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### An ethnography of Bitcoin: Towards a future research agenda

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## Abstract

Cryptocurrencies such as Bitcoin are a recent socio-technical innovation that seeks to disrupt the existing monetary system. Through mundane uses of this new digital cash, they provide a social critique of the centralised infrastructures of the banking industry. This paper outlines an ethnographic research agenda that considers how the social uptake and use of cryptocurrencies such as Bitcoin represents alternative views towards value exchange and critiques existing financial structures. We begin by arguing that the use of Bitcoin can be seen as an act of social resistance that is intended to bridge socio-economic inequalities within the context of a digital community. We then outline the disruptive nature of borderless, affordable and instantaneous international transfers in the form of remittances within social practice. Finally, we identify the possible permutations of trust that may be found in the technical affordances of Bitcoin technology and how these relate to user (pseudo)anonymity, cybertheft, cyberfraud, and consumer protection. Bringing together these three key areas, we highlight the importance of understanding the ordinary (rather than extra-ordinary) uses of cryptocurrencies such as Bitcoin. We contend that focusing upon users' interactions with Bitcoin as a payments system and community culture will shed light upon mundane acts of socio-technical disruption, acts that critique and provide alternative financial exchange practices to the payments and regulatory financial infrastructures of the banking industry.

## Introduction

This paper identifies three areas of inquiry that would benefit from the ethnographic study of the social uses of cryptocurrencies such as Bitcoin. The first considers the study of Bitcoin use as a methodological and community question that can be informed by ethnographic approaches to the study of a digital community. The second area considers the implications of Bitcoin use to payments systems, particularly as a vehicle for transnational value exchange. This area of inquiry engages with the literature on financial inclusion to consider the human implications of banking, globalisation and money, including digital and mobile currencies. The third research area focuses upon the loci of trust within Bitcoin use, particularly as this relates to themes of identity, privacy and risk. This research direction includes consideration of mechanisms for consumer protection, financial regulation, and currency stability alongside a focus upon the risks that Bitcoin adopters and users experience or anticipate in relation to cybertheft and cyberfraud.

Cryptocurrencies such as Bitcoin are a recent socio-technical innovation designed by their developers to disrupt the existing monetary system. The creation of Bitcoin is attributed to an anonymous group of developers (Nakamoto 2008 <sup>[8]</sup>), with its social uptake dated from 2009 (Böhme et al 2015 <sup>[9]</sup>). Anthropologist Bill Maurer and colleagues describe it as an electronic cash system that harnesses decentralised networking technologies to enable irreversible payments. Similar to peer-to-peer (P2P) file sharing sites such as Pirate Bay, Bitcoin's decentralised financial network means that there is no governing body that monitors and maintains its growth and no central server or trusted parties (Evans-Pughe et al 2014 <sup>[10]</sup>, Jacobs 2011 <sup>[11]</sup>). Consequently, Bitcoin is commonly positioned as circumventing the centralised control of the current fiat system and the mediation of the banking system through its nature as a distributed verification system (Maurer et al 2013 <sup>[12]</sup>). This distributed verification system is designed to facilitate real-time transfer and transparency through its public access ledger, referred to as the Blockchain. Despite the decentralised, distributed and transparent exchange protocols, recent commentary suggests that Bitcoin has not entirely escaped centralising pressures (*cf.* Fargo 2015 <sup>[13]</sup>). Nevertheless, ethnographic research conducted by Justin Fletcher (2013 <sup>[14]</sup>) suggests that mundane uses of this new digital cash can be understood as a critique of the centralised infrastructures of the banking industry.

