

Exploring DeFi Through Three Case Studies: Transparency, Social Impact and Regulation

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Abstract—DeFi is a network that avoids reliance on financial intermediaries through its peer-to-peer financial network. DeFi operates outside of government control; hence, it is important for us to understand its impacts. This study employs a literature review to understand DeFi and its emergence, as well as its implications on transparency, social impact, and regulation. Further, three case studies are analysed within the context of these categories. DeFi's provision of increased transparency poses environmental and storage costs and can lead to user privacy being endangered. DeFi allows for the provision of entrepreneurial incentives and protection against monetary censorship and capital control. Despite DeFi's transparency issues and volatility costs, it has huge potential to reduce poverty; however, regulation surrounding DeFi still requires further tightening by governments.

Keywords—DeFi, transparency, regulation, social impact.

I. INTRODUCTION

DeFi is a newly developing financial technology that aims to disrupt the current central banking system by promoting peer-to-peer transactions. By eliminating the fees charged by traditional financial institutions, DeFi offers a more accessible and cost-effective way to access financial services. In order to understand the emergence of DeFi, we must first look towards the origins of FinTech, considered as a concept composed of finance and technology.

This study aims to explore the benefits and drawbacks of DeFi compared to the traditional banking system, which comprises of the following research questions (Fig. 1): 'How does DeFi work?'; 'Does DeFi provide increased transparency?'; 'What are the social impacts of DeFi?' and 'What regulation does DeFi face?'. These questions are explored through building an understanding of DeFi, and its impacts are analysed within the framework of three case studies.

II. METHODOLOGY

The study was conducted by searching for scholarly papers within JSTOR and Google Scholar for English publications using "Fintech", "Decentralised Finance" along with other keywords such as, "transparency", "social impact", "adoption", "regulation", "scalability" and "inclusion". As a result, more than 150 papers were found. After screening the abstracts, 57 papers were considered, including three books. Together, the 57 papers were categorised into three groups: those related to regulation, social impact and transparency. In some cases,

papers were included in more than one of these three categories. As a result, the total number of studies was 28.

III. LITERATURE REVIEW

A. Understanding DeFi

In simple terms, DeFi is a network that uses a consensus-based system to avoid reliance on financial intermediaries [1], implemented by the peer-to-peer financial network. DeFi operates outside of government control, whereby no single individual has control of the system, rather it is controlled by a network of nodes. The world now is facing new interactions and challenges by this revolution in which the blockchain system may change the global financial system wherein all the currencies, transactions, commercial contracts, and global investments can be entirely changed. This has led to the development of related sectors, particularly in the financial industry, by what we call "FinTech". This latter means the use of software and digital platforms that distribute financial services to consumers [2].

B. A Brief History of DeFi

In order to understand the emergence of DeFi, we must first look towards the origins of FinTech, considered as a concept composed of finance and technology. This concept is used for technology start-ups or firms that adopt new technological applications and platforms that lead them to offer new financial services as well as the traditional ones [2]. The history of FinTech can be traced as far back as 1838 when Samuel Morse introduced the electric telegraph system. This subsequently led to the invention of the first transatlantic cable in 1866, which provided the infrastructure for financial globalization. Developments in FinTech since then have included credit cards in the 1950s, ATMs in the 1960s, electronic stock trading in the 1970s, bank mainframe computers in the 1990s, and internet and e-commerce business models in the 1990s [3].

However, since 2008, the new developments of FinTech have focused not on the financial products and services themselves, although this is a key area of innovation, but rather who is digitally delivering them. Bitcoin emerged out of the turmoil of the 2008 Great Recession, which heightened mistrust of banks and their role in the financial system. An individual or a group, going by the name of Satoshi Nakamoto, released a white paper addressing the centralised control of money and the need for trust in handling citizens' cash [4]. Thus, FinTech, more recently, acts to compete with traditional banks or even replace some of these services offered.

