International Journal of
Distributed Computing and Technology

ISSN: 2455-7307
Volume 10, Issue 1, 2024
January—June
DOI (Journal): 10.37628/IJDCT

https://journalspub.com/journal/ijdct

Review IJDCT

Implementation of Dropshipping Using Blockchain

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Abstract

This research introduces a novel approach to dropshipping via integration of blockchain technology and smart contracts. Dropshipping is a business model where retailers avoid stocking products by directly fulfilling orders from wholesalers, and face challenges related to inventory management, understocking, overstocking, and financial risks attached. This also focuses on issues related to tampering of data and mishandling of products during the exit transits. Our study addresses these challenges by leveraging blockchain's capabilities for product authenticity verification, real-time updates, and secure transactions. Smart contracts are powered by Ethereum's decentralized blockchain. This plays an important role in automating agreements between retailers and wholesalers. These contracts that are developed between retailer and wholesaler help to manage product allocation, duration of stock availability, pricing agreements, order fulfillment, and also can prevent tampering of data, thereby easing the operations and reducing financial risks associated with inventory management and retail risks. Furthermore, the use of cryptographic payments and digital wallets like MetaMask and many more ensures transaction security and protects user identities during payment processing. It is always better than unified payments interface (UPI) and card-related transactions, which reveal your personal info. This strategy not only improves security but also fosters trust among stakeholders. Our findings indicate that implementing blockchain and smart contracts in the field of dropshipping can significantly improve operational efficiency. It can also reduce losses due to improper stocking and lower the hurdles for aspiring entrepreneurs and small-scale retailers by enabling businesses to start with minimal investment in inventory.

Keywords: Blockchain, dropshipping, smart contracts, Ethereum, solidity

INTRODUCTION

Dropshipping is a business model where retailers do not keep any products in stocks. Instead, when customers directly purchase the product from the suppliers who directly ship to the customers. This remodeling of dropshipping can be best done by implementing 'blockchain' to the field of dropshipping. The concept of 'smart contracts' in blockchain which we will be developing using solidity helps to create a virtual contract between manufacturer and the customer, this involves the duration till which the product will be stored, price division, etc. this helps to keep track of stocks and units [1].

Also, cryptographic payment helps to keep the identity of the payee safe by not fetching their personal details. By using 'MetaMask' digital wallet which just takes in the account ID and nothing else, breach of data during payment, etc. can be overcome, also the tokens generated can help track

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Received Date: May 03, 2024
Accepted Date: May 13, 2024
Published Date: May 29, 2024

Citation: Shalom M., Shravan A., Shravya H.S., Ranjana S., Arjun U. Implementation of Dropshipping Using Blockchain. International Journal of Distributed Computing and Technology. 2024; 10(1): 29–34p.

authenticity of the product as its unique for each key. All these features will help remodel dropshipping and overcome the drawbacks and can serve as a boon [2].

LITERATURE SURVEY

The paper examines existing academic research on blockchain, particularly focusing on the realms of business and economics, through a systematic analysis of literature obtained from the Web of Science service.

The paper provides recommendations for future research directions and practical applications of blockchain in various fields, such as accounting, data storage, supply chain management, and smart trading. The paper also discusses the limitations of the literature review and the challenges of blockchain technology [3].

The paper examines the dropshipping scenario where the manufacturer incurs a cost for quality investment on a per-unit basis. The result is that the retailer always chooses to share demand information with the manufacturer under this case, regardless of the revenue-sharing rate and the quality investment efficiency [4].

The authors introduce Node Maps, a data processing framework designed to capture, analyze, and visualize data sourced from various prominent P2P (peer-to-peer) blockchain platforms, including Cosmos, Stellar, Bitcoin, and the Lightning Network. The authors define and study decentralization in terms of node geographical distribution, diversity of node hosting vendors, and variations in the software version running on the node [5]. The authors describe the varying approaches they took to capture data snapshots of node data from different blockchain networks, using public sources, state-of-the-art scrapers, or their own nodes. The authors conduct a comparative analysis of the geographic distribution, hosting provider diversity, and software client variance across each of the platforms. They find that Bitcoin and Lightning Network are widely decentralized, while Cosmos and Stellar have reduced node participation and centralization issues.

