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From Cyberpunk to Cypherpunk: The Tecnical and Ideological Roots of Bitcoin

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ABSTRACT

Cryptocurrencies initially gained prominence by eliminating intermediaries in payment systems and later found applications in various business sectors. The crypto network, pioneered by Bitcoin, has spurred new business forms and organizational structures with diverse motivations. Bitcoin's emergence is technically dated to 2008. However, its ideological and technical roots trace back to the cyberpunk literature of the late 1970s and the cypherpunk movement that began in California in 1992. The cypherpunk manifestos significantly influenced cryptographic work, shaping Bitcoin's technical foundation. This study aims to explore Bitcoin's ideological origins through a qualitative content analysis of cypherpunk manifestos, Nakamoto's posts on the 'Bitcointalk' forum, and 'Cryptography Mailing List' correspondence. By examining these sources, the study identifies the historical dimensions of Bitcoin's technical structure and highlights the impact of ideological debates on its development. Findings reveal that while cryptographic research influenced Bitcoin's technical evolution, ideological discussions were relatively less significant. Nonetheless, Bitcoin's developers, particularly Nakamoto, incorporated a strong ideological emphasis on 'privacy' despite the primary technical focus.

Keywords: Bitcointalk, Bitcoin, Ideology, Privacy, Cypherpunk.

JEL Classification Codes: Z13, A13, D70

Referencing Style: APA 7

INTRODUCTION

The "Bitcoin: Peer-to-Peer Electronic Cash Payment System", which was published under the pseudonym "Satoshi Nakamoto", has been cited more than twenty thousand times since 2008, paving the way for new fields of study and business lines. It is critical for the study of the topic as it has initiated areas of study where different disciplines such as computer science, economics/ business sciences, artificial intelligence and the Internet of Things converge. Studies on the historical/ideological origins of the technical document are relatively scarce in the literature. The neglected technical and historical origins of Bitcoin constitute the primary motivation of this study. Inspired by the cyberpunk movement that emerged in literature in the late 1970s, the ideological origins of cryptocurrencies, which have gone through different processes, can provide researchers with a different perspective on blockchain technology.

The cyberpunk movement that emerged in literature was shaped by the understanding of technology and the environment depicted in William Gibson's Neuromancer (Easterbrook, 1992). The cyberpunk universe is dominated by a multicultural structure and a gloomy description of cities in the post-industrial society with the impact of mass urbanization (Jones, 1994). Cyberpunk culture focuses on how technological development which was influenced by the wars and social events until the 1980s will shape the future. Therefore, in the cyberpunk universe, the future is depicted through a society in which postmodern aesthetics, cultural diversity, urbanization and military forces establish hegemony through high technology (Edwards, 1994).

Barbrook and Cameron (1996) argued that technological innovations would cause changes in social life in the long run. In this context, they named the utopian ideas of a structure consisting of different segments in the USA about the way technology works as the 'California ideology'. The California ideology is an ideological system that combines the bohemian lifestyle of San Francisco and the high technology of Silicon Valley (Babrook and Cameron, 1996). Proponents of this ideology have worked

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to ensure freedom in cyberspace. While the meaning attributed to technology in California ideology creates a deterministic structure, the technological structure experiences a pessimistic and oppressive process on the way to social freedom. There is a semantic unity with the Californian ideology and the origins of blockchain and cryptocurrencies. As cryptocurrencies have become more widespread, they have been defined as anti-system and anti-state, is a sign that this field is undergoing a repressive process. The deterministic, innovative and yet oppressive nature of technology is the totality of this context. Since the debut of blockchain technology and Bitcoin coincided with 2008 crisis, many researchers have interpreted it as a revolutionary and anti-systemic movement.[1] Only a few studies argued that blockchain technology has reinforced the continuity of the status quo through discourses such as technological revolution and disruption (Herian, 2018).

The cyberpunk movement later influenced the cypherpunk movement that emerged in California in 1992. Thanks to the mailing list established in the cypherpunk movement, software developers and hackers carried out activities to ensure 'cryptographic encryption' and internet freedom. Hellegren (2017) stated that the word 'cyber' was used in the sense of encryption and secrecy, and the word 'punk' referred to the opposition to authority representing the subculture. The cypherpunk group's concerns about privacy led them to struggle in this area. According to them, ensuring privacy in cyberspace is seen as one of the measures taken against the state.

Consequently, the basis of the cypherpunk movement is using cryptocurrencies to protect privacy on the internet through cryptography, as well as the free realization of economic transactions (Jarvis, 2021). These increasing trends in the cultural and intellectual structures of cryptocurrencies are guiding in terms of determining their ideological tendencies. Malherbe et al. (2019) argued that the ideological foundations of cryptocurrencies should be sought in the cypherpunk culture by stating that cryptographic encryption and decentralization are significant in the cypherpunk culture. The importance given to privacy in the cypherpunk culture and the ability to carry out transactions by eliminating intermediaries constitute the origins of the digital economy (Brekke, 2020). The fact that the state and economic institutions prevent the effective functioning of social distribution has led to the advocacy of decentralization and the emergence of the 'cryptoeconomy'. Brekke defines cryptoeconomics as the community formed by using concepts from computer science, economics and game theory, as well as blockchain and distributed ledger technologies, to create a decentralised structure and ensure security. Thus, the foundations of the cypherpunk movement laid the groundwork for today's blockchain, cryptoeconomy and cryptocurrencies. In this context, the manifestos published by cypherpunk advocates are critical to understanding their ideology.

The first manifesto published by May (1988) emphasised that computer technologies could provide anonymity. According to him, eliminating privacy was no longer needed to carry out transactions. New technologies allow people to exchange messages, conduct economic transactions and enter into contracts without being tied to their real names and legal identities. Hughes (1993), on the other hand, sees it as quite possible that privacy concerns will increase with the widespread use of internet technologies. This situation also increases the importance of ensuring confidentiality. With privacy, it should be possible to ensure that transactions are perceived only by the desired parties. Cryptography is highly emphasised in the published manifestos. In 2008, the creation of Bitcoin based on the blockchain led to the embodiment of this whole structure. Crypto-anarchists and libertarians claim that as cryptography gains importance, privacy will be ensured, and individuality will increase (Swartz, 2018). The privacy provided by cryptography also leads to the anonymization of transactions.