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Fig. 1 Research questions and objectives

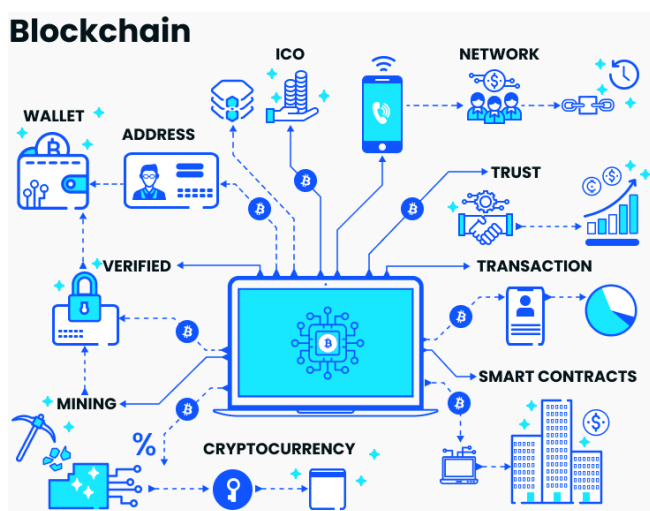


Fig. 2 How blockchain works [5]

Another example of this competition is P2P (peer-to-peer) lending, whereby borrowers and lenders are matched up based on their risk tolerance and size of capital required. This service is offered more cheaply than a traditional financial institution, where borrowers can secure loans at lower rates- reducing the need for banks acting as lenders. Today financial services are being delivered via mobile wallets, payment apps, cryptography, rob advisors (use of algorithms and surveys to enable investors to build portfolios) and crowdfunding using Web 2.0 technologies. FinTech is revolutionising the provision of digital financial services [3].

C. Overview of How DeFi Works

DeFi (Fig. 2) works by using software to record and review financial transactions in a financial database. Distributed ledgers can be accessed from a variety of locations, they collect and aggregate data from all users and use consensus mechanisms to review the data. DeFi uses blockchain technology that is used by cryptocurrencies. An application called a dApp is used to process transactions and execute blockchain.

In the blockchain, transactions are recorded in blocks and then validated by other users. If these reviewers agree to the transaction, the block is closed and encrypted. Another block is created with information about the previous block. The blocks are "chained" by the information in each subsequent block and are named blockchains. There is no way to change the blockchain because the information in the previous block cannot be changed without affecting subsequent blocks. This concept, along with other security protocols, provides the secure nature of the blockchain.

1. Distributed Ledgers

Distributed ledgers allow transactions to be consensually shared across multiple sites and geographies. As soon as transactions are recorded, copies are sent to the shared network, creating public "witnesses." Thus, in the event of a malicious attack or fraud on any part of the network, the participants of the shared network will be able to see what has been altered by the fraudsters since they have copies of the ledger transactions [6]. As a result, blockchain technology and its distributed ledger system can help reduce fraud and limit the damage caused by cyberattacks such as hacks [7].

2. Consensus Mechanism

A consensus mechanism is a fault-tolerant mechanism used by computers and blockchain systems to achieve the required consensus on a single data value or state of a network between distributed processes or multi-agent systems [8].

In public distributed ledgers, there are many nodes that need to reach consensus in order to validate transactions. Also, each node needs access to the entire blockchain in order to process transactions in a way that consensus can be reached. This means that over time it will become a huge database. Giving hundreds of nodes access to the entire blockchain also increases the security threat. As a result, thousands of transactions are queued rather than validated every minute [8]. Some ecosystems have attempted to address this issue by partially decentralising distributed ledgers where only a limited number of key nodes need to reach consensus, which allows certain transactions to be verified. However, this reduces the utility of DeFi, which

requires multiple nodes to validate the legitimacy of transactions.

Now, there are different types of consensus mechanisms, each with different underlying requirements. The two most implemented consensus mechanisms are Proof of Work (PoW) and Proof of Stake (PoS).

In PoW, the work done and submitted by the participant nodes must prove that they are eligible to add new transactions to the blockchain. This entire Bitcoin mining mechanism requires high energy consumption and longer processing time [8], [10]. Furthermore, this high energy consumption has many negative effects on the environment and is being further investigated.

