered the tensions between electronic payment solutions for the delivery of food aid, and the cooperative practices of a community of Syrian refugees in Lebanon. The individualised approach imposed through the use of prepaid debit cards effectively prevented any pooling of monetary resources for bulk buying, which in turn undermined these refugees' resilience to food insecurity.

A further example is provided by Ossandón (2014), who explains that although credit cards are intended as "private property, owned and managed by the person whose name is on the card" (p. 5), the practice of card lending, which is common in Chile, reveals a parallel and collective network of debt. Credit cards are not just used by their owners: people loan their cards to close others, creating "hidden networks" (Ossandón, 2014, p. 1) invisible to card issuers. The assessment of individual behaviour that underpins credit scoring and the calculation of credit limits is, therefore, misguided, since it disregards social lending practices.

In the UK, sharing practices have been found to be important for public transport users: "couples would pay for each other's travel, parents would pay for their children, friends would pay for travel as a group" (Pritchard et al., 2015, p. 915). The existing London travel card scheme, which enforces a strict policy of one travel card per person, effectively rules out all credit sharing, and prohibits communal practices in transport payment (Pritchard et al., 2015).

All across the globe, from food purchases, to credit cards, financial third party access, ATM adoption and public transport payments, we find that financial services, the technologies attached to them, and the policies that rule them are designed under the overarching assumption that your money is strictly and uniquely yours. In turning a blind eye to the collaborative reality of our day-to-day financial lives, financial services and technologies render themselves fundamentally unsuitable for our socio-cultural monetary practices (Singh et al., 2007).

3. Conclusion

In this paper, we have built upon existing design research to present a synthesis of dissonances between the purported benefits of financial technologies, and their actual outcomes for citizens. The synthesis was inspired by the experiences of our own research participants, who lived with both mental illness and financial difficulty, and faced particular challenges when managing their money through financial technologies. The dissonances described in this paper aim to counteract the overwhelmingly positive narrative that surrounds the production and adoption of financial technologies. Our goal is to encourage reflection amongst designers about the often hidden effects of the technology artifacts we contribute to create.

In previous publications we have proposed a set of alternative design principles for financial technologies that seek to address some of the issues outlined in this paper. We suggested designing for flexibility, complementarity, reflection, appropriation, collaboration and participation (Barros Pena et al., 2021a; Barros Pena et al., 2021b). Designing for flexibility should counterbalance processes of customer commodification, and restore agency and control to human actors. Designing for complementarity should contribute to a hybrid financial system that integrates both digital and non-digital channels and artifacts. Designing for reflection should restore opportunities for friction, and enable people to interact with financial technologies in ways that align with their values and preferences. Designing for appropriation should open space for interpretation, supporting users rather than enforcing rigid workflows. Designing for collaboration should encourage and amplify collaborative financial practices. Designing for participation should facilitate citizen's democratic oversight of the socio-technical system that produces money and maintains its value (Ingham, 1999). We argue that these principles, which together emphasise the social nature of money, can contribute to promoting access and fairness in financial service provision (Barros Pena et al., 2021a).

It is our hope that the dissonances presented in this paper, in combination with our alternative design principles, will support and inspire designers to conceive financial technologies differently.

Acknowledgements: This research was funded by a UKRI Arts and Humanities Research Council doctoral studentship (Ref: 1947353), and undertaken while the first author was a doctoral student at Northumbria University (UK). We thank our participants for their support, commitment and valuable contributions.

