

# Investing Trust in Blockchain Technology: Bitcoin Case Study

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## Abstract

*The present paper explores the current development of cryptocurrencies, emphasizing the concept of trust related to the blockchain technology and the digital currency market. The study offers a fundamental review of relevant research papers on Bitcoin, examining the main issues of trust among five categories of stakeholders: Governments, users, miners, exchanges and merchants. The results highlight the trust challenges on Bitcoin, revealing a unique perspective of risks on the cryptocurrency market, contagion effects, decentralisation systems or cryptocurrency regulation. The blockchain features are explained in order to better understand the Bitcoin mechanism, presenting the advantages of using such technology, concluding that Bitcoin is a product of the mistrust in financial institutions and an attempt to use alternative payment systems in a more secure way.*

**Key words:** blockchain, cryptocurrency, Bitcoin, trust

**J.E.L. classification:** G11, G15, E42

## 1. Introduction

Bitcoin, the first cryptocurrency developed in 2009 after the scheme introduced by Satoshi Nakamoto (2008), is a product of time, where financial institutions were perceived as unable to manage economic imbalances. Thus, the cryptocurrency market is a response to the financial uncertainty and crisis effects, a proper alternative to the central banks' functions in a time of mistrust of handling the recession period. Bitcoin is designed to be trustworthy, replacing those parties that one may mistrust with a decentralized system logged to a publicly viewable blockchain. The Bitcoin bases are more computational rather than human, being linked with mathematical algorithms that make the structure safer, as an intrinsic need of Bitcoin functionality.

This paper exploits trust as a contributing factor for cryptocurrency market growth, considering the level of trust invested by the users in a new technology as a very important factor of the cryptocurrencies' adoption, especially in the crisis circumstances of financial distress. Bitcoin, as a result of the blockchain technology, can be associated with a speculative investment, which is by its very nature, extremely risky. In the same time, Bitcoin security has particular capabilities as the bitcoin wallet can be backed up in different ways and customers are not exposed to fraudulent actions due to its decentralized model. This approach relies on the independent validation of transactions by miners through consensus, which is a completely decentralized security architecture.

The blockchain technology improves the efficiency, removing the system incompatibilities and speeding up the payments in a real time view of all transactions. The data is stored in multiple nodes of the system, feature that increases the resilience of the data through a replicated database. But, the most important, Bitcoin is sustained by a more honest mechanism, where questionable changes are immediately detected, function that requires a deep investigation of trust in the blockchain technology. According to this view, the computational algorithms are used as authenticity certificates for the uneditable trading records, being a relevant explanation for the investors' behavior on the cryptocurrency market. This paper contributes to the growing economic literature on this subject, treating trust as a single point of disrupting financial third parties' monopolistic actions and potential source of agreement in an unknown environment.

## **2. Theoretical background - Blockchain impact in terms of trust**

Blockchain is a technology that increases transparency by its decentralized mechanism, reduces costs and have significant influences for various economic sectors in terms of efficiency, enabling solutions to issues that otherwise could have not be solved. Innovative blockchain initiatives were provided in health system, financial inclusion, energy, climate and environment, followed by philanthropy, democracy, governance, agriculture and land rights. One of the most popular benefits of blockchain is related to trust as blockchain is perceived as a proper method to reduce risks and fraud – 38% (Galen et al., 2018, p. 4). Blockchain is the underlying technology that advanced cryptocurrencies, being a secure record book of transactions organized in “blocks” of data, which form a “chain” linked to other “blocks”. The blockchain technology has revolutionize the markets by using smart contracts, creating trust without a intermediary-party, through three main elements: (1) identity, which is referenced to the digital signatures; the transactions are authorized by a set of public – private keys that are similar to the password and the account number of a traditional transaction. (2) ownership, through the cryptographic hashing; each block contains hashed representations of data from the previous block, which makes the system reject all fraudulent attempts to manipulate the information which is already stored into the chain; (3) verification, through the distributed consensus; it makes the verification process more feasible replacing the trusted intermediary with a group of people that can publicly verify the truthfulness of a specific transaction.

