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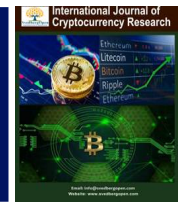
Research Paper

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Governance Challenges Faced by the Bitcoin Ecosystem: The Way Forward

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Abstract

The recent explosive development of new forms of the digital currency creates unprecedented opportunities while posing significant governance challenges. These challenges call into question whether bitcoin should adopt an institutionalized framework. It also raises concerns about whether bitcoin governance following the path of internet governance will be a viable solution to the challenges. This paper investigates the concept of the bitcoin ecosystem, the governance challenges that the ecosystem faces, stakeholder roles in governance, and whether having an institutionalized framework will effectively minimize the challenges that bitcoin network users face.

Keywords: *Digital currency, Governance challenges, Bitcoin ecosystem*

I. Introduction

Bitcoin is a digital currency that can be traded for goods or services with vendors accepting Bitcoin as payment. Without the use of a middleman like a bank or centralized authority, Bitcoin holders can buy, sell, and exchange goods and services directly.[1] With the advent and rapid pace at which Bitcoin has taken over the world, there is a need to understand the governance in the Bitcoin ecosystem, the challenges posed by the governance, and how these challenges can be mitigated to the bare minimum. When a system is created, one of the primary concerns is how to regulate its operation to ensure that it runs flawlessly. Most importantly, with an ecosystem like Bitcoin plagued by investment volatility, a lack of insurance, regulatory restrictions, and vulnerability to ransomware, the need for governance and the resolution of governance problems arise.

Bitcoin was introduced in 2009 by a person under the pseudonym Satoshi Nakamoto. The identity of Satoshi Nakamoto is still unknown. However, Nakamoto published a whitepaper titled "Bitcoin: A Peer-to-Peer Electronic Cash System." The whitepaper outlined the Bitcoin concept.[2] According to Nakamoto, the purpose of Bitcoin is to serve as an electronic payment system based on cryptographic proof rather than trust.[3]

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[1] Alexander, S. Gillis. (2021). *Bitcoin.* https://www.techtarget.com/whatis/definition/Bitcoin

[2] *Id.*

[3] Gillis, *Supra* note 2.

Some Bitcoin holders purchase it as an investment, hoping for it to appreciate, whereas individuals and businesses use or accept payments as currency. PayPal, for example, now accepts Bitcoin transactions, and El Salvador has accepted Bitcoin as a currency.[4]

Since its public launch in 2009, Bitcoin has risen dramatically in value.[5] It has since become the world's most well-known cryptocurrency. Its popularity has sparked the creation of numerous other cryptocurrencies. These rivals attempt to replace it as a payment system or are used as utility or security tokens in other blockchains and emerging financial technologies.[6]

Governance is a system that shapes the coordination of various enterprise participants.[7] As such, it refers to the processes that enable an organization to set its objectives, identify the means of achieving them, and monitor the performance of the organization against those objectives.[8] In traditional corporate law, the main governance objective is to design incentive mechanisms that optimally allocate ownership rights, and ownership structures, and define *control*, while aligning owners' interests to ensure that an organization's objective is met.[9]

In the Financial Market Infrastructure (FMI) context, governance is defined as "the set of relationships between an FMI's owners, board of directors (or equivalent), management, and other relevant parties, including participants, authorities, and other stakeholders (such as participants' customers, other interdependent FMIs, and the broader market)."[10] The governance of a blockchain is completely different. It essentially amounts to having the power to update its code, which may be done for technical reasons or to alter important constraints or assumptions (such as the rate at which new coins or shares are issued).[11]

Over the past ten years, some significant changes to the Bitcoin ecosystem have brought governance concerns to light. Such crises demonstrated the crucial role of human judgment in regulating Bitcoin and other cryptocurrencies because they could not be resolved by relying solely on the Nakamoto consensus.[12] Some of these crises include: an erroneous upgrade to the Bitcoin protocol and its rollback via coordination between developers and miners[13], the debate about Bitcoin scaling peaked in 2017 and resulted in extremely polarizing controversies in the Bitcoin community[14], and the discovery of an inflation bug in the Bitcoin protocol in September 2018 that allowed for potential double-spends.[15]

These crises resulted in the cancellation of some transactions[16], raising concerns not only about the finality of settlement, but also about Bitcoin Governance: transparency, who decides on issues concerning upgrades, and how such critical issues should be managed in the future. They emphasize the importance of Bitcoin

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[4] *Id.* For instance, El Salvador has adopted Bitcoin, a cryptocurrency produced using blockchain technology, as legal tender; Oscar Lopez and Ephrat Livni, *In Global First, El Salvador Adopts Bitcoin as Currency*, *New York Times,* (September 7, 2021), https://www.nytimes.com/2021/09/07/world/americas/el-salvador-Bitcoin.html.