4. References

- Adams, A. A., & Williams, S. A. (2013). What's Yours is Mine and What's Mine's My Own: Joint Accounts and Digital Identity. *ACM SIGCAS Computers and Society*, 44(1). <https://doi.org/10.1145/2602147.2602150>
- Barros Pena, B., Kursar, B., Clarke, R. E., Alpin, K., Holkar, M., & Vines, J. (2021a). Financial Technologies in the Cycle of Poor Mental Health and Financial Hardship: Towards Financial Citizenship. *CHI Conference on Human Factors in Computing Systems*. CHI '21. <https://doi.org/10.1145/3411764.3445251>
- Barros Pena, B., Kursar, B., Clarke, R. E., Alpin, K., Holkar, M., & Vines, J. (2021b). 'Pick Someone Who Can Kick Your Ass'—Moneywork in Financial Third Party Access. *Proceedings of the ACM on Human-Computer Interaction*, 4 (CSCW3). <https://doi.org/10.1145/3432917>
- Blumenstock, J. E., Callen, M., Ghani, T., & Koepke, L. (2015). Promises and pitfalls of mobile money in Afghanistan: Evidence from a randomized control trial. *Proceedings of the Seventh International Conference on Information and Communication Technologies and Development*. ICTD '15. <https://doi.org/10.1145/2737856.2738031>
- Chaum, D. (1983). Blind Signatures for Untraceable Payments. In *Advances in Cryptology* (Chaum D., Rivest R.L., Sherman A.T. (eds), pp. 199–203). https://doi.org/10.1007/978-1-4757-0602-4_18
- Chaum, D., Grothoff, C., & Moser, T. (2021). How to issue a central bank digital currency. *Swiss National Bank Working Papers*, 2021–03. https://www.snb.ch/en/mmr/papers/id/working_paper_2021_03
- Colavecchia, S. (2009). Moneywork: Caregiving and the Management of Family Finances. In *Family Patterns, Gender Relations Third Edition* (Bonnie Fox, pp. 417–427). Oxford University Press.
- Collins, D., Morduch, J., Rutherford, S., & Ruthven, O. (2009). *Portfolios of the Poor: How the World's Poor Live on \$2 a Day*. Princeton University Press.
- Coppack, M., Raza, Y., Sarkar, S., & Scribbins, K. (2015). *Occasional Paper No. 8—Consumer Vulnerability* (p. 118). Financial Conduct Authority. <https://www.fca.org.uk/publication/occasional-papers/occasional-paper-8.pdf>
- CreditLadder. (n.d.). *CreditLadder—Making Rent Count*. Retrieved 1 June 2021, from <https://www.creditladder.co.uk/>
- Davies, W., Montgomerie, J., & Wallin, S. (2015). *Financial Melancholia: Mental Health and Indebtedness*. Political Economy Research Centre, Goldsmiths University. <http://research.gold.ac.uk/16269/1/FinancialMelancholiaMentalHealthandIndebtedness.pdf>
- De Angeli, A., Athavankar, U., Joshi, A., Coventry, L., & Johnson, G. I. (2004). Introducing ATMs in India: A contextual inquiry. *Interacting with Computers*, 16(1), 29–44. <https://doi.org/10.1016/j.intcom.2003.11.003>
- Dold, F., & Grothoff, C. (2016). GNU Taler: Ethical Online Payments for the Internet Age. *ERCIM News*, 2016(106). <https://ercim-news.ercim.eu/en106/special/gnu-taler-ethical-online-payments-for-the-internet-age>
- Dunphy, P., Monk, A., Vines, J., Blythe, M., & Olivier, P. (2014a). Designing for Spontaneous and Secure Delegation in Digital Payments. *Interacting with Computers*, 26(5), 417–432. <https://doi.org/10.1093/iwc/iwt038>
- Dunphy, P., Vines, J., Monk, A., Blythe, M., & Olivier, P. (2014b). Understanding Financial Practices: Experiences with 'Eighty Somethings' and the Underbanked.

