

Can Stablecoins *Actually* Improve Financial Inclusion: Exploring the IT Affordances of Token-Based Digital Currencies

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Abstract

To motivate wider adoption, proponents of token-based digital currencies have advocated for their use for financial inclusion. Token-based currencies are closer to cash than are intermediated account-based ones (e.g., M-Pesa), which is important since cash is the least financially excluding form of money. However, in-depth evidential studies have concluded that the narrative appears compelling only in niche cases. In this paper, a re-examined exploration of the narrative, drawing from an IT Affordance lens, is presented. The paper explores how the recently introduced concept of an intermediary ecosystem can hinder or enable a financially excluded person's potential use of stablecoins to fulfill goals associated with financial inclusion affordances. The possibility that stablecoin functionalities could be integrated into, for example, community-based initiatives like Latin American tandas is explored. Hence, reframing through the lens of IT affordance reinforces that blockchain-based tokenized digital currencies could strengthen benevolent intermediaries' ability to aid financially excluded persons.

Keywords: stablecoins, digital currencies, CBDC, blockchain, financial inclusion

1. Introduction

The Bank of International Settlements (BIS) defines digital currency as “monetary value stored on an electronic device issued upon a receipt of funds and accepted as a means of payment by entities other than the issuer” (Bank of Canada Staff, 2020). They are the “money” used by digital money technologies such as bank deposits, e-money, faster payments, cards, and cryptocurrencies. When money is transferred between accounts of an intermediary like Tencent (via the WeChat Pay app), Safaricom (via M-Pesa), Paypal, or a traditional bank, the digital currency is account-based. In contrast, cryptocurrencies and stablecoins record ownership, value, and transfer of their coins or tokens

on a public, transparent blockchain, eliminating the need for intermediaries to privately manage accounts. These are thus called token-based digital currencies (Lee et al., 2020). Interestingly, Central Bank Digital Currencies (CBDCs) are legal tender digital currencies being prototyped and experimented upon by most sovereign states, though only a few have made them publicly available (Osae-Brown et al., 2022). Depending on how a central bank chooses its design, CBDCs can be account-based or token-based (Garratt et al., 2020).

Token-based digital currencies represent a newer form of technology compared to account-based digital currencies. While currencies used in WeChat Pay, M-Pesa, and Paypal accounts are established components of well-studied fintech applications (Hendershott et al., 2021), token-based cryptocurrencies and stablecoins enabled by blockchain and digital ledger technology (DLT) have not had widespread public adoption (Kowalski et al., 2023). Given studies that show bitcoin ownership in North America exceeding 10% (Balutel et al., 2022; Perrin, 2021), it can be argued that bitcoin and to a lesser extent, ether, constitute store of value. However, same cannot be claimed for use of bitcoin and other cryptocurrencies as well as stablecoins as widely used unit of account or medium of exchange (Ho et al., 2022). That is, account-based digital currencies *actually* are used as money; token-based digital currencies really are not.

To encourage broader adoption, proponents of cryptocurrencies and stablecoins have advocated for their use for financial inclusion. Due to their core principle of decentralization, these token-based currencies are much closer to cash than intermediated account-based ones. This is key because “the affordances of cash make it a critical backstop against [financial] exclusion. It remains the lowest requirements on payment mechanism above which some exclusion will always occur.” (Narula et al., 2023, p. 15). CBDC proponents (Caudevilla & Kim, 2022; Tan, 2022) have similarly promoted the financial inclusion narrative. A centrally managed, account-based CBDC could potentially be less exclusionary than private

intermediaries, while a token-based CBDC would more closely resemble cash.

Currently, the above-mentioned narrative is best advocated by focusing on stablecoins. With their peg to the US Dollar (USD), a stablecoin like tether (USDT) or circle (USDC) proxies the stability of USD and hence is a much better unit of account and medium of exchange than volatile cryptocurrencies. In contrast to CBDCs, which are operational only in select countries, stablecoins are in active use globally.

