# Why Did Bitcoin Fail as a Currency?

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**Taher Calcuttawala**

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

Advisor

Joshua Earle, Department of Engineering and Society

# STS Research Paper

## Introduction

Bitcoin users made an astounding $8.2 trillion in transactions in 2022, which equates to roughly $260,000 per second (Luvaga, 2023). This is a 1000% increase in transaction volume since 2017 (Georgiev, 2019). Bitcoin has come a long way since its first block was mined in 2009 (George, 2023). Bitcoin's founder, Satoshi Nakamoto, intended the virtual currency to be a decentralized and cryptographically secure electronic payment system without a trusted third-party intermediary to facilitate transactions (Nakamoto, 2008). Interestingly, an analysis of Bitcoin transactions uncovered that its primary usage is not as a currency but as a speculative asset (Baur et al., 2018). Speculative assets are classified by their significant volatility and high-risk/high-reward nature (Hayes, 2022). This paper aims to answer the question: Why did Bitcoin fail as a currency?

A currency is a medium of exchange used to purchase goods and services that typically has government backing. Most currencies have certain features that support their use for transactions. They are exchangeable, meaning one unit of a currency equates to one unit of the same currency. They are durable and easy to carry, making them last over many exchanges and convenient to use. They are also recognizable and trusted, so people adopt them to complete transactions (Frankenfield, 2020). Cryptocurrencies, on the other hand, are virtual currencies that use cryptography to secure transactions. They are electronic and are usually not issued or backed by a central authority (Frankenfield, 2020).

I will briefly describe how Bitcoin works, as it may provide insight into why it failed as a currency. Bitcoin is a digital currency that offers a solution to the issue of trust in a decentralized

monetary system. It uses a public ledger called a blockchain that records all valid transactions in chronological order. This ledger is auditable by all participants in the network, whether they are individuals or autonomous agent. People send information about a transaction they want to make to the Bitcoin network. Peers in the network check to make sure the transactions are legitimate. If they are, the network combines the transactions into groups called "blocks," which are secured cryptographically. Miners then race to add the new block to the existing chain of blocks, creating a timeline of all the transactions that have ever occurred on the Bitcoin network. (Aste et al., 2017).

In the next section, I describe the methods used to conduct my research and analyze my results. Then, I summarize the results of the research, highlighting specific features and reactions to Bitcoin. I then analyze the results to uncover why Bitcoin failed as a currency. Finally, I discuss the analysis in the broader context of blockchain technology and cryptocurrencies as a whole.

**Methods**

I conducted research for this paper using analyses of Bitcoin. These articles ranged from financial to cultural analyses of the cryptocurrency. Specifically, I researched the motivations for creating Bitcoin, its main uses, the government's responses to its widespread use, how people interact with it, and its environmental impact. Researching these aspects of Bitcoin uncovered why users generally moved away from using it as a currency.

For the analysis, I used Actor-Network Theory as it allowed me to investigate the many factors that affect Bitcoin. The Bitcoin network’s main actors were the various adopters of the currency: currency users and investors, and regulators such as the government. Each of these

different actors uses the Bitcoin network differently, and their intentions affect other users. By using Actor-Network Theory, the transformation of Bitcoin is easier to understand when decomposed into a study of the different actors that affect it.

## Results

### *Bitcoin Perception and Use:*

Due to its extensive price fluctuations and significant returns, Bitcoin is considered a speculative asset rather than a means of exchange. An analysis of Bitcoin's usage from 2011 to 2013 showed that the primary user groups of Bitcoin are classified as investors (Baur et al., 2018). This directly contradicts Nakamoto's vision for Bitcoin: to create an electronic payment system allowing parties to transact directly (Nakamoto, 2008). Interestingly, volatility is a feature that has attracted many people to Bitcoin, despite it making the cryptocurrency less useful as a means of payment (Dodd, 2017). Bitcoin is volatile because it has no intrinsic value and no institution backing it. As a result, its price is susceptible to fluctuations from slight changes in investor perception and expectation (Lapin, 2021).