The study assesses the risk of cryptocurrency exchange closures and develops predictive models to forecast the markets that will shut down and those that will remain operational, utilizing publicly available data. The paper collects a dataset of 273 cryptocurrency exchanges and 10 potential predictor variables, including five cybersecurity features, exchange lifetime, average trading volume, and an index of anti-money laundering regulation. The paper applies 10 different machine learning algorithms to classify the exchanges and evaluates their performance using various metrics, such as accuracy, recall, precision, F1 score, area under the curve (AUC), Brier score, and model confidence set [6].

METHODOLOGY OF THE PROJECT

In this system, we use smart contract to process the request, which is deployed in Ethereum blockchain, where Ethereum is a decentralized blockchain with smart contract functionality [7].

Figure 1 describes methodology of dropshipping using blockchain. Initially, when the contract is made, the ownership of the product is with retailers so they can sell to any users. When the product is not sold for a certain period of time, then the ownership will be transferred to the suppliers.

The terms and conditions are mentioned in the smart contract, which is immutable. It ensures that both retailer and supplier cannot alter the contract [8].

The product amount is transferred through smart contract, which automatically divides the amount according to percentage mentioned in the smart contract between supplier and retailer and transfer to their respective wallets. Within this system, the blockchain serves to monitor product ownership and uphold contract terms. It functions as a distributed ledger accessible to all participants in the system.

This means that everyone can see the ownership history of a product, and no one can tamper with the data. Smart contracts are stored within the blockchain and any data related to that is also stored.

In this system, the smart contract will be deployed to a Ethereum blockchain and every transaction is sent through it, where this smart contract will be run in an Ethereum virtual machine (EVM),which make sure it run as per user request, to connect it to frontend we use smart contract address and application binary interface (ABI) [9].

DESIGNED SYSTEM

The smart contract is used to automate the process of placing and fulfilling orders. The smart contract is deployed to the blockchain, and it contains the terms of the agreement between the user, the retailer, the supplier, and the vendor. When the user places an order through frontend (user interface [UI]) with contract address and ABI, the smart contract is triggered, and it begins to execute the terms of the agreement as shown in Figure 2.

In a server, there are mainly three functions: (1) Retailer supplier smart contract registration, which is triggered when a retailer registers in website, which create a smart contract with conditions and percentage division (commission); (2) Place order alert to supplier this function is triggered when a user place order through smart contract it send alert to supplier with user contact details; and (3) Order placed alert to user function is triggered when supplier confirm order placed it shows notification or alert to user through frontend [10].