This paper situates itself within the broader research domains of Digital Social Innovation (Qureshi et al., 2021) and Information Communication Technologies for Development (ICT4D) (Walsham, 2017). The key IT artifact under consideration is digital currencies like mobile money (Suri, 2017; Suri & Jack, 2016) as the key IT artifact, with financial inclusion as the user context.

Of the myriad of theoretical frameworks used for ICT4D research as enumerated in (Avgerou, 2017), this paper uses an IT Affordance lens. This choice is a pragmatic one: Not only has it already been aptly applied to explore mobile money for financial inclusion, but it is arguably the only IS theory that has gained wide visibility to key practitioner decision-makers by virtue of its use for analysis in (Narula et al., 2023)¹, a report financially supported by Central Banks of US and Canada as well as the Gates Foundation.

Consequently, this paper explores the narrative of using stablecoins for financial inclusion by re-examining concepts from related works through the lens of IT Affordance theory. The concluding section presents the innovative perspectives that are gleaned from this analytical approach.

2. Financial Inclusion and IT

Though ICT4D has offered a rich research tradition, a particularly fertile epoch in the field's evolution was presented as M-Pesa and other telephony and Internet based mobile payment systems improved financial outcomes for Africa and other parts of the Global South (Hayes & Westrup, 2012; Ngugi et al., 2010). That is, technology use actually and directly addressed the wicked problem of financial inclusion (Gates Foundation, 2021), defined as: "availability and equality of opportunities to access financial services" (Nanda & Kaur, 2016, p. 128) including banking, insurance, and credit that are essential for people to participate in economic activities and improve their livelihoods, especially those most marginalized and financially vulnerable.

¹ Albeit, "affordance" in Narula's paper interprets notions shared by the Human Computer Interaction (HCI)

The extensive and evidential study on designing CBDCs for financial inclusion conducted by the MIT Digital Currency Initiative (Narula et al., 2023) is then a continuation of that tradition and as such the paper draws from the tradition's theoretical constructs.

The authors note that the intermediated ecosystem is a nuanced concept wherein *intermediaries* are financial services providers who provision accounts and provide access including account-based currency intermediaries, crypto exchanges, and stablecoin providers like Circle. They are also system operators who operate a settlement layer – this could be Visa, SWIFT, Safaricom (M-Pesa) or a central bank (in the case of CBDCs). They are merchants and individuals who transact using digital currencies, phone companies and ISPs, electric utilities, and even validators and miners that help operate a public blockchain. NGOs who provide an integrated service are also intermediaries. The intermediary ecosystem is comprised of the significant socio-technical building blocks required to conduct payment, of which different IT artifacts such as CBDCs and other *digital currencies* as well as *IT infrastructures* and *identity verification systems* constitute crucial technologies.

There is a rich stream within ICT4D literature discussing the importance of intermediary organizations and individuals that: facilitate access to the Internet (Sein & Furuholt, 2012), provide access to, and demonstrate the utility of, open data (van Schalkwyk et al., 2016), and facilitate access to IT that improves educational and healthcare outcomes (Cecchini & Scott, 2003). For the more specific role of intermediaries for financial inclusion, topics such as intermediaries in microfinance and social entrepreneurship (Ademola S, 2017; Oreglia & Srinivasan, 2016), informal vs. formal intermediation (Alhassan et al., 2019), and mobile money intermediaries (Mas & Radcliffe, 2011; Senyo et al., 2022) have been explored.