- CHI '14 Extended Abstracts on Human Factors in Computing Systems. #CHIMoney: Financial Interactions, Digital Cash, Capital Exchange and Mobile Money, Toronto, ON, Canada. <https://doi.org/10.1145/2559206.2559221>
- Edgar, L., Green, F., Ward, V., & Gumbley, M. (2017). *The Ageing Population: Coping Mechanisms and Third Party Access*. the Big Window Consulting Ltd. <https://www.fca.org.uk/publication/research/coping-mechanisms-third-party-access.pdf>
- Elbogen, E. B., Tiegreen, J., Vaughan, C., & Bradford, D. W. (2011). Money Management, Mental Health, and Psychiatric Disability: A Recovery-Oriented Model for Improving Financial Skills. *Psychiatric Rehabilitation Journal*, 34(3), 223–231. <https://doi.org/10.2975/34.3.2011.223.231>
- Emma. (n.d.). *Emma—Money Manager & Budget Planner Tracker*. Retrieved 1 June 2021, from <https://play.google.com/store/apps/details?id=com.emmaprod>
- Ferreira, J., & Perry, M. (2019). From transactions to interactions: Social considerations for digital money. In *Disrupting Finance—FinTech and Strategy in the 21st Century* (Theo Lynn, John G. Mooney, Pierangelo Rosati and Mark Cummins, pp. 121–133). Palgrave Pivot. <https://doi.org/10.1007/978-3-030-02330-0>
- Forchuk, C., Montgomery, P., Rudnick, A., Lahey, P., Cohen, B., Schofield, R., Perry, S. E., Coatsworth-Puspoky, R., Edwards, B., Butzer, B., & Meier, A. (2017). Poverty Trajectories Experienced by Persons with Mental Illness. *Journal of Poverty*, 21(3), 247–264. <https://doi.org/10.1080/10875549.2016.1186772>
- Harper, A., Baker, M., Edwards, D., Herring, Y., & Staeheli, M. (2018). Disabled, Poor, and Poorly Served: Access to and Use of Financial Services by People with Serious Mental Illness. *Social Service Review*, 92(2). <https://doi.org/10.1086/697904>
- Heyman, S., & Artman, H. (2014). A Call for Financially Literate Designers. *Contribution to the Workshop '#CHIMoney: Financial Interactions, Digital Cash, Capital Exchange and Mobile Money', Extended Abstracts on Human Factors in Computing Systems*. CHI EA '14. <https://www.semanticscholar.org/paper/A-Call-for-Financially-Literate-Designers-Heyman-Artman/5a5b9b3bafaf2a0-fac546b408b51f5905951128a>
- Hulikal Muralidhar, S. (2019). Making Digital Money “Work” for Low-Income Users: Critical Reflections for HCI. *International Journal of Mobile Human Computer Interaction (IJMHCI)*, 11(4). <https://doi.org/10.4018/IJMHCI.2019100105>
- Hulikal Muralidhar, S., Bossen, C., Mehra, A., & O'Neill, J. (2018). Digitizing Monetary Ecologies: Intended and Unintended Consequences of Introducing a Financial Management App in a Low-Resource Setting. *Proceedings of the ACM on Human-Computer Interaction*, Article No. 72. <https://doi.org/10.1145/3274341>
- Hulikal Muralidhar, S., Bossen, C., & O'Neill, J. (2019). Rethinking Financial Inclusion: From Access to Autonomy. *Computer Supported Cooperative Work (CSCW)*, 28, 511–547. <https://doi.org/10.1007/s10606-019-09356-x>
- Ingham, G. (1999). Class inequality and the social production of money. *The Sociological Review*, 47(2_suppl), 66–86. <https://doi.org/10.1111/j.1467-954X.1999.tb03495.x>
- Jenkins, R., Bhugra, D., Bebbington, P., Brugha, T., Farrell, M., Coid, J., Fryers, T., Weich, S., Singleton, N., & Meltzer, H. (2008). Debt, income and mental disorder in the general population. *Psychological Medicine*, 38(10), 1485–1493. <https://doi.org/10.1017/S0033291707002516>

- Joyce, H. (2019). Neobanks are changing Britain's banking landscape. *The Economist*. <https://www.economist.com/special-report/2019/05/02/neobanks-are-changing-britains-banking-landscape>
- Kameswaran, V., & Hulikal Muralidhar, S. (2019). Cash, Digital Payments and Accessibility: A Case Study from Metropolitan India. *Proceedings of the ACM on Human-Computer Interaction, November 2019*, Article No.: 97. <https://doi.org/10.1145/3359199>
- Kumar, D., Martin, D., & O'Neill, J. (2011). The Times They Are A-Changin': Mobile Payments in India. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 1413–1422. <https://doi.org/10.1145/1978942.1979150>
- Kusimba, S., Yang, Y., & Kunyu, G. (2017). *Dynamic Networks of Mobile Money among Unbanked Women in Western Kenya*. Institute for Money, Technology and Financial Inclusion. <https://www.imtfti.uci.edu/files/images/2017/KusimbaFinalReporttoIMTFI3.pdf>
- Lewis, M., & Perry, M. (2019). Follow the Money: Managing Personal Finance Digitally. *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems*. CHI 2019, Glasgow, Scotland, UK. <https://doi.org/10.1145/3290605.3300620>
- Leyshon, A., & Thrift, N. (1995). Geographies of Financial Exclusion: Financial Abandonment in Britain and the United States. *Transactions of the Institute of British Geographers*, 20(3), 312–341. <https://doi.org/10.2307/622654>
- Ljungqvist, I., Topor, A., Forssell, H., Svensson, I., & Davidson, L. (2016). Money and Mental Illness: A Study of the Relationship Between Poverty and Serious Psychological Problems. *Community Mental Health Journal*, 52, 842–850. <https://doi.org/10.1007/s10597-015-9950-9>
- Mainwaring, S. D., March, W., & Maurer, B. (2008). From meiwaku to tokushita! Lessons for digital money design from Japan. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 21–24. <https://doi.org/10.1145/1357054.1357058>
- Morozov, E. (2013). *To Save Everything, Click Here. The Folly of Technological Solutionism*. PublicAffairs.
- Murray, N. (2016). *Strength in numbers: Consumers, carers and financial services*. Money and Mental Health Policy Institute. <https://www.moneyandmental-health.org/wp-content/uploads/2016/11/Strength-in-Numbers-report.pdf>
- Musaraj, S., & Small, I. (2019). Introduction. Money and Finance at the Margins. In *Money at the Margins: Global Perspectives on Technology, Financial Inclusion, and Design* (pp. 1–18). berghahn books. <https://www.berghahnbooks.com/title/MaurerMoney>
- Nichkasova, Y., & Shmarlouskaya, H. (2020). Financial technologies as a driving force for business model transformation in the banking sector. *International Journal of Business and Globalisation*, 25(4). <https://doi.org/10.1504/IJBG.2020.109120>
- Nissenbaum, H. (2011). A Contextual Approach to Privacy Online. *Dædalus Journal of the American Academy of Arts & Sciences, Fall 2011*, 32–48. <https://www.amacad.org/publication/contextual-approach-privacy-online>
- O'Neill, J., Dhareshwar, A., & Muralidhar, S. H. (2017). Working Digital Money into a Cash Economy: The Collaborative Work of Loan Payment. *Computer Supported Cooperative Work (CSCW)*, 26, 733–768. <https://doi.org/10.1007/s10606-017-9289-6>