In a similar vein, De Filippi (2014 <sup>[15]</sup>) describes cryptocurrencies as newly emergent digital currencies that rely upon a decentralised and open source cryptographic protocol to regulate the manner in which currency can be created and exchanged. Rather than focusing on the tension between centralisation of the fiat economy and the decentralised protocol of Bitcoin, Lui Smyth (2013 <sup>[16]</sup>) points to a condition highlighted by De Filippi – the creation of the currency – as the quality that defines Bitcoin in comparison to fiat currencies. Smyth suggests that unlike fiat currencies, this cryptocurrency may not be the only instance of its kind given that it is algorithmically generated. As he highlights from his survey findings of Bitcoin users (Smyth 2014 <sup>[17]</sup>), whilst Bitcoin maintains the largest community base, developer team, market value and network hash power, two-thirds of his respondents had a stake in alternative cryptocurrencies, which numbered over 100 versions at the time of the survey. This feature has become relevant in recent times, with community disputes amongst developers causing a split in the Blockchain. This dispute holds the potential to undermine the coherency and utility of the decentralised verification practices that underpin the Bitcoin currency (Popper 2016 <sup>[18]</sup>). In light of this, the self-organising nature of the Bitcoin community is driving a proliferation of cryptocurrencies derived from the original technology proposed within the Bitcoin protocols. Such events are noteworthy to the directions of research that can be derived from studying Bitcoin use practices, as they highlight the need for the research to extend beyond a specific focus upon a single cryptocurrency and to acknowledge the permutations and collaborative innovations that are a key feature of cryptocurrencies.

Today, Bitcoin is an accepted form of payment by some major online retailers whilst being commonly recognised as a virtual commodity by regulators rather than as a currency. As an indication of the market share of Bitcoin, Böhme et al (2015<sup>[9]</sup>) state that since its inception Bitcoin has had over half a million transactions from over a million accounts. Whilst this suggests that a substantial number of accounts are dormant, they estimated that as of March 2015 the total value of Bitcoins in circulation was USD3.5 billion. As Karlström (2015<sup>[19]</sup>) indicates from a European perspective, we can understand that over a very short period of time, Bitcoin had gone from a proof-of-concept to being traded for about EUR78million. These estimates of value circulation and market share support the idea that, despite its ambiguous legal and monetary status, Bitcoin has a level of uptake that holds the potential to provide alternative payments pathways for existing financial inequalities. More particularly, we point to the capacity of Bitcoin and its derivatives to lower the cost of international remittances because of its lack of friction in exchanging value across national borders. Consequently we argue that as a disruptive technology, the social uses and applications for the Bitcoin protocol challenge existing practices of financial exchange and value generation through its perceived capacity to act as digital cash with minimal transaction costs.

As noted previously, the majority of existing research into Bitcoin focuses upon the technical and regulatory aspects of the cryptocurrency. The capacity of Bitcoin to act as a decentralised alternative economy whose protocol facilitates pseudo-anonymous transactions has been explored through research into its role within illicit markets (Böhme et al. 2015<sup>[9]</sup>; Brezo & Bringas 2012<sup>[20]</sup>; Bronk et al 2012<sup>[21]</sup>; Lane 2014<sup>[22]</sup>; Stokes 2012<sup>[23]</sup>). A small body of work describes aspects of the community context and value field within which cryptocurrencies such as Bitcoin have been adopted; this includes research using survey analysis (Bohr & Bashir 2014<sup>[24]</sup>, Smyth 2014<sup>[17]</sup>), content analysis of discussion forums (Barton 2015<sup>[25]</sup>, Maurer et al. 2013<sup>[12]</sup>) and an analysis of Google search data (Yelowitz & Wilson 2015<sup>[26]</sup>). Additionally, participatory research with the Bitcoin community has been conducted through qualitative interviewing to compare perspectives towards Bitcoin by users and non-users (Gao et al. 2016<sup>[27]</sup>) and to understand the culture of the community through interviews, forum monitoring and a survey (Lustig & Nardi 2015<sup>[28]</sup>). Justin Fletcher (2013<sup>[14]</sup>) also carried out ethnographic research with the Bitcoin community in Florida and found that Bitcoin largely represented an economic opportunity for its users in the context of international financial crisis and instability. He highlighted that the community viewed Bitcoin as a means by which individuals could actively and directly shape the global market structure.

With the exception of Fletcher's study, few studies have explored how Bitcoin is actually used on the ground, the scale of its adoption and the social and economic drivers that underpin its use (Pink et al 2015<sup>[29]</sup>). We hypothesise that conducting research into the social uptake and applications of Bitcoin technology within its community of users will reveal marginalised practices for social support and exchange that attempt to address inequalities inherent in the regulation, exchange and value-generation practices of current payments systems. In the following sections we introduce three approaches to understanding this new digital frontier of financial exchange through digital currencies. By drawing together these areas of inquiry, we seek to bring into focus the human experience surrounding the mobility of new forms of money. We also seek to understand how self-organising community forms develop through innovations in P2P sharing technologies and give rise to alternative economies.