Emerging technologies that have been touted to address financial inclusion include digital public infrastructure (Ajide et al., 2022; Constantinides & Barrett, 2015) and public digital ID and verification (Lim et al., 2022; McGrath, 2016). These two technologies have been shown to positively affect financial inclusion (Singh, 2023; Suzman, 2022) in a way that stablecoins have not. Robust centralized ID systems using public infrastructures already exist in Southeast Asia and other parts of the Global South as well as in some countries in the Global North. However, the centralized way in which these technologies are deployed is antithetical to the decentralized ethos of stablecoins. There are decentralized public

community and is different from, and more informal than, interpretations shared by the IS community.

infrastructures; the Ethereum network is a prime example. And Worldcoin represents a decentralized digital ID system that is actively collecting biometric data from Global South citizens, though it has been heavily criticized for privacy violations and colonialism (Gent, 2023).

In sum, whereas intermediation and use of the IT artifacts of public digital infrastructure and identification systems for financial inclusion have been theorized about and shown to have practical merit, nascent notions of an intermediary ecosystem for financial inclusion using digital currencies and stablecoins as IT artifacts are at present arguably not much more than a narrative.

3. The Stablecoins for Financial Inclusion Narrative

Use of the term *narrative* is intentional since inasmuch as there are strong proponents there is also vociferous opposition (Carmona, 2022; Pierre-Louis Jr., 2022). “Narrative” is also apropos since beyond a few descriptions, there is scant evidence of their use. “Stablecoins for financial inclusion” is a narrative currently heavy on conjecture and light on evidence.

Here though is some evidence of real-world uses. OXFAM and the startup Sempo developed a program after Cyclone Harold devastated Vanuatu in 2019. The Unblocked Cash solution consists of a tap-and-pay card provided to beneficiaries to purchase goods from vendors, smart phone and apps given to vendors for receiving payments from beneficiaries, and an Ethereum-based platform used for disbursing funds to beneficiaries and monitoring transactions (Oxfam Staff, 2022). This solution has been scaled to other needy parts of the world, and though initially specialized tokens were used as digital currency on the platform, USDC was used to provide \$18 million to 60,000 Venezuelan doctors and nurses who treated patients without government salaries (Long, 2021). USDC was also used to disburse aid to Ukrainians displaced by the war (O’Sullivan, 2022). Other examples include the UN World Food Program’s Building Blocks project that allowed displaced Syrians to use token money for food and goods in refugee camps (Awan & Nunhuck, 2020) and Mercy Corp similarly disbursing funds to Sudanese refugees in Ugandan shilling pegged digital currency on the Binance Chain (Mercy Corps, 2020). These are all examples of cash and voucher assistance (CVA).

In the absence of much more rigorous studies especially beyond CVA, there are understandably works that merely conjecture on this topic. The Bank of Canada compares scenarios involving credit cards, payment apps, and stablecoins in depth and concludes that stablecoins currently do not offer a distinguishable

advantage for payment for the financially included (Ho et al., 2022). Thus, it can be surmised that their use for the financially excluded is likely not more appealing. They do mention that stablecoins may be attractive in niche use cases; the humanitarian examples just mentioned would constitute such a niche. Others conceptually argue the various pros and cons (Finance Magnate Staff, 2023; Qin En Looi, 2023).

The World Economic Forum’s study is the most extensive to date and outlines the known risks, rewards, challenges, and obstacles of stablecoins for financial inclusion and conducts a thorough analysis of three realistic though hypothetical use cases – remittance from an undocumented worker to his family in Honduras, small business payments in India, and a gig economy employee in Cameroon receiving wages from the US. The paper concludes that “Overall, at the present time stablecoins do not present features or capabilities that significantly reduce the specific barriers to financial inclusion in the scenarios studied – compared to pre-existing options, once accounting for consistent legal and compliance requirements” (WEF Staff, 2021, p. 36). It posits that there would be difficulty in overcoming digital, financial, or general literacy challenges of financially excluded persons. In addition, limited access to electricity, internet connectivity, and mobile phones presents a barrier, as does the very limited number of merchants and service providers capable of processing stablecoins – and even if available, the providers are likely not proximate.

