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# Blockchain Technology Empirical Studies on the Demand of Distributed Network

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**Abstract.** Blockchain technology has become a new model for encryption, unsustainability and confidence in both consumers and suppliers (SPs) in order to increase the quality of services. A game theory framework is used to simulate a competitive market with the existing platform controlled by a centralizer as a confidant third party to provide an economic overview of such a Blockchain-based platform sector. The portals serve as a mediator in this industry and provide consumers with services delivered by SPs. The key reasons for blockchain based network market performance are (i) how engagement by SPs represents its service efficiency (QoS) and (ii) how SPs are empowered to contribute their services, such as the virtual environment. A non-cooperative two-stage competitive game is used in our game formulation, whereby the first stage model how to promote SPs on a blockchain basis and the second stage model elevates rivalry between platforms to draw consumers. We therefore have an equilibrium analysis that offers a valuable description of the effect on competition among platforms and SPs' equilibrium reward policy of the service quality of the blockchain network. Our numerical analysis reveals that the incentive to balance is increasing proportionately to the Fault tolerance of a blockchain-based network when the incentive is unfavourable if the number of participating SPs has a non-increasing QoS.

**Keywords:** Block chain, QoS, Network, Bitcoin, Distributed Network

## 1. Introduction

We are now seeing a major advancement in blockchain technologies from Bitcoin's central architecture [1]. A variety of projects have been created that involve real-time collaboration between suspect contributors around the Internet, thanks to the widespread acceptance of blockchain technologies. The growth of blockchain technology involves horizontal expansion by start-ups predominantly using public blockchain such as Bitcoin [7], Ethereum [2], and the vertical advancement guided primarily by approved blockchain consortia and business alliances such as Hyper ledger [3] and Corda [4].

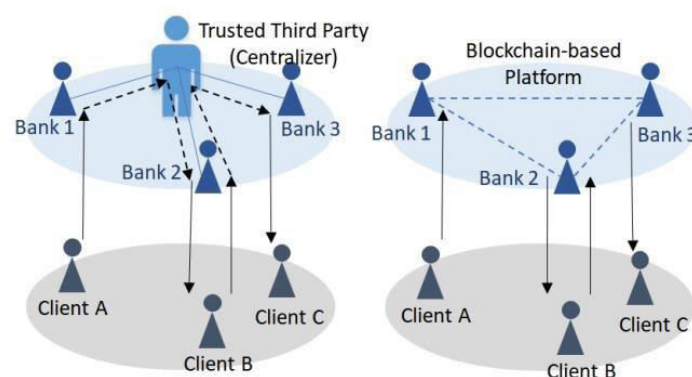
The technology from Blockchain has allowed building a new network system by means of which a community of collaborative and similarly privileged suppliers will decentralise, along with no unilateral centralization, a large amount of data storage and processing capacity. Samsung SDS [5]



launches a digital blockchain-based supply chain management network, which replaces an EDI system. R4 [6] offers an open account exchange finance network between banks to the blockchain consortium. As seen in the diagram 1, unlike a centralised network, the consistency of the service for a blockchain-based platform depends greatly on its inherent cryptographic structure, which enhances QoS stability, irreversibility and faith. In addition, blockchain-based platform QoS depends on large-scale shared data storage and processing resources, and therefore an encouraging mechanism is required on the blockchain-based platform to enable participants to participate.

The key interest of this article lies within the feasibility of a blockchain-oriented network that mediates resources for SPs and customers where SPs participate as blockchain nodes, and customers consume their services. Effective blockchain operation includes a reward system for SPs and a pricing policy for consumers where the service level of a Blockchain-based network varies with the participation of SSPs. It was therefore not understood how SPs who invest costs to sustain decentralised storage and computing power can be rewards which rely heavily on the dynamic pricing strategies of the blockchain-based platform and the centralised platform.