Privacy is what compelled many to use Bitcoin at first. One of the earliest groups to adopt Bitcoin were businesses that sought features not readily accessible through other means, such as increased anonymity and a lack of restrictions on what could be purchased or sold. The Silk Road marketplace was an anonymous online marketplace and was the first to support transactions made with Bitcoin solely. One year after it started, the marketplace reached a transaction volume of $15 million per year (Christin, 2012). Gambling websites also embraced the use of Bitcoin, aiming to preserve their customers' privacy and accept payments from those who could not utilize traditional payment methods (Böhme, 2015).

Another compelling feature of Bitcoin is decentralization. Decentralization shifts power and authority from a centralized entity, such as an individual, organization, or group, to a distributed network. This decreases the reliance and trust placed in one another and prevents the exertion of control that may negatively impact the network's performance (AWS, n.d.). Nakamoto's reasoning for decentralization was to allow transactions without the need for a trusted third party by leveraging cryptography (Nakamoto, 2008). It also prevents a concentration of power that could lead to a single person or organization controlling and manipulating the Bitcoin network and prevents a single point of failure (Tambe, 2023).

Individuals are attracted to Bitcoin due to their perception of inadequacies in the existing monetary system. Specifically, Bitcoin appeals to those with libertarian and anarchist views who believe people should strip the government's monetary control. The broader appeal of Bitcoin lies not just in its ability to remove money from the control of financial institutions and governments but in its power to eliminate politics from the creation and administration of money entirely. Due to this, Bitcoin can also be considered a social movement (Dodd, 2017).

Bitcoin's implementation allows for various other advantages that have drawn users to the cryptocurrency. Unlike credit card companies that block illegal transactions, Bitcoin imposes no such prohibition on any transaction. It also does not require any financial institute or middleman to verify an individual's identity, enticing organizations who aim to evade international capital control (Foley et al., 2018). The People's Bank of China, China's central bank, prohibited banks from dealing with Bitcoin exchanges in December 2013. The Economist magazine attributed this decision to the desire to stop the movement of yuan overseas through Bitcoin (D.K., 2013). There is also a significant level of interest in Bitcoin in Argentina, where government regulations restrict the transfer of funds to other currencies (McLeod, 2013).

***Bitcoin Drawbacks:***

Although the Bitcoin protocol allows for complete decentralization, economic forces drive the concentration of power among a small number of intermediaries in various parts of the Bitcoin ecosystem, effectively centralizing the platform (Kroll et al., 2013). Mining Bitcoin introduces new coins into circulation and is a key aspect of confirming new transactions on the network. It also plays a crucial role in maintaining and developing the blockchain ledger system (Hong, 2021). Mining is a competition among users to validate transactions. A user's greater computing power correlates to an increased chance of successfully mining a block. Those who verify and construct blocks are rewarded for their contributions (Aste et al., 2017). As more miners compete to verify transactions, the difficulty of mining increases, increasing the computational power needed for a user to mine a block successfully.

Since mining a block is an all-or-nothing task, miners are at risk of wasting significant resources without any reward. To combat this, miners combine resources to form mining pools and increase their chance of successfully mining a block. The rewards are distributed to the contributing miners if the pool mines a block (Datta & Hodor, 2023). The excessive size of some mining pools poses a threat to the decentralized nature that is essential for the trustworthiness of Bitcoin. For example, in June 2014, a mining pool, GHash, held over 50% of the total mining power for a twelve-hour period, which could have led to potential manipulations of the Bitcoin blockchain by GHash pool operators. An attacker with control over the majority of Bitcoin's computational resources could alter the system's records, including adding false transactions and rejecting legitimate ones (Böhme, 2015).

Bitcoin *can* be used to purchase goods and services. However, marketplaces typically quote its price in a currency such as the US dollar due to the highly volatile nature of Bitcoin's

value. It is unrealistic to envision Bitcoin replacing state-issued currencies or even becoming widely adopted in mainstream use (Dodd, 2017). Currency exchanges offer users the opportunity to exchange their Bitcoins for traditional or other virtual currencies. Currently, many Bitcoin exchange transactions involve one or even two conversions to and from conventional currencies. Additionally, exchanges almost always quote the price of Bitcoin in real time based on a fixed amount of conventional currency. As a result, Bitcoin resembles more of a payment platform than a currency (Böhme, 2015).

