



Smart Contract and Blockchain for Crowdfunding Platform

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ABSTRACT

In the situation of the Covid-19 plague, many organizations are raising funds to help local governments to obtain additional sources of funds that will be distributed to those in need. Trust is an important factor for the parties involved in raising these funds, both in terms of the funder, the service provider of fundraising platform and even the fundraiser. On this occasion, the author tries to analyze how to implement blockchain technology and smart contracts in the dominant schemes of crowdfunding process. The results of this study indicate that blockchain-based smart contracts can be applied to the dominant schemes of crowdfunding process.

Key words: Crowdfunding, blockchain, smart contract

1. INTRODUCTION

In this industrial era 4.0, almost all industrial sectors apply technology to support their business, from businesses that are for-profit to businesses that are non-profit. Non-profit organizations (non-profit) have characteristics that are almost the same as profit-oriented organizations (profit) profit-oriented, but between these two organizations have different problems.

In the current situation of the Covid-19 plague, almost every country has the same problem in dealing with this problem, especially in terms of the funds needed. Many strategies carried out by the government how to manage government funds in tackling this Covid-19 plague outbreak. This situation also triggered the community to raise funds to help the government in tackling this Covid-19 plague outbreak.

In the process of raising funds, of course it is not easy, because it requires trust between many parties, both the funders, intermediaries, or organizations as a place to store temporary funds to the recipient of funds. That trust is the main capital for fundraising organizations to attract funders to donate their funds to recipients of funds.

Lots of non-profit organizations play a role as fundraisers, especially in the condition of the Covid-19 plague. Trust is their challenge in attracting donors to donate their money to the organization. Not a few also a non-profit organization that uses technology to make it easy for donors to donate funds through them. So from this it can be concluded that in addition to trust which is the main factor to get as many funds as possible, technology also plays a big role in this as well.

Based on this, the author tries to do an analysis the processes that are generally contained in this fundraising organization by applying blockchain technology that can be an alternative solution to increase the trust of funders which will certainly affect how much funds will be obtained by the fundraising organization. These funds as well as smart contract technology that makes it easy for recipients to get these funds if all the conditions are met. Based on previous research, this technology can be used in the telecommunications and medical industries

The application of blockchain technology not only increases trust in fundraising organizations, but can also be used as validation from funders to ensure that funds are obtained from reliable sources and also to validate recipients of funds, whether the recipients can be trusted or not.

2. LITERATURE REVIEWS

2.1 Crowdfunding

Crowdfunding is a method of connecting between entrepreneurs and investors to invest in small amounts with an internet-based platform.

Crowdfunding is divided into three categories according to the funding base offered by the crowdfunding platform. The three categories are:

1. Donate
2. Pre-selling

3. Equity Crowdfunding

In crowdfunding, entrepreneurs, crowdfunding platforms and investors are the main criteria. The main stakeholders have their respective roles and interests. The first flow starts with entrepreneurs (businesses or startups) proposing ideas, funding requests through crowdfunding platforms and then promising returns to investors. Backers (investors) will look at investment opportunities offered by entrepreneurs and then give their commitment to fund or give advice. To bring together investors and supporters, a platform that acts as an intermediary is needed.

2.2 Smart Contract

Smart Contract is an agreement that can be executed automatically and needs to be done in accordance with the agreement that has been made. Smart Contract can run automatically using a computer while some parts still require input and control from humans. Can be enforced both legally in the enforcement of rights and the implementation or execution through computer code that cannot be changed or approved [9]. Smart Contract can be deployed on top of blockchain technology to automate complex transaction. The Smart Contract is a code that can be executed and executed on a blockchain platform that is used to facilitate, execute and enforce the terms of a contract or agreement. The main purpose of the Smart Contract is to fulfill the agreement after the terms of a contract have been fulfilled.

