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Blockchain Technology as a Catalyst of Change: Insights for Supply Chain Entrepreneurs

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Abstract: The impact of Blockchain technology has been felt across the globe, but it's the world of supply chain that has seem some of the most startling shifts. In that regard, supply chain start ups has an avenue to change, being able to leverage blockchain's advantages of transparency, immutability, and decentralization. The objective of this paper is to integrate the theory of disruptive innovation in the context of supply chain start ups, analyze the determinants of their real applications, and the problems in implementing blockchain technology. The research ends by providing practical insights on how startups can better utilize blockchain technology and discusses topics for future investigations.

Keywords: Supply chain, startups, decentralized, Blockchain.

1. Introduction

SCM involves planning for, sourcing, and delivery and return of goods[1]. It is key to international hardware, and software trading for it enhances integration of operations of organizations across the globe. However SCM continues to have its fair share of issues such as lack of information sharing, inefficient systems and processes and is easily penetrated by fraudsters with much ease. The above mentioned inefficiencies cause companies billions of losses annually and reduce the faith of customers[2]. Global supply chains have become increasingly more intricate with different players operating in different legislatures. Traditional systems are having a challenge to meet the expectations of accountability, which is usually in real time. Here, Blockchain technology has provided a glimmer of hope[3].

The aforementioned objectives can be achieved through the adoption of blockchain processes across SCM. For blockchain to be effectively integrated into supply chain management practices there must be enhanced integration in the areas of trust, efficiency, and traceability across the supply chain. Given the variety of industries and activities undertaken, the proportion of emerging actors willing to adopt this sort of technology in the course of their operations is quite astonishing. More so, considering the fact that replacing incumbents and established leaders will be the least cost effective scenario for most of these companies[4].

It would be safe to say that this, however, remains a straightforward description of what appears to be a dense theoretical framework focusing on IB and internationalisation motivations, which explains why majority of the studies to date have being biased towards emergent economies, and yet there is a rise in the bulk of studies which are restricted to specific CB economies. Such barriers tend to be conceptual/ideological in nature, which means this scenario cut across a lot of regions and

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transformation difficulties; saying so aids us in understanding AFS systems as a theory which provides practical tools for understanding the adverse implications of disruptions across regions alone. An important aspect of this disease of diffusion developed in the course of the interview was the importance of cultural and political factors that undermine or stimulate such technological advancement [5]. The theory offers an insight of how new technologies can allow small and flexible businesses to introduce better and cheaper solutions into the market in order to compete with well established companies and eventually dethrone them. This is achieved through a plethora of other characteristics blockchain supports, for example it is able to minimize the complexity of various operations, cut costs and widen the access to the information pertaining to the chain of supply blockade [6].

Disruptive innovation comes with some benefits: firstly, the technology-focused view of competitive markets and their internal dynamics instead of how technologies spread through markets, makes it easier to explain how blockchain technologies, from the standpoint of diffusion of innovation theory, redefine the entire traditional supply chain. It connects more to investigating the effects of disruption of the blockchain over the regular supply changes rather than using Rogers[7]. Secondly, There are comprehensive argument as why innovation in the new_core book will provide an entirely fresh perspective on competitive strategy which in turn will address the RBV. Thirdly, as suggested in the title, this study while supportive of the disruptive innovation theory in competitive strategy thoroughly integrates the LIWDS integrative framework from strategic management in this hypothesis [8].

The significance of the theory of disruptive innovations has been advanced and validated by the paradigmatic shifts witnessed in different industries. First of all, simplification of Processes, or the FSI point of view. Smart contracts are facilitating work processes within the supply chains rendering the use of intermediaries unnecessary [9]. Secondly, cost Reduction. Startups that apply blockchain seem to be at a lower cost than enterprises deploying standard software programs because of lessened fraud and reduced costs of administration [10]. Thirdly, accessibility and Transparency: Blockchain offers more collaboration and confidence that is characteristic of radical technologies by enabling all parties to have the same access to information[11].

