ENGINEERING IN ADVANCED RESEARCHSCIENCE AND TECHNOLOGY

ISSN 2352-8648
Vol.03, Issue.01
May-2022
Pages: -261-265

AN ENHANCED AND RELIABLE TECHNIQUES TO DETECT PRODUCT-COUNTERFEITING PROBLEM USING BLOCK CHAIN

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Abstract:- As a disruptive tool, block chain technology can eradicate the product-counterfeiting problem in supply chains. However, a block chain-supported platform charges an operating fee to legitimate manufacturers and retailers for product traceability and authentication. In this study, we employ enterprise profit-driven analytical models using Stackelberg equilibrium theory and highlight the values of block chain-supported e-commerce platforms in addressing the product-counterfeiting Problem. To measure the actual benefits of block chain technology, we compare the profits of all agents in two different supply chains, traditional and block chain-supported. Results show that the application of block chain technology is not always beneficial to manufacturers, retailers, and customers. However, when the manufacturing cost of a legitimate manufacturer is sufficiently high, the manufacturer generates more profits using block chain technology. Further, for a price-sensitive market, a retailer tends to trade in a block chain-supported e-commerce platform if the retailer's qualification in the platform is lower than that in a traditional supply chain, and the manufacturing cost of the counterfeit manufacturer in the platform is higher than that in a traditional supply chain.

Keywords- Block chain technology, counterfeiting problem, supply chain ,e commerce platform

INTRODUCTION:-

The emergence of e-commerce websites has enabled users to publish or share purchase experiences by posting product reviews, which usually contain useful opinions, comments and feedback towards a product. As such, a majority of customers will read online reviews before making an informed purchase decision . It has been reported about 71% of global online shoppers read online reviews before purchasing a product . Product reviews, especially the early reviews (i.e., the reviews posted in the early stage of a product), have a high impact on subsequent product sales . We call the users who posted the early reviews early reviewers. Although early reviewers contribute only a small proportion of reviews, their opinions can determine the success or failure of new products and services . It is important for companies to identify early reviewers since their feedbacks can help companies to adjust marketing strategies and improve product designs, which can eventually lead to the success of their new products. For this reason, early reviewers become the emphasis to monitor and attract at the early promotion stage of a company. The pivotal role of early reviews has attracted extensive attention from marketing practitioners to induce consumer purchase intentions . For example, Amazon, one of the largest e-commerce company in the world, has advocated the Early Reviewer Program1, which helps to acquire early reviews on products that have few or no reviews. With this program, Amazon shoppers can learn more about products and make smarter buying decisions. As another related program, Amazon Vine2 invites the most trusted reviewers on Amazon to post opinions about new and prerelease items to help their fellow customers make informed purchase decisions.

II.Related Work:-

The block chain is a distributed ledger that stores data through a chain structure, as shown in Figure 1. It establishes a trusted environment via consensus algorithms, asymmetric encryption, and smart contracts, giving it characteristics of

transparency, decentralization, traceability, and anonymity [1–3]. The block chain is divided into three different application modes, namely, public, private, and consortium, depending on the level of centralization. A block chain is chosen according to the different requirements of information confidentiality and transparency under different application scenarios. A public blockchain is completely decentralized, in which each node can participate in the process of data verification, storage, and update without the need to gain access from anyone else [4,5]. A private blockchain is centralized, and all its related nodes are strictly controlled in specific institutions [4,7]; the central organization is controlled by a limited number of nodes. A consortium blockchain is partially centralized, in which some specific nodes control the consensus process [8,9]. Compared with private and public block chains, the authority of nodes in a consortium blockchain can be flexibly set, and information

processing is faster. Thus, consortium block chains are widely applied

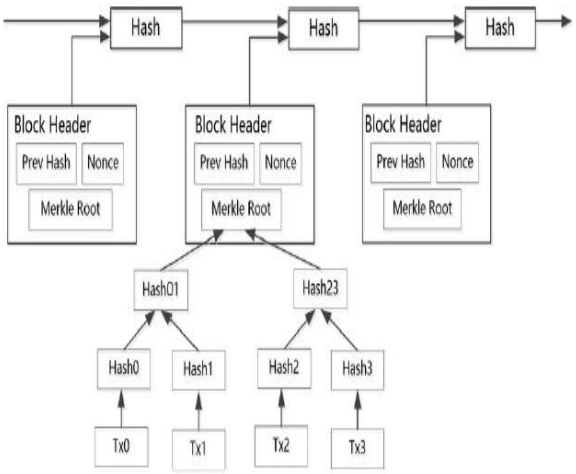

Figure 1. Blockchain structure.

