

A SCENARIO OF ADOPTING BLOCKCHAIN TECHNOLOGY IN SUPPLY CHAIN: A STUDY OF E-COMMERCE IN BANGLADESH

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Abstract

In Bangladesh, the use of blockchain technology remains almost a concept. Though many countries have already used this technology and gotten better results, especially in the supply chain, we are yet to make sure use of them. Therefore, we are deprived of this technology benefit. Blockchain can eliminate some major issue that exists within the supply chain, in our study we have tried to identify the scenario that will be influenced by this technology, especially in the e-commerce industry. This technology has the ability to create a trustworthy, secure, and swifter documentation process. We closely investigate the barrier while adopting this technology in respect of Bangladesh's e-commerce industry. We develop a model that illustrates blockchain integration in the supply chain. To understand the real scenario, we communicate with field-level management and higher management of leading e-commerce companies in Bangladesh. We find positive responses from all of them though they have reproached Bangladesh's government policy. In spite of some issues we are very optimistic regarding blockchain-based supply chain management system.

1. Introduction

With the improvement of lots of new technologies, we are now on the verge of an information-driven Fourth Industrial Revolution (4IR). For the last couple of decades, the world economy is moving forward so fast with the help of new technologies. The countries that can cope with the new technologies can lead the world economy. Blockchain technology is one of them; this is a revolutionary technology in terms of supply chain management. This technology has been invented for many years but we still could not make sure of its usage in the supply chain. Though Bangladesh is an LDG listed country, Due to its rapid economic progress, it has been dubbed a "Asian tiger" in past few years. World-leading e-commerce companies such as Alibaba, Walmart, Amazon, e-bay have started using blockchain technology in their supply chain management and seeing its impact of it positively. The more time Bangladesh will take to get used to the new technology, the high possibility it has to lose control of the proper supply chain management system. Anything that can conceive of as a supply chain, blockchain can vastly improve its efficiency- it does not matter if it is people, numbers, data, or money. (Ginni Rometty, CEO IBM). Therefore, in this qualitative research paper, we are going to evaluate the impact of blockchain on supply chain in Bangladesh's e-commerce at the same time company's productivity.

1.1 Blockchain

Blockchain was first introduced in 2008 by Satoshi Nakamoto. The blockchain is an immutable digital database of financial transactions that can be configured to register nearly anything of value, not only financial transactions. A blockchain is a decentralized information ledger that keeps lists of records called blocks that can't be modified. It's similar to a word document that may be accessed across several machines. Multiple versions of this document can be generated on a system, and the document can be updated frequently. Blockchain or Distributed ledger technology (DLT) can be used to store permanent and tamper-proof records of digital data (National Blockchain Strategy: Bangladesh 2020).

Blockchain technology is a peer-to-peer system that maintains data about digital assets and transactions in a decentralized database. To encrypt, store, and disseminate data, blockchain is employed in a new and novel method. A chain of blocks that are encryption keys linked together protects Blockchain data. A blockchain-based business service platform, has the features of distributed data storage, time series, tamperproof data, intelligent execution of smart contracts, security, and privacy protection. (Xingxiong Zhu, Dong Wang 2019) Build blockchain-based trusted systems such as e-commerce, finance, and new energy. Blockchain technology can enhance the transparency of financial transactions and enables to smooth data transformation system with high security. Concerned people with blockchain say that it is almost impossible to break the security system of blockchain. Technology experts are eye to eye with the view of them.

Already blockchain has ensured a high-security system regarding these programmers is working hard to make it stronger. Companies maintain their blockchain technology by private blockchain, which is also known as the managed blockchain. Another form of this technology is a public blockchain. In a public blockchain, anyone is allowed to get access to it. taking into consideration the privacy and payment methods of the blockchain The government of Bangladesh is examining blockchain as a viable option. If the Bangladesh government allows blockchain technology, it will be an epoch-making event on Bangladesh's e-commerce site. Following the government's approach, some big e-commerce companies in Bangladesh are very optimistic about blockchain technology.

1.2 Supply chain management

Supply chain management can be defined as the combination of "design, planning, execution, control, and monitoring of supply-chain activities. A supply chain is a relative, cross-company interdependence of two or more legally independent companies and institutions (Stadtler, 2015).

It includes all parties involved, from the suppliers of the raw materials to the producers and intermediaries to the end customer (Neubert, Ouzrout & Bouras, 2018).

In the production cycle, efficient supply chain management solutions bring down costs, waste, and time. Supply chain management will be more than simply a method for cutting costs or a goal for increasing productivity improvements inside a firm. The demand for supply chain management is increasing, due to high automation and increased enterprise connection. Customer satisfaction has increased as a result of the supply chain's efficiency, and the company's success is based on continued performance.