PoS is another popular consensus algorithm that has emerged as a low-cost, low-power alternative to PoW algorithms [11]. This includes assigning responsibility to maintain the public ledger to the participant node in proportion to the number of cryptocurrency tokens held. However, this creates an incentive to save instead of using crypto coins, which undermines the entire use of crypto as a transactive asset.

D. Transparency

The implementation of consensus mechanisms and distributed ledger will allow DeFi to improve the transparency of the financial system. Centralised financial institutions cannot ensure full transparency, as they must protect their centralised books through access restrictions. Decentralised finance, by contrast, secures a public ledger through decentralised consensus and radical transparency.

Recorded transactions on a public ledger can be easily viewed and verified. With a public ledger, decentralised finance creates distributed trust, allowing trading parties to transact with each other without pre-existing relationships or trusted intermediaries, expanding the scope and scope of potential transactions. Additionally, because decentralised finance is often built on open-source code, it allows outside parties to review business logic to uncover hidden risks and biases and reassure trading partners. Additionally, transparent public ledgers and open-source code help keep records of all past transactions, helping to “get to the bottom of major financial disasters” [12], [13]. This was demonstrated in the June 2021 hacking in Colonial Pipeline whereby the Department of Justice was able to recover half the bribe (\$2.3 million) [13], which was paid to the hackers in bitcoin, to regain access to its computer systems after its oil and gas pipelines across the eastern US were crippled by ransomware.

1. Information Costs

To achieve distributed trust through blockchain technology, a decentralised network makes critical information publicly available to all parties, validates information through distributed consensus, and duplicates information through P2P mechanisms, which brings significant information costs. Achieving distributed trust can dramatically increase the costs of preparing, storing, and processing information. As a result, distributed trust is often expensive, which may limit its applications. For example, the electricity cost of processing

Bitcoin transactions has been estimated to be commensurate with all the electricity consumption of Ireland [14]-[16]. Thus, it is unclear whether the expansion in the scale and scope of potential transactions would be sufficient to counterbalance the informational cost imposed on the environment.

At present, cryptocurrencies and public blockchains bring serious environmental and inefficiency concerns. Bitcoin’s annualised total electrical energy is 58.93 TWh (comparable to the power consumption of Switzerland) [17]. At the same time, the average bitcoin transaction now uses 330,000 times more energy than a credit card, Spending one bitcoin = 330,000 credit card transactions, 2020 [19]. Some studies [17]-[19] show that all cryptocurrencies would “pose a serious threat to the global commitment to mitigate greenhouse gas emissions under the Paris Agreement.” [17]. This is strengthened by the prediction that “Bitcoin emissions alone could push global warming above 2 degrees Celsius” [17]. As for climate change itself, the impact of increased weather hazards caused by this high energy consumption will be felt most acutely in developing countries. In developing countries, typhoons, hurricanes and floods could devastate the homes of the poor with unprecedented frequency and intensity from a national average increase of 1 degree Celsius. Exacerbating this problem, some bitcoin mining operations have teamed up with struggling fossil fuel power plants, keeping some power plants online that would otherwise have retired, increasing overall carbon emissions [17]-[19].

2. Risks

Primarily, although transparency is the foundation of decentralised platforms and decentralised trust, extreme transparency can endanger privacy. To achieve decentralised trust, transaction records are often stored and displayed on public blockchains: these can be abused to compromise user privacy [20].

Secondly, although public ledgers and the immutability of smart contracts increase transparency and trust, they can also lead to rigidity and lack of flexibility [21]. This can hinder experimentation, learning and discovery. Smart contracts and decentralised platforms can be upgraded through decentralised consensus but achieving broad consensus among key stakeholders to implement major upgrades is often difficult: if consensus is not reached, progress may stall.