Balanced, thorough analysis from authoritative sources such as the Bank of Canada and the World Economic Forum find only niche uses of stablecoins for financial inclusion. And the naysayers are blunter: “When examined closely, crypto’s current capabilities do not match the needs of the groups it purports to serve, and it carries a host of risks and drawbacks that undermine its benefits. More alarming, we can observe parallels between crypto and other predatory products, which highlights crypto’s potential to exacerbate unequal financial services to historically excluded groups” (Carmona, 2022, para. 61). There is an inclination then to connote that the stablecoin for financial inclusion narrative is perhaps not false but rather unremarkable... if not for the niche use cases.

Next, let us revisit this narrative using the lens of affordance used for analysis in (Narula et al., 2023)

4. The Narrative Under the Lens of IT Affordance Theory

The concept of affordance was introduced by the ecological psychologist James Gibson who stated, “The affordances of the environment are what it offers the animal, what it provides or furnishes, either for good or

ill” (Gibson, 1979, p. 127). Gibson also states, “The perceiving of an affordance is not a process of perceiving a value-free physical object to which meaning is somehow added in a way that no one has been able to agree upon; it is a process of perceiving a value-rich ecological object... Physics may be value-free, but ecology is not” (Gibson, 1986, p. 140). An animal is an actor, there is an object that is of value to the actor, an affordance is an action taken by the actor using the object, and the environment constrains how that action can be taken – or not taken.

Let us offer an example. An environment like a dog park or backyard constrains what a dog can and cannot do in it. A specific valuable object for the dog in that environment is a ball because it potentially offers the dog a particularly enjoyable form of play, fetch. Gibson would say that the affordance of fetch cannot be explained merely by describing properties of the dog only, or the ball only, nor without describing how fetch can or cannot occur within the dog park or backyard. Only when a certain combination of properties of all three are observed can there be a successful fetch session. If the ball is made of glass, the backyard is in the 20th floor balcony, or the dog is not a breed with a retrieving instinct, there will not be much fetching. Also, whether a person is regarded as part of the environment, another value-rich object that the dog perceives, or as another actor, someone to throw the ball is also necessary.

The management information systems (MIS) field has adopted Gibson’s principles to develop the concept of IT affordance, defined as “the possibility for goal-oriented actions afforded to specific user groups by technical [IT] objects” (Markus & Silver, 2008, p. 622). Constraints on affordances arise or are placed at the intersections of IT artifacts and actors (Leonardi, 2011). More germane to the topic of this paper are works that have used this lens to study affordances provided by enterprise blockchain (Du et al., 2019; Ostern et al., 2020), Bitcoin as an investment or speculative financial instrument (Lichti & Tumasjan, 2023), or mobile money (Oo Tha et al., 2022) as IT artifact of focus. The work presented in this paper complements these prior works.

Let us start by applying the IT affordance lens with those niche use cases in which stablecoins do appear to serve a purpose. Are these cases exclusively for cash and voucher assistance? A bit more broadly, are they exclusively for humanitarian aid led by NGOs? For those use cases that are not niche, must they always devolve to predatory practices and exacerbation of inequalities or at best unremarkable use? The argument is that the answers to these questions do not have much to do with cryptocurrencies and stablecoins as technologies. Rather, it is what an *intermediary*

ecosystem enabled in part by those *technologies* that *affords* the financially excluded person to gain or suffer.

(Narula et al., 2023) specify affordances that cash provides for the financially excluded. They note that the ability to *custody* or personally possess physical money affords the owner means to achieve their financial goals. Cash affords the widest *access* to payment and other services for the financially excluded to meet those goals. Cash also offers *finality*, the ability to settle transactions instantly, and *data privacy* insofar as there is limited or no digital trail of transactions. Finally, they note cash does not offer the ability to transact remotely; it is not possible to transcend *distance*, as is possible with digital currency transactions.

By specifying these concepts, Narula et al. provide a framework for CBDC designers. That is, an ideal CBDC motivates the development of an intermediary ecosystem that affords the financially excluded person as much of the custody, access, finality, and data privacy affordances of cash along with the transcending distance affordance that is desirable but not afforded by cash.