Most of the innovations that are referred to as “disruptive” should not be referred to as such at all but only as improvements. The scope “disruptive innovation” is too wide and hence provides application inharmonious [12]. In addition, disruptive innovation is often considered to be a tool used to analyze historical events rather than a framework which can predict the occurrence of future innovations. This study however argues that even with these criticisms, the basic propositions of the theory are applicable in explaining the deployment of blockchain technologies in supply chain start-ups: If anything, the promises of blockchain technology, which include reduction of cost, promotion of decentralization and increased transparency, fit the bill of being the characteristics of a disruptive innovation. This paper addresses the identified weaknesses and attempts to offer a broader analysis by combining disruptive innovation theory and ecosystem theory [13].

Disruptive innovation theory is of particular importance to blockchain as it tells the story of how new technologies displace existing ones: firstly, make it easier to use: There is no longer a requirement for intermediaries as blockchain supports decentralized transactions, which greatly simplifies supply chain systems [10]. Second, it’s cost-effective: The use of a blockchain reduces operational expenses especially for entrepreneurs who are unable to have recourse to traditional methods of supply-chain [11]. Third, it’s accessible- Blockchain makes data nondiscriminatory as it allows all the members of the supply chain to have the same level of information, thus making it possible for the smaller players to go up against the big players [12].

In this essay, the disruptive innovation theory moves to the principle of the business model with respect to the technology driven principle. Several authors have, in the recent past, placed emphasis

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on the role of business models in the existent of disruptive innovations. Blockchain exemplifies this shift as it creates new models such as supply chain finance on a decentralized basis, or sharing logistics platforms [13]. In addition to that, disruptive innovation theory have as an ecosystem view. The success of disrupting innovations is conditional upon the ecosystem. The essence of blockchain technology lies in its ability to design networks which share data across stakeholders.

2. Blockchain Applications in Supply Chain Startups

2.1. Improving Traceability and Transparency

The pillars of blockchain technology, the secure, unchangeable ledger together with the decentralization gird it as a game changer in terms of improving traceability and transparency in the supply chains. In particular, these attributes are very important in the food, pharmaceutical and luxury goods industries that are highly regulated and where consumers' confidence is paramount [14].

A UK based startup that could be used as an example is Provenance, which utilizes blockchain technologies to improve transparency on food. In addressing the fact that consumers wish to know more about the source of food and its ingredients, Provenance devised a blockchain solution that allows tracing of food products from farm to fork. Provenance combines blockchain and QR codes to provide each product with a digital identity. Through the QR code on the packaging, the consumer will be able to find information on the whole supply chain journey of the product, such as: the place where the product was grown or raised; whether it meets organic, fair trade or other social standards; the warehouses and the shipping time it spent in them [15].

For instance, a jar of honey could contain blockchain information that indicates the geographical location of the apiary, the date it was gathered, and an endorsed certificate of organics. For customers to receive the most preferrable service Provenance Trust Assurance is defined through assurance that different customers are able to view how a particular product reached the market which makes Provenance a reputable center as it promotes responsible purchase. With consumers increasing their focus on sustainability based or ethically sourced products, they are able to make better choices. The impact are: firstly, brand differentiation: companies using Provenance's system can differentiate themselves in competitive markets by showcasing their commitment to transparency and accountability. Secondly, scalability: Provenance's model has been extended to other industries, including apparel and cosmetics, demonstrating blockchain's versatility in creating transparent supply chains [16].

But there are challenges. First and foremost, concern regarding input integrity. Data has to be trusted, otherwise, it is useless. However, with inputs that are unreliable, data cannot be trusted, even with a trustworthy blockchain. This risk is reduced by Provenance through joint ventures with certification organizations as well as the usage of IoT sensors. The other barrier is the level of adoption. Blockchain based solutions may be out of reach of small scale producers due to technical issues or finances, hence carefully designed policies and cost sharing schemes are needed [17]. Proof of concept from brands such as Unilever and Co-op has successfully shown that Provenance has been able to scale across different supply chains thanks to blockchain. These interventions have had a positive impact on the confidence of buyers on sellers as well as on supply chain management [18].

Provenance is a good example of a start-up which can broaden the perspective of how trust, supply chain and innovation activities can be transformed through the use of blockchain. With each passing day, different industries across the globe are facing several hindrances owing to the fraudulent practices and an increasing amount of counterfeit goods. Blockchain's solution transforms single product retailers into a considerably improved platform for high-end global brands. Although, the scale at which a particular brand is operating will also directly influence the effectiveness of this remedy [19]. Blockchain's solution seems to be quite helpful, especially for industries in

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counterfeiting and brand positioning trouble such as: luxury items, pharmaceuticals, and electronics. They say a revolving door is for redundancy; however, it ultimately harms both the business and the consumer. It ultimately shifts the balance, highlighting the significance of all potential future "heads," implying that if these industries resort to a more adaptable and versatile approach, they will be able to compete in endless trajectories.