Thirdly, there is a greater possibility for decentralised platforms to achieve distributed trust in inputs that can be objectively obtained and verified. However, many aspects of business and life cannot be objectively codified or publicly recorded on a blockchain, so they may not be inputs to a distributed trust system. As a result, decentralised distributed trust systems may not fully utilise all available information, limiting their efficiency [22].

E. Social Impact

Although blockchain technology can protect individuals against various forms of capital control and monetary censorship, as well as protecting marginalized groups’ privacy, an aspect less explored is how blockchain can become an enabler for social innovation. Some go further and define

blockchain as a “fundamental for forwarding progress in society as Magna Charta or the Rosetta Stone” [23].

The use of blockchain technology can help reduce fraud and corruption gaps and, therefore, advance legal property titles [24]. Thus, it can provide entrepreneurial initiatives to the low-income world. It has been convincingly demonstrated that blockchain has the potential to enable social innovators in “democratis[ing] entrepreneurship by democratising the access to capital [...] and disrupting traditional venture investments just as social media is disrupting traditional media” [22]. Further, it can also help financial transactions be performed more quickly and ensure that support is spreading so less theft and fraud is possible [25].

F. Regulatory Problems

Blockchain protocol users or decentralised applications are not required to comply with anti-money laundering (AML) and know your customer (KYC) requirements. AML is an umbrella term for the set of regulatory processes that businesses must undertake to prevent money laundering, and KYC is a part of AML that allows institutions to check and verify the legitimacy of their customers [26]. Decentralised finance only requires that customers hold some crypto assets (in this case bitcoin) in a private wallet for them to interact with decentralised applications. This gives access to anyone to use decentralised applications to transact anonymously without fulfilling KYC. Consequently, it is easy for users to transfer funds for all sorts of illicit activities, thus bitcoin could be seen as enabling these activities which carry a great social cost.

Another one of the key risks involving public or permissionless blockchains is that the crypto-assets used to back these technologies are highly risky in terms of their valuations (high volatility of exchange rates), which can involve extremely variable and often prohibitive costs, and can be subject to liquidity risks [27]. This is reinforced by the fact Bitcoin price exhibits strong and, over time, growing signs of susceptibility to herd behaviour and information shocks—especially during the periods associated with cybersecurity breaches involving major exchanges [24].

IV. CASE STUDIES

A. Nubank in Brazil

Nubank is a Brazilian neobank. Neobanks are fintech companies that implement different technologies to increase the efficiency of mobile and online banking.

Nubank was founded due to a personal experience one of the founders, Véléz, had with a Latin-American national bank, in which it took him four months to open a checking account and to claim a credit card for which he was charged a handling fee of between \$20 and \$30 a month and paying an interest rate of more than 400% a year.

Nubank not only does not have any management or admin fees, but its interest rates are also between 2.7% and 11%, while the average interest rates for credit cards in Latin America are 15% per month. Nubank offers unparalleled ease of opening a bank account and applying for a credit card, which is its main

distinguishing factor from traditional Latin-American banks. In this way, digital technology can be seen to revolutionise access to finance in the developing world. Fintech innovations overlap and feed off each other, which complementarities have the potential to provide disruptive financial services [3], seen through Nubank’s lower interest rates.

Through its app, Nubank allows its users to have access to financial services from their cell phone, including making inquiries about their credits, checking balance statements and rescheduling their debts, all without having to set foot in a bank. Nubank also offers savings accounts, business loans, insurance and investment products across three countries in a region where tens of millions of people have traditionally been excluded from mainstream financial offerings. Thus, new solutions can be seen to increase financial inclusion in developing countries. This is reinforced by [28] which found primary evidence that the fintech industry has the potential to disturb financial inclusion.

Consumers' dissatisfaction with traditional banking has played a significant role in Nubank's success, which has led many of them to adopt the new forms of financial technology. Nubank looks to double its clients to 100 million and expand beyond Latin America, where Brazil accounts for 98% of revenue after it added Mexico and Colombia in the last two years [43].