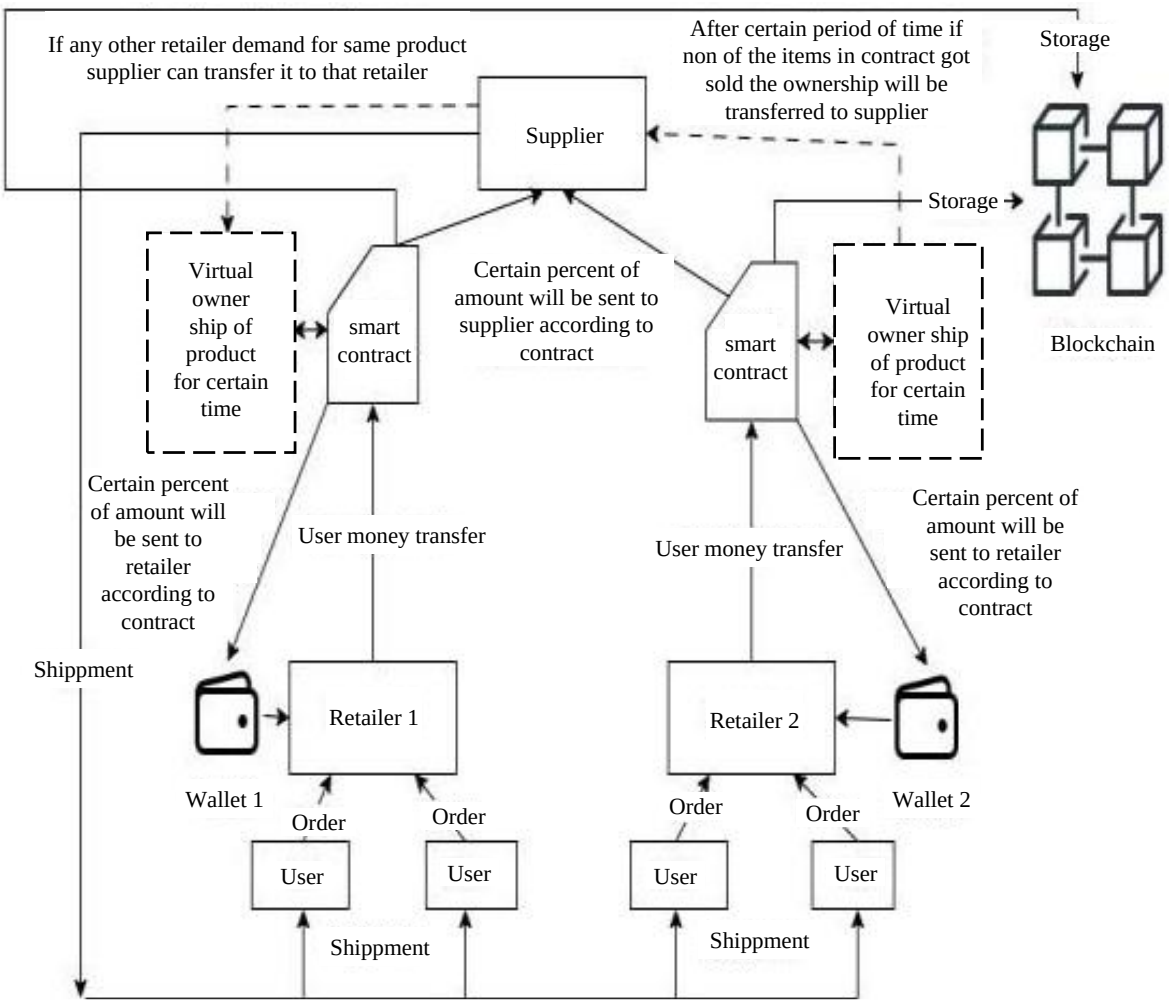

Figure 1. Sale of products the transfer of money to the wallets.