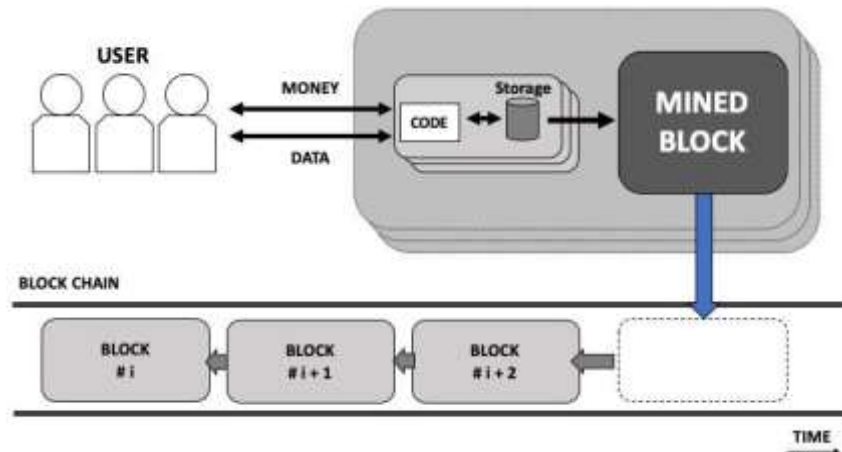


Figure 1: Smart Contract System

Smart Contract (figure 1) consists of account balance, personal storage and an executable code. The smart contract status is stored in one interconnected block and is updated every time the contract is called. The code in the blockchain cannot be entered into after the contract is entered. The contract can be executed by sending a transaction to a unique address 20 bytes from the contract. Subsequently the contract is executed by the miners in the network to reach consensus output then the status of the contract will be renewed. Contracts can read or write transactions to personal storage and save money into their accounts and receive messages or money from other users or can make new contracts.

Deterministic and non-deterministic are types of smart contracts. Deterministic Smart Contract is a contract that when executed does not require information from external parties (from outside the blockchain). Non-deterministic contracts are contracts that depend on information from external parties. For example a contract to get weather information which is one example of information that is not available on the blockchain.

2.3 Blockchain

The main purpose of the blockchain is to overcome the ever-increasing problems especially on how to build trust. Blockchains are digital ledgers that are resistant to damage applied in a distributed mode. Blockchain is a distributed database of a general ledger of all transactions that have been carried out which are verified by a majority of consensus in the system that will be shared with all parties concerned. And, once entered, information cannot be deleted. Blockchain contains certain records and can be verified every single transaction that has ever been carried out [2]. Blockchain is a database of transaction records that are distributed, validated and managed by computer networks around the world.

Based on the definition above, it can be concluded that the blockchain is a distributed database technology with a guaranteed security system that is considered to be able to increase the trust of the parties involved in a project or in long-term collaboration.

Blockchain has 2 categories namely Permissionless, and Permissioned. Permissionless (figure 2) can be interpreted as a decentralized ledger platform open to anyone publishing a block, without requiring permission from any authority.

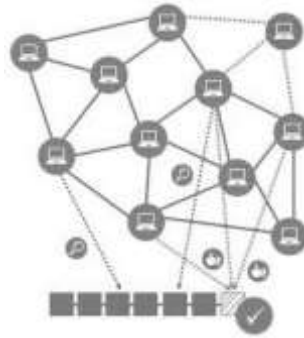


Figure 2: Permissionless Blockchain[4]

While permissioned on the contrary (figure 3), Permissioned, where the network where users publish the block must be authorized by several authorities.



Figure 3: Permissioned Blockchain

Based on other references, there is one additional category of blockchain, namely the consortium is open to the public but not all data is available for all participants [4].

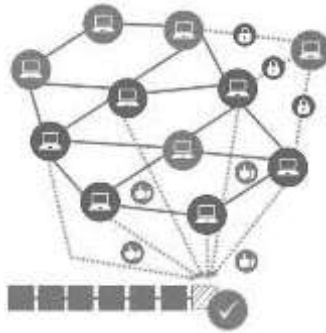


Figure 4: Consortium Blockchain

Data in a blockchain is stored in a standard structure called a block. The most important part of the block is:

4. Header

Contains unique reference number information, the time when the block was created and a link with the previous block.