This study aims to examine the ideological dimension of Bitcoin by clarifying its historical and theoretical structures. The methodology used here is the qualitative content analysis (QCA). The scope of the QCA includes cypherpunk manifestos, Nakamoto's technical document, 'bitcointalk' forum posts and 'cryptography mailing list' correspondence. In particular, the literature discusses blockchain technology and cryptocurrencies in terms of their volatility. However, blockchain technology has also created new socio-technical and techno-political areas. In this context, the study consists of five chapters. In the first part, Bitcoin's relations with the cypherpunk movement, which bears traces of its ideological origins, were revealed. At the same time, the distinction between secrecy and privacy, which Hughes mentions in his manifesto, was analysed through Nakamoto's technical document and ideological connections were shown. The second section categorised the qualitative data used in the study and explained the methodology of qualitative

[1] See for example Weber, 2016; Appukuttan Nair, 2018; Corradi and Höfner, 2018; Malharbe et al., 2019; Heister and Yuthas, 2020; Faustino et al., 2021; Brekke, 2021.

content analysis. In the third part, the findings section, word frequencies were analysed through Nakamoto's writings on the 'Bitcointalk' forum. At the same time, the elements that influenced Nakamoto up to the creation of bitcoin were detailed in chronological order. The fourth section discusses the ideological connections of cryptocurrencies based on the findings of the study using Bitcoin as an example. Finally, the analysis is concluded with a general evaluation.

HISTORICAL AND THEORETHICAL BACKGROUND

The universe created by the cyberpunk movement in science fiction literature has also influenced the cypherpunk movement. Founded in 1992 in California, this organization consists of the basic elements of freedom, decentralization, cryptography and privacy in cyberspace. In the light of all these developments, the concept of 'crypto anarchism' came to the fore with the cypherpunk movement. As an ideological armament, crypto anarchism tries to protect the rights to privacy and autonomy by advocating the liberation of the individual in the digital space (Chohan, 2017). Thus, the ideas of the cypherpunk movement regarding the digital world are associated with anarchism. Therefore, the texts 'Crypto Anarchist Manifesto' and 'Cypherpunk Manifesto' that emerged in the cypherpunk movement are concrete indicators of the community's ideology.

Cryptography is the technology that presents the security, integrity and timeliness of a data in a way that cannot be denied, along with who sent it. In the cypherpunk movement, the emphasis on cryptography, along with all these features, is on ensuring privacy. Therefore, cryptography is seen as a means of freedom and privacy in cyberspace, expressing an attitude against centralised structures. Cryptography has the potential to undermine the power of states and established institutions by enabling comprehensive social and political change (Narayanan, 2013: 76).

The vision of Bitcoin, which emerged on the basis of blockchain, is also influenced by these developments and includes decentralised structure, privacy and anonymity. Their opposition to the trust mechanisms provided by centralised structures has led to a political attitude. The cypherpunk movement has a techno-political approach. In other words, it tries to realize its political goals via technological means (Bertelloni, 1998). For the cypherpunk movement, the political attitude is not only a mechanism shaped around the political structure, but also an area where the economic structure is taken as a basis. In the cypherpunk movement, overcoming the traditional order is only possible with the emergence of new technological structures. In this context, it can be said that technological determinism is the dominant view in the cypherpunk movement.

The first text in the cypherpunk movement was the 'Crypto Anarchist Manifesto' written by Timothy C. May. According to May (1988), with the provision of anonymity and privacy, users should be able to carry out transactions in the virtual environment without depending on their legal identities. Therefore, the use of cryptographic technologies makes these structures possible.

May (1988) states that computer technology enables individuals and groups to communicate and interact with each other in a completely anonymous way, enabling two people to exchange messages, conduct business and negotiate electronic contracts without knowing the real name or identity of the other. The messaging process mentioned by May has become possible since 2002 with the privacy of legal identities thanks to the 'Tor' software. Through blockchain technology, electronic transactions and contracts can be realised by ensuring the privacy of users. The peer-to-peer (P2P) transactions mentioned by May have become possible in blockchain technology. May's emphasis on privacy and anonymity is based on concerns about trust. It is therefore clear that cypherpunk is concerned about the dangerous dimensions of the mechanism of trust, which in the traditional system is largely mediated by the state and institutions. Appukuttan Nair (2018) states that cryptocurrencies such as Bitcoin challenge the Hobbesian understanding of the state. In this context, it can be said that the way crypto anarchists perceive the state is identified with 'Leviathan'. In his Leviathan, Hobbes argued that self-regarding people recognise that it is in their interest to trade some of their liberty for security of self and property, and in so doing enter into a contract with a sovereign, a deified figure who sets the rules of engagement for society. In other words, Bitcoin has replaced the sovereign with the general will (Scott, 2017). The potential of blockchain technologies to transform the institutions monopolised by the state is made possible by removing the element of trust and providing privacy and anonymity to the individual within the system. In centralized systems, trust is often vested in a central authority, whereas Bitcoin relies on a network of nodes and a consensus mechanism (Riedl et al., 2024). Securing these technological developments, which May also highlighted, will make transformations possible in relation to the state.

May (1988) emphasised the potentials created by cryptography and new technological transformations. He stated that this structure would be especially effective in the transformations it would create regarding the state. By anticipating the revolutionary nature of technology, May preserved the language of the Communist Manifesto while changing its form and function (Applegate, 2012). Instead of creating a space for revolutionary struggle, May's manifesto drew attention to the consequences of the use of technology by creating a practice of resistance.

The other manifesto in the cypherpunk movement was Eric Hughes' "A cypherpunk manifesto" which was published in 1993. It is clear that the manifesto published by Hughes had similar tendencies to the one published by May. According to Hughes, the introduction of the internet and computer technologies has led to increased concerns about privacy. Therefore, ensuring confidentiality in such an environment becomes the main problem. Ensuring confidentiality is possible through developments in the field of cryptography.