2.2. Reducing Fraud and Counterfeiting

Essentially, such characteristics are able to ensure that tracking of products is possible at each level, from the production stage to the final sale and, thus, enable the prevention of the free entry of counterfeit goods into the market. In implementing this notion, the firm focuses on developing a blockchain-based platform aimed at tracking the world's most valuable assets: trade in diamonds. Counterfeit certification, blood diamonds, and diamond theft have existed in the diamond drilling, trade, and selling industries [20]. Everledger utilizes blockchain technology to approach these barriers in an innovative manner. Firstly, unique digital fingerprints: Each diamond's characteristics such as the cut, color, carat weight and clarity which are physical form to each diamond enable Everledger to provide every diamond with a unique digital fingerprint. Secondly, blockchain-backed records: a comprehensive history of each diamond's life starting from its origin to the time it is offered on the market is maintained on the record with its digital fingerprint. Thirdly, stakeholder access: The blockchain ledger can easily be accessed by the manufacturer, the retailer, and the consumer. A consumer who wants to purchase a diamond ring can verify through Everledger that the diamond meets the ethical sourcing requirements as stipulated on its certificate.

Internally, this creates a system that reverses the classical notions of risk management and insurance, and externally raises barriers to the market penetration of counterfeit diamonds. Moreover, the framework encourages the responsible purchasing of diamonds through its certification of diamonds as conflict free, environmentally and ethically approved. Also, trust Building: Retailers that utilize Everledger can bolster customer confidence by having in place the certified documents of the diamond alongside its route from source to seller. Everledger has partnered with De Beers and other actors in the diamond market in relation to the use of its blockchain technology. These measures have worked to reduce the circulation of fake diamonds and increased accountability along the chain [21].

Nevertheless, there are some barriers and Challenges. For first data input, although blockchain guarantees that data encoded is unchangeable, the system is reliant on exact and accurate data being fed to it at the start. If such counterfeit inputs are made at the start of the chain, the blockchain is at risk of validating counterfeit items. For implementation costs: high-value industries tend to operate on international level and networks, thus implementation of block chains becomes complicated and expensive, especially for small scale companies. For industry's global acceptance: for the blockchain system to work well in tackling counterfeits, there should be acceptance all across the players in the supply chain. Barriers to the adoption of technology and interoperability barriers are stumbling blocks to large scale adoption [22].

The example of Everledger is a case of how the use of blockchain technology should mitigate fraud and counterfeiting issues across the globe. Blockchain solutions for startups in high-value sectors provide a competitive edge in the market by enabling product validation, safeguarding fair practices, and deploying consumer confidence. As the thirst for authenticity grows among consumers, blockchain solutions will be integrated into numerous supply chains. Nevertheless, the challenges encountered in blockchain adoption and implementation must be addressed to maximize the potential that the blockchain has to offer.

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2.3. Enabling Decentralized Marketplaces

In consumer-to-consumer transactions, Decentralized or self-contained markets that require no intermediaries like agents or centralized platforms are valuable. With blockchain allowing peer to peer transactions without going through a centralized authority, it lowers the amount of middlemen which in return allows for a better price equilibrium as well as faster settlement. Other critical barriers of P2P trading include the fact that decentralized markets do not usually require the assistance of dedicated platforms which usually charge a high fee for payment processing and handling the listings [23].

To circumvent centralized platforms or authorities and with the help of smart contracts, blockchain allows buyers and sellers to communicate with each other, making transactions a lot more efficient and cost effective as the lack of middlemen allows for prices to be fairer. While establishing their strategies, blockchain allows for marketplace-startups to directly target customers, minimizing the need for high fees while rendering competition with market giants more feasible. Moreover, due to decentralized markets, sellers are able to create rules since they are limited because of the dominant e commerce platforms, set prices, and even trade all over the world. Also because of the characteristics of blockchain, transparency and immutability, all transactions can be tracked and secured. Therefore, both buyers and sellers do not have to worry about the robustness of the system because the chances of any fraud or disputes are very low [24].