Our approach to developing a platform market, in which we build a two-stage, dynamic platform, is a central network, blockchain-based platform, SPs and clients. The SPs decide what platform they join in the first stage of networks and SP's and inspires the blockchain-based platform for SP. Within the platform of the blockchain, SPs can expend investment costs while paying a premium for centralising the core platform. In step two, platforms and consumers are playing a complex sequential game in which customers select when and on which platforms their price plans are determined. Moreover, we model multiple heterogeneities in order to enhance their practicality in I consumer purchases, (ii) SPs' readiness to spend, and (iii) the QuoS role of each network.



**Figure1.** System model

In our dynamic two-stage platform game, the following questions would be analysed: how much QoS could be feasible against the centralist platform in place, due to the presence of SPs in a blockchain-based platform, and under what conditions it will be motivational to join SPs. Figure 1 shows the system model. we calculate the economic impacts of each network as net profits according to the selection of platforms of SPs and consumers. As a consequence, we have a balanced study that provides us a valuable summary of the effect on competitiveness between platforms and SP's balance stimulation approach of the service Quality of the blockchain-based network. In addition, our computational analyses show that juggling compensation increases as the QS of a blockchain network increases, and the reward becomes negative, if there is a rise in the number of users in the blockchain ecosystem SPs.

## 2. Related Work

In recent years, blockchain innovations have been the focus of the network industry. Bitcoin is a financial network for validating transactions between nodes without a trustworthy third party, being the first crypto-currency-based blockchain. Moreover, the smart agreements concept implemented by

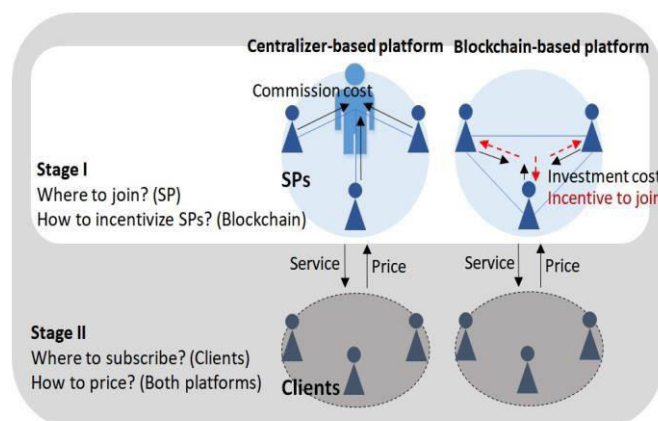
Ethereum [2] has made the use of trustworthy distributed applications on a blockchain basis. Blockchain technologies like Nexledger [7], Hyperledger [3], and Corda [4] are proliferating, which has intensified business networks for companies needing to be linked to accepted (or public) nodes. Moreover, each provider of cloud services [8] has an infrastructure for creating a blockchain network.

Examples are the Internet of Things (IoT) platform and supply chain platform. The papers in [12], [13] explored how the IoT network would apply the blockchain technology. In [14] the future IoT blockchain was analysed and integrated into supply chain management. The papers [15] discuss even the economic effects of a blockchain-focused network. The author of [15] discusses the costs of a blockchain platform, authentication and networking costs, the impact of blockchain technologies on platform ecosystems and how multi-faceted markets are to be constructed inductively.

The authors of [15] are similar to our work evaluating the economic impact on a non-cooperative gaming theory network market. Scholars engage in Internet service providers' expenditure promotion incentives and the paper explores the motivation process for edge resource owners to add to the fog computing network. However, our main goal is to consider the economic ramifications of a blockchain-based network, so we specifically model blockchain technical features such as the QoS mechanism based on the involving SPs and the cost of investment for decentralised capital. To the best of our understanding, this paper is the first game theoretical approach studying the effect on the incumbent network industry of the introduction of the blockchain based platform [11].