- Ossandón, J. (2014). "My Story Has No Strings Attached": Credit Cards, Market Devices, and a Stone Guest. Institute for Money, Technology and Financial Inclusion. https://www.imtfti.uci.edu/files/blog_working_papers/2014-3_Ossandon_Working%20Paper%202.pdf
- Panjwani, S., Ghosh, M., K, P., & Vardhan Singh, S. (2013). "The Paper Slip Should be There!" Perceptions of Transaction Receipts in Branchless Banking. *Proceedings of the 15th International Conference on Human-Computer Interaction with Mobile Devices and Services*, 328–331. <https://doi.org/10.1145/2493190.2493236>
- Perry, M., & Ferreira, J. (2018). Moneywork: Practices of Use and Social Interaction around Digital and Analog Money. *ACM Transactions on Computer-Human Interaction (TOCHI)*, 24(6), Article no. 41. <https://doi.org/10.1145/3162082>
- Prelec, D., & Simester, D. (2001). Always Leave Home Without It: A Further Investigation of the Credit-Card Effect on Willingness to Pay. *Marketing Letters*, 12(1), 5–12. <https://doi.org/10.1023/A:1008196717017>
- Pritchard, G., Vines, J., & Olivier, P. (2015). Your Money's No Good Here: The Elimination of Cash Payment on London Buses. *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems*, 907–916. <https://doi.org/10.1145/2702123.2702137>
- Richardson, T., Jansen, M., & Fitch, C. (2018). Financial difficulties in bipolar disorder part 1: Longitudinal relationships with mental health. *Journal of Mental Health*, 27(6), 595–601. <https://doi.org/10.1080/09638237.2018.1521920>
- Richardson, T., Jansen, M., Turton, W., & Bell, L. (2017). The Relationship Between Bipolar Disorder and Financial Difficulties: A Qualitative Examination of Patient's Views. *Clinical Psychology Forum*, 295. <https://eprints.soton.ac.uk/405770/>
- Scott, B. (2016). The War on Cash. *TheLong+Short*. <https://thelongandshort.org/society/war-on-cash>
- Scott, B. (2018). Cash in the Era of the Digital Payments Panopticon. In *Moneylab Reader 2: Overcoming the Hype* (Editors: Inte Gloerich, Geert Lovink and Patricia de Vries, pp. 147–159). Institute of Network Cultures. <https://networkcultures.org/blog/publication/moneylab-reader-2-overcoming-the-hype/>
- Sewraz, R. (2019). *Price comparison sites. Find out how price comparison sites work, and how to use them to get a great deal on a range of services.* <https://www.which.co.uk/money/money-saving-tips/getting-a-great-deal/price-comparison-sites-a0y5j1c9u13k>
- Singh, S., Cabraal, A., Demosthenous, C., Astbrink, G., & Furlong, M. (2007). Security Design Based on Social and Cultural Practice: Sharing of Passwords. In *Usability and Internationalization. Global and Local User Interfaces. UI-HCII 2007* (Nuray Aykin, Vol. 4560). Springer-Verlag. https://link.springer.com/chapter/10.1007/978-3-540-73289-1_55
- Singh, S., & Cassar Bartolo, K. (2004). The Privacy of Money and Health: A User Study. *Proceedings of the OzCHI*. OzCHI '04, Wollongong, Australia. https://www.researchgate.net/publication/254214263_The_Privacy_of_Money_and_Health_A_User_Study
- Snow, S., Vyas, D., Lyle, P., Mallett, M., & Brereton, M. (2016). Building connections: Technology design for living on a low income. *Proceedings of the 14th Participatory Design Conference: Short Papers, Interactive Exhibitions, Workshops*, 2, 1–4. <https://doi.org/10.1145/2948076.2948091>