[5] Kate, Ashford. (2022). *What Is Bitcoin And How Does It Work?* (June 8, 2022, 5:12 pm). https://www.forbes.com/advisor/investing/cryptocurrency/what-is-Bitcoin/

[6] Jake, Frankenfield. (2022). *What is Bitcoin? How to Mine, Buy, and Use it* (November 22, 2022). https://www.investopedia.com/terms/b/Bitcoin.asp

[7] Philipp, Hacker. (2019). Corporate Governance for Complex Cryptocurrencies? A Framework for Stability and Decision Making in Blockchain-Based Organizations. in Philipp Hacker *et al.* in *Regulating Blockchain: Techno-Social and Legal Challenges,* 140-166, Oxford Univ. Press.

[8] Comm. on Payment and Settlement Sys. & Technical Comm. of the Int'l Org. of Sec. Comm'ns, *Principles for Financial Market Infrastructures,* 26(2012). https://www.bis.org/cpmi/publ/d101a.pdf.

[9] Eugene, F. Fama. and Michael C. Jensen. (1983). *Separation of Ownership and Control, 26 J.L. & Econ.;* Brian L. Connelly, *et al.* (2010). Ownership as a Form of Corporate Governance, *J. of Mgmt. Stud.,* 47, In other words, governance refers to the dynamics of power and influence that shape decision-making within a firm and delineate the rights and responsibilities of various stakeholders towards the firm; Ying-Ying Hsieh *et al.* (2018). *The Internal and External Governance of Blockchain-Based Organizations: Evidence From Cryptocurrencies,* in Malcolm C. Verduyn. (2018). *Bitcoin and Beyond: Cryptocurrencies, Blockchains, and Global Governance, 48,* https://doi.org/10.4324/9781315211909

[10] *Supra* note 9.

[11] David, Yermack. (2017). Corporate Governance, and Blockchains. *Review of Finance,* 7. DOI: 10.1093/rof/rfw074.

[12] Aaron, van Wirdum. (2016). A Primer on Bitcoin Governance, or Why Developers Aren't in Charge of the Protocol. *Bitcoin Magazine,* September 7, 2016.

[13] This happened on March 11, 2013.

[14] Joseph, Poon. and Thaddeus, Dryja. (2016). *The Bitcoin Lightning Network: Scalable Off-Chain Instant Payments.* http://lightning.network/lightning-network-paper.pdf. *See also* Aaron van Wirdum. (2018). *The History of Lightning: From Brainstorm to Beta,* (April 4, 2018) *Bitcoin Magazine;* Aaron van Wirdum. (2016). *Mimblewimble: How a Stripped-Down Version of Bitcoin Could Improve Privacy, Fungibility, and Scalability All At Once,* (August 12, 2016) *Bitcoin Magazine* (August 12, 2016).

[15] *See* BitcoinCore, CVE-2018-17144 Full Disclosure (Notice) (September 20, 2018), https://Bitcoincore.org/en/2018/09/20/notice.

[16] *Id.*

having robust governance arrangements; whether these arrangements are built into the protocol (i.e., on-chain governance mechanisms) or delegated to Bitcoin network participants (i.e., off-chain governance mechanisms), or a combination of both mechanisms (i.e., a hybrid form of governance).[17]

This paper investigates the Bitcoin ecosystem, Bitcoin governance and its challenges, a comparison of Bitcoin governance to internet governance, stakeholders' roles in governance, and the need for an institutionalized framework as a way forward. This paper concludes that the lack of an institutionalized framework for Bitcoin governance is a contributing factor to the challenges with Bitcoin governance and recognizes the importance of institutional governance arrangements in dealing with Bitcoin's major crises.

2. The Bitcoin Ecosystem

It is impossible to discuss the emergence of the Bitcoin ecosystem without first defining blockchain, the technical infrastructure that underpins it. The term "blockchain" refers to a system of independently verified and cryptographically linked blocks that make up a single immutable ledger[18] It helps with the pairing of these blocks to avoid manipulation.[19] As previously stated, Satoshi Nakamoto conceived of blockchain as the infrastructure to support his digital currency, Bitcoin.[20] Thus, cryptocurrency was essentially founded on the premise of lowering the costs associated with governance, which had previously been largely handled by Trusted Third Parties (TTP).[21]

Bitcoin eliminates the need for central authorities such as banks or governments and uses blockchain technology to support peer-to-peer transactions between users on a decentralized network.[22] Transactions are authenticated using Bitcoin's proof-of-work consensus mechanism, which rewards cryptocurrency miners for validating transactions. Bitcoin (BTC) was the first and most valuable entrant into the emerging class of assets known as cryptocurrencies.[23]