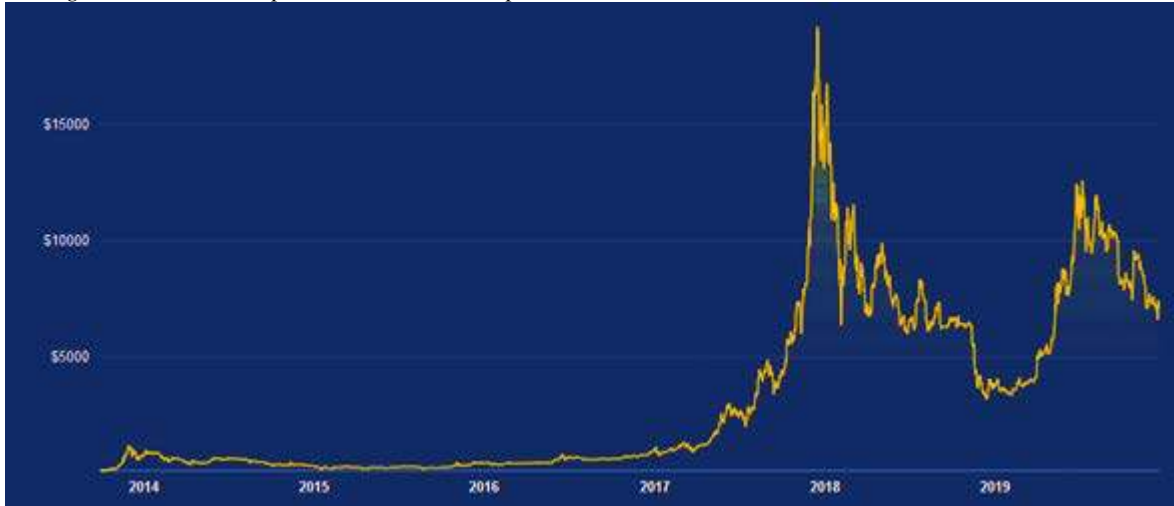
Blockchain has no single controller of the data, which makes impossible to alter the data without the consensus of the other participants of the network. Furthermore, blockchain has the advantage of real time transactions and no need to reconcile the trades by a third party, increasing efficiency and transparency. Every piece of data is added to the final blockchain after the consensus of the parties, which aligns the participants to a single version of the event. Data concentration has a potential risk from external attacks to internal disruptions, while trusted third parties are expensive and often quasi-monopolistic. A study conducted by DBS Asian Insights in collaboration with DBS Innovation Group suggested a three-scale trust evolution: (1) first level is a mutual distrust, which leads to minimal business opportunities; (2) the second stage use the third party and is associated to some business opportunities, but also risks, complexity and more expenses; (3) the final stage is correlated with high levels of trust and the use of blockchain; it reduces the complexity and risks and increases the business cohesion (Lewis et al., 2016, p. 11).

## **3. The cryptocurrency market: Bitcoin**

The Bitcoin background starts with the Satoshi Nakamoto paper entitled “Bitcoin: A Peer-to-Peer Electronic Cash System” (2008) and its decentralized system without a central authority that validates the transactions. Instead of the third party, the system uses a Proof-of-Work algorithm to arrive to the consensus. In fact, Bitcoin was essentially a product of mistrust, in a time when “mistrust of the handling of this crisis by financial institutions, central banks and governments was growing” (Craggs, 2017, p. 13). Bitcoin has the advantage to unify the markets to a digital economy, where the Governments must adjust to the new conditions, more competitive and responsible. Bitcoin was the starting point for some important technologies that have the potential to transform the global economy through its informational features.

According to the Figure 1, the Bitcoin market is still in its infancy and has some cyclical trends of evolution, with an explosion of price in December 2017 (19.166,98 USD – 17.12.2017). Since then, the Bitcoin price has slowed down, tried to recover in 2018, but has been clearly declining at the end of the year. Until march 2019, there has been a low level of volatility of the prices, suggesting an accumulation phase before the next strong decrease. In the period April 2019 – June 2019, there was a soft increase of the Bitcoin price, reaching the maximum point in July (12.335 USD – 09.07.2019). This local peak emphasized the decreasing trend which was very similar with the one observed throughout almost the whole of the year 2018.

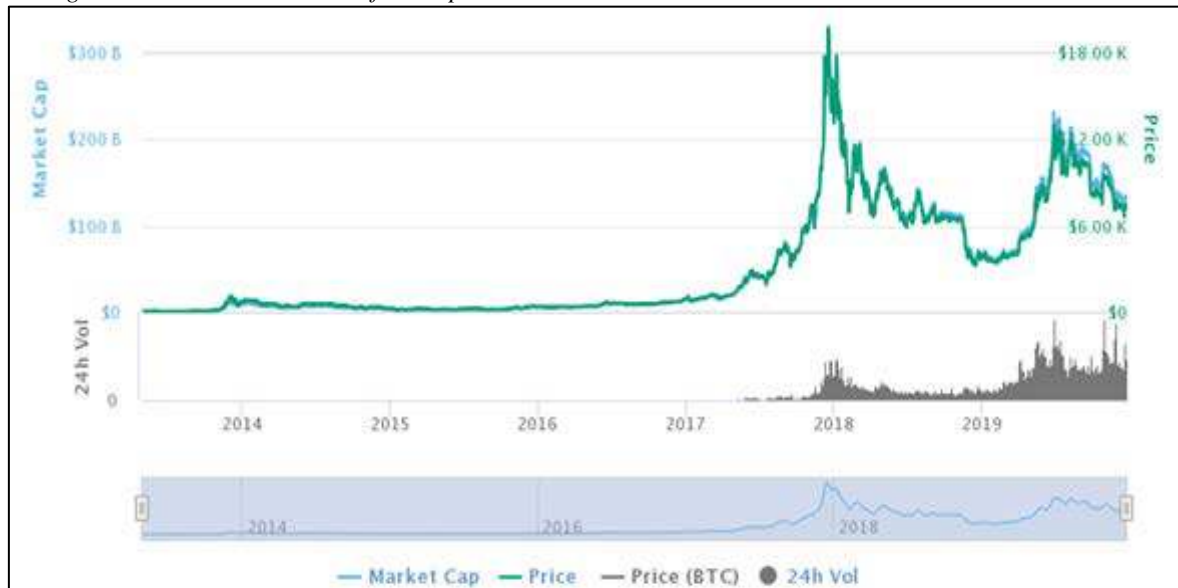
Figure no. 1. Bitcoin price evolution in the period 2014-2019