B. The Legalisation of Bitcoin in El Salvador

Decentralised payment services can be especially helpful in solving existing problems associated with cross-border payments—cost, delay, and inconvenience. Currently, cross-border payments through correspondent banking and SWIFT can take several days and incur significant fees. Decentralised payment services rely on blockchain technology and cryptocurrencies (in this case bitcoin) that are inherently global, so cross-border payments can become fast and inexpensive [29]. This is demonstrated in El Salvador where bitcoin was accepted as legal tender in September 2021.

It is estimated that impoverished El Salvadorians pay \$440 million per year, given the global remittance sector’s average fee of 6.5% [29]. Due to the legalisation of bitcoin, which has much lower network fees, it is highly likely that more of these remittances will be able to go to their intended recipients, instead of being syphoned off by intermediaries. In the developing world, money sent from overseas workers via international remittance systems can be integral to the economic survival of rural households [30]. A cost-effective remittance system can greatly improve the well-being of local inhabitants, as lower fees can preserve more of the earning power of overseas workers [31]. Therefore, bitcoin can be seen reducing inequality between citizens of developed and developing nations.

Furthermore, bitcoin can be seen as offering poor El Salvadorians a store of value. They cannot allocate their spare capital to assets which are nominally appreciating as their spare capital is too small to be effectively invested, therefore the majority are unable to earn interest to protect the meagre financial savings that they do have, as 70% of El Salvadorians are unbanked [32].

Although it is true that bitcoin is an unpredictable store of value, its long-time period overall performance is remarkably attractive. Over the past decade, bitcoin's annual return has been 230%. Although this will not last forever, having a fixed supply ensures that bitcoin will always be deflationary. It will always appreciate against inflationary currencies [29]. Quantitative easing (money printing) which has become increasingly common in the wake of the 2008 financial crisis and the current pandemic has been shown to increase inequality, disproportionately benefitting elites and the already-wealthy. Bitcoin has the potential to act as a counterweight to this. El Salvador presents a strong case study about how developing nations can liberate themselves from US financial hegemony. Thus, this liberation can be seen to have great social benefits through once again reducing inequality between developed and developing countries. However, one of the key risks involving public or permissionless blockchains is that the crypto-assets used to back these technologies are highly risky in terms of their valuations (high volatility of exchange rates), can involve extremely variable and often prohibitive costs, and can be subject to liquidity risks [27]. Bitcoin price exhibits strong and, over time, growing signs of susceptibility to herd behaviour and information shocks—especially during the periods associated with cybersecurity breaches involving major exchanges [9]. These findings suggest that social impact financial services solutions based on major publicly traded cryptocurrencies are potentially subject to transmission of volatility, which could have extremely harmful impacts on bitcoin's use as a store of value for many poorer El Salvadorians. In addition, by the nature of bitcoin, which eliminates or reduces the involvement of central entities, no central entity can be held accountable for bitcoin [33]. Thus, in difficult and critical situations, there is no central party to resort to, therefore when a decentralised platform temporarily fails, no central party can quickly restore the platform: without accountability. For this reason, decentralised platforms may have serious limitations.

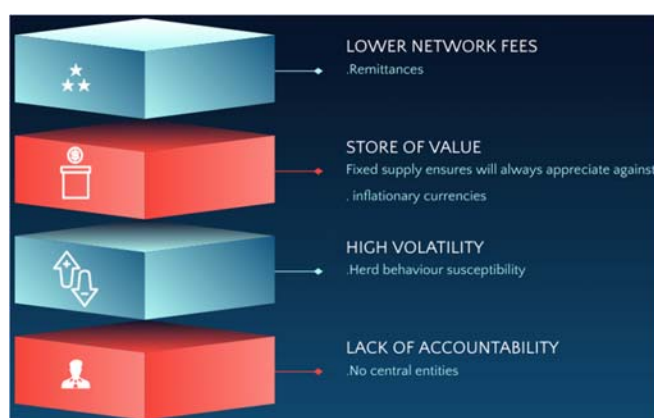


Fig. 3 Benefits and drawbacks of legalisation of Bitcoin in El Salvador

C. Stablecoins

An alternative to Bitcoin and other cryptocurrencies is stablecoins, a type of crypto asset designed to maintain a stable market price. They were introduced as a stabilising mechanism