### 3. Proposed System

A main means of ensuring authentication and protection for cloud data that kept cloud data from unauthorised users was access checking. Other features, including verification, authorization and data auditing, have had an inefficient access control process. We addressed in this section the complexities of standard cloud access management approaches. Access privileges were allocated to topics in the RBAC model based not on identification but on their position and duties on the system. The nature of RBAC caused the downside since other elements of the topics were not considered. Figure 02 explains about Overview of proposed system with process flow.



**Figure2.** Overview of proposed system

These problems were suggested to be dealt with further by ABAC. The access rule was designed using the objects and topics analysis attribute. With its robust authentication consideration, ABAC has major advantages. While ABAC's authentication was a time-consuming operation, in the cloud setting the computational resources that it costs were negligible. There are two important benefits of our study. BAC initially sets up a consensus about the way access control works so that all parties can, technically speaking, interact during the process. Consensus usually requires the approval of the voting

voters or decision-makers to reach agreement-level, improving the protection from a dispersed perspective.

Second, blockchain-supported traceability offers a traceable and unchanging access control management feature. The issue of adversaries is posed by this function. We discuss leaders of recent BAC work in this portion. Because of the cloud architecture's layered nature, access management played primarily two functions in the cloud. The first was the role of a cloud provider that manages the access to cloud data and resources by cloud users. A decentralised blockchain based access management technology may prevent one-point breakdown and third-party data misuse.

Data owners can flexibly and fully monitor access to their own data by using blockchain technologies. In the first step, powerful off-chain data processing should be carried out to ensure the security of off-chain data during data processing. A method of evaluating the problem, by using a stable multi-part model, has been suggested, splitting the data into shares. The second phase of the enlargement was a blockchain network confidence measurement. The new faith assessment recommended that the difference between the amount of 'positive' and 'bad' acts be sigmoid feature. The findings of the assessment revealed that the blockchain mechanism is able to tolerate Sybil attacks by this confidence measurement. It was designed as a stable multiparty computing system[9].

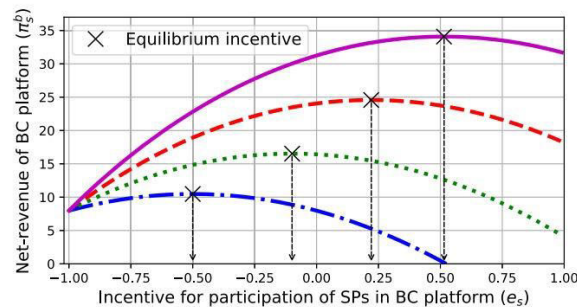
Various parties have been developed for different computing activities and for the safeguarding of privacy workers. The introduction of this design removed the redundancy of measurements and storage in order to face the challenge of scalability. Although medical consumer data is stored in off-chain clouds, off-chain data access policy was incorporated into an intelligent contract. The biggest downside being that the third parties such as the physiotherapy facility, the health care provider and the psychiatrist rely on their reliance. System used various forms of smart contracts to gain access control and cooperated with cloud provenance info.

Although some contracts are responsible for evaluating potential wrongdoing and threats on the basis of evidence, others perform probable misconduct ions and threats on the basis of these data of origin. Furthermore, the sanctioning of malicious cloud customers was revoked. However, access verification could only be revoked; other important access management operations were ignored. Pass management was a vital means of stopping unauthorised attackers from intruding user information.

Standard methods of access management are threatened by loss of the signal point, incorrect third parity, and lack of user control. Users can monitor their data entirely without a single point failure hazard with the introduction of blockchain technologies. Furthermore, the intelligent arrangement provided for handling automated access and the identification and deterrence of wrongdoing. In addition, all these access management mechanisms were used for secure cloud computing.