Source: <https://www.coindesk.com/price/bitcoin>

The BTC price fluctuates around the level of USD 7.000, while the total market capitalization of Bitcoin totalizes over USD 132 billion. The Bitcoin price at 26.12.2019 was USD 7.323,18 and the 24-hour volume was over USD 21 billion (Figure 2). Given the repeatability of the two cycles, it can be assumed a continuity of the decreasing trend under a limited volatility, followed by the next wave of boom which may reach the psychological barrier achieved in 2017. On the other hand, the BTC dominance is about 68,7% and Ethereum, the second most important cryptocurrency after Bitcoin, has a market capitalization of USD 14.045.977.871, which is approximately ten times less than Bitcoin.

Figure no. 2. Bitcoin statistics for the period 2014-2019



Source: <https://coinmarketcap.com/currencies/bitcoin/>

Bitcoins are produced by computers and use a system that enables payments based on cryptographic methods. The Bitcoin system is composed by users, miners and the authoritative ledger of all transactions. The “wallet” holds the private and public keys that allows the Bitcoin investors to access the addresses. The miners add new Bitcoins to the money supply through consensus, validating new transactions and including them in the blockchain, according to a peer-to-peer network. Miners solve mathematical problems in order to validate the transactions, using algorithms and being rewarded for their work. Bitcoin is more than a computing innovation, designing a powerful mix of bitcoin protocols – distributing mining – blockchain technology.

#### 4. Results and discussions

Starting from the Bitcoin evolution during 2017, when it experienced a kind of bubble, followed by a sharp decrease of prices, Ferreira and Pereira (2019) evaluate the contagion effect between Bitcoin and other major cryptocurrencies using different time-scales, concluding that there is a more interconnected market at present than in the past. These results are in line with previous works of Beneki et al. (2019), which emphasize a correlation between Bitcoin and Ethereum, or Silva et al. (2019), which identified a contagion effect of Bitcoin in almost all cases of the sample (50 cryptocurrencies with greater liquidity).

The Bitcoin technology rises multiple issues in terms of trust, its architecture being based in the same time on scrutiny and anonymity. While the transactions are publicly archived on the blockchain, the identity of the users is undisclosed, due to the cybersecurity models and cryptography. Trust is seen as a subjective belief in the truth or honesty of someone/something (Grandison and Sloman, 2000), being emphasized the distinction between three forms of trust (Misiolek et al., 2002; Leppanen, 2010): (1) technological trust, which is related to the usage benefits, usability and individual perceptions of user's skills; (2) social trust, referring to the disposition towards trust and the dependence on the others and (3) institutional trust, which is influenced by the power relationship and organizational trust based on hierarchy.

Sas and Khairuddin (2015) propose a symmetry between the two frameworks for exploring levels of trust in the Bitcoin technology and across various stakeholders: Governments, users, miners, exchanges and merchants. In this respect, users are those people which use Bitcoin in their transactions and are subject to security risks, having limited knowledge about the blockchain technology. Merchants are those businesses which accept risks due to the unknown identity of their buyers, being engaged in positive transactions with the Bitcoin's owners. Both exchanges and miners are essential for supporting the merchants' and users' trust in Bitcoin transactions, providing the trading platforms for Bitcoin and recording new transactions through solving crypto-puzzles. The regulatory international framework of the cryptocurrency market is becoming increasingly relevant in the current global debate, dominated by a lack of consensus on the topic. The fundamental link of Bitcoin with the Governments designs a sophisticated mechanism without a central authority, where disputes are solved through peer-to-peer protocols.

#### 5. Conclusions

The cryptocurrency market is based on a fundamentally novel mechanism, which has the potential to fulfill various functions for its users. We formulate the main advantages for the blockchain technology in terms of trust, investigating its role compared with the traditional groups of assets. We construct our hypothesis related to five major categories of stakeholders (Governments, users, miners, exchanges and merchants), investigating the security risks associated and reporting trust as a crucial point of the analysis. Bitcoins are mined through public distributed nodes of the blockchain network, while miners have a catalyst role on the market. The core of the mining process is the trustless mechanism of transactions in a transparent way, due to the cryptographic features of the system and sophisticated algorithms. Once the transactions are verified, they are added on the blocks and recorded in the blockchain ledger. The unregulated nature of transactions, the lack of a financial third-party authority and the consensus protocols that are used are features of the Bitcoin technology that significantly differ from the e-commerce systems. Future research can be directed to exploring security threats for each category of stakeholders, with a special focus on the miners' practices and their involvement in the process.

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