## Bitcoin, community and ethnographic engagement

Bitcoin is an example of a cryptocurrency that is experiencing adoption within social practice. Consequently, not only is it an alternative digital cash system derived from disruptive technologies, it is also an alternative monetary system that is an expression of emergent community values. Bill Maurer (2013<sup>[12]</sup>: 3) argues that Bitcoin combines 'practical materialism with a politics of community and trust that puts code front and center'. He identifies that the value of Bitcoin for the community of users is situated in the community's belief that its use acts as an applied critique of current practices within the fiat economy that reduce users' privacy, encroach upon personal liberty and undermine the flow of money through state and corporate oversight.

Originating from the cypherpunk movement, this self-organising network of people has come together through the development and adoption of the open source cryptocurrency software such as that which underpins Bitcoin (Barton 2015<sup>[25]</sup>: 10; Bagozzi & Dholakia 2006<sup>[30]</sup>; Karlström 2015).<sup>[19]</sup> The social profile of members, Maurer argues, reflects a combination of monetarist economic views and libertarian politics:

'in the world of Bitcoin, there are goldbugs, hippies, anarchists, cyberpunks, cryptographers, payment systems experts, currency activists, commodity traders, and the curious. (Maurer et al 2013<sup>[12]</sup>: 2)

This diverse network of people, political stances and vested interests is usually based on a shared value of libertarian politics as suggested by Maurer. Barton (2015: <sup>[25]</sup> 24, 27) describes a complex cultural sensitivity existing in the community of self-sovereignty and resistance to government repression expressed through shared values of free speech, an emphasis on personal and technological privacy, and a practice of crowd-sourced meritocracy (see Coleman & Golub 2008<sup>[31]</sup> for a discussion of the hacker ethos that underpins this). Similarly, Smyth's 2014 survey of Bitcoin users found a complex value field encompassing both left-wing and right-wing politics. Regardless of this complexity in political orientation and membership profile, we argue that the online-first, self-organising community of users surrounding Bitcoin can be considered a digital community.

The Bitcoin community can be identified as a digital frontier in community experimentation and characterised by a collective vision to act as a site of social resistance to existing financial inequalities through the development and uptake of a user-produced payments system that is digital in its DNA. The coalescence of the Bitcoin user base represents a community that is formed through overlapping foci of activity (Feld 1981<sup>[32]</sup>) that are mediated by technological innovations in social exchange and copresence. We can understand this non-traditional community format as being generated within a niche socio-technical environment rather than as gathered together through an organisation or place-based location. These characteristics of community engagement have been described previously through the re-conceptualisation of digital community (Maddox 2015<sup>[33]</sup>) and the characterisation of the emergent and mobile properties of communities forming around cryptomarkets (Maddox et al 2016<sup>[34]</sup>). Through this lens, one area of inquiry that we propose is the study of whether the combination of community engagement and P2P financial transactions facilitate new forms of social organisation that harness the emergent and dynamic properties of digital community

In light of this, we argue that the emergent and self-organised socio-technical form of the Bitcoin community is constituted by activist approaches that intend to critique and hack mechanisms for financial inclusion in response to a risky, precarious and individualised economic environment. Through an ethnographic study of the community that has formed around cryptocurrencies such as Bitcoin, we seek to understand the underpinning social conditions and technological environment that support the emergence of alternative payments systems. Consequently this line of inquiry may contribute to a discussion of social mobility and financial inclusion that is uniquely contextualised within the socio-technical engineering of peer-to-peer networks. This area of research inquiry may reveal how new forms of currencies, payments and digital value exchange represent fundamental shifts in the ways in which people think about and seek to leverage money to achieve forms of life security and financial stability.

## Bitcoin, remittances and international transfers

In alignment with the projections of Fletcher (2013<sup>[14]</sup>: 60), given the continual iterations of Bitcoin-style cryptocurrencies developed by the community, these growing systems of exchange have the capacity to provide insight into new opportunities for transnational human interaction and future conceptualisations of fiat currencies. We argue that one aspect of this transnational practice where a study of Bitcoin use may be most informative is in the area of remittances and international transfers.