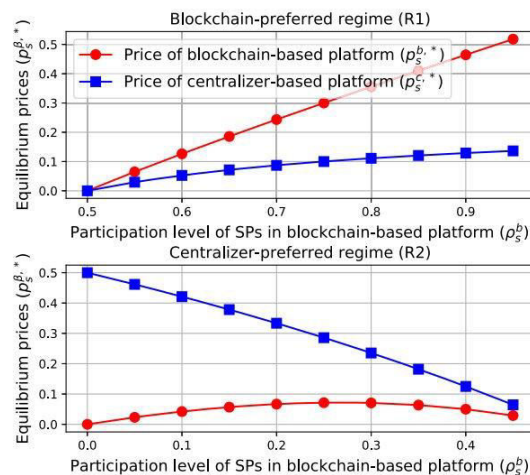
#### 4. Results and Discussion

We are now providing numerical analyses that illustrate the effect of the QoS functioning of the network on the degree of SP engagement on the balance actions of clients and the collection of platforms at the balance under each scheme. Under R1, consumers who have strong ability to pay for a service have a stronger QoS based blockchain network. In the meantime, consumers who are not prepared to pay for a central network that provides a service of poor quality are chosen. Similarly, R2 has a higher degree of centralisation, whereas low-end users opt for a blockchain network. Their efficiency would be more efficient. Figure 03 elaborates about Net revenue comparison with equilibrium incentive.



**Figure 3.** Net revenue comparison

In addition, in these schemes, the services cannot be used by customers with extremely low payment preparation. Equilibrium pricing of every network  $p\beta$  and the presence of the SPs on the 'b' platform is concerned. A price greater than the R1 prices is set by the blockchain-based network. This means that the Blockchain-based network has more impact on the market than the central platform and higher QoS contributes to a higher balance price. Likewise, a higher R2 QoS would also improve the balance price of the centralised network. However, the balancing price of both platforms is zero under both schemes at the stage of the Homogeneous QoS platforms. Under R1, the market share continues to decline as SP's turnout on blockchain-based platforms rises, as the participation rate of the SP increases the QoS and the balance price of blockchain-based platforms. Similarly, the degree of participation by SPs under R2 rises with the decrease in the equilibrium price. In comparison, a higher QoS platform with greater market control would raise the market share in the platform market under both regimes. The balance income in terms of participation levels of SPs is thus balanced. Blockchain based network encouragement. This will happen when the expense of the commission subscription of the central network is sufficiently greater than the costs of investing using the blockchain platform and where the SPs are able to pay the cost of investment.



**Figure 4.** Equilibrium Comparison

Condition Circuit explains the case where not just the network centred on the centralizer, but also the QoS platform in the blockchain is a constant such that the reward doesn't rely. The selection of SPs on the platform, depending on the degree of reward, does not influence the QoS of the blockchain-based platform and balance reward and balance incentive. Figure 04 discusses about equilibrium comparison on different participation level.

In this paragraph, we show number analysis that calculates the effects of the QoS on the balance reward for SPs of the blockchain-based network. We consider two types of QoS features: one is a



linear QoS and the other is a logarithmic SP participation feature. Interestingly enough if the presence of SPs in a blockchain network has a poor effect on platform efficiency; the motivation for balance is negative. In this regime, the business influence of the blockchain network is negligible, so the balance opportunity is very poor.

## 5. Conclusion

We explored the digital platform industry through a two-stage competitive game through a blockchain focused platform, a centralised platform, SP's and consumers. We model different features of blockchain technology, for instance the QoS function, depending on the participating SPs and the cost of investment for decentralised storage. In addition, our model captures the heterogeneity of consumer preparedness and expenditure readiness that have great repercussions for their selection platform strategies. The answers to the following main questions are in our analysis: (i) how SP participants' involvement represents their QoS and (ii) how SPs can be inspired to contribute to the computer/storage infrastructure. Our economic review thus gives a valuable glimpse into the feasibility of the blockchain-based network to compete with the centralised platform. We first demonstrate from our balancing study that a platform that provides higher QS will set a higher price and gain a higher income. In addition, the reward for SPs who were interested in a blockchain network relies heavily on the QoS feature, so we demonstrate when and how the QoS impacts the stimulus.

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