

The Applications of Blockchain Technology in Crowdfunding Contract

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Abstract

At present, Crowdfunding source of raising funds typically for business startups has gained much primacy with most businesses resorting to the use of Crowdfunding platforms to raise funds because it is relatively inexpensive and uncomplicated in nature. The call for a solution to issues related to security, investor abuse and, illegal transactions that could plague crowdfunding contracts is the spurred this paper. Using existing literature on Crowdfunding and blockchain technology, we put forward a conceptual framework that can provide the solution to the problems related to Crowdfunding contracts through the use of blockchain technology. Taking into account the role of the intermediary platforms, we examine how the foundational qualities of the blockchain technology may resolve the problems of these platforms. We discuss how blockchain technology can effectively and securely handle the relationship between fundraisers, platforms and the investors. We anticipate that our paper will drive the attention of researchers to delve into blockchain technology in Crowdfunding contracts practicality.

Keywords: Crowdfunding contract, Blockchain technology, Investors

1. Introduction

A global challenge facing business start-ups is the raising of the required funds. Although there are many sources of funds available to entrepreneurs who wish to start new businesses or expand existing ones, the challenge of getting inexpensive funding at the right time still remains a challenge in the small business domain. The emergence of crowdfunding as a brainchild of crowdsourcing provides an alternative form of funding for business start-ups (Belleflamme,

Pambert, and Schwienbacher 2014). The concept of crowdfunding simply involves selling a business idea to a specific group of individuals via the internet to convince them to contribute towards it each to the tune of the total fund required to transform that idea into a reality. This means that the possibility of getting investors could hinge on how valuable an idea sounds. Crowdfunding could take several forms, investors could swap their money for shareholder status where they can vote and receive dividends, investors could simply donate without expecting any form of returns, investor can lend to the business and expect their principal plus interest back after a period of time and, finally investors can invest in anticipation of a reward (Schwienbacher and Larralde 2010). Crowdfunding is preferred for business startups ahead of other sources of funds because of the relatively lower cost of raising the funds, the speed with which funds can be raised and the lower entry barrier for businesses (Bradford 2012).

In practice, crowdfunding could have potential challenges if not regulated, as reported by Hu (2014) investor interest can be damaged in a situation where regulations are not properly administered causing illegal transactions to become the order of the day. Information asymmetry is key to any financial decision and the lack of accurate information on the credit ratings of fundraisers, clear description of rights of investors could also hamper the security of investing in a crowd contract (Wang 2016, Liu 2014). How do we secure the interest of shareholders? how do we prevent illegal businesses from raising funds through a crowdfunding contract? The crowdfunding market is fast developing and there is the need to ponder on the security of the tradings that take place on this market (Wang 2016; Lou 2015; Dong, Mei, Zhou, Liu, Zhang, and Yuan 2014). Can blockchain technology be the solution to these foreseeable problems?

The application of blockchain technology has been tested and verified with the success of bitcoin. Blockchain technology is the creation, insertion and using of blocks to help solve problems related to the needs of people in society. Blockchain technology endorses transparency in records, supports decentralization, encourages trust and provide a low-cost alternative to a platform for the recording of business activities (Schatsky and Muraskin 2015). According to Swan (2015), while the full potential of the blockchain technology is still under exploration, it could be adapted in voting systems, financial markets, currency transfer as well as in E-payment systems. Can the blockchain technology help solve the problem of abuse, lack of information

asymmetry and reputation in crowdfunding? With the central banks of many countries supporting research into the prospect of blockchain application in the financial sector, this paper delves into how blockchain can support crowdfunding contracts. There are several studies exploring the applications of blockchain technology; Zhu and Zach (2016) looked into the application of blockchain technology in the equity type of crowdfunding in China. Guo and Chen (2016) studied the possible use of blockchain technology in the banking industry. Sun, Yan, and Zhang (2016) proposed a framework for the application of blockchain technology in sharing services. These studies do not cover extensively the application of blockchain technology in crowdfunding. However, the following studies show glimpses of how blockchain technology could affect crowdfunding. Kshetri (2015) discusses the application of crowd-based online technology in raising funds by considering the role of the institutional platforms. Huang and Zhao (2017) write on the Revolution of securities law in the Internet age with much focus on equity crowdfunding. We look at the various participants in a crowdfunding contract and how blockchain technology can support each of the participants to promote trust, decentralization and information asymmetry. We tackle the following questions.

