Blockchain & Cryptocurrencies: Technology, Money, or What?

By Raymond Lee

I first became fascinated with blockchain two years ago after hearing on the news that a piece of "NFT" digital artwork sold for 69 million dollars; confused and curious, I quickly learned that Beeple's digital artwork, "Everydays — The First Five Thousand Days," was a non-fungible token (NFT), a blockchain-based token representing a unique asset entailing art, ownership rights, or other forms of content and media (Weiner). Despite my research, I still could not fully comprehend how a JPG file that could be screen-shot and re-uploaded at any time by any member of the public could have any tangible asset value–let alone 69 million dollars worth. This concept puzzled me, leading me to delve deeper into the mechanics of NFTs and their valuation. Nevertheless, my 17-year-old self believed I was witnessing the first chapter in a new age of art, sparking my interest in the blockchain and its products. Despite blockchain coming into the mainstream two years ago, evolving and solidifying itself into its own newfound industry, the concept of its technological framework showcasing decentralization and a distributed database of transactions was first outlined in the 1980s.

Decentralization refers to a process of spreading responsibility to different people or computers, and a distributed database of transactions is a record-keeping system that many computers work on so that no one computer has all the important information. In 1991, Stuart Haber and W. Scott drafted a white paper, which is an authoritative report giving information on a complex issue, solidifying the idea of time-stamping a digital document. Years later, the popularity of the technological concept skyrocketed in 2008 when an anonymous individual with the online username "Satoshi Nakamoto" referenced Haber and Scott's work in their original "Bitcoin" white paper, making their work a critical piece of blockchain infrastructure in

cryptocurrency development made notable again. This white paper is what we know today as a critical piece of blockchain infrastructure used in developing cryptocurrencies—digital money you can use on the internet (Iredale).

The concept of blockchain can be simplified to a metaphor where a file of transactions is stored on your computer (a "ledger"), and you (a "node") make a transaction by sending two accountants ("miners") an email each to inform them of the transaction. This means you are notifying the two accountants about your transaction (Benefits of Blockchain - IBM Blockchain | IBM). The two accountants each have the same file of transactions on their computer (thus, it's "distributed"); next, each accountant checks to see if you can afford the transaction and expects to be paid in "Bitcoins" for their work. The first of the two accountants will check your information and validate it by executing "Reply All," which showcases all their logic and reasoning for validating your transaction in their reply ("proof of work"). If the other accountant agrees, everyone has successfully updated their file. The same transaction file(s) are 'distributed' or held on each accountant's computer. This concept is a process enabled via "Blockchain" technology. Blockchain, as a technology, powers the various applications that are more widely known and interactive to the public: digital currencies (e.g., Bitcoin, Ethereum), NFTs, smart contracts, blockchain-based voting systems, decentralized finance products (DeFi), etc.

Discussing all this, it is controversial whether blockchain's security protocols are safe, whether society can trust a decentralized monetary ecosystem, and whether NFTs are just part of another economic bubble driven by hype and speculation. Some argue that blockchain offers innovative solutions in banking and financial services, land titling, supply chains, real estate, and other varying industries. Blockchain creates an audit trail allowing the public to track the origin of funds; thus, in industries with concerns regarding counterfeiting or fraud, it not only provides

proof but can also expose weaknesses in a supply chain due to its traceability data (Benefits of Blockchain - IBM Blockchain | IBM). In the words of Professor Kevin Werbach, a professor of legal studies and business at the Wharton School, one of this view's main proponents, "The challenge is not the [blockchain]; it's the issues involved relating to implementation, organization, and trust" ('How the Blockchain Brings Social Benefits to Emerging Economies'). Is the blockchain equipped to address societal problems? Should it be trusted? In sum, it comes down to whether blockchain has the necessary components to be implemented and trusted in addressing governments, security, and supply chains or lacks the organization and structure to be a revolutionary technology as it is perceived to be. Ultimately, blockchain possesses the potential to change existing systems in concept due to its distributed ledger technology and ability to verify transactions; however, not only are blockchain-based existing technologies not as efficient as their original counterparts, but they also exhibit fundamental contradictions in defining cryptocurrencies as investment assets whilst creating negative externalities on the financial markets.