***Bitcoin Regulations:***

There is now a growing consensus that Bitcoin regulatory oversight is feasible and may be beneficial in certain circumstances. One reason for the need for regulation is the lack of consumer protection and the irreversibility of the Bitcoin blockchain. Protection against unauthorized transfers is a common feature of most electronic payment systems. Lawmakers have written most of these protections into laws. Bitcoin's lack of these protections seems to go against established public policy (Böhme, 2015). An example that highlights the need for consumer protection is the failure of the Mt. Gox cryptocurrency exchange in February 2014. The firm uncovered the loss of a substantial number of Bitcoins, with estimations varying from 650,000 to 850,000 coins. Authorities were able to recover 200,000 of those Bitcoins. However, the missing cryptocurrency had a profound impact on market stability. The worth of the lost Bitcoins was estimated to be in the range of hundreds of millions of dollars (Frankenfield, 2019).

A significant challenge for potential regulators lies in determining where to impose regulations. The sheer number of peers in the Bitcoin network, coupled with their geographic dispersion and the privacy features of the network, make it impractical to regulate all participants. Regulators are, therefore, inclined to focus on key intermediaries. However,

intermediaries are likely to raise objections, questioning why they should be held responsible for the actions of third-party users, customers, or suppliers. Additionally, some users may anticipate the targeting of intermediaries by regulators and take measures to avoid such monitoring, similar to how criminals may use cash transactions to conceal illegal activities from financial institutions (Böhme, 2015).

The United States implemented Know Your Customer and anti-money laundering regulations for cryptocurrency exchanges operating within the United States several years ago. However, these measures have been ineffective in curbing illicit transactions, as individuals can simply utilize exchanges located in other countries. The US government has increased its efforts to mitigate cybercrime through legal means and confiscate cryptocurrencies obtained through criminal activities. One notable instance of this effort was the successful seizure of Bitcoin valued at approximately $2.3 million by Colonial Pipeline from hackers who had infiltrated the company and disrupted fuel supply to the east coast (Wolff, 2022). China has been more aggressive with its cryptocurrency regulations too, declaring all cryptocurrency transactions illegal in September 2021. The reasoning for this decision is that, at its best, Bitcoin is just a speculative asset but has the negative potential to be a vehicle for money laundering. (BBC News, 2021).

The annual global carbon emissions of Bitcoin mining are similar to the levels produced by Jordan, which is the 82nd largest CO2 emitting country. Global electricity prices do not take into account the future harm caused by current emissions, and as such, economic theory advocates for government intervention to rectify this market failure to improve social welfare (Stoll et al., 2019). Countries like Iran have embraced cryptocurrency mining as a means of increasing revenue amidst sanctions on their oil exports. The availability of low-cost energy has

attracted numerous cryptocurrency miners, with mining operations in Iran now constituting 8% of the total computational power in the Bitcoin network. Iran's use of Bitcoin could be to bypass economic sanctions. Various countries sanctioned Iran to prevent them from acquiring nuclear military capabilities. If this is the case, Iran's use of Bitcoin could pose a threat to global security. In 2018, Hydro-Quebec, a Canadian power company, in collaboration with the Quebec Energy Board, a regulatory body, enacted a temporary ban on the establishment of new cryptocurrency mining operations due to a surge in applications that posed a risk to the stability of the regional energy grid. Furthermore, in January 2021, Iran took the step of confiscating mining equipment amid power outages attributed to the high demand for energy generated by cryptocurrency mining activities (de Vries, 2021).

**Analysis**

The main actors involved in Bitcoin are currency users, investors, and regulators. Each of these groups uses the virtual currency differently, affecting the Bitcoin network. Anonymity drew many currency users to Bitcoin, which may be why anonymous online marketplaces such as the Silk Road and gambling websites accept payment in Bitcoin. It is likely that users of those services did not want their purchases tracked and therefore resorted to Bitcoin for protection. Unfortunately, Bitcoin is not entirely anonymous. Evidence shows that the US government can track Bitcoin transactions and has cracked down on illicit activities. Actors who want to make purchases anonymously no longer do so because of government pressure and the persistence of transactions on the blockchain tying illicit purchases back to users. This pressure may drive Bitcoin currency users to other, more anonymous cryptocurrencies.