So, the framework of Narula et al. expressed in the lens of IT affordance can be characterized this way.

- Actors: Different financially excluded persons
- IT artifact: CBDC
- Environment that constrains affordances: Intermediary ecosystem
- Goals of actors: vary depending on the actors
- IT Affordances: personally possess money (*custody*); wide *access* to merchants and services; settle transactions instantly (*finality*); leave little or no data trail (*data privacy*); and transcend *distance* in transactions.

For developing the IT artifact, a CBDC, this characterization in the lens of IT affordance organizes data, concepts, and opinions to help the CBDC designer simplify and prioritize the problem space, à la (Maier & Fadel, 2009).

Finally, the environment dimension is more granularly characterized into how its facets enable or hinder whether the user can use their IT affordances to realize their goals. This delineating characterization is referred to more in the Human-Computer Interaction literature (Moyer-Packenham et al., 2016; van Vugt et al., 2006)

5. How Does an Intermediated Ecosystem Enable or Hinder Financial Inclusion: An Example

Similar characterization is done to better understand the problem space for exploring how stablecoins can be used to address financial inclusion.

Specifically, one of the scenarios detailed in (WEF Staff, 2021), which is the most comprehensive paper on stablecoins for financial inclusion, is characterized. Note that as affordances, the generic financial needs of financially excluded persons used in (WEF Staff, 2021) is used. This in turn is derived from a seminal report commissioned by the Gates Foundation (Makuvaza et al., 2018). Below, one of the scenarios in the lens of IT affordance is excerpted. Analyzing the other scenarios is beyond the scope for this paper though pertinent for future work; analysis of African gig workers would be particularly interesting as it would allow for exploration of topics like ad hoc, informal, cross-border work and taxation, and would draw from additional theories such as online peer production communities (Kane & Ransbotham, 2016) in both Global South and North.

Table 1: IT Affordance Characterization of Cross-Border Remittance Scenario

Scenario	Environment that constrains affordances	Actor(s)	IT Artifact	IT affordances	Financial Goals
Cross-border remittance to Honduras	Intermediary Ecosystem	José and Maria	Stable coins	<ul style="list-style-type: none"> • Transfer value • Maintain liquidity • Stay resilient to financial shocks • Meet other family or lifestyle goals 	<ul style="list-style-type: none"> • Send remittances from José to Maria at lower cost • Develop a credit history that can be used across many loan providers in Honduras, made possible because there are affordably priced loan options • Obtain affordable and suitable health and automotive insurance

How does the Intermediary Ecosystem in this scenario constrain affordances?

- *Transfer of value between Jose and Maria using stablecoins.* As an undocumented migrant worker in the US, José does not have a government issued ID so he cannot get an account required to use digital remittance service. So, he is limited to services like Western Union that will accept cash. Maria, his wife in Honduras, receives those remittances via TIGO money, a popular money app. Even if Jose and Maria could get stablecoin accounts, it is unlikely that stablecoin-based remittance will be substantially cheaper. As an addendum, the recent announcement that Paypal (DeVon, 2023) will be issuing stablecoins does improve the feasibility of greater use but it is likely that Paypal will require identity verification to comply with AML regulations, so Jose is still unlikely to use them even if the intermediary ecosystem was in place.
- *Maintain liquidity using stablecoins.* Without a bank account, José must be attentive about physically managing cash: if he carries too much, it can get stolen and if he carries too little, he may be unable to make critical payments. He does belong to a *tanda* – a lending circle run by the Honduran community where he lives – and that allows him to stow some of his money. Maria has

a factory job but needs the supplement that José’s remittances provides and though she has a bank account she transacts primarily using cash as do most Hondurans. It is unlikely that many merchant services in Honduras – nor the US for that matter – will transact using stablecoins. Perhaps cost-effective exchanges that provide on and off ramps to convert to and from fiat to stablecoins would be more achievable in the future and would offer some benefits to José and Maria. As an addendum, if there is widespread adoption because of the entrance of TradFi (traditional finance) companies like Paypal, Jose may be able to pseudo-anonymously use a third-party custodian for his stablecoins – i.e. he wouldn’t have to reveal his true identity but rather only “prove” that he is not a terrorist or laundering money.