to counter the tremendous volatility that characterises crypto-assets like Bitcoin. Algorithmic stablecoins use algorithms to control the token supply and keep the price at a constant level. The goal of these coins is to maintain a stable value by algorithmically expanding and contracting the circulating supply according to market movements [26]. However, stablecoins face risks that threaten their ability to ensure the stability of DeFi loans. Take, for example, the cryptocurrency pandemic on March 12, 2020 (“Black Thursday”). This happened because investors in all asset classes, including those in “safe havens” like gold, were desperate to liquidate them. Not surprisingly, crypto investors followed suit. As a result, collateral valuation plummeted, and many MakerDAO loans were under-collateralised, resulting in automatic liquidation of borrower accounts.

Additionally, the issuers of fiat-backed stablecoins, widely used in the DeFi space, do not need to hedge all tokens held in a bank account with a 1:1 dollar-to-token ratio, as this threatens financial stability. The three largest stablecoin issuers – Tether in March 2020, Paxos in July 2021 and Circle in August 2021 – confirm this in their recent detailed reports [34], [35]. Upon inspection, these assets are backed by debt, including loans to public and private institutions, US Treasuries, corporate bonds, and commercial paper. In the event of a run on the crypto assets where many holders want to withdraw their money, there would not be enough dollars in the bank for holders to convert their stablecoins into physical dollars and realise their profit/losses. This could put significant market selling pressure on the assets held by these stablecoin issuers, which in turn could lead to a market downturn. While not an immediate risk, it is a potential risk given the growth rate of fiat-backed stablecoins. Therefore, the term stablecoins itself, could be perceived to be untrue and misleading to investors, which is further developed when examining the May 2022 tether downturn.

1. Recent Stablecoin Volatility: Tether

As the largest operator in this \$180 billion stablecoin space, Tether plays a key role in facilitating trading in the crypto market and connecting it to the mainstream financial system. Tether aims to remain pegged to the dollar by holding a reserve of traditional assets. With 80 billion Tether tokens in circulation, it should hold \$80 billion in assets. This is an amount comparable to the world's largest hedge funds. However, details of how these reserves are managed are sparse and are not subject to audit under internationally accepted accounting standards [36]. TerraUSD's model was experimental. Typically, operators of stablecoins say they are backed one-for-one with dollar-based-reserves. Terra, by contrast, was backed by an algorithm linked to its sister-token, Luna, to keep its dollar peg in check.

The \$1.3 trillion cryptocurrency industry suffered one of its biggest challenges Thursday when stablecoin Tether, failed to maintain its link with the US dollar. Tether fell to 95.11 cents in European trading, well below the \$1 peg it was trying to maintain as it faced intense selling pressure [36]. Prices then rose, but it is rare plunge so recent after its rival TerraUSD collapsed, sent Bitcoin to its lowest level since late 2020.

Support for terra's par value depended on operations that expanded the supply of Luna, so faltering demand meant prices gapped downwards and turned the definite arbitrage into a loss [37]. This downturn demonstrates the fragile nature of stablecoins which rely on a huge amount of trust and have the potential to undermine financial stability. As a result, traders are shifting away from investments linked to decentralised finance.

Many crypto enthusiasts, who considered DeFi to be one of the most promising innovations in the financial industry, are withdrawing their support after the May 2022 failure of Luna, and its linked stablecoin terraUSD, which underlined the risks of investing in DeFi projects and the potential for serious flaws in this design, and programs that underpin their operations. Therefore, the latest volatility suggests that instead of lighting the way towards building a new, decentralised financial system, cryptocurrencies are likely to remain get-rich-quick speculative trades for highly risk-tolerant investors. Although, the EU proposed an Asset Regulation in September 2020, which seeks to apply standards depending on the "significance" of particular stablecoins, this "importance" is determined by the size of the stablecoin issuer's customer base; the value of tokens issued and used in individual transactions; the level of the issuer's reserve assets; and interconnectivity of financial systems and financial instruments [26].