RQ1. How does blockchain technology affect formal and informal institution in the the success of crowdfunding contracts?

RQ2. How does the effect of blockchain technology on these institutions differ within the types of crowdfunding contracts?

The Crowdfunding contracts can be launched by individuals or institutions and executed by both formal and informal institutions and it is important to examine how blockchain can be used in each of these institutions. Again, There are four classes of crowdfunding contracts namely, the crowd lending, the crowd equity, the reward based crowdfunding and the donation-based crowdfunding. The remainder of the paper is structured are follows; (2) crowdfunding contracts, (3) Blockchain technology, (4) Elaboration of the framework, (5) Results and discussions, (6) Conclusion and, (7) Recommendations for future studies.

2.Crowdfunding contracts

The dilemma for most small businesses is the ability to raise money at the cheapest cost. Crowdfunding as a source of raising funds delivers speed, low cost and efficiency for business startups in terms of fundraising (Zhu, 2016). Crowdfunding provides an easy, cost-efficient Crowdfunding is turning out to be a popular source of business startup funding in many developed countries. This concept operates almost identical to the fiat money system where the platforms serve as an overseeing authority that regulates the activities of the fundraisers and the investors to ensure that there are trust and security in the crowd dealings. According to Forman, Goldfarb, and Greenstein, S (2005), the internet is extensive and crowdfunding contracts can be used by lots of individuals across the globe. However, raising the exact amount of money required from investors could be reliant on geographical location. Ordanini, Miceli, Pizzetti, and Parasuraman (2011) in their study of three diverse crowdfunding contracts observed that crowdfunding contracts are endorsed by individuals who are closer such as family and friends. This means that although the internet is extensively spread, only individuals close to the location of the crowdfunding contract might be interested. This is as a result of the fact that, differences in geographical locations could have a significant effect on information asymmetry (Morgan, 2004). Apart from propinquity, cumming and Zhang (2016) in the study of 51 crowdfunding platforms observed that higher funds were raised on platforms where due diligence a priority. This is indicative of the fact that individuals are willing to support crowdfunding projects when they can be confident of its legitimacy. Figure 1 explains the framework of crowdfunding contract