Those with anarchist and libertarian views embrace Bitcoin as they believe monetary control should not be in the hands of the government. It is evident why they support Bitcoin as it employs cryptography to secure payments rather than relying on a trusted third party such as a government or a bank. Economic forces have forced Bitcoin to become more centralized. Entities such as mining pools control large percentages of Bitcoin mining and, as a result, could arbitrarily modify the blockchain. The consolidation of mining power can be seen as a centralizing force, as it increases the power of a single entity: the mining pool. This may explain why most Bitcoin users are investors rather than currency users, as traditional currency users were driven away from Bitcoin because of these drawbacks. Actors who believe the money supply should be decentralized moved away from Bitcoin as economic forces centralized the mining of coins through mining pools. The same groups who distrust the governments control of the monetary system may now have similar feelings towards Bitcoin.

Investors are the largest group that uses Bitcoin. They are drawn to Bitcoin due to its classification as a speculative asset, meaning it is a high-risk/high-reward volatile investment. The ability to quickly buy and sell the virtual currency may be another factor that draws investors. Additionally, the possibility of quickly making large profits, like gambling, may entice a certain kind of investor. Unfortunately for currency users, minimizing volatility is imperative as it makes transactions for goods and services difficult, as the value of Bitcoin may change drastically from day to day. This may be why firms accepting Bitcoin payment avoid pricing goods and services in the virtual currency and opt to use a traditional currency like the US dollar. Investor actors who profit from Bitcoin's instability could be driving away currency users who prefer a more stable virtual currency.

Regulators such as the government shape Bitcoin through legislation, impacting the other actors participating in the network. While previously thought to be very difficult, the US government has cracked down on various cybercrimes and recovered stolen Bitcoin in some instances, which may scare away currency users who believed they were safe behind Bitcoin's guise of anonymity. Additionally, as many of Bitcoin's currency users use it for illicit transactions, government regulation may dissuade those actors from using the currency for fear of facing criminal charges. The Chinese government banned the use of all cryptocurrencies due to the frequency of money laundering and other illicit practices through them, negatively affecting all actors of the Bitcoin network as they can no longer complete transactions. Other countries have banned cryptocurrency mining due to the strain it has on local power grids. This may also drive away investors and currency users as a reduction in miners could cause an increase in transaction times and fees, consequences that harm all actors.

**Discussion**

While Bitcoin was the first successful cryptocurrency, many of its features have not aged well. It is a brilliant proof of concept that highlights the potential of blockchain technology. Unfortunately, many modern cryptocurrencies offer much more. On average, one Bitcoin transaction takes around an hour to confirm. Miners confirm a Bitcoin transaction by mining at least six blocks on top of the block containing the desired transaction (Gondek, n.d.). For comparison, the cryptocurrency XRP has a confirmation time of three to five seconds by using a different consensus protocol. When considering desirable factors for a currency, transaction speed is imperative for ease of use. Unfortunately for Bitcoin, its slow block mining time hurts

its usability as a medium of exchange. Fortunately, creators have developed different currencies to combat this, making them similar to traditional currencies.

Bitcoin is a Proof-of-Work currency, meaning miners must complete computationally intensive algorithms to confirm transactions and mint new Bitcoin, which demands significant power and electricity. Proof-of-Stake is a different consensus mechanism that has a much lower environmental impact. Instead of completing computations, miners financially stake some of their currency to verify their honesty. Currencies that use this mining method could significantly reduce their carbon footprint, making it a better medium of exchange for the environment.

Cryptocurrencies have evolved since Bitcoin's inception. New protocols have made them more efficient, highly capable and have even stabilized their price. The numerous actors participating in Bitcoin's network are responsible for its inability to replicate a traditional currency. Differing goals among the actors modified the Bitcoin network, transforming it into what it is today: a speculative asset. Despite this, there are over 100 cryptocurrencies created each day. With this level of enthusiasm for blockchain technology, there is no doubt that cryptocurrencies have a future.

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