The World Bank calculates that the global average cost of sending US\$200 internationally was about 7.7 per cent in the second quarter of 2015. Banks are the most expensive at 11 per cent, compared to money transfer operators at 6.6 per cent and post offices at 5 per cent of the amount sent. These are average costs, differing across regions, with the highest in Sub-Saharan Africa at 9.7 per cent. Within regions, the average costs of sending US\$200 were highest from Australia to the Pacific Islands at 18 per cent in the second quarter of 2015 (Ratha et al. 2015<sup>[35]</sup>). The Sustainable Development Goals articulated in this recent report by the World Bank aim to reduce the cost of remittances to 3 per cent, with no corridor having an average cost greater than 5 per cent. The World Bank calculated that migrants and their families would save US\$20 billion if the average cost of remittances fell from 8 per cent (in the last quarter of 2014) to 3 per cent. In this context of reducing remittance costs to support financial inclusion across international contexts, the development of mobile remittance channels using Bitcoin, such as BitPesa, suggests that a remittance cost of 3 per cent holds promise (Jackson 2015<sup>[36]</sup>).

The lower cost and instantaneous transfer of BitPesa offer an immediate benefit. But in 2014 when CGAP assessed BitPesa's usage for remittances from the UK to Kenya, they found that it was used mainly by business entrepreneurs to receive payments from abroad. Consequently, in this instance BitPesa was unlikely to aid financial inclusion as it was observed to be taken up by people who already had accounts (Mazer 2014<sup>[37]</sup>; McKay 2014<sup>[38]</sup>). Whilst BitPesa still faces legal and regulatory challenges, there is little study of its use. Yet stories of Bitcoin's potential for lowering the costs and increasing the efficiency of international remittances are found among start-ups in the Caribbean (Alpha Point 2015<sup>[39]</sup>), Australia (Donnelly 2015<sup>[40]</sup>) and its use in India (Bhakta 2015).<sup>[41]</sup> Regardless of these case studies reporting increased efficacy in disparate first-world and developing contexts, it remains difficult to find studies of people who have used it for remittances; what led to their adoption of Bitcoin; and how they overcame issues of unfamiliarity, lack of consumer protection and trust. Drawing on the work of Supriya Singh (2013<sup>[42]</sup>) examining banking, globalisation and money, including digital and mobile currencies, and Horst's work examining mobile money in the Caribbean and Pacific (see Horst 2013<sup>[43]</sup>; Horst & Taylor 2014<sup>[44]</sup>; Horst, Kailahi & Singh forthcoming<sup>[45]</sup>; Taylor & Horst 2013<sup>[46]</sup>), this study will consider Bitcoin within its context as a nascent alternative digital payments mechanism driven by P2P sharing practices that will drive down the cost of remittances. Consequently, we require further research which seeks to document and explore social adoption in environments where Bitcoin payments involving foreign exchange transfer are faster, anonymous and cheaper than current arrangements, without increasing risk of loss or theft.

## Bitcoin, trust and use

Given the focus of the research upon the user experience of Bitcoin, and its community articulations, the notions of trust, value and exchange are prominent technical, economic and social considerations reflected and critiqued by the social adoption and use of this cryptocurrency. Maurer et al. (2013<sup>[12]</sup>), citing Kelty (2008<sup>[47]</sup>), describes the currency as functioning on the basis of the trust that its community of users have placed in the code (a cryptographic algorithm). More accurately, he highlights the observation of a lead Bitcoin programmer, Gavin Andresen, that this can be translated as the trust they place in the 'wisdom of crowds' and their collective ability to review, effectively evaluate, and agree as a group to changes to it. Maurer (2013<sup>[12]</sup>) states that this distributed network of shared trust in the operations of the Bitcoin code reveal a sociality of trust that is alternatively 'expressed and obscured' by a practical materialism with two parts: concerns about privacy and concerns about value.