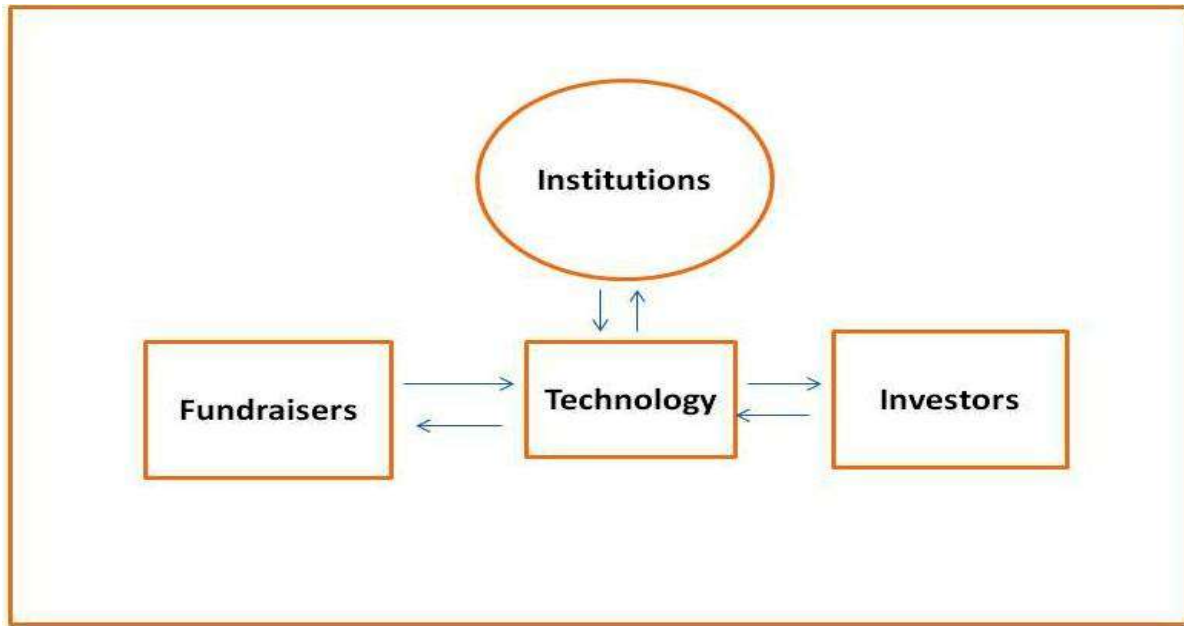


Figure 1. Framework for Crowdfunding contract

Characteristically, crowdfunding contract involves three parties, the fundraisers, institutions, and the investors. The institutions operating the platforms serve as the intermediary connecting the fundraisers and the investors. *Fundraising* in the crowdfunding contract must be initiated by an individual who has a viable proposal or who wants to start a business venture and requires an amount of money to support that idea or venture. *Institutions* offer a form of mediation, there are institutions that have launched crowdfunding platforms that fundraisers can use to reach out to their potential investors in an attempt to raise the required capital to support their business activities. *Technology* via the internet is the means of reaching out to investors and also receive their contributions in a crowdfunding contract. *Investors* are individuals who respond to the call of fundraisers and are willing and able to commit a specific amount of money to support the idea or business of fundraisers. There are four core types of investors under the crowdfunding contract, equity shareholders are investors who give out their money to the fundraisers in exchange for part ownership of the company in the form of shares (Cui, 2014). With the investor who chooses to lend in a crowdfunding contract, the investor gives out money in anticipation of interest plus principal at a given time. Reward-based investors also expect a reward at a later date while the donation investors give without expecting any returns.

3.Blockchain Technology

The idea behind cryptography is the protection of valuable information at every level of usage, it could be protection from unauthorized users and or the provision of access to only authorized users in an organization, institution or at a personal level and the cryptocurrency concept functions on the very same principles as it is unquestionably reliant on the security of information (Saper, 2013). In the financial market, the availability of information, security, and trust are some of the major determinants of how effective the market can be. During the barter trade era, trust through verification of the goods served as the only form of security backing trade and the exchange of goods did not have to depend on the presence of an intermediary. However, the era of fiat money introduced the mediation model where two parties have to depend on a third party to effect transactions. Banks have and continue to serve as the trusted parties until the advent of the disruptive blockchain technology that provides the novelty of eliminating banks as mediators and still make transactions more secure. Blockchain technology goes beyond just payments and extends into other aspects such as corporate governance, voting, and social institutions and supports the operations of the financial market (Wright and De Filippi, 2015).

The blockchain technology can use either a public ledger, private ledger or a hybrid ledger depending on the context of the application of the technology. Public ledger provides free access to every user on the internet and depends on a consensus mechanism of proof-of-work for validation (Buterin, 2015). Using a private ledger relies on write-permission for decision making and read-permission is either made private or public. Private ledgers provide less decentralization and high anonymity. A hybrid ledger is introduced to harness the positives of these two ledgers and minimize their negatives. It balances the low-trust in the Public ledger with the high-trust in the private ledger (Buterin, 2015). Figure 2 explains the mediating role of blockchain technology in a payment system.