2.1. How does the Bitcoin Ecosystem Work?

The growing popularity and practical applications of cryptocurrencies have sparked an interest in all things crypto. Each user's Bitcoin is stored in a program known as a digital wallet, which also contains each address from which the user sends and receives Bitcoin, as well as a private key known only to the user.[24] These wallets contain private and public keys which allow for the initiation and signing of transactions digitally.[25] Each coin represents the current value of Bitcoin, but you can also own a portion of each coin. Satoshi is the smallest denomination of each Bitcoin, named after Bitcoin's creator. Because each Satoshi is equal to one hundred millionth of a Bitcoin, owning fractional shares of Bitcoin is quite common.

Peer-to-peer transfers are used on a network of computers that keeps track of all cryptocurrency transactions. Bitcoin does away with the requirement for central facilitators, such as governments and banks, to verify currency transactions because these transfers are directly confirmed between users and are recorded on a shared public ledger.[26]

3. Bitcoin Governance and Its Challenges

There is no established protocol for Bitcoin. One could argue that the term 'governance' is not strictly applicable to Bitcoin. The reason is that governance implies a process of interaction through laws and a situation where leaders act as proxies for the masses; this is not how Bitcoin works. While formal governance mechanisms like the ability to vote on proposals on-chain or elect leaders are integrated into some blockchain-supported decentralized systems, Bitcoin does not.

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[17] Hossein, Nabilou. (2021). *Bitcoin Governance as a Decentralized Financial Market Infrastructure*, Univ. of Amsterdam Law Sch., June 30.

[18] Mira, Nagarajan. (2018). *An Analysis of Cryptocurrency Governance*, Joseph Wharton Scholars, June 26, 2018. Available at https://repository.upenn.edu/joseph_wharton_scholars/51

[19] Team Coin Switch. (2022). *What is a Crypto Ecosystem?*, July 12. https://coinswitch.co/switch/crypto/what-is-a-crypto-ecosystem/

[20] Gillis, *Supra* note 2.

[21] *Id.*

[22] Kevinn, Voigt. and Andy, Rosen. (2022). *What is Bitcoin? BTC Price and How it Works,* December 1. https://www.nerdwallet.com/article/investing/what-is-Bitcoin

[23] Bitcoin.org. Bitcoin: A Peer-to-Peer Electronic Cash System. Satoshi Nakomoto Accessed December 5, 2022. Launched in 2009 by a mysterious developer known as Satoshi Nakamoto

[24] Gillis, *Supra* note 2.

[25] Kevin, Voigt. and Andy, Rosen., *Supra* note 23

[26] David, Floyd. (2022). *How Bitcoin Works,* May 11. https://www.investopedia.com/news/how-Bitcoin-works/

For any association or organization, governance is crucial. It facilitates coordination. Without clear governance, there is a chance that some stakeholders will abuse the authority and influence they have over others. It may also be challenging to hold people accountable and offer appropriate conflict resolution grounds where governance is not institutionalized.

Bitcoin governance is the process by which a set of transaction and block verification rules are decided upon, implemented, and enforced, such that individuals adopt these rules for verifying that payments they received in transactions and blocks fit their subjective definition of "Bitcoin". [27]

3.1. Off-Chain Governance Mechanism

Bitcoin and many other blockchains use off-chain governance. Off-chain governance places the ultimate decision on whether or not to adopt a coding change in the hands of the people who provide the computing power required to run the blockchain (hereafter referred to as miners).[28] If the decision is left to the miners, some may accept the change while others will not, resulting in the blockchain being split into two separate blockchains with different rules. The possibility of such forking has serious implications for governance and the utility of such blockchains as financial infrastructure.[29]

3.2. On-Chain Governance Mechanism

On-chain governance addresses the issue of blockchain splits, but it raises the question of who controls the procedures for on-chain governance. In practice, on-chain governance blockchains typically allow voting by those with a stake in the blockchain, most commonly those who hold the blockchain's cryptocurrency. The goal is to distribute governance rights to those vested in the blockchain's success while retaining the permissionless blockchain advantage of independence from any trusted authority.[30]

Despite its noble intentions, on-chain governance does not always prevent decisions from being made by a small group of people. It also does not ensure that decision-makers are adequately informed and motivated by the blockchain's overall health.[31]

One factor contributing to concerns about a small group exercising control is how to distribute votes. The only group that can be identified objectively as having an interest in a blockchain's cryptocurrency is its owners.[32] However, relying on this group to make governance decisions will almost certainly result in those with the most coins (and thus the most money invested in the cryptocurrency) wielding the most power.[33]

