BLOCKCHAIN TECHNOLOGY, A TRANSACTION COST ECONOMICS PERSPECTIVE

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ABSTRACT

Cryptocurrencies (e.g., Bitcoin, EOS, Etherum, Litecoin, and others) are disrupting the traditional banking and financial systems. The cryptocurrencies are based on a set of technologies commonly referred to as blockchain technology. The potential effect of blockchain technology on institutional economics is profound. Already, blockchain technology-based applications in supply chain management, marketing, and finance are decen- tralizing and streamlining vital institutional functions. In this paper, I examine the economics of blockchain technologies as it pertains to transaction costs in startup financing. I try to draw upon the theory of transaction cost economics and the transactional nature of blockchain technology to propose a model to demonstrate how and why blockchain technology based applications are effective. I then apply the model to demonstrate how blockchain technology can be used to overcome many problems inherent in startup financing. For example, information asymmetry and transaction costs involved with matching an entrepreneur with an investor and the terms of the financing deal are some of the fundamental issues in entrepreneurial financing. I try to explain how a financing system based on blockchain technology can ameliorate the problems and lead to a more effective and decentralized entrepreneurial financing process.

Keywords: Blockchain technology, Institutional economics, Transactional costs, Startup, financing, Entrepreneurship, Venture capital.

1. INTRODUCTION

Technologies based on the blockchain platform have the potential to disrupt various industries. We are already witnessing the disruptive effects of cryptocurrencies, such as Bitcoin and Ethereum, on the ongoing revolution in banking, online currency markets, and online buying-selling of goods and services. The decentralized nature of blockchain technology in conjunction with the trust generation through sophisti- cated algorithms, absence of any middlemen, and negligible counter- party risk has far-

reaching implications for institutional economics. However, while there has been research on various aspects of cryptocurrencies and specific applications of blockchain technology, studies exploring the economic and entrepreneurial side of blockchain technologies are limited. According to the limited extent research, blockchain technologies re- present several entrepreneurship opportunities in areas of unbanked practices, new business models, and startup financing. Given the relevance of blockchain technologies in entrepreneurship and the anecdotal evi- dence about the advantages and disadvantages of implementing cryp- tocurrencies for startups financing, the ongoing academic debate highlights the need for exploring both themes using robust conceptual and methodological approaches. Inspired by these academic debates, this paper examines the blockchain technologies and startup finance through the lens of the institutional economics approach (i.e., trans- action costs).

Concretely, the theory and predictions of transaction cost economics model help to inform how blockchain technologies can influence a firm's organizational de- cisions because of their ability to decentralize (democratize) and reduce transactions costs (economically and socially) thereby creating trust in the counterparties. We assume, technologies based on the blockchain architecture has a potential to revolutionize trans- action costs, both in terms of cost and convenience. We utilize the framework to develop a better understanding of various industries and institutional functions in the economy. In this regard, this paper focuses on the area of entrepreneurial finance where the information asym- metries (between an entrepreneur and an investor) and transaction costs associated with startup financing are high and often un- surmountable. More concretely, we explain how blockchain technolo- gies inherent transaction-based decentralized system can alleviate these problems in the area of startup financing.

Our paper makes significant contribution to the entrepreneurship, finance and technology literature. To the best of our knowledge, this is the first paper to explain the transactional costs of implementing blockchains technologies for startup financing. Specifically, this is the first study to explore the ability of blockchains to reduce and provide alternative to activities that involve transaction costs. utilized transaction cost economics model to ana- lyze the potential impact of blockchain technology on supply chain management. However, in the present study we complement by focusing on the startup financing and how the blockchain technology applications in the field of startup financing can be better understood using transaction cost economics. Further, in utilizing a transaction cost economics model to explain the utility of blockchain technologies, the study explains how blockchain's ability to reduce and manage transactions is the driving force behind its applic- ability in the broader institutional framework. Moreover, the proposed theoretical framework highlights applications of blockchain technology to address inherent inefficiencies and problems in the traditional

en- trepreneurial financing model. As a result, the paper provides practical examples of the efficacy of this novel framework by applying it to analyze how blockchain technology can be applied to raise startup fi- nancing. We explain how the blockchain technology's ability to gen- erate trust, its decentralized nature, and the capacity for tokenization help startups seeking financing.