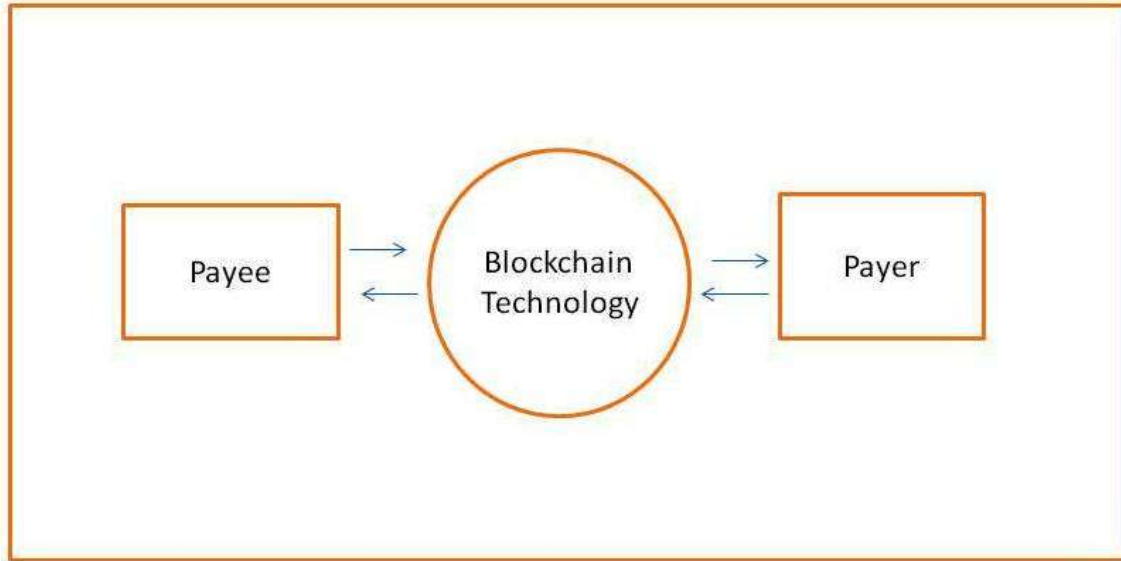


Figure 2. Framework for blockchain technology-mediated payment system

The blockchain technology payment system eliminates the third party or mediatory role existing in the fiat money transfer system which necessitates the involvement of a bank as the intermediary. A *payee* is a person expecting a specific amount of money from another person known as the payer. If a transaction can take place on a blockchain it must be initiated and because the technology depends on cryptography, the payee is the person who initiates the transaction by sending his public key to the payer. *Blockchain technology* binds transactions in the form of a coin with monetary value to addresses of the payee and payer. This makes it easier for the transfer of coins from one address to the other via verification of addresses. With a system that can bind the addresses of the parties in position, it provides an avenue for the tracing of transactions but without revealing the identity of the parties on the block. The block can be confirmed by parties of the transaction and this makes it easier to know when a transaction has gone through (Dwyer, 2014). *The payer* can also confirm the request of the payee after receiving a request via the sharing of the public key by the payee. The blockchain technology trades using coins that have monetary value and this is transferred using a digital signature of a hash using the addresses stored in the blockchain to help support verification if need be.

4. Elaboration of research framework

The conceptual framework of the blockchain technology based crowdfunding is elaborated below in figure 3. We consider the existing literature on Crowdfunding and blockchain technology and provide insight into how blockchain technology can be used to execute Crowdfunding contracts. We consider fundraisers as either individuals or institutions and also classify investors into four categories and explain how the elimination of institutions (Crowdfunding platforms) and replacing it with blockchain technology can provide efficiency and ensure security.