Although blockchain's central promise is its decentralized network and ability to make transactions peer-to-peer online, whenever individuals attempt to recreate or increase efficiency to real-world problems, recreated solutions are simply slower and worse versions of existing processes and structures. Peer-to-peer refers to transactions that are dealt with between buying and selling parties only, exclusive of any central mediators or institutions facilitating the transaction (Benefits of Blockchain - IBM Blockchain | IBM). The most prominent example of these so-called "worse versions" would be cryptocurrency. At its fundamental characteristic level, money must be stable, durable, portable, divisible, uniform, acceptable, and possess a limited supply; these characteristics are what economists call the "six properties of money."

These criteria assess how well money is functioning as a medium of exchange, store of value, or a unit of account (‘What Is Money?’). While cryptocurrencies encapsulate many of these properties due to their digital nature, they simply do not fulfill all criteria. As of now, approximately 3 billion people, or about 47% of the world, do not have access to the internet; this poses a problem as it cuts people off entirely from transacting these currencies like Bitcoin, the biggest cryptocurrency in the world by market cap, should they become legal tender with government institutions. Another issue with cryptocurrencies such as Bitcoin is the expensive transaction fees that are required every time you send something via the blockchain; transaction fees in 2021 were at a median of $20, frequently resulting in fees costing more than the actual paid amount, making cryptocurrencies an unviable medium of exchange (‘The Brutal Truth about Bitcoin’). It also takes a long time for cryptocurrency transactions to be validated on the blockchain, with Bitcoin averaging about 10 minutes of approval time (‘The Brutal Truth about Bitcoin’).

One example of cryptocurrency serving as a failed and worse version of an existing solution would be Salvadoran President Nayib Bukele’s attempt to establish Bitcoin as an official national currency alongside the U.S. dollar. Not only have 91% of Salvadorans indicated a preference for the U.S. dollar over Bitcoin, but The Chivo payment system, a digital wallet and mobile app used for facilitating Bitcoin transactions alongside the U.S. dollar in El Salvador, was largely unreliable at launch due to repeated accounts of identity fraud (‘El Salvador’s $300 Million Bitcoin “Revolution” Is Failing Miserably’). The idea of a governmentally monetized digital currency slowly began to fade when Salvadorans engaged in large protests against compulsory Bitcoin usage. Similarly, the International Monetary Fund (IMF) voiced concerns about the scheme and the risks associated with it being legal tender. In response to the IMF,

Bukele maintained plans for a “Bitcoin City,” a new charter city around Bitcoin mining. This city, funded by issuing one billion dollars in “volcano bonds,” a proposed financial instrument by Bukele, is backed by future Bitcoin revenue and other cryptocurrency-related investments. These bonds not only qualify investors for Salvadoran citizenship if they hold 100,000 dollars’ worth, but they would also pay investors 6.5% annual interest, with half a billion dollars used to buy Bitcoin. However, investors were extremely distrustful as their bonds would be issued via Bitfinex Securities (‘El Salvador’s $300 Million Bitcoin “Revolution” Is Failing Miserably’). Although a cryptocurrency exchange ranked eighth in trading volume, on August 2, 2016, hackers stole approximately 120,000 bitcoins (72 million dollars at the time) from the exchange, consequently harming the exchange’s reputation in customer security. To touch back on Werbach’s point, once again, the issue with blockchain comes down to the challenges regarding implementation and trust rather than the technology itself.

Blockchain technology possesses fundamental limitations in its ability to scale and create negative externalities in financial markets. To assess and compare Bitcoin as a monetary instrument, we must contextualize it as a financial asset rather than conventional “money” or “currency.” The El Salvadoran experiment highlights the complexities and challenges of adopting cryptocurrency at a national level. Despite Bitcoin's promise of decentralization and financial inclusion, its real-world application has been marred by technological issues, lack of trust, and resistance from the populace and international institutions. Today, most people see and treat their cryptocurrency as an investment, yet there isn’t a physical thing of value that backs the cryptocurrency, nor is it in relation to any economic activity. A counterargument could suggest that a dollar does neither of those things either (The Case Against Crypto). However, unlike cryptocurrency, the dollar doesn’t claim to be an investment or financial asset; as a separate class