When Hughes (1993) mentions the necessity of privacy for an open society in the electronic age, he also explains what privacy means. He describes privacy as something that a person does not want the whole world to know and secrecy as something that a person does not want anyone to know. Thus, he defines privacy as the power to reveal oneself selectively to the world.

When Hughes referred to the electronic age, he meant that the dynamics experienced in the process of globalization had turned societies into an open structure. He stated that with the development of global networks, there were differences between privacy and confidentiality and that the connection between these two structures was important (Hughes, 1993). According to Warren and Laslett (1977), there is a moral difference between privacy and confidentiality. Privacy and confidentiality are important concepts in determining the boundaries between individuals and others in their lives. Where there is no privacy, privacy is consensual; that is, there is a 'right to privacy' but not an equivalent 'right to secrecy' (Warren and Laslett, 1977: 43). Therefore, the fact that individuals can be monitored electronically and the state's intervention in this area is a significant threat to 'privacy' (Akman and Övgün, 2022: 38).

While giving the magazine example, Hughes (1993) emphasizes the 'right to privacy'. As he exemplifies, when you buy a magazine and pay for it in cash, there is no need for the seller to know who you are. Similarly, your e-mail service provider does not need to know what your message is or who you are communicating with. When your identity is known to the mechanism through which you transact, you have no privacy. The right to privacy has a consensual basis in society. Hughes emphasizes that the right to privacy is prevented in non-consensual systems. Therefore, in systems where privacy is denied, confidentiality cannot be ensured.

Hughes (1993) also highlights that anonymous transaction systems are necessary for privacy in an open society. Anonymous transaction systems only ask for the identity information of individuals by request, which is the essence of privacy. Privacy is ensured in consensual systems. According to Hughes, anonymous transaction systems must be provided to make this happen. Conducting transactions in the fiat money of a state provides partial anonymity and privacy, while decentralized structures based on cryptography can provide complete privacy. This is where the structure between privacy and secrecy emerges in Hughes' manifesto. Anonymous transactional systems offer privacy to individuals based on consent, but the provision of confidentiality does not depend on this structure. Since secrecy is non-consensual, the behaviour subject to secrecy is seen as illegal and involving the interests of the excluded (Warren and Laslett, 1977).

Hughes (1993) states that cryptography has an important role in ensuring privacy. While cryptography has different functions such as ensuring the security of information, Hughes discusses it in the context of ensuring privacy. While it is possible to ensure the privacy of individuals through decentralized structures, it is not enough. At the same time, identity must be secured with a cryptographic signature. Thus, the ideological perception created by secrecy is transformed into privacy with cryptography and legitimacy is tried to be ensured. The spaces created by privacy in cyberspace are structures that must be prevented by the state and institutions. Hughes, on the other hand, tries to provide legitimacy by stating that they are ideologically in favour of privacy.

Hughes (1993) explained that as cypherpunks they were dedicated to building anonymous systems and protecting their privacy through cryptography, anonymous mail forwarding systems, digital signatures and electronic money. He emphasised that the cypherpunk team had an important role in ensuring privacy. The emphasis on privacy rather than secrecy is important for the study. Privacy includes information that can be shared consensually through decentralised structures. Secrecy, on the other hand, includes information that

is developed non-consensually and does not carry the desire to share. At this point, Hughes states that there is an important distinction between privacy and secrecy after May's manifesto and that they endeavour to ensure privacy. In this context, it is noteworthy that the anarchist expressions used by May are not present in Hughes. In his manifesto, Hughes does not directly guarantee the shaping of a political form. Rather, he emphasises that he has concerns about privacy and that these structures can be overcome through the use of cryptographic technologies. In this context, rather than using a form of expression that will shake the world like May, Hughes comes up with a solution proposal at the point where there are concerns about the system.

As can be seen, there are both similarities and differences between the two main manifestos of the cypherpunk movement. Considering what Nakamoto wrote in the technical document in the context of the cypherpunk manifestos will give clues about how the ideological context is shaped. In the technical document published in 2008, Nakamoto first established a payment system between peers and proved that the peer-to-peer network would be a solution for the double spending problem. A fully peer-to-peer electronic payment system enables online payments to be made without the need for the intermediation of a financial institution (Nakamoto, 2008). Thus, the cryptography-based electronic money mentioned by Hughes came to life with the blockchain network established by Nakamoto. At this point, it cannot be said that Nakamoto has a direct political stance; however, an implicit/indirect political stance is present in his work. The indirect political stance is the claim that blockchain technology will transform traditional money and payment systems. At this point, it can be said that the language used by Nakamoto in the technical document is closer to Hughes' language. Similarly, Nakamoto (2008) notes that financial institutions serve almost exclusively as trusted third parties for processing electronic payments in online commercial transactions. He adds that although the system works well enough for most transactions, it is still affected from the weak points inherent in the trust-based model.

In traditional payment systems, the centralised structure has an important function in ensuring the trust element for the maintenance of the system. This structure is perceived by cryptocurrency advocates as the main problem of the system. At this point, Nakamoto implicitly emphasised the need to ensure privacy, which is similar to what Hughes stated in his manifesto. This leads to the conclusion that the function of traditional systems to ensure trust violates the 'right to privacy'. According to cryptocurrency advocates, the presence of the state and intermediary institutions in the monetary system prevents the provision of privacy. Therefore, the existence of decentralised structures and developments in cryptography overcome this problem and create a privacy space.

