

Blockchain and Smart Contract Applications Can Be A Support For Msme Supply Chain finance Based On Sharia Crowdfunding



Yulia Putri Ayu Sanjaya¹, Musthofa Ainal Akhyar²

Management Retail, University of Raharja¹

Communication Studies, University of Muhammadiyah²

Modern, Jl. Jenderal Sudirman No.40, RT.002/RW.006, Cikokol, Kec. Tangerang,
Kota Tangerang, Banten 15117

Jl. Perintis Kemerdekaan I No.33, RT.007/RW.003, Babakan, Cikokol, Kec. Tangerang, Kota
Tangerang, Banten 15118

Indonesia

e-mail: yulia.putri@raharja.info, musthofa2019@gmail.com



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Abstract

Financial supply chain (Supply Chain Finance/SCF) is a hot topic in supply chain management research (Supply Chain Management). SCF's goal is to diversify funding sources from companies with limited capital and be able to improve financial efficiency throughout the company's supply chain network. SCF has become a source of short-term funding for thousands of micro, small and medium enterprises (MSMEs). The current research on SCF still uses a conventional financial framework, and no SCF research uses an Islamic financial framework. This study aims to develop an SCF framework and system based on Islamic sharia principles in the form of a sharia crowdfunding platform using blockchain technology and smart contracts. The system design produced by this research uses smart contracts that are run using the Ethereum protocol to prevent fraud/embezzlement and improve the security system on the planned platform, according to blockchain characteristics, which are very difficult to take over.

Keywords: Blockchain, Smart Contract, Supply Chain Finance, Crowdfunding Syariah

1. Introduction

In supply chain management, companies, including micro, small and medium enterprises (MSMEs), have three streams that must be regulated and integrated. The three streams are material, information and financial flows [1]. The current studies and research on supply chain management aim to optimize the flow of materials and information. There is very little research on financial flows in companies' supply chain management. The global economic crisis in 2008 made many companies pay attention to their working capital supply chain to maintain the company capital liquidity [2]. Companies are starting to realize the benefits of managing financial flows by collaborating with a company in their supply chain network or with their partner's financial institution. Companies have also started looking for new methods to maintain their company's financial supply chain. Some literature has begun to discuss new research areas labeled Financial Supply Chain Management (FSCM) and Financial Supply Chain (SCF) [3]. Although these two terms have different definitions, currently, the two terms can replace each other with the term Supply Chain Finance (SCF),

which is often used (Gelsomino, Mangiaracina, There are many definitions related to SCF put forward by experts as stated in Research by Gelsomino et al. SCF has the latest definition put forward by More and Basu, where he defines SCF as "the process of organizing, planning and controlling all transaction activities and processes related to cash flow among supply chain stakeholders to increase the company's working capital."

Gelsomino et al. argued that SCF is a new concept with complex problems. Existing research on SCF lacks practical and empirical studies on SCF. As far as the author is aware, current research on SCF still uses a conventional financial framework, and there has been no research using an Islamic financial framework. For this reason, this research intends to develop an SCF framework based on Islamic sharia principles as an alternative by using blockchain technology and smart contracts [4].

Gao, Fan, Fang, and Lim stated that SCF aims to diversify funding sources from companies with limited capital and improve the financial efficiency of companies' entire supply chain network. This is convincing in some literature; SCF has become a source of short-term funding for thousands of micro, small and medium enterprises (MSMEs), whose number has reached more than 90% of companies in the supply chain network. These MSME companies play an important role because they act as suppliers or retailers in the supply chain network. Although MSMEs play an important role in supply chain networks, MSMEs often experience problems of lack of funding to run their businesses. MSMEs with limited capital in a supply chain network usually entrust loans from 2 sources to run their business—external references in bank credit funding and internal sources in trade credit funding. Bank credit funding determines companies in the supply chain network that access financing from banks. In contrast, trade credit funding determines companies that extend their credit to partner companies in the supply chain network, both upstream and downstream partners in debt funds and receivable funds [5].

In Indonesia, MSMEs are the backbone of the Indonesian economy when viewed from their contribution to Gross Domestic Product (GDP). Throughout 2019, the gift of MSMEs to gross domestic product is projected to grow by 5%, with a total contribution reaching 65% of the national GDP or around Rp.2,394,5 trillion, but with the realization of the gift of MSMEs to the national GDP last year which gained 60.34% [6].