3.3. Why do we Care about Bitcoin Governance?

By putting forth different models of organizational governance, blockchain-based businesses like cryptocurrencies compete with established financial institutions and essentially limit the extent to which institutions can implement frameworks governing the system. The Bitcoin network claims to be autonomous as well as self-sustaining. It aspires to operate independently of any social institution as a trustless infrastructure. The platform's rules are not enforced by a single entity; rather, they are embedded directly into the network protocol, which all users must follow.[34]

Bitcoin's governance matters because Bitcoin is the first successful, most liquid, and most widely known crypto-currency. If Bitcoin's governance model is flawed, it may prevent it from reaching its full potential. If Bitcoin's governance is flawed, Bitcoin's stakeholders should work to improve it.[35]

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[27] Pierre, Rochard. (2018). *Bitcoin Governance,* July 18. https://pierre-rochard.medium.com/Bitcoin-governance-37e86299470f
[28] The term "miners" is ordinarily used for those who supply the computing capacity to solve the cryptographic problem embedded in blockchains that rely upon a consensus method called proof of work.
[29] *Supra* note 7.
[30] *Id.*
[31] *Id.*
[32] *Id.*
[33] *Id.*
[34] Bruce, Bimber. (1994). *Three Faces of Technological Determinism,* June 14, in M.R. Smith. and L. Marx (eds.), *Does Technology Drive History? The Dilemma of Technological Determinism,* 79-100. Cambridge, MA, and London: MIT Press. This reveals a significant bias of the Bitcoin community towards technological determinism – a vision whereby technological artifacts can influence both culture and society, without the need for any social intervention or assimilation
[35] *Supra* note 28.

3.4. Governance Challenges with Bitcoin

The high level of controversy and inability to reach a consensus on key decisions on infrastructure design, security threats, and community policing have been described in the literature as components of an ongoing governance crisis confronting public blockchain protocols.[36] The Bitcoin and Ethereum communities' governance issues stem from conflicts of interest among governance participants.[37]

Participants in a blockchain protocol ecosystem typically include core developers, other open-source code contributors, full node operators, cryptocurrency or token holders, protocol founders, and foundations.[38] The most common governance issues in a public permissionless blockchain are how to get participants to agree on proposed core code upgrades, the SEC's involvement in regulating cryptocurrency, and investor interest and financing mechanisms surrounding cryptocurrency, all of which introduce the concept of external influence on governance systems.

Governance structures are established to adequately pursue collective goals, maintain social order, channel interests, and keep power relations in check, all while ensuring the legitimacy of collective actions.[39] They are thus closely related to the issue of trust, which is a key aspect of social coordination and which online socio-technical systems address in various ways by combining informal interpersonal relations, formal rules, and technical solutions.[40] Two key characteristics shape the governance structure of online peer-production communities: they are volunteer-driven and seek to self-organize.[41] As a result, they frequently need to implement alternative means of coordination and incentivization when compared to more traditional forms of organization such as firms and corporations.[42]

I agree with Nicolas Auray that, while the nature of online peer-production communities can vary greatly, they all face challenges that must be addressed for them to thrive.[43] He identifies three major challenges: defining and protecting community borders; creating incentives for participation and recognizing the status of contributors, and developing a conflict resolution mechanism.[44] Having a clear picture of how to resolve these challenges is difficult because Bitcoin has two distinct mechanisms: the decentralized payment system, which operates according to a specific set of protocols, and the developers and engineers who are tasked with developing the technology.[45]

It should go without saying that when difficulties arise, they should be explained because doing so helps suggest ways to find a solution. The fact that the Bitcoin ecosystem is decentralized means that its community boundaries are adaptable and dynamic to welcome new participants into the system. The issue with this is that it raises the question of protection, which in turn causes participants—both active and passive—to feel fear. This is primarily caused by the absence of a single organization in charge of monitoring its operations.[46]

The Proof-of-Work (POW) mechanism, which was created to make it prohibitively expensive to cheat the network, was implemented by Bitcoin as a technical solution to address this issue and safeguard the network against malicious attacks. Is it successful? Is this something that has been demonstrated to work? I feel compelled

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[36] Carla, L. Reyes. (2020). *(Un)Corporate Crypto-Governance,* April, 88, Fordham *L. Rev.* 1875; *See* Primavera De Filippi. and Benjamin Loveluck *The invisible politics of Bitcoin: governance crisis of decentralized infrastructure.* (Sept. 30, 2016) *Internet Policy Review,* 5(3). DOI: 10.14763/2016.3.427 at 9 ("One thing is sure though: regardless of the robustness and technical viability of the Bitcoin protocol, this governance crisis and failure in conflict resolution has highlighted the fragility of the current decision-making mechanisms within the Bitcoin project").