Blockchain-based crowdfunding contract

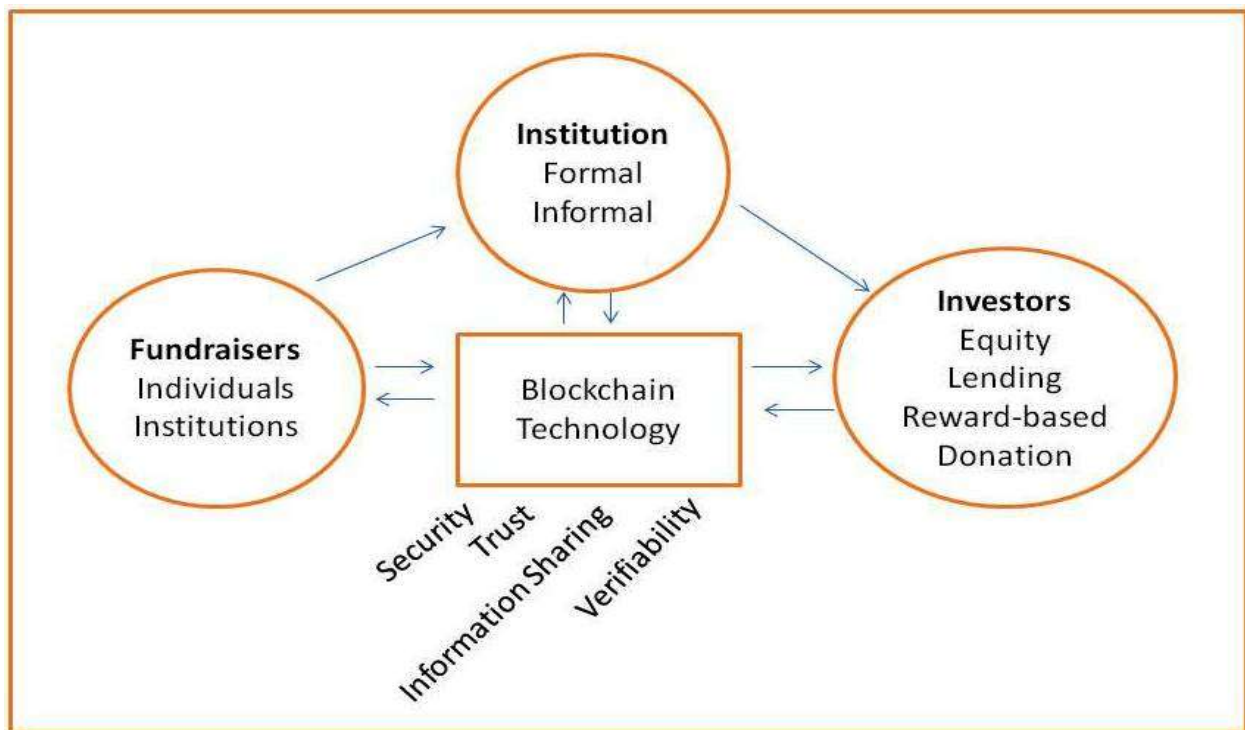


Figure 3. framework for blockchain-based Crowdfunding contract

The introduction of blockchain technology in Crowdfunding contract does not mean that the presences of Crowdfunding platforms are no longer useful. Although this is true for now, in the near future blockchain technology could completely take over the role of the intermediaries (Tapscott and Tapscott 2016). Crowdfunding contracts are executed via the internet with the use

of technology and the introduction of blockchain technology in crowdfunding could be the baseline technology to resolve most of the apparent challenges of executing crowdfunding contracts over other technologies.

Fundraisers under a characteristic Crowdfunding contract are individuals or institutions looking for an inexpensive and uncomplicated way to raise funds to support their businesses. There are several sources of funds accessible for fundraisers to opt for in funding their businesses but most prefer the use of crowdfunding source of funding due to the comparatively lower cost of transacting on it. In a blockchain-based crowdfunding, fundraisers would still have to have their idea go through the institutions before it is accepted and executed. The use of blockchain technology can help the platforms to record information on the business registration of the fundraisers and also keep a record of the nature of the business and make this information readily accessible for investors.

Institutions under a Crowdfunding contract are liable for the liaison between the fundraisers and the investors. The platforms serve as a mediator to discourage investor abuse and ensure trust between the trading parties. There are several pre-and post-activities undertaken by these platforms to make the fundraising campaign successful. However, the most noteworthy concern here for these platforms is to ensure trust and provide investor protection and this can be challenging for the platforms. In a blockchain-based Crowdfunding, the technology is known as a trusted machine and this can further the path of the Crowdfunding platforms in the battle to keep the contracts safe and secure.

Investors part companionship with their money for numerous motives, although some investors under the Crowdfunding might donate without expecting any form of returns, it must also be stated that investors do not want to be taken for granted. They want to make sure that they are investing in the right business in terms of legality and nature as portrayed on the platforms. Investors demand security and protection of their investment and do not want to invest in a business that cannot provide these. In a blockchain-based Crowdfunding, the technology will ensure verifiability and information asymmetry to help the investors make informed decisions (Dwyer, 2014).

Blockchain technology unlike the traditional Crowdfunding contracts where any technology could be used, here the use of a blockchain technology is central to the contracts. The blockchain technology sustains the entire contract by linking all the three parties together by providing timely information that can be verified simultaneously by all the parties involved. According to the Economist (2015), blockchain technology is designed in a way that it can handle all issues allied with trust without human interference. In a blockchain-based Crowdfunding, the technology can help the platforms handle issues related to trust, security, payment, voting, communication as well as fund management where necessary.

5. Results and discussions

The blockchain technology although is seen by the utopian view a disruptive technology that threatens to substitute the role of all intermediaries in different fields of application, we currently side with Catalini and Gans (2017) argument on the technology modifying intermediation and demonstrate how blockchain technology can alter the intermediation of platforms in the Crowdfunding contract. It is a technology that can solve most problems of human-related transactions (Glaser, 2017). We explain the possible contribution of the blockchain technology in a blockchain-based Crowdfunding contract.

Fundraisers- The recent call for the proper regulation of Crowdfunding activities to ensure investor protection and also prevent money laundering has initiated research into blockchain technology. The blockchain technology's initial quintessence is informational and can store information on the registration status of fundraisers who intend to use the Crowdfunding platforms (Buterin, 2015). The Blockchain technology information sharing between the three parties involved in the contract becomes symmetrical making it easier for decision making amongst investors (Dwyer, 2014). The status of fundraisers can easily be ascertained to confirm if they are legally registered or not as confirmed by the platforms and stored on the block. This technology keeps records of historic and current transactions permanently and this makes it easier for retrieval of information where necessary (SpendMatters 2015).