Proponents of cryptocurrencies and opposition to centralised structures in this area are also ideologically linked to the neo-Austrian approach. According to the neo-Austrian approach, state intervention is at the root of monetary instability. In this context, the decentralised structure of cryptocurrencies interferes with the monopolistic structure of the state in this field (Dow, 2019). According to Dow, the emergence of cryptocurrencies not only enables payments between peers but also bears the characteristics of neo-Austrian libertarian philosophy in the context of 'privatization' of money. Bitcoin is important because it is the first cryptocurrency to be issued on blockchain technology. Within this framework, the first introduction of Bitcoin as a payment mechanism does not imply a concern for the privatisation of money. In the technical document he published, Nakamoto emphasised that the traditional system cannot provide privacy based on the element of trust. Therefore, it creates an alternative to the traditional system providing a payment system without the need for intermediaries on the basis of cryptography and proof of work. The indirect effects created by this structure may resemble the structures claimed by different ideologies such as the privatization of money. However, this is not enough to explain the ideologies of cryptocurrencies. The fact that states and institutions have started to use this technology has led to the emergence of new debates. In his study on how cryptocurrencies will take a place in monetary payment systems in the world, Duque (2020), points out that the potential of cryptocurrencies to become reserve currencies in the international arena will lead states to become more involved in this field. However, it is a key feature of the blockchain that it can be easily obtained through cryptographic algorithms that verify and record transactions thanks to the consensus between the users of the database, without necessarily recognising or trusting each other (Duque, 2020).

The fact that blockchain technology does not provide information about who the transactions are linked to is important in terms of ensuring privacy. Therefore, it is seen that there is no perception of individuality inherent in the system, and privacy is more important.

DATA and METHODOLOGY

Qualitative content analysis is a method that not only analyses the content of the relevant material, but also analyses the theme, main idea and formal aspects of the text (Mayring, 2004: 267). Thus, it also performs an analysis on the hidden meaning connections of the relevant materials analysed. In addition, the formal characteristics of the texts analysed are critical in terms of showing the different layers influenced by the study under consideration. Although qualitative content analysis is a flexible method with a unique structure, the analysis process can be classified according to specific procedures (Schilling, 2006). Therefore, the data obtained from the texts are made transparent and systematically investigated in an inductive and interpretive manner (Mackensen and Wille, 1999). The reason for using inductive content analysis in this process is the absence or fragmentation of previous studies on the phenomenon under investigation (Elo and Kyngäs, 2008: 107). As a result, the main point of qualitative content analysis begins with summarizing and continuously comparing the data, thus evaluating the relevant materials within the scope of the research question (Kuckartz, 2019).

Table 1. Materials Analysed in the Study

1	The crypto anarchist manifesto	Timothy C. May
2	A cypherpunk's manifesto	Eric Hughes
3	Bitcoin: A peer-to-peer electronic cash system	Satoshi Nakamoto
4	Cryptography mailing list	Satoshi Nakamoto vd.
5	Bitcointalk	Satoshi Nakamoto vd.

In this study we use inductive content analysis, which is one of the QCA methods and which is a data driven approach. In contrast to the deductive approach, inductive content analysis is a bottom-up approach to meaning making that starts with no preconceived codes or theories. Instead of using a pre-existing framework or previous research, you develop a theory from the bottom up as you analyse the entire data set. Regardless of which variant of QCA is used, the focus will always be on working with categories (codes) and developing a category system (coding frame). Within several different types of categories in the social science research literature, we use the thematic one. Thematic categories refer to certain topics, arguments, schools of thought etc. Based on our research question, we took ideology as a thematic category.

May and Hughes' texts, unlike the other three, have been used as starting texts to follow the trajectory of bitcoin ideology. As discussed above in the history section, these texts are included because of their role in the historical trajectory as the beginning and foundation of the ideological debates around bitcoin. The 'Bitcointalk' forum is a website founded by Nakamoto in November 2009. Nakamoto registered on this forum site under the name 'satoshi' and was last active on December 13, 2010, during which time he posted a total of 575 posts.[2] The content of the posts varied, but mostly he answered users' questions and provided information about the technical structure of the Bitcoin network. There are posts where he introduces updates to the Bitcoin network and explains the difference between old and new versions. Thus, there are posts detailing the technical structures of Bitcoin's development process. Satoshi's first post was on November 22, 2009, to introduce the 'bitcointalk' forum site.[3] His last post was on December 12, 2010, under the title 'development and technical discussion'.

Table 2. Information about 'satoshi' in the forum

Name	'satoshi'
Posts	575
Activity	364
Merit	4639
Status	Founder
Registration Date	November 19, 2009, 07:12:39
Last Active Date	December 13, 2010, 04:45:41

Source:https://bitcointalk.org/index.php?action=profile;u=3

After Nakamoto published his technical document in 2008, he discussed the technical aspects of Bitcoin with different people in the same year.[4] The existing correspondence has been developed through e-mail exchanges. In this context, his correspondence with Ray Dillinger, Hal Finney, James A. Donald and Dustin D. Trammel is available on the Cryptography Mailing List.

[2] https://bitcointalk.org/index.php?action=profile;u=3

[3] https://bitcointalk.org/index.php?action=profile;u=3;sa=showPosts;start=520

[4] http://satoshinakamoto.me/source/cryptography-mail-list/?order=asc

Table 3. Information about 'Hal' in the forum

Name	Hal
Posts	314
Activity	314
Merit	2587
Status	VIP
Registration Date	November 30, 2010, 01:29:24
Last Active Date	March 29, 2017, 06:22:58

Source: https://bitcointalk.org/index.php?action=profile;u=2436

One of the details that stands out at this point is the correspondence with Hal Finney. Hal Finney, himself a member of the cypherpunk team, is known for his work on the 'RPOW' (reusable proof of work) and the digital currency prototype.[5] The discussions between 'Hal' Finney and Nakamoto took place not only on the cryptography mailing list but also on the bitcointalk forum.

technical document he published.

FINDINGS

Bitcoin has an extensive history of research in its historical/theoretical background. If we analyse this history of Bitcoin, we can see that its ideological, technical and theoretical dimensions have different determinants. In this context, if we were to chronologically express development stages of Bitcoin historically, we can trace the starting point of this structure to the cyberpunk literature of the late 1970s.