- *Stay resilient to financial shocks using stablecoins.* Maria has to depend on family and friends in times of financial hardship because she is unable to get credit. Moreover, if Maria gets sick or José can’t use his car, they may lose valuable hours of work or even risk becoming unemployed. Private insurance in Honduras would alleviate concerns but that is expensive. Also, Jose cannot get car insurance without an ID. DeFi using stablecoins ostensibly offers credit services, but its use requires expert digital literacy, superior internet access, and high risk appetite. None of that describes José and Maria. In the same vein, obscure stablecoin-based insurance products are inappropriate for them. As an addendum, Honduras at this time is not experiencing hyperinflation nor strict restrictions on use of personal funds. If it were, then it may be worth overcoming the significant frictions mentioned here so that Maria could use stablecoins as a superior store of value.
- *Meet other family and lifestyle goals using stablecoins.* José and Maria really want to buy a house in Honduras. However, it has been difficult to build up a credit history because most of their transactions have been in cash. Moreover, as the resident in Honduras, Maria would be buying the house and women are turned down for loans more often. Since no transactions really are done in stablecoins, that will not help in creating a credit history. As an addendum, if there were widespread adoption of stablecoins, records of legitimate exchange of stablecoins could eventually be allowed to assess credit-worthiness.

Disintermediation, or alternative intermediation, is the *raison d'être* of blockchain (Kim & Laskowski, 2018; Warburg, 2016): Blockchain use either replaces or mitigates an inefficient, ineffective, or extractive intermediary, or enables an intermediated service where one, even though desirable, did not exist before. For example, DeFi arguably bypasses inefficient human market-making and Walmart and IBM's Food Trust provide a worldwide food traceability service where one did not exist before (Vitasek et al., 2022). So, in characterizing the intermediary ecosystem, opportunities can be identified.

- Intermediaries that hinder Jose and Maria's affordances: US identity system, banking system in the US, Honduran merchant services, auto insurance systems in the US, public healthcare system in Honduras, banking and credit system in Honduras
- Intermediaries that enable Jose and Maria's affordances: Western Union, Tigo money, tandas, family members, stablecoin on/off ramps like crypto exchanges

It can be determined whether stablecoin use can mitigate the hindering intermediaries or actualize the potential of enabling intermediaries through alternative disintermediation. In terms of mitigating impedances, perhaps there is an opportunity for a non-governmental, blockchain-based ID system that can allow for pseudo-anonymous verification. In terms of actualizing enabling, there may be an opportunity to digitalize and incorporate stablecoin functionality into tandas. Since they already serve as low functionality shadow banks, is it possible to enhance functionality to, say, provide low-cost remittance, via stablecoin use?

6. Concluding Remarks

For the most part, the narrative of stablecoins for financial inclusion seems rather unremarkable, both in terms of actual uses as well as analyses of potential uses in the future. There have been some niche uses by NGOs, especially in cash disbursement to the financially vulnerable. However, when the exploration using the lens of IT affordance on scenarios previously described in literature is reframed, it is possible to discern a novel new use – by community-based lending circles like the Latin American tandas. The lens we used allowed us to identify that benevolent intermediaries like NGOs and tandas could enable financially excluded persons to use an artifact like stablecoins to fulfill goals related to affordances like transferring value, maintaining liquidity, staying resilient to financial shocks. Our exploration is arguably validated in some part by the Circle Impact initiative to allocate some

USDC reserves towards aiding minority-owned community-based financial institutions (Bellusci, 2021).

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