Our paper is structured as follows. In the next section, we provide a brief description of transaction cost economics to familiarize readers about the main theoretical framework. In the third section, we offer a brief description of the literature on blockchain technologies and startup financing. In the proposed theoretical model, we provide ar- guments and logical reasoning regarding the transactional costs and blockchain technology applied to startup financing. In the discussion section, we explain how our model compares to findings and arguments advanced in the extant literature. We conclude our paper after pro- viding future research directions.

2. TRANSACTION COST ECONOMICS THEORY

Transaction cost economics has been a dominant theoretical para- digm in the study of management and organization since the publication of Williamson's seminal book, Market and Hierarchies. The theory attempts to explain the nature of the firm and predicts why certain activities are performed inside the firm versus the neoclassical economics view of the activities undertaken by a free market system or a hybrid market arrangement, where parties to the transaction are interdependent in a nontrivial way The core of the transaction cost economics theory is ‘transactions’ and ‘costs’. The transaction refers to the transfer of a unit of goods or service, while costs refer to the sum of associated monetary and non-monetary values involved in facilitating the transfer. The latter is also referred to as the transaction costs. The transaction costs arise

from environmental uncertainty, bounded rationality, opportunism, and specificity of assets. Environmental uncertainty and bounded ra- tionality lead to incomplete contracts and subpar decision making. These two factors make it impossible to have informationally complete contracts as proposed by neoclassical economics. In the absence of complete contracts, there is a probability that either party to the transaction can indulge in opportunism and extract economic rents. Thus, trust in transactions becomes a vital part of the relation between the parties. Blockchain technology has potential to overcome the trust problem by using mathematical algorithms and decentralized networks.

Another factor contributing to the transaction costs is asset speci- ficity. If an asset cannot be easily redeployed for alternative uses, it is said to have a high asset specificity, while an asset that can be utilized for alternative purposes has low asset specificity. For example, if a supplier commits to undertake substantial investments in

assets that are used to manufacture a good for a specific buyer. The supplier has caused their assets to be specific to the buyer. In this case, if the supplier fails to meet the buyer's demands, the supplier allows the buyer to pay less to not lose the substantial value of specific assets.

3. BLOCKCHAIN TECHNOLOGY AND STARTUP FINANCING

Startups financing suffers from many of the costs discussed in transaction cost economics. Startups are new and upcoming private companies that operate in a dark world where information asymmetries between the startup and investors are enormous. In order to deal with these uncertainties, the market has adopted var- ious financing models such as VC model, angel investor model or hybrid models involving convertible debt and more recently crowdfunding models. Further, startups face the search costs of finding a suitable investor. Different VC's and angels specialize in different industries and phases of a startup and may not be a good fit for all startups. Other investors who may be willing to invest in the startup may not do so because of informational reasons. Crowdfunding fills some of these gaps in the funding of innovative startups. A typical startup often requires less than $100,000 in its initial stages.

The traditional avenues of raising outside financing are the banks (debt), and angels or venture capitalists (equity or convertible debt). Banks are reluctant to fund startups because they lack collateral and credit, however established SME often fair better. A startup typically has no assets to collateralize and has no history of accounts receivables or accounts payables. VCs are constrained by general partners' time devoted to grooming and developing their portfolio. Thus, VCs rarely make investments under $1 million. In this sense, angel investors have historically filled this gap with a concentration in certain cities. Also, entrepreneurs are often unwilling to accept financing from angel investors due to aggressive equity negotiation tactics employed by them. Thus, crowdfunding platforms like Kickstarter, Gofundme, and Indiegogo have become popular alternatives for entrepreneurs in recent years.