The first cryptographic protocol studies used in payment systems before Bitcoin can be traced back to David Chaum's work in the 1980s (Dostov and Shoust, 2014). Later, Chaum's work on digital signatures and anonymity against third parties influenced Bitcoin technically. As Arslanian and Fischer (2019: 92) pointed out Chaum's work probably laid the foundation for

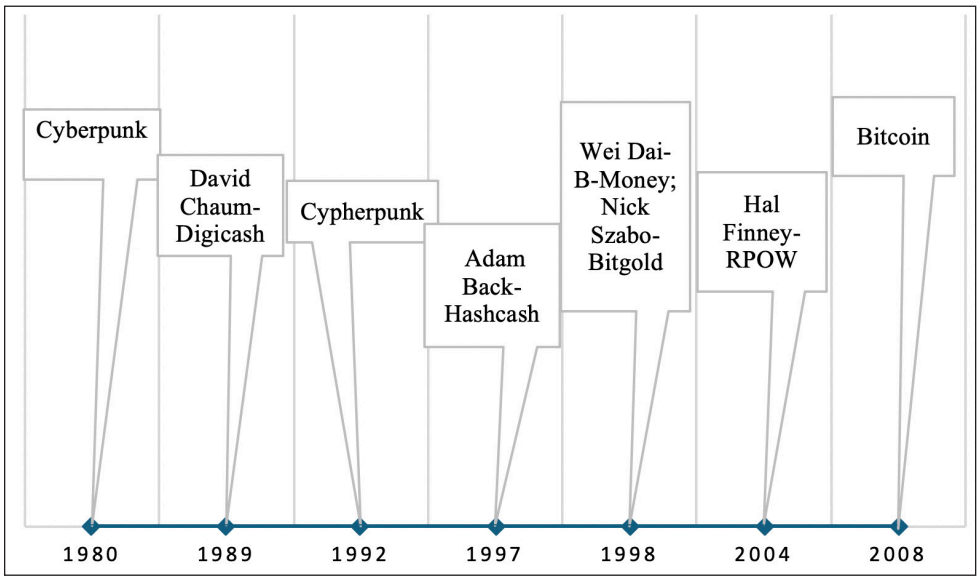

Figure 1: Technical and Ideological Origins of Bitcoin

The Bitcointalk forum has facilitated the development and understanding of Bitcoin in the contexts of past correspondence. In this context, studies on the Bitcointalk forum are scarce in the literature. In this section, the posts of 'satoshi' on Bitcointalk were analysed using qualitative text analysis with MAXQDA to examine the word frequencies of the correspondence and to discuss how they were theorised in ideological and social contexts. Since Nakamoto is the founder of the first 'functional' cryptocurrency, his existing correspondence in forums and emails was also included in the analysis, not just the

blockchain and cryptocurrencies today. Considering the historical development phase of Bitcoin, the 'technical' and 'ideological' layers have been shaped by different structures. The technical layer that has influenced Bitcoin is based on the work of Adam Back. The technical structures of the proof-of-work protocol are based on Back's Hascash proof-of-work (Ma et al., 2018: 4). Although Bitcoin emerged with technical innovations, different digital currency instruments with similar features had already been discussed. B-Money (Wei Dai) and Bitgold (Nick Szabo) are examples of past cryptocurrencies (Chohan, 2022: 8). Finally, it can be said that Hascahs' proof-of-work idea was developed further

[5] https://nakamotoinstitute.org/finney/rpow/

with Hal Finney's RPOW protocol, leaving an experience for Bitcoin.

The ideological layer of Bitcoin has been associated with libertarian philosophy in terms of providing transparency, anonymity and privacy. Golumbia (2013) defines cyber libertarianism as an ideology which states that as a result of the integration of computer technologies into human life, this structure will make people free. According to him, in cyber libertarianism, computer technologies should be integrated into human life and technical methods should be used to solve the problems that will arise. As measurable phenomena become more important, calculations should be based on certain standards. Golumbia (2015) states that the social and political functions claimed by cryptocurrency advocates and cyber libertarians are superior to the technical functions of Bitcoin. At the same time, their libertarian presentation of the possibility of using blockchain technology in different fields has led them to use the concept of democratization. Golumbia emphasises that these discourses serve neoliberal ideology, noting that the devices and software used to operate the technical infrastructure require competence and that this process feeds technocratic authoritarianism. Thus, Bitcoin works technically but not socially and politically as its proponents claim (Golumbia, 2015: 119). Bitcoin's decentralised structure and limited supply with a deflationary tendency are indicative of its attitude towards traditional structures. Bitcoin creators claim that the economic role of the state will weaken, and politics will play a lesser role in social life due to libertarian ideology (Kalstrøm, 2014). Crypto advocates and cyber libertarians argue that the weakening of the role of the state and its institutions in economic life will lead to a more efficient functioning of the market and a greater emphasis on individualism. In Bitcoin ideology, the elimination of intermediaries, and thus the reduction of the need for the state, is associated with techno-leviathan by Scott (2017). The techno-leviathan is a crypto-sovereign to whose rules we can contract. And these rules are a series of algorithms, step-by-step procedures for calculations that can only be overridden with great difficulty. This may initially represent the general will of the participants in the contract network, but the key point is that once you are locked into a contract in this system, there is no getting out. The decentralised structure of cryptocurrencies causes some legal problems. The anonymity of users thanks to cryptographic encryption makes it impossible to monitor and control cryptocurrencies (De Filippi, 2014).

The idea of using strong encryption to protect people's freedom and privacy from governments and large corporations dates back to the cypherpunk and crypto-anarchist culture of the late 1970s (Atzori, 2015). In this context, we can see that the main concern of cyber libertarians and crypto advocates is primarily to defend privacy against the state and large capitalist corporations. However, this is not enough to explain their main justifications. The question of the contexts in which privacy should be guaranteed, rather than against whom, explains the ideological dimension of cryptography. In this respect, the adoption of blockchain and cryptographic technologies by governments and large corporations obscures the ideologies of their proponents. The use of blockchain technology by states and banks reduces the credibility of its proponents who claim that blockchain is anti-state and anti-capitalist (Caliskan, 2020).