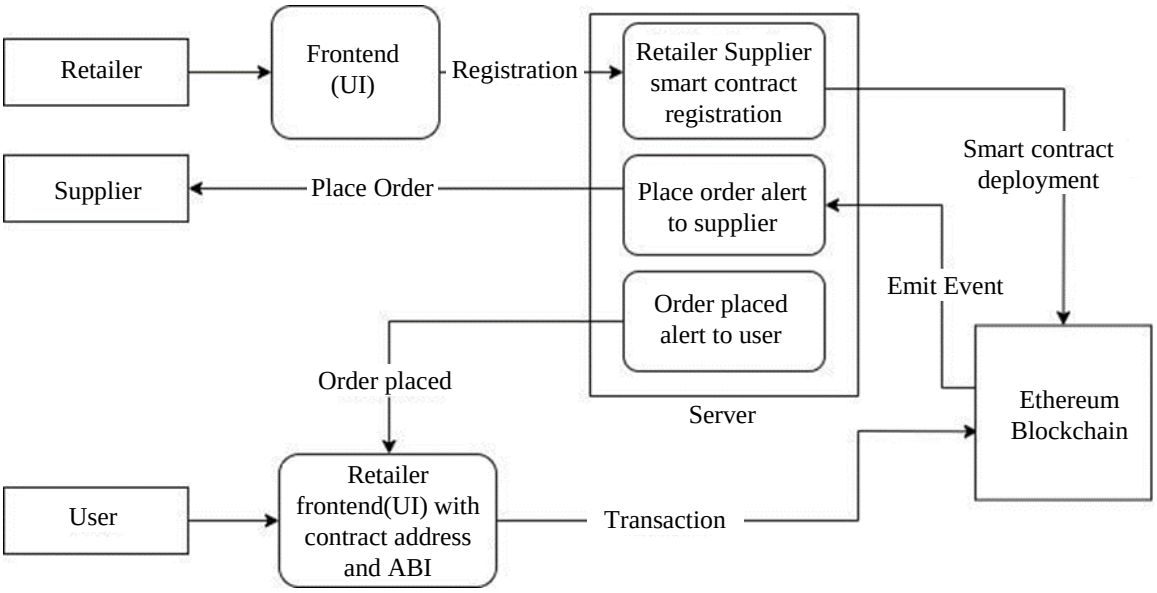

Figure 2. The flow of product shipment from manufacturer to the customers.

The smart contract first checks to see if the user has enough money to pay for the order.

If the user lacks sufficient funds, the order is terminated. Conversely, if the user possesses adequate funds, the smart contract proceeds to transmit the order to the retailer. Subsequently, the retailer verifies the availability of the item in stock. If the item is unavailable, the order is annulled. However, if the item is in stock, the retailer forwards the order to the supplier.

The supplier then checks to see if they have the item in stock.

If the item is not available in stock, the order is canceled. However, if the item is in stock, the supplier proceeds to ship the item to the user. The utilization of a smart contract in this system offers several advantages. Firstly, it enhances the efficiency of order placement and fulfillment processes. Secondly, it enhances security, as the agreement terms are stored on the blockchain and immune to tampering. Third, it makes the process more transparent, as all the participants in the system can see the status of the order.

RESULTS

In the proposed work, the objective to automate amount division using smart contract is achieved where, to create the smart contract, the argument is passed in the constructor, the arguments are wallet address of user1, user2, amount division percentage of user1 (retailer), user2 (supplier), and the actual product prize.

We deploy the smart contracts in solidity by filling above arguments which is the required data. In frontend, there will be a Bookproduct button. On clicking this, the product price from the smart contract is displayed to the end users as shown in Figure 3.

After that the Wallet Catalog is opened along with the actual product price along with the gas fees.

When the user transfers the amount using cryptocurrencies, that will be divided automatically using smart contract and transferred into the retailer and supplier wallet respectively as shown in Figure 4.

Currencies are divided according to the percentage mentioned in the smart contracts and sent to the respective wallets.