One of the problems in the development of the MSME sector is the lack of access to banking as a source of capital. It is a global phenomenon where banks are generally reluctant to provide credit to MSMEs. On the other hand, MSME upstream and downstream partners in the supply chain network assess the creditworthiness of MSMEs as low and have a high risk of bankruptcy due to insufficient working capital or not having business guarantees. To anticipate risks, upstream and downstream MSME partners in the supply chain network often use high-interest rates as a source of internal funding in the form of trade credit [7]. For this reason, alternative instruments are needed as a source of financing for MSMEs to strengthen their financial supply chain (SCF) while at the same time strengthening the position of MSMEs in the supply chain network of the company. Sharia crowdfunding is one alternative financing scheme for MSMEs to improve their financial supply chain and comply with Islamic law.

Crowdfunding is one of the ways used by a person, organization or company to generate capital through online media (which is called a crowdfunding platform) [8].

To finance their activities. There are two crowdfunding models: the donation model and the investment model. The donation model of crowdfunding is divided into 2: donation-based, where the funder provides funds without expecting any compensation and reward-based, where the funder will receive rewards such as appreciation such as thanks on album covers, event tickets, gifts, etc. The crowdfunding investment model is divided into 3: stock-based, loan-based and royalty-based. The funder will receive an ownership share or profit-sharing in share-based crowdfunding. In loan-based crowdfunding, the lender will receive a refund with additional interest after the specified time has elapsed. Whereas in royalty-based crowdfunding, the funder will receive royalties from the copyright generated by the fund recipient [9].

Sharia crowdfunding is crowdfunding that complies with Islamic sharia rules. Projects and products offered for funding must be halal and permitted by Islamic law. Investment-based sharia crowdfunding using a Masyarakat or mudharabah contract between the project owner/funder and the funder. Sharia crowdfunding also provides interest-free loans. The lender will receive a refund without any additional interest after the specified time has elapsed. Sharia crowdfunding can also be based on donations with waqf, infaq and sadaqah contracts [10].

Crowdfunding has several advantages because it can be used as a place for project owners or MSMEs to quickly seek financing capital obtained from banks. In addition, crowdfunding benefits investors who have directly chosen which projects/MSMEs will be financed according to their interests. Investors come from all over the world without any regional restrictions. Although it has several advantages, crowdfunding also has some disadvantages. One of the main problems with crowdfunding is fraud. Conventional online crowdfunding is easily subject to fraud due to the reputation of traditional online system security that does not work well and is quickly taken over by irresponsible people. Some of the problems with other conventional online crowdfunding systems seen by researchers are the length of time for refunds to funders, the loss of communication between the beneficiary and the funder after the funds are disbursed, and the promised refund not on the schedule. It does not even return fully to the funder. These problems must be solved by implementing technology that ensures the absence of fraud and the security of the online platforms used by crowdfunding hackers. Blockchain is a technology that can solve these problems by using smart contracts on the crowdfunding platform used. By implementing smart contracts on the crowdfunding platform, we can also create arrangements that will hold investors' funds until a specified time limit or until certain conditions in the smart contract are met. Based on the achievements of project owners/MSMEs, funds will be given to project owners/MSMEs or returned to investors using smart contracts that operate on the crowdfunding platform.

2. Research Method

This research can be classified as scientific design research that focuses on research on blockchain as a solution to the problem of sharia crowdfunding to strengthen supply chain finance for MSMEs. By the scientific design research methodology, this research begins by identifying and describing existing practical issues, setting goals for solutions, and designing and developing solutions. As a stage after developing solutions in the form of simulations, evaluation and communication are not included in this study.

For problem identification and description, this research was conducted using literature studies and interviews with experts related to crowdfunding, sharia crowdfunding, and blockchain applications for crowdfunding. For setting the goals of the solution to be developed, such as utilizing blockchain technology using smart contracts to eliminate problems that exist and often occur on conventional crowdfunding platforms. For the simulation process, the blockchain-based sharia crowdfunding platform that we designed uses Solidity to create smart contracts, Metamask extension for users to interact with the system and e-wallet, and web3.js for users to interact with the Ethereum nodes used in this sharia crowdfunding platform. This blockchain-based sharia crowdfunding platform is still in the development stage for the front end.

3. Results and Discussing

- Based on the identification results, there are four stakeholders in sharia crowdfunding, namely: fund applicants (can be individuals, organizations, or MSMEs), funders, crowdfunding platform operators (in this case because they use blockchain technology, operators in the form of smart contracts), and sharia board. This must be resolved by implementing technology that ensures the absence of fraud and the

security of the online platform used by crowdfunding from sharia to function as a supervisor, mainly to ensure that the contracts on the blockchain-based crowdfunding platform are by Islamic requirements will later be translated. Returns in the form of an intelligent or intelligent agreement executed when a transaction occurs on the crowdfunding platform. The results of the design and development of this solution are in the form of a blockchain-based sharia crowdfunding transaction process design with smart contracts. The algorithm of the transaction process is as follows:

- The project owner or fund seeker (an individual, organization or MSME) submits a project that requires funds to the platform according to the desired contract (donation, loan or investment contract) and registers an e-wallet on the forum.
- This registration will be able to activate the smart contract on the platform according to the selected agreement.
- The platform will describe the project that has just been submitted and offer it to investors who have joined the forum.
- Investors interested in the proposed project will provide part of the funds by sending them to the platform and depositing them in a smart contract.
- The smart contract will automatically send funds from the investor to the project owner's e-wallet if the terms and conditions contained in the intelligent agreement are met. If the needs in the smart contract are not met, the funds in the smart contract will be sent back to the investor's e-wallet.
- Project owners who have applied for funding with a loan agreement after a specific time must make payments to the platform in the form of initial capital from investors by the contracts and conditions in the smart contract.
- For project owners who apply for funding with an investment contract, after a specific time has passed, they must make payments to the platform in the form of initial capital from investors and profit-sharing with the warranties and conditions contained in the smart contract.
- The smart contract will automatically send payments from the project owner with the investment contract into the investor's e-wallet if the conditions in the smart contract are met.
- All actors/stakeholders involved in the platform can see and check all the details of transactions on the platform transparently.
- Because this platform uses blockchain technology, transactions that have been done in the system cannot be changed or deleted, according to the characteristics of the blockchain.

Because the blockchain-based sharia crowdfunding platform will be used as a supporter of SCF for MSMEs in the supply chain network, the design of the transaction process needs to be changed from the creation of the general transaction process. In this study, there are two strategies for funding the MSME supply chain network (SCF) which are designed:

MSMEs as fundraisers act as retailers/retailers who have difficulty in capital and are under financial pressure. At the same time, producers/manufacturers as product makers are in a condition of having sufficient money. Thus, MSMEs as retailers/retailers seek funds through the sharia crowdfunding platform to optimize their profits. Because the loan funds provided by the platform are not guaranteed by collateral, the platform will assess the eligibility of MSMEs to obtain loan funds through the rating given by the platform to MSMEs based on the track record as long as the platform uses the MSMEs to seek funds. Next, investors will assess the feasibility of MSMEs getting loan funds from the rating that the platform has given to MSMEs. MSMEs as retailers/retailers have sufficient capital to buy products, but producers/manufacturers have problems with money in the production process. Producers apply for loan funds to Islamic crowdfunding platforms to overcome financial difficulties.

3.1 Smart Contract Implementation for Sharia Crowdfunding

In this study, the innovative contract application for sharia crowdfunding was implemented and tested using Remix-Ethereum IDE (Integrated Development Environment). The Remix IDE has excellent features to test and debug intelligent contracts before deploying them. In addition, Remix IDE is facilitated by a built-in debug and allows checking various transactions to ensure that the clever agreement executed is as desired. Smart contracts for sharia crowdfunding in this study were written using Solidity, which is a programming language developed by ethereum by writing code on smart contracts.

In the smart contract developed by the sharia crowdfunding system, several functions for the project owner/funder (owner contract), project submission, project status, contributors, and conditions will cause funds to be transferred from the smart contract to the project owner. Or refund funds to contributors.

3.2 Analysis System

Blockchain is a technology that is still relatively new, and there is little research on blockchain applications on crowdfunding platforms, especially for sharia crowdfunding. Blockchain can be defined as an open, transparent and decentralized data storage model. A chronological series of transactions are recorded in a "block." Since each block contains the previous block's hash value, these blocks form a chain structure hence the name 'blockchain'. Blockchain is a public, immutable, distributed ledger. To add a new block, a need must be met: a transaction verifier called a 'miner.' The miners compete with each other for the right to add blocks, and the winning miner will get a reward. As discussed in this study, the application of blockchain technology to the crowdfunding platform is different from the conventional crowdfunding system platform that has been running so far.

4. Conclusion

The application of blockchain technology in the design of the SCF system for MSMEs in a supply chain network using a sharia crowdfunding platform makes transactions between stakeholders in the supply chain network more transparent. This makes financiers in the SCF system feel more confident that their funds will not be misused, and they are convinced that the projects offered are not fake projects when they decide to provide funds for MSMEs that need financial support. This can happen because of the characteristics possessed by blockchain technology. Namely, there must be consensus from all system participants in accepting transactions submitted by one party, transparency, and transaction data that cannot be changed after being recorded in the blockchain system. Therefore, the application of blockchain technology using smart contracts on the sharia crowdfunding platform can help funders find out, check, and track the flow of funds that they have disbursed to fund seekers through the platform. This research is still ongoing and needs to continue producing decentralized apps (Dapps).

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