5. Content

Consists of a list of digital assets and the number of instructions that have been validated (transactions, number of transactions and addresses of those transactions)

Blockchain structure also can be illustrated as figure 5 below

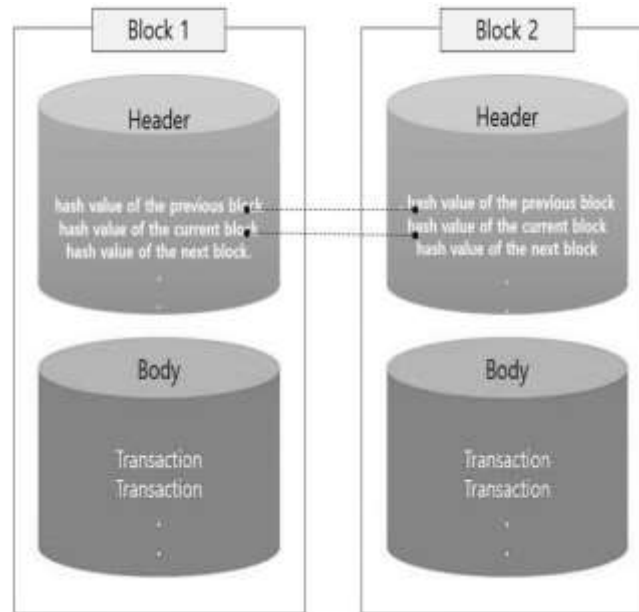


Figure 5: Structure of Blockchain

Blockchain has 4 main characteristics, namely:

1. **Immutable** - (permanent and tamper-proof) blockchain is a record of a transaction that cannot be changed thereby increasing the trust of the transaction record.
2. **Decentralized** - (network copies) all blockhais are stored in a file that can be accessed by any network.
3. **Consensus Driven** - (trust verification) blockchain is independently verified with certain rules that use unique resources to show evidence of efforts that have been made
4. **Transparent** - (complete transaction history) all transaction data can be accessed and audited by all parties

3. RESEARCH METHODOLOGY

A literature study is another term for literature study, literature review, theoretical study, theoretical foundation, literature review, and theoretical review. What is meant by library research is research conducted only based on written works, including research results both those that have been and that have not been published.

Based on the explanation above, the methodology used in this paper is the method of library research. This writing relies on sources from journals that have been published both internationally and nationally along with other relevant articles so that they can be used as a reference from this writing.

4. RESULT

4.1 Flow Process of Crowdfunding (Traditional)

Each fundraising organization must have different mechanisms and rules. However, the entity within the organization is inseparable from the 4 main entities namely the funder, fundraiser, depository fund (Bank) and the recipient of funds. In general, the relationship between entities in a fundraising organization can be described as follows:

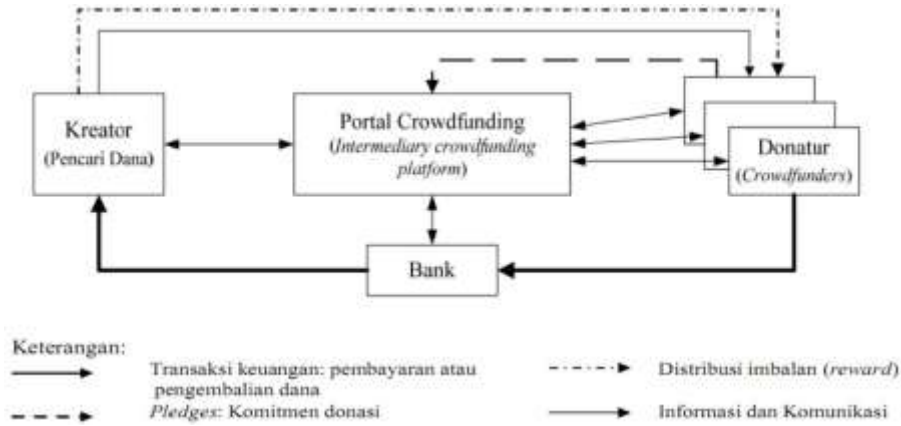


Figure 6: Crowdfunding Mechanism

There are 3 dominant schemes in the crowdfunding process, namely[12]:

1. All-or-Nothing (AoN)

This AoN scheme is a crowdfunding process scheme that implements if fundraising does not reach the target, then the funds will be returned to the funders. The following is an illustration for the AoN crowdfunding process scheme:

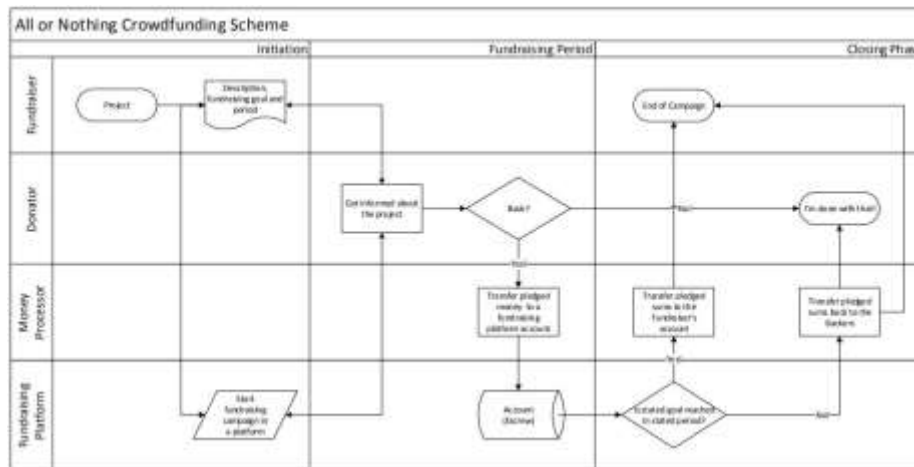


Figure 7: AoN Crowdfunding Process Scheme

2. Keep-It-All (KIA)

Not much different from the AoN scheme, this scheme applies rules if data collection is not achieved then the funds will be returned in accordance with the policies of fundraising. This scheme (figure 8) can be described as follows:

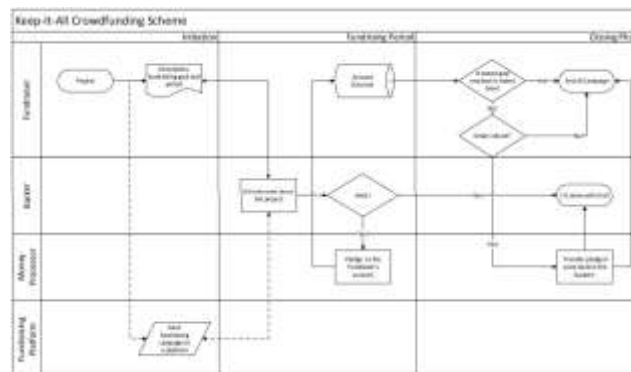


Figure 8: KIA Crowdfunding Process Scheme

3. Stretched Goals Scheme (SGS)

In this scheme, there is a development of the fundraising goal is expanded and bound by the statement can add some predetermined additional values to products and services, if the fundraising goal is achieved, then the fundraiser can take all the actions needed to add that value. the model of this scheme (figure 9) can be described as follows:

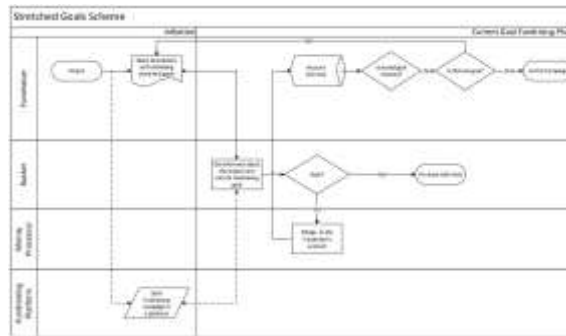


Figure 9: SGS Crowdfunding Process Scheme

Based on 3 dominant crowdfunding process schemes. The author takes the example of the main usecase of fundraising mechanisms, namely fundraising registration, funder registration, fundraising process, fund donation process and fund disbursement process.