[37] Arvind, Narayanan *et al.* (2016). *Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction,* 11, February 9.

[38] *Id.,* at 173-75.

[39] Yochai, Benkler. (2022). *The Wealth of Networks. How Social Production Transforms Markets and Freedom,* October 23, Yale University Press, New Haven, CT.

[40] Christopher Kelty. (2005). *Trust Among the Algorithms: Ownership, Identity, and the Collaborative Stewardship of Information.* in Rishab Aiyer Ghosh, *Code. Collaborative Ownership and the Digital Economy,* 127-152, MIT Press, Cambridge, MA.

[41] *Supra* note 35.

[42] Benoit, Demil. and Xavier, Lecocq. (2006). Neither Market nor Hierarchy nor Network: The Emergence of Bazaar Governance. October, *Organization Studies* 27(10), 1447-1466.

[43] Nicholas, Auray. (2012). Online Communities and Governance Mechanisms. in E. Brousseau, M. Marzouki. and C. Méadel (Eds.), *Governance, Regulation and Powers on the Internet,* 211-231, Cambridge University Press, Cambridge and New York.

[44] *Id.*

[45] *Id.*

[46] Primavera, De Filippi. and Benjamin, Loveluck., *Supra* note 37 at 5, 10.

[47] Primavera, De Filippi. and Benjamin, Loveluck., *Supra* note 37 at 11.

to reject this because of the numerous criticisms that have been leveled against it, which amounts to a vote of no confidence in the system.

The next difficulty is in developing reward systems and recognizing status.[47] It is well known that this is eliminated by the Bitcoin ecosystem by building a trustless infrastructure where the identity of the participating nodes is completely irrelevant.[48] As was already mentioned, the protocol lacks a central authority in charge of giving each node a network identifier. The Bitcoin protocol's idea of mining has provided a strictly technical solution to the problem.[49] The POW algorithm introduces several financial incentives to reward those using their computational resources to maintain and secure the network and act as a protection mechanism.[50]

The mining algorithm is set up so that the first person to solve a challenging mathematical problem[51] can add a new block to the blockchain and will receive a reward for a certain number of Bitcoins. According to game theory, this creates an intriguing incentive for all network users to contribute more and more resources to the system to increase their chances of receiving Bitcoin rewards.[52] By relying solely on mathematical algorithms and cryptography, Bitcoin's incentive mechanism is a complex, albeit mathematically elegant way to encourage a decentralized network of self-interested actors to cooperate and contribute to the operations of the Bitcoin network.[53]

The Bitcoin network is now largely controlled by a small number of mining pools, making it more vulnerable to a 51% attack.[54] Over time, however, the increasing difficulty of mining caused by the growing amount of computational resources used in the network, combined with the decreasing amount of rewards awarded by the network, has eventually led to a progressive concentration of hashing power.[55] This has led to the Bitcoin network evolving into a highly centralized network controlled by an increasingly oligopolistic market structure, in contrast to its original design as a fully decentralized network governed by distributed consensus.

The final point is about conflict resolution. What exactly is a conflict in the Bitcoin ecosystem? If the purpose of the Bitcoin protocol is for a decentralized network of peers to reach a consensus on what is the correct set of transactions to record into the Bitcoin blockchain, then a conflict arises whenever two alternative blocks (both valid from a purely mathematical standpoint) are registered in the same blockchain by different network participants, resulting in two competing versions of the same blockchain[56] Given that there is no objective way to determine which blockchain should be preferred over the other, the Bitcoin protocol employs a fork-choice strategy that states that if there is a conflict somewhere on the network, the longest chain wins.[57] This demonstrates the Bitcoin ecosystem's lack of a conflict resolution mechanism.

De Filippi and Loveluck are of the view that the description of these issues shows that Satoshi Nakamoto and the early Bitcoin developers' goal was to create a self-sufficient and self-contained decentralized payment system.[58] They believe that it was most likely the creator's reasoning that it would be possible to create a new technological infrastructure that could govern itself using its protocols and rules and would not require any third-party intervention to function. Nonetheless, despite the overall mathematical elegance of the system, once introduced in a specific socioeconomic context, technological systems frequently evolve in unexpected ways and may fall victim to unexpected power relations.[59]

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[48] *Id.*

[49] *Id.*

[50] *Id.*

[51] The difficulty of said mathematical problem is dynamically set by the network: its difficulty increases with the amount of computational resources engaged in the network, so as to ensure that one new block is registered in the blockchain, on average, every 10 minutes.