There are two main actors in blockchain technology: transactors and miners. Initially, it is stated that transactors and miners generally exist in blockchain technology by taking individual actions. However, in the following processes, the intensification of computing power led to an increase in mining activities and as a result it became costly. The increase in mining activities requires high processing power to create blocks. In this context, the fact that 80 per cent of Bitcoin mining activity in 2017 was carried out by a total of just five mining pools is indicative of the industrialisation of mining (Swartz, 2017). Swartz discusses the emergence of new classes of intermediaries instead of people transacting on the blockchain base. The emergence of intermediaries to enable financial transactions specific to cryptocurrencies undermines the decentralised structure of blockchain technology.

When considering the ideological layers of Bitcoin, Nakamoto's posts on Bitcointalk are instructive. In the forum, Nakamoto provides technical information and answers questions from Bitcoin users. First of all, if we look at Nakamoto's posts, he mostly provides information about the technical structure of Bitcoin. While introducing Bitcoin, it is noteworthy that Nakamoto's primary goal is not a political organisation. 'Bitcoin', 'Block' and 'Transaction' are the most used words. The most frequently used words mostly cover the technical structures of Bitcoin. Nakamoto also used the word 'cypherpunk'. In the first mention of the word 'cypherpunk', he referred to 'Wei Dai' and 'Nick Szabo' in the first place where the word 'cypherpunk' was mentioned, and stated that Bitcoin was influenced by and an adaptation of these preliminary

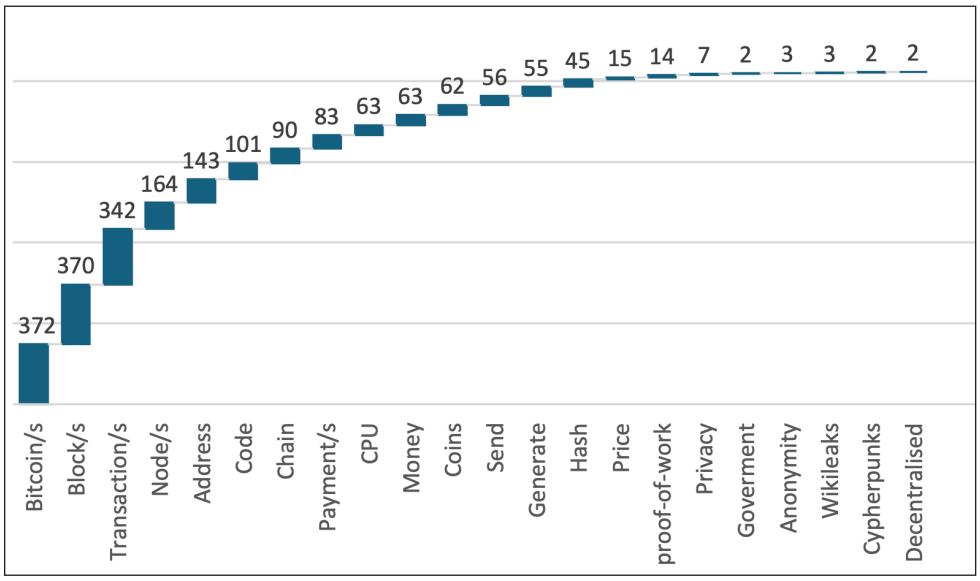

Figure 2: Bitcointalk posts of Satoshi Nakamoto
Source: https://bitcointalk.org/index.php?action=profile;u=3;sa=showPosts

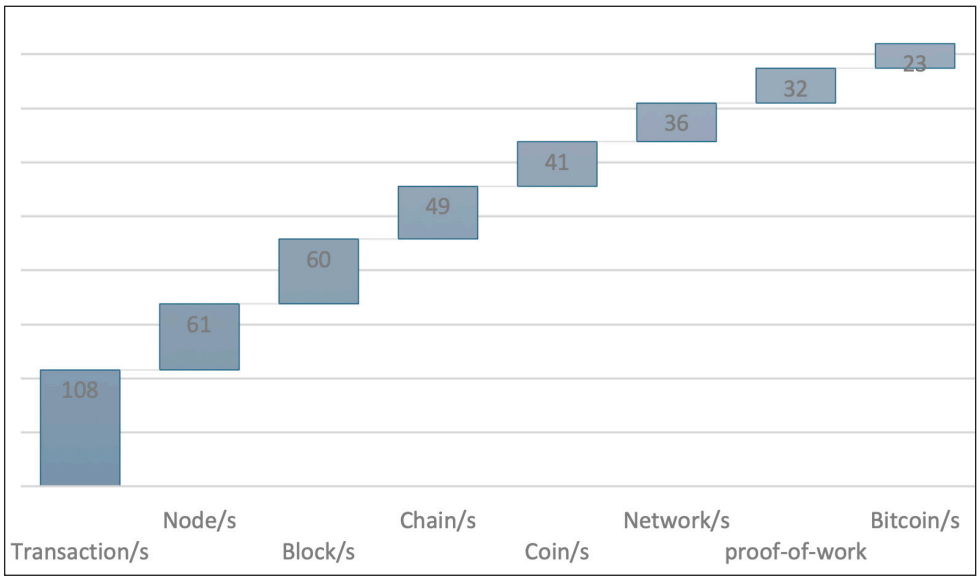

Figure 3. Word Frequencies of Cryptography Mailing List
Source: http://satoshinakamoto.me/source/cryptography-mail-list/?order=asc

studies.[6] In addition, it is understood from the forum posts that Nakamoto is closer to Hughes because of his preference for the word 'privacy' in the language he uses, based on the debate about privacy and confidentiality. Another noteworthy dimension of Bitcoin's ideological orientation is found in Nakamoto's posts on the 'WikiLeaks' debate. In the 2010s, discussion on the forum focused on the need to help WikiLeaks through Bitcoin to overcome the financial obstacles it faces. Nakamoto explained that Bitcoin was still in the early stages of its development and that donations via bitcoin would not be enough for WikiLeaks' pocket money.[7] In another post, Nakamoto stated that WikiLeaks had kicked a swarm of 'hornets' and that this swarm would turn on Bitcoin.[8] It is noteworthy that Bitcoin does not want to be labelled as an anti-system movement while it is still in its initial stages of development. In conclusion, when analysing the posts on Bitcointalk, it is very difficult to say that Bitcoin has a direct ideological orientation. In this context, when the word frequencies are analysed, there is a pool of posts that are mostly based on the technical structure of Bitcoin.