1. Registration - Fundraiser

Before submitting a proposal to a fundraising platform, of course fundraisers must register to a fundraising platform service providers. of course, each service provider has its own rules who can submit proposals to find funds in their organizations. In general, the fundraiser registration process only involves two entities, the fundraiser and the service provider of fundraising platform itself.

The fundraiser will register to service provider of fundraising platform. In this case, the data from the fundraiser is stored in the service provider database and can be accessed by certain parties in accordance with the rules that apply to the service provider of fundraising platform. All transaction or historical data of fundraiser only can be consumed by service provider.

2. Registration – Funder (Backer)

Similar to the fundraising registration process, donors certainly need to register with a fundraising platform service provider, both offline and online. This is needed so that fundraising knows the source of funds provided for fundraising. Data from this fundraising course is also stored in the fundraising database and can only be accessed by parties who have been determined by the service provider. This process also involves 2 entities, namely the funder and the fundraising platform service provider. all historical transactions are stored in a system provided by the fundraising platform service provider.

3. Fundraising Campaign

To raise funds, a fundraiser must submit a proposal to the fundraising organization. each fundraising organization certainly has its own rules for publishing proposals from fundraisers. Every proposal that enters the fundraising organization certainly goes through a very strict verification process, because not all proposals from fundraisers are accepted, this could be due to the rules of the organization. This needs to be done to avoid proposals that are inappropriate for publication so as to reduce the confidence of the parties involved, especially the funders. This process involves two entities, the fundraiser and the fundraising organization. If the terms and conditions of the proposal are fulfilled, the fundraising campaign can be published by service provider of fundraising platform.

4. Donation

The funding process to provide assistance to fundraisers, of course, begins with funder conducting surveys of many proposals issued by fundraisers. If the fund supporter gets a proposal in accordance with his wishes, the fund supporter carries out the process of giving funds through the fundraising organization or to the fundraiser directly. In general, fundraising organizations have the option to make it easier for funder to transfer funds to them. With current technology, sending funds can be done using electronic money, virtual accounts, bank transfers can even be done through traders who work with these fundraising organizations. In this case, easier or more options for transferring funds, directly affect the willingness of funder to make transactions back at the fundraising organization. Not all fundraising organizations have the ability to integrate with the above entities, but in general the entities involved in this process are funder, fundraisers and banks where temporary funds are stored. all historical transactions must be stored in a fundraising organization or fundraising platform service provider.

5. Disbursement

The last major of usecase is the disbursement of funds. In the process of disbursing funds, of course, each fundraising organization has its own terms and conditions. In this process, it generally takes time because they have to go through the verification process and the process of disbursing funds. For organizations that do not yet have the technology to make online disbursements, fundraisers must of course have to process the disbursement of funds

manually by following up on proposals previously given. Conversely, for organizations that already have web portals and mobile applications, it is certainly easier for funders to withdraw funds.

In the process of disbursing funds, the platform provider for fundraising in Indonesia takes two days to withdraw funds. In the process, it is necessary to fill out forms and verification processes to ensure that funds are disbursed by registered fund seekers who naturally have their own terms and conditions. In the process of raising funds, generally it involves 3 entities, namely fundraisers, fundraisers and banks as a place to store and raise funds.

4.2 Crowdfunding Flow Process (Smart Contract and Blockchain)

Based on the main usecases contained in the fundraising process which also refer to 3 dominant crowdfunding process schemes in the crowdfunding process, the authors see that there are some process that can be optimized by using smart contract and blockchain technology. Things that can be applied to this process are the process of verifying data from seekers and funders, eliminating dependency with third parties (banks) and shortening the submission and disbursement of funds.