of financial instrument, the dollar can be deduced as a monetary object to which its efficiency is measured through its fulfillment of the "six properties of money." As a result, the problem with promoting cryptocurrencies and their sophistry is that companies simultaneously attempt to advertise these tokens as monetary objects and investments. This grey area of dual advertising revisits the very same issues of trust regarding implementation. Through marketing, properties of traditional financial products are being interchangeably associated with cryptocurrency without regard to the contradiction, displaying the effects of an asset (cryptocurrency) with no income or cash flows; its demand is purely based on narrative, promise, and the greater fool theory—the idea of buying something expensive and hoping to sell it to someone else for even more money, even if it doesn't have much value (The Philosophical Argument Against Crypto). Microsoft founder Bill Gates said in a conversation with TechCrunch that cryptocurrencies and NFTs were "100 percent based on greater fool theory" ('Cryptocurrency and the "Greater Fool" Theory of Economics'). Or, as Berkshire Hathaway chairman and CEO Warren Buffet said in 2020, "Cryptocurrencies have no value. You can't do anything with it except sell it to somebody else" ('Cryptocurrency and the "Greater Fool" Theory of Economics'). Blockchain also introduces artificial volatility into markets with limited economic activity, creating a big opportunity cost; as a result, investment opportunities appear only as a synthetic hedge against other productive assets, displaying its effects of technical regression. The volatility of Bitcoin ignites concern about its use as a worldwide currency; due to its large yet fluctuating prices in conjunction with the long transaction time, the value of goods and services may go down or up, resulting in an extra loss or profit to the receiver by the time they convert the coins back to fiat. High volatility also means individuals can use the same 10 dollars to buy a beer on one day but a bottle of exotic wine on another.

Examples of cryptocurrencies' volatility affecting financial markets include when Bitcoin explained a sixth of S&P500 volatility during the pandemic and a tenth of the changes in stock market returns (Mahvash S. et al.). Another factor that cannot be dismissed is if investors owned both Bitcoin and regular stocks; if Bitcoin prices fall, it will make investors more cautious and incentivize them to invest less in traditional stocks and bonds. However, this influence also goes the other way around, with increases and decreases in the stock market affecting Bitcoin and its fear and greed index. The growing interconnectedness between digital assets and stocks becomes especially significant during market turbulence or extreme price volatility, as seen in March 2020 and early 2021. Similarly, stablecoins, a type of cryptocurrency pegged to a fiat currency, specifically Tether, also introduced volatility into the stock market, though their impact is much smaller than Bitcoin's. From another perspective, people often misunderstand cryptocurrency as Veblen goods due to its high promise, high cost, and value generated by their dollar signs as products of high status and social significance. The diamond and gemstone industry is a prime example of narrative-driven demand; despite high trading premiums relative to production costs, these products are naturally scarce, unlike artificially scarce cryptocurrencies. They are challenging to manipulate commodities: you cannot just snap for a Rolex to appear out of thin air, whereas, with cryptocurrencies, you can create one anytime, anywhere, with a "limited supply."

Conclusively, while blockchain has the potential to be a transformative technology in niche industries, it cannot replace many of the existing systems we have in place today. While blockchain can revolutionize current systems of transactions due to increased transparency and security, existing blockchain technologies are not as efficient as their traditional counterparts. They also pose fundamental contradictions by defining *cryptocurrencies* as investment assets,

causing adverse effects on the stock market. However, blockchain excels in making two-party transactions more efficient by automating transactions through “smart contracts,” the main component that gives the 69 million dollar JPG its value, a contract that can be coded to exchange digital ownership. (Benefits of Blockchain - IBM Blockchain | IBM). Smart contracts reduce human error and intervention and rely on third parties to review contract terms. For instance, a claim can be automatically filed and settled in insurance should the customer provide all their documentation due to the smart contract’s pre-specified conditions. Thus, with “smart contracts,” individuals can exchange assets peer to peer without the need for a middleman. For example, an author would now be able to sell their books directly to their audience through the blockchain; this way, book publishers won’t need to collect fees or a percentage of earnings; or, an individual looking to sell their property may list it on the web as a digital certificate of ownership. If an interested buyer comes by, they can purchase it immediately without the seller paying any fees to any agents or platforms for regulating the transaction. For many, it is hard to wrap their heads around a technology that promises to revitalize industries at mass and replace our medium of exchange that has backbone the United States for decades. To that point, it can’t: no matter how new or how innovative the next best technological solution may be, it cannot disregard the very nature of what money and its properties were made to be.

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