The crowdfunding platforms complement the blockchain technolo- gies in reducing various costs associated with startup financing. Typically, in a crowdfunding campaign, entrepreneurs or companies seeking to tap customers and raise financial resources offer customers or audience of the platform access to their idea or products. In order to engage the audience and achieve success for their funding campaign, entrepreneurs employ marketing tactics that utilize multiple modes of communicating their messages (e.g., written, oral and video). In the popular crowdfunding models, potential customers and /or investors can decide to financially support the development of a product or idea by pledging a varying level of financial support that can range $1

to thousands of dollars. If the promoter of the idea can achieve the set funding goal, then the funds flow from investors to them minus the 3–5% fees charged by the crowdfunding platform.The investors and or potential consumers who support the product or service take an active interest in the development of the product or service. Active two-way communication between promoters and investors helps investors to understand the product while at the same time it helps promoters to understand the consumer needs. The developers also give frequent updates on the progress and development of the product or service and investors can give feedback and suggestions at each stage. While many startups avail the benefits of crowdfunding still the potential is not fully realized because of the absence of ownership stake and monitoring.

Blockchain technology helps to overcome these limitations. A startup project or product development can be structured such that the underlying product or project is tokenized using blockchain. These to- kens are sold to the public, for example, through crowdfunding cam- paigns. These tokens can represent pre-orders where the customer will get the product when the project is funded, or they can even represent an equity stake in the company. The equity stakes are possible now with the implementation of the 2012 “Jumpstart our Business Startups (JOBS)” act in the United States. The act allows entrepreneurs and small business owners the flexibility to seek investment from the general public often in the form of Crowdfunding. The new law allows startups to offer securities such as stocks and bonds directly to consumers as long as they meet specific regulatory requirements. Hence the tokens can now legally represent an ownership stake in the company. Further, these digital tokens can be governed by smart contracts that trigger specific actions when certain conditions are met. For example, successful completion of a stage in the development of the product or a project can signal a reduction in uncertainty and increase the value of the tokens. It is thus incentivizing early investors by allowing them to trade their initial investment for a profit. Such trades have not been possible in traditional crowdfunding campaigns. The smart contracts can even be something as simple as token acting as a pre-order, and when the de- velopment and manufacturing are complete the smart contract is trig- gered, and each token holder is shipped the finished product. The trade of tokens also helps the startup to gauge the interest and support of investors just as stock price movements help the management of a public company. Further, these tokens can allow the investors to monitor and control the progress of a startup and take corrective action in ways similar to the board of directors to do in a public company. Thus, we see that blockchain technology, not only overcomes various transaction costs associated with startup financing, but also empowers both startups and investors to complete the financing and development of the startup more effectively.

4. DISCUSSION

Blockchain technology is a disruptive innovation underlying cryp- tocurrencies, such as Bitcoin and Ethereum. The technology has re- ceived significant attention from practitioners (for use in optimizing various market and organization functions) and academics (for re- search). The technology has been utilized extensively for not only creating many new cryptocurrencies but also for financial services, such as digital assets and online payments. The revolutionary technology has potential to significantly alter many other areas that include internet of things (IoT), security, supply chain management, and delivery of services.

5. CONCLUSION

Entrepreneurial finance is an inefficient ecosystem, where transaction costs are quite high. The prevailing inefficient system has also resulted in the system where locational advantages are prohibiting the development of en- trepreneurial firms in areas lacking availability of a strong network of financial stakeholders, such as banks, angels, and VCs. The ecosystem inefficiency is also partially due to specialization of financial inter- mediaries, such as angels and VCs, who specialize in a specific industry or a specific stage of the entrepreneurial venture. We believe the en- trepreneurial ecosystem is fertile for application of blockchain tech- nology to address some of the inherent inefficiencies. The distributed and cost-efficient characteristics of the technology will facilitate transactions in the system, where the probability of opportunism and uncertainty is low, and trust and security are high. The blockchain technology can significantly reduce the transaction costs for stake- holders in the entrepreneurial ecosystem, such as entrepreneurs, angels, and VCs. The primary cost reduction is achieved by reducing search cost and eliminating third-party intermediary in the system. Blockchain technology can address many of the issues hindering the development of a robust entrepreneurial ecosystem at the local level for economic development

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