Most existing studies on the blockchain originated from a white paper by Nakamoto, in which the concept of the bitcoin cryptocurrency was first put forward []. Currently, blockchain technology could be applied to overcome problems in supply chains. Some studies focused on improving supply-chain finance (SCF). Chen and Cai propose a blockchaindriven platform to solve pain points existing in traditional SCF. They found that this Product Counterfeiting Problem in Supply Chains As is evident from previous studies, the counterfeiting problem in supply chains can be classified into two types. First, customers may choose to buy counterfeit products even though they can differentiate between genuine and fake products, mainly because they are unwilling (or unable) to pay for the more expensive genuine products [6]. Second, the customer cannot distinguish between the two products because the fake product looks identical to the genuine product [7]. Both situations have adverse effects on the legal manufacturer's profit and brand reputation. To highlight the research issues, we focus on the latter situation. Several technologies have been applied to solve the product-counterfeiting problem in the supply chain, such as radio-frequency identification, barcode scanning and mobile and blockchain technologies. Owing to its rapid development, blockchain technology is the most attractive solution. Alzahrani and Bulusu combined blockchain technology with near-field communication technology to detect counterfeiting attacks [8]. Kumar and Tripathi used blockchain and encrypted quick-response code technology to track whether a drug contained the correct active pharmaceutical ingredients in the manufacturing process [9]. Modgil and Sonwaney proposed that the application of blockchain technology could establish an effective mechanism for the identification of counterfeit products [6]. Past research investigated whether the combination of blockchain technology and an e-commerce platform could eradicate the product-counterfeiting problem. However, this efficient and reliable financing platform for SMEs could reduce financing costs and accelerate cash flows [1]. Du and Chen combined a supply-chain financial platform with blockchain technology to overcome the lack of trust between buyer and seller during a transaction. The study also used homomorphic encryption to ensure the security of sensitive information [2]. Other studies mainly focused on

blockchain technology that facilitates the management of supply chains. Choi built a model with consumer utility to explore the values of blockchain-technology-supported platforms for diamond authentication and certification. The study also found that a decrease in blockchain-based diamond authentication and certification costs is beneficial to all parties in the supply chain [5]. Cai and Choi proposed that the adoption of blockchain technology could eradicate the moral-hazard problem under a markdown sponsor contract [5]. Song et al. proposed a new IoT management framework based on blockchain technology to facilitate companies to effectively build a supply chain [5].

Literature Survey:-

The literature related to this study can be classified into three categories: platform operations, blockchain technology, and product-counterfeiting problems in supply chain. We review them in the following sections Currently, platform operations are very well established. An e-commerce platform consists of a platform firm and its two-sided market: sellers and buyers. The platform charges an operating fee to buyers and sellers to facilitate interactions, so that the enterprise's supply and demand can be matched [1–3]. With the recent development of small and medium-sized enterprises (SMEs), several e-commerce platforms have emerged to cater to them, which can be classified into three types. The first type includes platforms based on large-scale e-commerce groups, such as Alibaba (Hangzhou, China) and Amazon Business (Washington, DC, USA), which have a large amount of transaction data and enterprise qualification information according to historical transactions among enterprises [3,3]. It is easy for these platforms to correctly evaluate the ability and demand of enterprises with their recorded information, which is the basis of intelligent matching algorithms. This type of e-commerce platform can provide financing and trade management between manufacturers and retailers in the supply chain. For example, Alibaba International Station is an e-commerce platform for cross-border trade that assists firms by precisely matching buyers and sellers, offering credit guarantees, and facilitating transnational supply-chain management. The second type includes platforms based on core enterprises, such as HC GROUP (Huizhou, China) and JD.COM (Beijing, China), which focus on providing trading information and financing support for their upstream manufacturers and downstream retailers [3,4]. In contrast to the first and second platform types, which only provide services to firms in their own supply chain, the third type includes platforms that focus on building a professional trading platform for all firms, such as GlobalSources (Hong Kong, China) and TradeKey (Riyadh, Saudi Arabia) [3–4]. There are many registered enterprises on this type of platform. As the platforms have powerful data-processing and flexible information-retrieval abilities, they can facilitate deals between many manufacturers and retailers.

IV. Conclusion:-

The use of the block chain eradicates counterfeit products, which benefits social supply chain sustainability. Customers can buy goods that are manufactured and supplied by legal firms because product information is clearly recorded on the blockchain, and illegal firms have no access to supply chains, so the blockchain-supported supply chain provides a better guarantee for human rights and fair work practices. The application of block chain technology can eradicate counterfeit products while incurring an operating fee for the manufacturer and retailer; therefore, these firms should consider the fees involved before confirming their intention to use blockchain technology. Risk-averse retailers prefer to trade on blockchain-supported platforms to establish relationships with reliable manufacturers and obtain high-quality products. Moreover, legal products are fully protected; therefore, the manufacturer is encouraged to concentrate on product research and brand development.

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