[52] In the early days, given the limited number of participants in the network, mining could be easily achieved by anyone with a personal computer or laptop. Subsequently, as Bitcoin's adoption grew and the virtual currency acquired a greater market value, the economic incentives of mining grew to the point that people started to build specific hardware equipments (ASICs) created for the sole purpose of mining, making it difficult for people to mine without such specialized equipment. Note that such an evolution had actually been anticipated by Satoshi Nakamoto.

[53] Primavera, De Filippi. and Benjamin Loveluck, *Supra* note 37.

[54] *Id.*

[55] Bitcoin mining pools are a mechanism allowing for Bitcoin miners to pool their resources together and share their hashing power while splitting the reward equally according to the amount of shares they contributed to solving a block. Mining pools constitute a threat to the decentralized nature of Bitcoin. Already in 2014, one mining pool (GHash) was found to control more than half of Bitcoin's hashing power and was thus able to decide by itself which Trans actions shall be regarded as valid or invalid – the so-called 51% attack. Today, most of the hashing power is distributed among a few mining pools, which hold over 75% of the network and could potentially collude to take over the network.

[56] Primavera, De Filippi. and Benjamin Loveluck, *Supra* note 37.

[57] *Id.*

[58] *Id.*

[59] *Id.*

Indeed, there have been significant tensions in Bitcoin's short history related to border protection, reward systems, and conflict resolution. They are also of the view that it may be worthwhile to consider whether, independent of the technical soundness of the Bitcoin protocol, the Bitcoin network can do away with any form of external regulation and/or sanctioning bodies, or whether, to ensure the proper integration and assimilation of such a technological artifact within the social, economic, and cultural contexts of modern societies, the Bitcoin network may require some form of surveillance and arbitration. a technological artifact within modern societies' social, economic, and cultural contexts.[60]

Due to decentralization and the lack of a controlling trusted third party, blockchain incidents have sparked a new debate about how blockchain governance should be structured. Governance is difficult due to the permissionless blockchains' decentralized nature, immutability, lack of organizational or company structures, fluid, and unknown actors, and entanglement of application and infrastructure elements. This frequently leads to a lack of overall effective governance actions.[61]

3.5. Bitcoin Governance vs. Internet Governance

It is necessary to compare with internet governance because they are quite similar in the digital space and specialists in these fields frequently compare both systems when considering governance.[62] This only raises the question of whether the intention is for Bitcoin to be governed in the same way that the internet is, and whether the governance mechanism in place for the internet is the best fit for the Bitcoin ecosystem.

Blockchain protocols define the rules that allow computers to interact with each other on a peer-to-peer basis for the exchange of value, much like the internet defines the rules that allow computers to exchange information on a peer-to-peer basis.[63] Some commentators have suggested that blockchain governance takes the same path as internet governance.[64] This is surprising because a brief examination of the evolution of current internet governance mechanisms reveals flaws that blockchain protocol governance would do well to avoid. Some of these flaws include a lack of institutional legitimacy, the increasing politicization of internet governance, the fact that the chosen governance mechanisms have allowed for inappropriate intervention by sovereign governments, and the fragmentation of what was meant to be a global, borderless network.[65]

The parallel between the development of the internet and the development of blockchain protocols is obvious. Both technologies are protocol technologies.[66] They both facilitate peer-to-peer exchange and have experienced governance crises. To date, the results of internet governance efforts have been mixed, with many critics pointing to the dangers of national government interference, decentralization, and increased politicization as examples of how internet governance structures fail to uphold the original vision of the internet. This raises the question of whether continuing down this path will help to alleviate the challenges associated with Bitcoin governance.

The success stories and failures of internet governance provide useful indications of what should be applied and also avoided in terms of Bitcoin governance. It is worthy of note that socio-technical systems cannot ensure their self-governance and self-sustainability just by being included in a social and cultural context. Any technology will eventually succumb to its environment's social, cultural, and political pressures, causing it to grow and evolve in unexpected directions.[67]

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[60] *Id.*

[61] Olivier, Rikken., Marijn, Janssen. and Zenlin, Kwee. (2019). *Governance Challenges of Blockchain and Decentralized Autonomous Organizations,* November 2019) https://www.researchgate.net/publication 337239592_Governance_challenges_ of_blockchain_and_ decentralized_autonomous_organizations

[62] Marco, Iansiti. and Karim, R. Lakhani. (2017). *The Truth About Blockchain.* Jan.-Feb. 2017. https://hbr.org/2017/01/the-truth-about-blockchain

[63] A "protocol," for its part, is "a set of instructions for the compilation and interaction of objects." *See* Alexander R. Galloway, *Protocol: How control exists after Decentralization,* 75(2004). Blockchains are a form of network protocol. Generally, a "network protocol" simply sets the rules that allow networked computers (nodes) to communicate with each other. Will Warren, *The Difference Between App Coins and Protocol Tokens,* (February 2, 2017). https://blog.0xproject.com/the-difference-between-app-coins-and-protocol-tokens-7281a428348c

[64] Phillip, Hacker. (2019). Corporate Governance for Complex Cryptocurrencies?: A Framework for Stability and Decision Making in Blockchain-Based Organizations. in *Regulating Blockchain: Techno-Social and Legal Challenges,* 140-166, Oxford University Press.