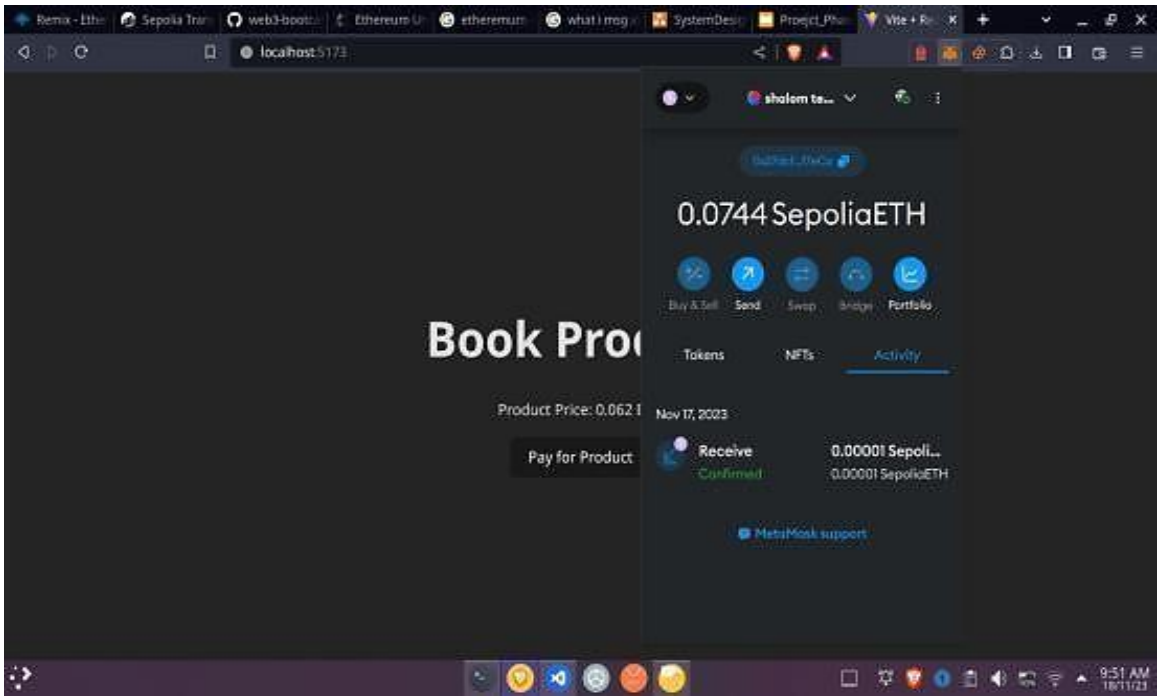

Figure 3. Amount transferred to supplier wallet address.

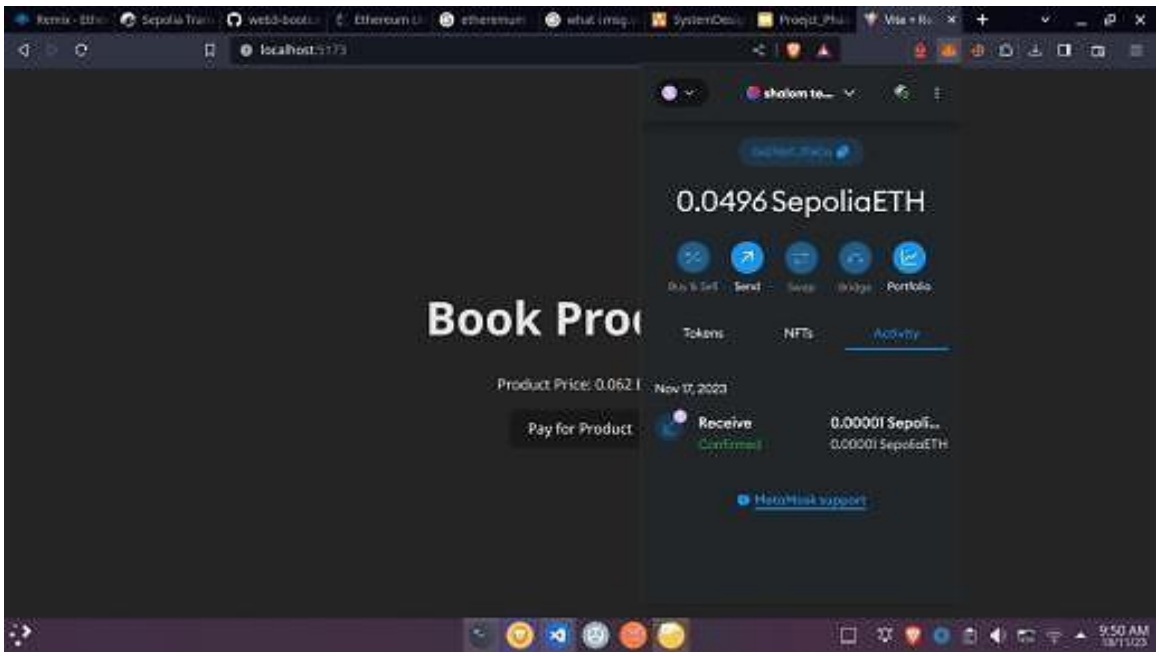

Figure 4. Amount transferred to retailer wallet address.

CONCLUSION

The proposed solution of integrating blockchain technology, specifically through smart contracts, cryptographic payments, digital wallets like MetaMask, and unique product tokens, holds great promise in addressing these limitations.

The transparent and immutable characteristics of blockchain, along with the automated functionality of smart contracts, have the potential to transform the process of making and executing agreements within the dropshipping ecosystem. Furthermore, the incorporation of unique tokens provides an extra level of authentication verification.

This project uses blockchain for the same, which has enhanced security and data security. All the aforementioned aspects and implementations will be done in the following project such that the objectives mentioned will be treated as a top priority and will be focused on their achievement. The outcome of this project will remodel the dropshipping concept and will help the betterment of society.

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