As is apparent in Maurer's repositioning of trust within the discourse of the Bitcoin community, it becomes both a technical and political construct. In one sense, trust is a technical problem that is solved through cryptographic authentication protocols. In another sense, the technological affordances mediating trust within Bitcoin use are intended by developers to engender a politically motivated discourse. This discourse provokes the user to consider how Bitcoin generation and exchange represents the subversion of state endorsed third parties who control and regulate the circulation and value of money. The technical obviation of trust therefore is aimed at shifting the social narrative towards a consideration of ethical issues surrounding sovereignty and state power (see Barton 2015 [25], 51-54 for further discussion of this). Whilst this observation of the nexus between trust, value and exchange seeded within the cryptographic protocols of Bitcoin is seen through an anthropological lens, its insight resonates across the literature. In particular this is the case for authors considering the structural, political and technical dimensions of Bitcoin, where there is an emphasis upon the generation of trust, privacy and security. Similarly, this resonance can be found in the associated literature discussing the generation of trust within online contexts and through socio-technical innovations (Ba 2001 [48]; Blanchard et al 2011 [49]; Brown & Morgan 2006 [50]; Cheshire 2011 [51]; Ganley & Lampe 2009 [52]; Grabner-Kruter & Kaluscha 2003 [53]; J'sang et al 2007 [54]; Marti & Garcia-Molina 2006 [55]; Resnick & Zeckhauser 2002 [56]) and within recent research and social commentary considering the relationship between privacy and security within the online contexts of Bitcoin and the wider cryptographic movement (Bauman et al 2014 [57]; Biryukov et al 2013 [58]; Elias 2011 [59]; Lee 2011 [60]; McCoy et al 2008 [61]; Reid & Harrigan 2013 [62]; Ron & Shamir 2013 [63]). This suggests that an ethnographic perspective has a substantial contribution to make to this field of study (Horst & Miller 2012 [64]).

A third area of inquiry will be developed by examining commercial challenges where technology, regulation and services intersect in the context of the Internet. In speaking to this research direction, we seek to understand what Bitcoin users believe about the currency, with a particular focus on the permutations of trust and risk that they associate with its use. From this, we seek to understand the implications these perceptions upon their consumption practices and engagement with the banking system. From a banking and payments perspective we aim to develop insight into the risks that Bitcoin adopters and users experience or consider in relation to cybertheft, cyberfraud, and consumer protection. Specifically, we will seek to understand the belief of users in the functionality of Bitcoin for value storage, transaction reliability, currency stability, privacy, anonymity and legal validity. We will also seek to understand where users actively discount current payments system obligations, such as anti-tax evasion, anti-money laundering, or sanctions compliance. Consequently, we argue that the questions emerging from the nexus of trust, risk and value that Bitcoin raises for ethnographic research, particularly through its translation to social and financial exchange practices, are likely to reveal a very human story that transcends code and critiques the strengths and limitations of our current financial transactional and regulatory environment.

## Conclusions

As we have argued in this article, cryptocurrencies, such as Bitcoin, are a recent socio-technical innovation that has both disruptive and bridging potentials across the voids of risk, trust and real-time exchange between people existing within the fiat economy. Research to date has focused upon Bitcoin as a system of which the political discourse and technological affordances help people imagine an alternative future. Missing from this dialogue is an ethnographic engagement with the human experience and motivations behind the use of Bitcoin in mundane social exchange practices.



Through engaging the community that forms around and innovates upon the Bitcoin exchange platform, we argue that there are three research domains that can be developed. Firstly we argue that the alternative payments system cryptocurrencies introduce incorporates many aspects of social engineering designed to facilitate practices of social resistance within a community of users who share overlapping values of personal sovereignty and information freedom. This unique community experiment in generating a peer-to-peer payments system that harnesses innovations in digital networked technologies points to an evolving and under-studied digital social frontier. We suggest that the alternative digital economy created through Bitcoin technology and the associated user community is both emergent and mobile. These characteristics speak most strongly to the use of ethnographic techniques, particularly those that encompass both the physical and digital spaces of community. The methodological frameworks developed within these works will provide background context for the politics and socio-technical practices of the communities associated with the use and generation of cryptocurrencies. Given the nature of the community adopting Bitcoin to be dispersed across international contexts and the capacity for Bitcoin to facilitate borderless exchange, the second research direction proposed is to explore social adoption in environments where Bitcoin payments involving foreign exchange transfer are faster, pseudo-anonymous and cheaper than current arrangements. The third domain of research proposed through an ethnographic lens is to consider what Bitcoin users believe about the currency, from a banking and payments perspective. We have argued that this direction is likely to encompass considerations of the risks that Bitcoin adopters and users experience or consider in relation to cybertheft, cyberfraud, and consumer protection.

The three areas of inquiry into Bitcoin use proposed in this paper offer different yet interrelated perspectives into how cryptocurrencies critique and hack the existing payments system. In doing so, we anticipate that conducting an ethnographic study of the cryptocurrency movement more generally will point to socially generated solutions for current financial inequalities both within the local and global contexts.

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