[65] Milton L. Mueller. (2010). *Networks and States: The Global Politics of Internet Governance,* 1; Dmitry Epstein. (2013). The Making of Institutions of Information Governance: The Case of the Internet Governance Forum, 28 *J. INFO. TECH.,* 137, 139.

[66] Daniel, Folkinshteyn. and Mark, Lennon. (2015). *A Tale of Twin Tech: Bitcoin and the WWW,* January.

4. Role of Stakeholders in Bitcoin Governance

The question of who should govern Bitcoin and other cryptocurrencies is still being debated and discussed. This technology has the potential to disrupt many stakeholders, including governments, financial incumbents, consumers, and merchants, to name a few, and each is reacting differently. Governments must be active participants and leaders in the governance process. They must, however, recognize that their role in governing Bitcoin will be fundamentally different than it has been in the past for currency and financial transactions.

Bitcoin is a significant innovation with the potential to disrupt numerous industries. It could even be a tool for solving global problems and improving human welfare by lowering remittance costs and driving financial inclusion. However, Bitcoin will not reach its full potential unless it is governed with openness, transparency, and accountability. Governments will undoubtedly play a role in determining its future. Other incumbent interests stand to gain or lose depending on their strategy. Payments and other financial services are the most obvious and currently prevalent use cases for the technology, but developers are working on a plethora of other Bitcoin applications.[68]

Furthermore, because Bitcoin is still a developing technology, stakeholders will have to strike a balance between the need for strong governance and network participants' desire to continue to promote innovation, especially since the Bitcoin protocol is still open to change and adaptation. Many different types of Global Solution Networks (GSNs) will play roles in a Bitcoin governance network, but four GSN functions are critical.[69]

First, standards networks are required to establish technical standards for interoperability and other key performance issues for the industry.[70] Second, policy networks are required to develop international guidance on key policy issues such as crime, fraud, consumer protection, anti-money laundering, and others.[71] Third, knowledge networks should use technology to study the evolution of cryptocurrencies and their impact on societies and economies and then disseminate findings to key stakeholders.[72] Finally, watchdog networks must scrutinize the actions of powerful stakeholders in the ecosystem to ensure that all players act ethically and adhere to key community standards.[73] A Bitcoin governance network should follow similar principles, with all network types working in close cooperation to promote cryptocurrency's robustness, safety, and success.[74]

Having emphasized the role that stakeholders have to play in ensuring an adequate bitcoin governance system, it is pertinent to also ensure that when blockchain technology is invoked as a solution to a social issue—whether it is consensus-seeking, dissensus-management, transaction facilitation, value storage, value creation, or general governance, such as a UN initiative on blockchain for sustainable development—the ideologies of blockchain development and governance must be more thoroughly discussed by international lawyers.[75]

5. Way Forward: The Need to Have an Institutionalized Framework for Bitcoin Governance

Looking at the issues with Bitcoin governance in place only highlights one factor: the need for an institutionalized framework. This will greatly aid in addressing these issues because, once a framework is in place, adequate sanctions can be imposed on participants in this industry who are in default. A centralized authority could be an option. Regulating Bitcoin has been difficult, as it is with any new technology.

The current Biden administration seeks to impose regulations on Bitcoin while also attempting not to stifle a growing and economically beneficial industry.[76] The administration's first-ever framework for crypto regulation outlines how the financial services industry should evolve to facilitate borderless transactions and how to combat fraud in the digital asset space. The new directives rely on existing regulators such as the

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[67] Donald, MacKenzie. and Judy, Wajcman. (1999). *The Social Shaping of Technology,* 2nd Edition, Open Univ. Press, Buckingham.

[68] Alex, Tapscott. (2014). *A Bitcoin Governance Network: The Multi-stakeholder Solution to the Challenges of Cryptocurrency.*

[69] *Id.* at 15.

[70] *Id.* at 15.

[71] *Id.* at 15.

[72] *Id.*

[73] *Id* at 16.