[6] https://bitcointalk.org/index.php?action=profile;u=3;sa=showPosts;start=280

[7] https://bitcointalk.org/index.php?action=profile;u=3;sa=showPosts;start=20

[8] https://bitcointalk.org/index.php?action=profile;u=3;sa=showPosts;start=0

When Nakamoto's mailing list is analysed, his correspondence with Ray Dillinger, Hal Finney, James A. Donald and Dustin D. Trammel also exhibits a similar tendency. As analysed here, the technical aspects of Bitcoin have been the subject of more discussion. A noteworthy detail at this point is that the correspondents are from the cypherpunk team (Hal Finney and James A. Donald). James A. Donald is a Canadian cypherpunk member. He corresponded with Nakamoto on the scaling of Bitcoin. In conclusion, Nakamoto's technical documentation, as well as his forum and e-mail correspondence, shows a tacit ideological stance. The structure and possibilities provided through his technical and historical background make the ideological orientation more revealing. In this context, it has been revealed within the scope of the study that Nakamoto is fed by the tradition of cypherpunk. The possibilities provided by the technical structure are discussed within the scope of the literature with which ideology they are associated, and their similar aspects are revealed.

DISCUSSION

The fact that blockchain technology has different application areas has led to its association with different ideologies by economic and organizational theories. The association of Bitcoin and other cryptocurrencies with different ideologies is due to the wide scope of blockchain technology. Despite this, research on the political/ideological dimensions of blockchain technology tends to take a critical stance against the utopian and viability of the technology (Inwood and Zappavigna, 2021). Dodd (2018) argues that there is a paradoxical aspect to Bitcoin's success as a monetary system. This paradox is built on the premise that the criterion for Bitcoin's success as a currency is that it must fail ideologically. Bitcoin ideology is based on an anti-state and anti-system attitude. Cryptocurrencies can be ideologically differentiated depending on their function. According to Dodd, although Bitcoin is associated with anarchist and libertarian ideas, the way it works in practice is incompatible with the infrastructure. Nevertheless, it can be said that the distinct layers of Bitcoin's ideological dimension are shaped in a techno-political manner. The basic dynamics of this ideology lies in the use of technological possibilities without engaging in political debates, and in the independence of monetary control mechanisms from centralised structures on the axis of states and institutions.

According to Doria (2020), Bitcoin deconstructs centralised structures and reduces the element of 'trust' to algorithmic bases, eliminating centralised controls in the money and payment system. The possibilities provided by this structure have led the ideology of Bitcoin to be associated with the Austrian School. According to Corradi and Höfner (2018), Hayek's idea that competition between different currencies would increase efficiency by all banks issuing their own money (free banking) is similar to Bitcoin's decentralization. Studies in the literature[9] mostly focus on the similarities between the cypherpunk movement and libertarianism in terms of 'cyber freedom' and Bitcoin in terms of 'eliminating intermediation'. However, the structure of Bitcoin which eliminates intermediaries goes beyond the ideology of the Austrian School. Additionally, Hayek's term 'spontaneous order' refers to an unplanned complex system. Libertarians understood Hayek's term to mean an unplanned complex order that emerges as a result of different individual actions to meet short-term needs (Arnhart, 2018). According to the findings of this study, Bitcoin cannot be said to be related to the concept of 'spontaneous order'. Bitcoin is a cryptographic and algorithmic understanding of order that has been developed in a planned way, drawing on a rich historical background. According to Dos Santos (2017), this order is provided in a technical manner and has a structure that is not 'complex'.

The main problem with the cypherpunk movement is that the areas related to 'freedom' are brought to a level where they cannot be destroyed by the state and its institutions, rather than ensuring freedom. This is why cypherpunks have been wrongly associated with 'libertarianism', because they respond to the crisis of freedom by opposing 'technocratic authoritarianism' (Beltramini, 2021). When analysing Nakamoto's writings on Bitcoin, although the focus is on the technical dimension, there is an ideological background to 'privacy'. For example, the privacy offered by cryptography in Bitcoin stems from the fact that it is seen as a basic necessity of freedom. In this respect, Bitcoin cannot be said to have a direct relationship with libertarianism. Although the emphasis on individuality is prominent in libertarianism, it can be said that the technical structure of Bitcoin transcends individuality.[10]

[9] See for example Miscione and Kavanagh, 2015; Bartlett, 2016; Dahlberg, 2017; Redshaw, 2017; Dallyn, 2017; Jarvis, 2021; Nabben, 2021; Jansen, 2013.

[10] By providing this structure, the transactions carried out in the blockchain technology provide privacy to the users and allow the users to transform into another form within the system. The fact that there is only one address for those who perform the transaction contradicts the argument that the system will increase the individuality of the users. However, the system can affect the self-concept in terms of its results. These dimensions of the blockchain create conditions where individuals are responsible for

Another dimension of Bitcoin ideology is its reference to the problem-solving nature of cryptography. Bitcoin's decentralization of money and payment systems has undermined the legitimacy of the state and its institutions, leading to the consideration of cryptography as a new armament in Deleuze's 'society of control'[11] (DuPont, 2014). Furthermore, Bitcoin's infrastructure that does not need centralised structures has also led to its understanding as a 'techno-centralist' ideology (Parkin, 2019). With the interventionist structure of the state and institutions, it has led to an increase in libertarian discourses by encouraging the use of cryptography technologies to prevent 'panopticons'[12] in cyberspace. Since the existence of panopticons in cyberspace will lead to the ignoring of privacy, it can be said that Bitcoin advocates are influenced by the libertarian discourses of the cypherpunk culture. In addition, the driving forces behind the development of Bitcoin are ideologically driven by the solution of the double-spending problem and ensuring privacy in cyberspace (Hayes, 2019).