V. DISCUSSION

A. Transparency

It is evident that the technology backing bitcoin, in the form of distributed ledgers, provides greater transparency in tracking illicit money flows, as was seen in the case of the ransomware attack. Thus, Bitcoin can be seen as heightening barriers within the shadow economy, due to the ease of tracking bitcoin transactions.

Although, some argue that DeFi is more equal and transparent, as much of the activity is based on publicly available code [38], this does not necessarily translate into improved investor and financial consumer awareness of the nature of financial risks. The average retail investor (without

sufficient technical knowledge and financial literacy) would not be able to understand the implicit risks, despite the transparency of the open-source code [39]. Technically, users would require a combination of coding skills and financial literacy in order to fully understand the mechanism of the protocol as well as the implications of the code on financial and other (e.g., governance) risks.

Furthermore, much of DeFi is funded by professional investors as well as venture capitalists and private equity groups. The underlying funding agreement provides professional investors with shares, options, advisory roles, access to project team management, formal or informal voice in governance and operations, dilution rights, and control to allies. These contracts are rarely disclosed but can have a significant impact on asset values and outcomes. Retail investors, who are already at a notable disadvantage to professional investors in DeFi, are further harmed by this information asymmetry which reduces the transparency of transacting parties [40], [41]. Thus, although DeFi generates distributed trust with public ledgers, expanding the scale and scope of potential transactions, its open-source code requires a level of technological and financial literacy to be understood. In addition, the funding deals of DeFi carry undisclosed arrangements, increasing information asymmetry.

Studies [9], [11], [18] show that there are ways to transact in bitcoin that use less energy, the predominant ways of transacting remain highly energy intensive, adding to the social cost involved in its production and use, which could cripple developing nations. However, despite these environmental costs, Bitcoin appears to remain an economically viable alternative to the official currency, according to McCook, who estimated the environmental costs of Bitcoin mining to be lower than the costs of issuing paper money, gold mining and banking systems [19]. Thus, the relative social cost of bitcoin could be seen as less than traditional fiat currencies. Thus, the increased transparency that the blockchain technology lends can lead to user privacy being endangered; rigidity and inflexibility that could hinder experimentation; as well as limited efficiency due to neglecting more qualitative inputs.



Fig. 4 SWOT analysis: transparency

1. Stablecoins

Some stablecoins tied to fiat currencies, such as Tether, aim to maintain their pegs by keeping up a store of reserves of traditional assets. The number/value of tokens in circulation should be equivalent to their reserve holdings. However, there is a lack of information about how those reserves are managed. Furthermore, they are not subject to audits under internationally recognised accounting standards [36]. This information asymmetry poses significant risks to the investor, as seen through the recent tether downturn and “Black Thursday”, which reduces the transparency of investing in DeFi, which could lead to a drop in the rates of adoption.

B. Social Impact

Fintech could afford developing countries the possibility to leap directly to the new e-commerce and e-finance operations by the significant evolution in financial services through the development of mobile phone uses, mobile money transactions, payment solutions, etc., such as M-Pesa, BitLand, BitPesa, Musoni, and Flutterwave. Fintech start-ups are doing business in different countries of three regions: Latin America, Africa, and Asia. These regions have the largest concentration and intensive existence rate of unbanked and underbanked populations in the world.

In fact, there are nearly 1.7 billion people, mostly in Asia and Africa, who do not yet have a proof of identity and essentially are cut off from accessing basic services and rights [24]. Without proof of identity such as an ID card, the simple process required to open a bank account becomes more onerous, as a bureaucratic operation that may lead inevitably to the rejection or nonacceptance for opening an account [24]. However, an electronic national ID or other digital identification system can facilitate and enhance fintech start-ups’ activities and allow customers who have wide access to financing institutions to reach other digital financial platform services as well.