[74] *Id.*

[75] Outi, Korhonen. and Juho, Rantala. (2021). *Blockchain Governance Challenges: Beyond Libertarianism,* December. https://www.cambridge.org/core/journals/american-journal-of-international-law/article/blockchain-governance-challenges-beyond-libertarianism/D34C6761D744E44FA04C3E64B4DEFE51

[76] Josephine Wolff. (2022). *The Competing Priorities Facing U.S. Crypto Regulations,* October. https://www.brookings.edu/techstream/the-competing-priorities-facing-u-s-crypto-regulations-Bitcoin-ethereum/

Securities and Exchange Commission and the Commodity Futures Trading Commission but do not impose any mandate. The framework follows an executive order issued by President Joe Biden in March[77], in which he directed federal agencies to investigate the risks and benefits of cryptocurrencies and issue official recommendations.

Biden has stated that he will work to prevent the illegal use of Bitcoin while also encouraging its development. The US has been particularly focused on regulating cryptocurrency and its criminal use overseas, such as sanctioning cryptocurrency exchanges and individual cryptocurrency wallets and recovering cryptocurrency payments made to criminals. There have also been calls for the US to create a central bank digital currency (CBDC) to better direct these sanctions.[78]

As the Bitcoin and cryptocurrency worlds develop, so will the regulation, which will see numerous changes and laws implemented over time.[79] This is not meant to be an attack on innovation.[80] The assumption that innovation will automatically result in positive outcomes should be challenged.[81] There are some drawbacks to consider, such as the lack of cryptocurrency regulations to ensure adequate consumer protection and the potential risks to the financial system as a whole.[82] As the government works to create a regulatory framework for cryptocurrencies, local leaders should exercise caution before promoting them or enacting policies that do not fully understand how they work.[83] Stakeholders should examine the use cases for cryptocurrencies, how cryptocurrencies work, how attracting crypto businesses may affect local economies, and how local leaders can improve financial access and wealth-building opportunities for their communities beyond cryptocurrencies as part of their assessments.[84]

While some may argue that a centralized governance body in charge of ensuring the legitimacy and accountability for the future developments of the Bitcoin ecosystem would fail to obtain any kind of legitimacy from within the Bitcoin ecosystem, the Bitcoin network was designed to eliminate the need for fiduciary institutions or other centralized authorities.[85] The technologically-driven approach currently endorsed by the Bitcoin project, aiming to create a governance structure that is solely and exclusively dictated by technological means (governance by infrastructure), has also been shown to be doomed to failure because a purely technological system cannot fully account for the entire spectrum and complexity)of social interactions.[86]

At this specific time, it is challenging to foresee what would be the best strategy to ensure that Bitcoin evolves in the interests of all relevant stakeholders, given the technology's experimental nature and current lack of maturity. Nevertheless, regardless of the strategy used, in my opinion, a proper governance structure for Bitcoin can only be achieved by openly acknowledging that the current framework will not be able to comprehend and accommodate the social issues tied to it and replace it with an institutional framework capable of accommodating the complexities of social interactions and power play.[87]

Much of the proposed global regulations are based on fears of a dangerous speculative bubble, which many fear will harm the country if cryptocurrency commodities fall.[88] It is worth noting that, regardless of how cryptocurrency appears to have gained acceptance among its participants, it has the potential to completely disrupt monetary policy around the world, and an institutionalized framework can govern the Bitcoin ecosystem better than the current situation and is a way forward to resolving the challenges.

6. Conclusion

Despite cryptocurrency's promise of minimizing governance, both Bitcoin and Ethereum rely heavily on trust networks, indicating that elements of non-technical governance are, in fact, critical to their effectiveness.

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[77] The White House. (2022). *Executive Order on Ensuring Responsible Development of Digital Assets*, March, 9. https://www.whitehouse.gov/briefing-room/presidential-actions/2022/03/09/executive-order-on-ensuring-responsible-development-of-digital-assets/

[78] *Supra* note 78.

[79] *Supra* note 77.

[80] *Id.*

[81] *Id.*

[82] *Id.*

[83] *Id.*

[84] *Id.*

[85] *Id.*

[86] *Id.*

[87] *Id.*

[88] Taimur, Hyat. (2022). Op-ed: The Toughest Challenges for Cryptocurrency Lie Ahead, not in the Rear-view Mirror, July 17. https://www.cnbc.com/2022/07/12/op-ed-the-toughest-challenges-for-cryptocurrency-lie-ahead.html

Blockchain protocols are not the first open-source protocols to face global governance issues. Indeed, the evolution of Bitcoin governance has followed a path that is strikingly similar to that of internet governance. If Bitcoin governance development does not move away from the current technical framework and toward an institutionalized framework, it may succumb to some of the same threats that the internet did. It is also worth noting that, while an institutionalized framework may appear to be a solution to the problems encountered in the bitcoin ecosystem and a recommended path forward, it comes with its own set of legal interpretations and implementation challenges.