- Talhouk, R., Coles-Kemp, L., Bjerg Jensen, R., Balaam, M., Garbett, A., Ghattas, H., Araujo-Soares, V., Ahmad, B., & Montague, K. (2020). Food Aid Technology: The Experience of a Syrian Refugee Community in Coping with Food Insecurity. *Proceedings of the ACM on Human-Computer Interaction*, 4(CSCW2), 1-25. <https://doi.org/10.1145/3415205>
- Tilse, C., Setterlund, D., Wilson, J., & Rosenman, L. (2005). Minding the money: A growing responsibility for informal carers. *Ageing & Society*, 25(2), 215-227. <https://doi.org/10.1017/S0144686X04002983>
- Topor, A., Ljungqvist, I., & Strandberg, E. L. (2016). Living in poverty with severe mental illness coping with double trouble. *Nordic Social Work Research*, 6(3), 201-210. <https://doi.org/10.1080/2156857X.2015.1134629>
- Tully. (n.d.). *Tully—About us*. Retrieved 1 June 2021, from <https://www.tully.co.uk/about-us-covid>
- Vines, J., Blythe, M., Dunphy, P., & Monk, A. (2011). Eighty Something: Banking for the older old. *Proceedings of the 25th BCS Conference on Human-Computer Interaction*, 64-73. <https://doi.org/10.5555/2305316.2305330>
- Vines, J., Blythe, M., Lindsay, S., Dunphy, P., Monk, A., & Olivier, P. (2012a). Questionable Concepts: Critique as a Resource for Designing with Eighty Somethings. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 1169-1178. <https://doi.org/10.1145/2207676.2208567>
- Vines, J., Dunphy, P., Blythe, M., Lindsay, S., Monk, A., & Olivier, P. (2012b). The Joy of Cheques: Trust, Paper and Eighty Somethings. *Proceedings of the ACM 2012 Conference on Computer Supported Cooperative Work*, 147-156. <https://doi.org/10.1145/2145204.2145229>
- Vines, J., Dunphy, P., & Monk, A. (2014). Pay or Delay: The Role of Technology When Managing a Low Income. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 501-510. <https://doi.org/10.1145/2556288.2556961>
- Vyas, D., Snow, S., Roe, P., & Brereton, M. (2016). Social Organization of Household Finance: Understanding Artful Financial Systems in the Home. *Proceedings of the 19th ACM Conference on Computer-Supported Cooperative Work & Social Computing*, 1777-1789. <https://doi.org/10.1145/2818048.2819937>
- Welch, J. (2018). *Stick to your savings goals by locking your Pots*. Monzo. <https://monzo.com/blog/2018/12/13/locked-pots>
- Woldmariam, M. F., Ghinea, G., Atnafu, S., & Groenli, T.-M. (2016). Monetary Practices of Traditional Rural Communities in Ethiopia: Implications for New Financial Technology Design. *Human-Computer Interaction*, 31(6), 473-517. <https://doi.org/10.1080/07370024.2016.1139461>
- Zachariadis, M., & Ozcan, P. (2017). The API Economy and Digital Transformation in Financial Services: The Case of Open Banking. *SWIFT Institute Working Paper No. 2016-001*. <http://dx.doi.org/10.2139/ssrn.2975199>

About the Authors:

Belén Barros Pena is a post-doctoral researcher at Queen Mary University London (UK).

Bailey Kursar is the founder of fintech-for-good Touco Lab, a financial inclusion advocate, and a member of the UK Financial Inclusion Commission and the UK Government's Financial Inclusion Policy Forum.

Rachel Clarke is an interdisciplinary design researcher working between interaction design, human-computer interaction (HCI), feminist science and technology studies (STS). She is a Senior Lecturer at Newcastle University in the UK.

John Vines is Chair in Design Informatics at the University of Edinburgh (Scotland). His research focuses on how people experience and use digital and data-driven technologies in their everyday lives.