Institutions- Crowdfunding platforms have the responsibility of ensuring the legality of a contract while at the same time protecting the interest of investors. Much of the Crowdfunding campaign depends on these institutions and therefore the introduction of the blockchain technology will not only serve as a means of communication and transactions with regards to funds. The blockchain technology is described by Catalini and Gans (2017) as a general purpose technology due to its ability to enforce contracts across a wide combination of digital assets. Almost all the activities of the platforms could be automated using the blockchain technology and therefore the presence of humans to ensure trust in transactions will not be required. As pointed out by Pilkington (2016) the blockchain technology can be an efficient, cost-effective and safer means for raising funds in a Crowdfunding contract, it can support fast and secure means of fund transfer, provide timely information for regulators to monitor and protect investors and prevent money laundering and also make obligatory legal compliance in a peer-to-peer fund transfer. The call for security measures to be put in place on Crowdfunding platforms could be resolved using the blockchain technology which provides security in terms of confidentiality, permission of only authorized transactions and also the integrity of the transactions (Avizienis, Laprie, Randell, and Landwehr, 2004). To validate electronic transactions (Nakamoto, 2008) initiated the proof of work to make sure that the formation of harmony in a process of continually running hashing algorithms. The blockchain technology's introduction into the Crowdfunding contract will help the platforms to create paperless transactions and also limit any difficulty that has to do with geographical barriers (Zhu and Zhou, 2016).

Investors- investors in a Crowdfunding contract come in many shades and it is important to understand how the introduction of the blockchain-based Crowdfunding could affect these types of investors. The investors seek returns as well as protection. In equity Crowdfunding, the blockchain technology can help in the paperless registration and confirmation of shares as well as shareholder status irrespective of geographical location (Zhu and Zhou, 2016). Similarly, investors who lend or donate money in return for reward on the platform can also have their status confirmed and stored permanently on the block. It is important for investors to be able to trade their share easily and add value to their shares and if investors cannot easily trade it will discourage others from investing in a Crowdfunding contract (Lee and Wu 2003). The introduction of the blockchain technology in the blockchain-based Crowdfunding can help easy

and safe share trading amongst members. This is possible due to the registration of members on the block which requires just the matching of the address of members to make transactions occur (Zhu and Zhou, 2016). Investors who lend on the platform can also easily receive their regular interest payments from the business easily because they are registered on the block and all it takes is the matching of addresses. Reward-based investors can also get their rewards easily when the time is due. To prevent the mismanagement of funds on the Crowdfunding platforms, there is the need for a system that prevents the platforms from doing so (Yang and Lunga 2014). The introductions of the blockchain technology in the Crowdfunding contract, all parties are privies to the information simultaneously and this makes it easier for parties to be aware of who controls the capital pool generated on the platform. Generally speaking, crowd investors might be dispersed geographically making it almost impossible for them to meet and vote on governance issue related to the business they have invested in. To solve this problem, the blockchain technology can be programmed to support voting to protect the interest of shareholders in decision making (Porta, Lopez-de-Silanes, Shleifer, and Vishny, 2002).

6. Conclusion

The possible application Blockchain technology in different fields is still under study and this is an indication of the possibility of blockchain technology resolving most of the problems related to humans in terms of the trust. The call for investor protection and security in Crowdfunding contracts could be answered by the introduction of the blockchain technology which functions on a trust-free system where individuals have little to do to make it work. There are challenges with Crowdfunding in relation to abuse, trust and confidentiality and the adoption of blockchain technology in Crowdfunding contracts could provide the much-needed solution. Blockchain technology provides cheaper, easy, and secure and a convenient means for the exchange of information and transfer of funds. The technology is programmable and can be extended to cater for any other requirement in the Crowdfunding contract where necessary. Although currently the technology can be used to modify the role of the platforms (intermediaries), in future the technology could be used to execute Crowdfunding contracts without the need for the institutional platforms.

7. Recommendation for future studies

As the blockchain technology has been identified as a much secure and convenient way of executing Crowdfunding contracts, little is known about how the blockchain technology can completely take over the Crowdfunding contract without the need for institutional platforms (intermediary) in a similar manner like how the bitcoin replaced banks in the fiat money system. Again, more studies should go into finding out a cheaper way of addressing the limitations identified by Swam (2015) with regards to the high power usage and computing resources by the distributed system used by the blockchain technology.

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