As an example, openBazaar is a new example of centralized e commerce platform that allows users trade directly because there are no central authorities controlling it. This platform accept the use of bitcoin and other cryptocurrencies which makes it decentralize and cut the VAT taxmaking easy for the users worldwide. OpenBazaar takes the following steps: Firstly, Buyers and sellers undergo smart contract integration as the first step in the commencement of the transaction process. When Me and you sign contract, smart contracts finalize the processes only if you meet your obligations. Two: All payments are done via cryptocurrencies so you do not have the need for third-party payment processors making it easier and inexpensive to conduct transactions. Thirdly: Decentralized: Use of a central server is prohibited by openBazaar so that one person does not control everything, making it neutral. This model helps in cost reduction for startups as they do not incur the cost of using the platform fees which is usually associated with the e commerce centralized platforms. Decentralized infrastructure and Cryptocurrency payments help them in cutting across international boundaries without getting entangled into any hassles such as currency exchange or norms. What's more, the nature of OpenBazaar as a decentralized system means that it is less exposed to disruptions including outages, censorship and bans of the platform [25].

Even though there are considerable benefits accompanying the use of platforms such as OpenBazaar, there are challenges that are prominent. As for the adoption barriers: consumers and businesses are largely still not accustomed to the harnessing of blockchain technology and are rather reluctant to utilize the decentralized modes. Widespread use will require first overcoming the learning curve and gaining some some degree of trust in these blockchain systems. Regarding the regulatory issues: a decentralized mode of operation lacks a central management authority, hence enforcement of laws revolving around taxation, anti-money laundering (AML) and consumer protection is challenging. Concerning the limited features available compared to their centralized counterparts: most decentralized platforms lack basic features found on centralized platforms such as an effective algorithm that would enable effective search, placement of advertisements or even customer support. Concerning the volatility of cryptocurrencies: buyers, sellers and providers of services using cryptocurrencies are all at risk of the price fluctuations of the coins they are utilizing, which is a disincentive to engage in business.

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Decentralized marketplaces thus are a great opportunity for supply chain startups to expand their businesses without being restricted by certain distribution channels and allow them to interact directly with end-customers. A streamlined process of onboarding onto markets' platforms will be enabled by Intermediary elimination further increasing the scalability of their operations relying on the barest possible infrastructural needs. Additionally, there is a potential for the advancement of transparencyin startups through the rollout of blockchain technology. With total transparency of information distribution, there will be complete trust in a product with no issues concerning ethical malpractice advertising. Additionally, individuals within the start-ups will no longer have to deal with the slow-moving policies of platforms that bar them from efficiently customizing their products to fit specific markets. Rather, they will be able to directly meet what the customer will want.

The concept of decentralized marketplaces enabled by blockchain is a game changer when it comes to how commerce is conducted. For startups, e-commerce decentralization promises to be cheaper, more transparent, and simply more flexible while retaining the potential for marketing innovations to inclusivity. There are still issues regarding business incorporation and conforming to laws and regulations. However, the advantages outweigh the challenges which is the reason why decentralization hopes to be the new normal in the management and running of supply chains. With OpenBazaar and similar cases, the research and understanding of the concept clearly shows a breakthrough in this market. This will aid in expansion into different sectors.

3. Conclusion

It is evident that blockchain technology has transformed the world of supply chains and provided a chance for startups to overcome existing hurdles like fraudulent activities, inefficiencies and lack of transparency. Startups can leverage the distinctive features of blockchain – transparency, immutability and centralized – in a bid to enhance traceability, apply restrictions on fraudulent activities and develop decentralized marketplaces encouraging fair and efficient conduct of businesses in the end. From the perspective of disruptive innovation theory, such enhancements offered by blockchain are important in the supply chain altering models of operations lowering the costs of processes and making it easier for niche businesses to serve the market. Blockchain technology has already been actively used in various industries for product traceability and counterfeiting and peer-to-peer transactions. Companies like Provenance, Everledger, and OpenBazaar, for example, were able to demonstrate such properties. These cases illustrate the adaptability of blockchain in solving specific problems of industries as well as providing a competitive advantage to startups in their battle with large players. Nevertheless, the problem of integration of blockchain in supply chains is not easy. However, challenges like data management, scalability, and regulatory hurdles need to be resolved to achieve such aspirations.

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