1. Data verification of funder and fundraiser

It is natural for fundraising platform service providers to repeatedly verify fundraising and donatur. This is done to ensure that funders or funders are clear individuals or organizations. Specifically for fundraiser, to ensure fundraiser is a person or organization that is suitable for submitting data submission proposals. Based on 3 dominant crowdfunding process schemes, there is a process whereby the fundraising does not reach the target with a certain amount and time then the funds collected will be returned to the fundraiser either directly or indirectly and there is also the possibility to develop the fundraising with certain term and conditions.

In this case, block chain technology can be used, so that data that enters the fundraising database can be trusted. Based on the block chain category, the appropriate category is applied to the fundraising process, according to the authors, the blockchain can be applied is categorized as a consortium, where only certain data can be seen by the public. In the case of the AoN and KIA schemes, where there is a possibility of a refund, with blockchain technology all transactional historical data carried out between related parties is stored securely and cannot be changed so that from here it can be used as a reference for direct refunds to funders . Whereas in the SGS scheme, where the fundraising can be developed with the terms and conditions that have been determined, with this blockchain technology can be tracked from the beginning of this fundraising activity to the final destination of the fundraising.

So, if there are additional entities in the future, then the data can be used without having to re-verify. This is in accordance with the principle of the blockchain that applies historical storage of stored data. So, it is almost certain that data stored with this concept is more trusted.

2. Eliminating dependency on third parties

One of the main objectives of implementing this block chain is to eliminate dependence on third parties or intermediaries in the fundraising process. In this case, the third party commonly involved is the bank, the fintech company, of course, legal services if a problem occurs. In this case, by applying block chain technology, fundraisers can remove this dependency. For example, the banks, with the application of block-fighting technology, fundraisers can utilize cryptocurrency that is commonly used by smart contract and blockchain service providers. Thus, funds are stored in a secure system and the verification process is arguably unique. Where every transaction carried out of course, required a unique code, so that transaction data will not be lost or overwritten.

Another example is the use of legal services. There is still the possibility of funders entering data that is not in accordance with the facts, so that with this block chain technology, it can reduce cases like this by means of only verified data that will be stored and if there are changes in incorrect data on one of the seekers can be traced so that action can be taken as needed.

3. Shorten the submission of campaign and the disbursement of funds

Each fundraising organization certainly has its own terms and conditions. In this case, the technology that can be used to standardize these rules is the smart contract. In this case, in terms of fundraisers, fundraisers must meet the requirements proposed by fundraisers, if fundraisers agree with these requirements, then smart contracts will apply between fundraising organizations and fundraisers.

Likewise, from fundraising, if the terms and condition of the smart contract, in the fundraising process (for example, the deadline for collecting funds or the total funds collected have been obtained), the funds collected will be immediately disbursed without having to carry out a verification process that requires time for the disbursement process fund. If seen from the perspective 3 determines the dominant of fundraising, for AoN and KIA schemas, with the application of smart contracts, if required rules are not fulfilled (for example, fundraising does not meet the target according to a certain time and amount). In the AoN scheme, the funds will be returned directly to the funders while the KIA scheme will directly apply for a refund to the fundraiser whether the funds can be returned or not. while in the SGS scheme, smart contracts can be implemented by automating further development of the campaign, so that fundraisers can make terms and conditions as a reference whether fundraising can be developed. These terms and conditions are embedded into the smart contract system.

Smart contracts between parties related to the fundraising process are stored in a blockchain database, so that the data from the smart contract can be seen in the history of changes in the smart contract, to avoid problems that occur if there are changes in the contents of the smart contract.

5. CONCLUSION

Smart Contracts based on Blockchain technology are very suitable to be implemented in 3 dominant crowdfunding process schemes. Beside increasing trust due to blockchain, with smart contract also shorten main process in fundraising.

Implementation of Smart Contract based on Blockchain technology, requires high-cost if the organization takes the initiative to implement this technology using their own resources.

In general, smart contract service providers use cryptocurrency, where not all governments legally recognize the use of these currencies

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