With cryptographic encryption in the Bitcoin blockchain, users can carry out transactions with a virtual identity, hiding their real identity. The anonymity of transactions can alter the way people feel about doing business (Heister and Yuthas, 2020). With the anonymity of virtual identities, the privacy of users is also ensured. With the blockchain, in an environment where intermediaries are eliminated and privacy is ensured, data is under the control of users. As people start to realise that they are able to take back control of their personal data from big business and government institutions, it is estimated that support for blockchain technologies will accelerate and threaten traditional or existing systems (Heister and Yuthas, 2020). The irreversibility and inalterability of the transactions which are recorded in the blockchain represent the radical aspect of the transaction structure of the system. The fact that this structure is inalterable creates an inherent trust in the system. Therefore, when discussing the principle of insecurity in the blockchain, although there is trust in the system, the parties can carry out their transactions without the need for mutual trust for the realisation of transactions. When the principles of anonymity, confidentiality, immutability and insecurity are evaluated, the future of the system makes potential transformation possible for many institutions. Although the impact of this transformation on the individual is important, whether the individual will exist in this system is one of the important questions in our opinion.[13] However, institutions that are intermediaries in cryptocurrency exchanges (e.g. Coinbase, Binance) gain the appearance of pseudo-anonymity by enabling users to switch from cryptocurrencies to fiat money to carry out transactions (Heister and Yuthas, 2020). Therefore, it is possible for institutions and governments to access the information of users who transact through cryptocurrency exchanges. The existence of cryptocurrency exchanges gives the impression that users cannot be anonymous, but this structure is not a feature of the blockchain. Since blockchain technology is an address-dependent system, the identity of the individual becomes uncertain. The emphasis on anonymization and cryptography leads to the concealment of identities rather than emphasizing individuality. Thus, addresses transcend individuality as the location of the individual is concealed, making it unclear to whom the addresses belong.

CONCLUSION

Since the cypherpunk movement, it has been a generally accepted view that privacy should be ensured in cyberspace. Hence, the rise of cryptography has played an important role in the secrecy process. Cryptography is often associated with privacy and the concealment of information and identities, but it is likewise concerned with verifying the authenticity of information and

the ownership, security and management of their own data (Heister and Yuthas, 2020). Although the nature of the blockchain system itself does not contain any principles that enhance individuality, it does provide for the basic principles of privacy, anonymity and decentralisation. These principles can be said to affect the concept of self in terms of the outcomes they produce, but there is no concern for individuality inherent in the system.

[11] Deleuze (1992) discusses the society of control with reference to Foucault's disciplinary societies. In societies of control, structures have become more complex. In order for the individual to overcome these complex structures, as Deleuze puts it, "fear or hope is not a remedy; one must attempt to find new weapons". Thus, 'cryptography' is a good example of Deleuze's new weapon in control societies.

[12] 'Panopticon' is a concept developed by Jeremy Bentham and later analysed by Foucault in the context of knowledge and power. The Panopticon is a system in which control, surveillance and intervention mechanisms are structured using prison architecture as an example. As a metaphor, it is discussed whether blockchain technology is a panopticon (Robb and Deane, 2021). In this structure where transparency is emphasised, blockchain technology may have the potential to increase control and surveillance at the point where the area of privacy is not considered.

[13] This structure, which does not require the state and intermediary institutions to ensure agreements between spouses, seems to give the impression that individuality is at the forefront. The fact that peers are anonymised by cryptographic algorithms and carry out their transactions without the need for intermediary institutions is an indication that individuality has disappeared in its known dimension. In this system, transactions are now realised through algorithms without the need for an individual. It is not important for the blockchain whether the transactors are individuals or not. The algorithm in question is that the algorithm works effectively, and transactions take place between peers, who the peers are is not important to the system. Heister and Yuthas (2020) found blockchain technology valuable in terms of affecting the concept of self, as it enables transactions to be carried out without the need for intermediaries by providing privacy and anonymity.

identity claims (Hütten, 2019). Bitcoin's ability to provide privacy in the blockchain and prevent the problem of double spending reveals the innovative nature of the system. In addition, one of the measures taken against the state and institutions in Bitcoin is the emphasis on privacy. The findings obtained from qualitative data such as cypherpunk manifestos, technical documents, Bitcointalk and cryptography mailing lists, which were discussed in the historical context of this study, reveal the 'tacit' ideological dimension of Bitcoin and blockchain technology in the debate on how privacy should be technically ensured.

Bitcoin ideology benefits from a historically deep-rooted past. This historical structure shows that Bitcoin has a planned trajectory that cannot be explained by Hayek's concept of 'spontaneous order'. In addition, Bitcoin's algorithm-based creation of trust by destroying traditional perceptions of trust has caused it to be interpreted as an anti-system movement. Firstly, the creation of a system that eliminates intermediaries in the payment system has created the perception that an anti-state order has been created. Blockchain technology offered an alternative to traditional payment systems by enabling transactions to take place without the need for intermediaries. The ability of individuals to carry out transactions without intermediaries prevents their data from being stored in third parties. The general attributes of the blockchain create an environment in which individuals assume greater responsibility for both managing and protecting their private data and maintaining the trustworthiness of the participants with whom they trade (Heister and Yuthas, 2020). All this has led to Bitcoin being associated with different ideologies. However, when the structures that paved the way for the development of Bitcoin are analysed, it is found that an ideological orientation inherent in the system is linked to the ideology of cypherpunk, defined in terms of technically enhanced privacy. Instead of the 'distorted' Bitcoin ideology of the libertarian literature, the article finds findings consistent with the arguments of Brekke (2021), Scott (2017) and Inwood and Zappavigna (2021). Although the technical structure of Bitcoin is associated with different ideologies, Nakamoto's language and the structures he was influenced by cannot be said to have a 'crude' libertarian ideological dimension.

In future studies, the data set used in this study can be expanded to include all posts of the Bitcointalk forum. However, how the perception of 'self' will be shaped in the light of the possibilities provided by blockchain technology is the subject of another study.

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