Despite all its capacities and advantages, fintech might also present risks and dangers for such developing countries at most levels of development. Distinct doubt has also arisen about undesirable impacts that can seriously affect some emergent markets driven by fintech companies.

1. Nubank

Digital technology can be seen as a disruptor to retail banks in the developing world as demonstrated by Nubank’s lower interest rates, which have caused many Latin American banks to match these offerings. Furthermore, fintech innovations can be seen to increase financial inclusion, through the ease of opening a bank account, and access to financial services from a cell phone.

2. El Salvador

Although the decentralised network’s lack of accountability poses a risk of moral hazard, bitcoin can be seen to preserve the earning power of overseas workers through a cost-effective remittance system. As cryptocurrency facilitates the elimination of third-party intermediaries, it makes it cheaper for small businesses to transact and lowers the cost of global remittances.

It has, therefore, the potential to alleviate global poverty and improve access to capital [24]. Furthermore, it can act as a store of value for El Salvadorians, albeit a volatile one, and reduces the country’s dependence on the US dollar.

C. Regulation

Social impact financial services solutions based on major publicly traded cryptocurrencies are potentially subject to transmission of volatility, as seen with the recent Terra stablecoin downturn. In addition, by the nature of bitcoin, which eliminates or reduces the involvement of central entities, no central entity can be held accountable for bitcoin [33]. Thus, in difficult and critical situations, there is no central party to resort to, therefore when a decentralised platform temporarily fails, no central party can quickly restore the platform: without accountability. For this reason, decentralised platforms may have serious limitations.

1. Stablecoins

Crypto-backed stablecoins like DAI are highly volatile, and when many MakerDAO loans run out of collateral, borrower accounts are automatically liquidated. This is an area that requires regulatory oversight to protect investors. Furthermore, fiat-backed stablecoin issuers do not need to hold reserves for each token held in a bank account, this can undermine financial stability [42]. Thus, the event of a run on the crypto assets could lead to significant market sell pressure, which could in turn result in a stock market downturn. We can draw parallels from this financial instability to the cause of the 2008 crisis in which banks were highly leveraged. Thus, we should anticipate regulatory measures on the debt-to-equity ratios of these issuers in the coming years. Although, the EU has already taken steps to regulate these assets in accordance with their “significance”, this framework provides a strong step to address the financial stability concerns raised by the volatility of stablecoins.

VI. CONCLUSION

One of the main attractive features of DeFi is its transparency. Although DeFi generates distributed trust with public ledgers, its open-source code requires a level of technological and financial literacy to be understood. Furthermore, the increased transparency can lead to user privacy being endangered, rigidity and inflexibility, and environmental costs. In addition, this distributed trust can dramatically increase the costs involved in storing and processing this information, increasing the blockchain security threat, due to its huge database. Currently, it is unclear whether the expansion in the scale and scope of potential transactions (due to distributed trust) would be sufficient to counterbalance this storage cost and informational cost imposed on the environment.

Regarding the social impact of DeFi, it can provide entrepreneurial initiatives, as well as protecting against capital control and monetary censorship. This can be seen through the legalisation of bitcoin in El Salvador which allowed it to liberate itself from US financial hegemony and reduce inequality through lower network fees involved in remittances.

In the case of Nubank, it has afforded developing countries the possibility to leap directly to the new e-commerce and e-finance operations- revolutionising access to finance in the developing world. Nubank's lower interest rates have shown that fintech solutions have the potential to provide disruptive financial services.

Although Bitcoin can be used as a store of value in developing countries, in some cases preferable to the local currency, bitcoin can be subject to liquidity risks, as its price exhibits strong susceptibility to herd behaviour. The alternative to cryptocurrency, widely regarded as more 'stable': stablecoins show this same tendency, demonstrated during the Tether downturn. Therefore, although DeFi despite its costs (associated with transparency) and volatility, has the potential to alleviate poverty, it still lacks regulation by governments, which allows it to enable illicit activities. Thus, more research is needed surrounding regulation of DeFi, which needs to involve both governments and private sector.

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