1.3 E-commerce

E-commerce or Electronics Commerce is a tremendous platform where customers buy and sell their products or services using the internet. More specifically, buying and selling products online is called e-commerce. Back in 1979, Michael Aldrich was an English inventor, innovator and entrepreneur is the person who invented online shopping. However, he did not use the payment method for his online purchasing. Since then, e-commerce has been growing at a rapid pace. Now, most of the orders of the world's giant companies are taking place through the e-commerce business. In e-commerce, a customer can directly deal with the business or company through customer to business (C2B) approach which is one of the great advantages of e-commerce. E-commerce decreases costs by eliminating intermediaries, since customers may buy items or services directly from the company's website. Gradually the reliability of e-commerce is increasing because companies are providing a better and fast delivery strategy with a high-security system. As a consequence, cross-border trading is becoming highly popular across the world. Companies like DHL can deliver their commodities to their consumers so quickly because they have direct arrangements with them. E-commerce is expected to be particularly important in Bangladesh's economy in the near future.

2. The blockchain in the supply chain management

Blockchain technology was introduced in this area with the promise of solving the main problems of the supply chain due to its capacity of tracking the flow of goods in real-time and, enhancing the visibility and transparency of the operations (Azzi et al., 2019; Saberi et al., 2019; Kshetri, 2018).

E-commerce, which now has established a standardized e-commerce infrastructure, has reformed "middleman" trading mechanism. The third-party payment platform was developed in the traditional e-commerce mode to secure the rights and interests of both parties, which is a decentralized process with numerous limitations. The traditional e-commerce supply chain is currently challenged by several issues, such as the theory of supply chain management, inventory challenges, supply chain integration, supply chain parties' trust, intermediate linkages, and cost issues. eBay, Amazon, Alibaba, Other trading platforms have stringent restrictions and demand fees for the platform and transactions. Blockchain technology has the potential to increase supply chain transparency and establish confidence among participants. Blockchain technology will increasingly be integrated into the supply chain system as different sectors evolve. Blockchain can be beneficial, especially when the supply chain needs to be regulated. Now, e-commerce can quickly fix inefficiencies within their supply chains, as well as locate items in real-time. Customer and government demands will drive the growth of transparency, traceability, and transaction speed.

3. Literature Review:

Addressing the issues of adopting supply chain structure with blockchain in the Bangladesh e-commerce industry, we have driven a narrative literature review. As blockchain is a newish theme in Bangladesh, it is very difficult to search any academic database on the Blockchain. Primarily we search and collect information about blockchain from various articles, which we found, on Google Scholar, Scopus, and Researchgate. We do, however, have significant limitations because there has not been enough done in this area (blockchain in Bangladesh e-commerce sector) before. Secondly, we surveyed various e-commerce firms, such as daraz, chaldal.com, and foodpanda, to see if they were interested in implementing blockchain technology. We have gotten some ideas and resources regarding this important topic. We summarize the essence of the observations in our study that is critical for making good judgments. The properties and application status of blockchain technology analyses the problems faced by e-commerce nowadays introduces the innovative application of block chaining technology, and probes into the influence of blockchain technology on e-commerce (Tong Zhang, Chunbo Tan). Blockchain implementation has the potential to solve this problem with increased security and transparency through the implementation of cryptocurrency in payment and smart contracts. Exploring the usage of the blockchain, cryptocurrency, and smart contract in e-commerce for a secure and efficient transaction (L Ismanto et al 2019). The information anchoring technique, key distribution technique, data encryption algorithm, and anti-counterfeiting technique are among the basic approaches and algorithms created. The framework, principles, and approaches work together to create a complete and realistic solution that is evaluated in a range of real-world difficulties and offensive situations.

Top corporations are now developing blockchain technologies, while 16 are still in the research stage. The 27 firms implementing live blockchain operations include Microsoft, Amazon, Walmart, Alibaba, PayPal, Samsung, and the Bank of China which are profit increased day by day reason behind everything is transparent. This research paper showed that Bangladesh's perspective affects the e-commerce industry's adaptability to blockchain benefits and barriers. Our discussion cannot bias any party such as govt policy should be maintained. Our research also included article analysis and an investigation of the supply chain and blockchain technology in e-commerce from the standpoint of Bangladesh. Finally, we will discuss the research paper's potential and adoptin supply chain with blockchain in Bangladesh's e-commerce sector, which can transform and make our e-commerce industry more dependable.

4. Methodology

The study makes use of primary and secondary data, as well as available studies, Since the largest portion of the information comes from primary sources. Primary data is collected through a survey of 183 e-commerce's consumer of different demographic groups of Bangladesh. The interview is arranged with six top executives and fourteen sales executives of six leading e commerce (Daraz, Chaldal, foodpanda, Hungrynaki, Rakomari.com, Shazgoz.com) to receive information on the current operating status and prospect of e commerce supply chain.

The questionnaire includes open-ended and close-ended questions. Customers who buy online have been conducted to determine the variables and have an idea about consumer's perception. Likert scale model and arithmetic mean is used to classify and analyze data.

The interviews were conducted with different level executives of e commerce. The supply chain process, warehouse management, demand forecasting, supply chain layers, delivery system and the factors affecting the supply chain with block chain were elaborately discussed during an in-depth interview. The entire supply chain process for e commerce was monitored.

The challenges during this study were evaluated carefully. Since there are very few researches conducted on e-commerce , specifically for block chain, this was difficult to obtain market information and real competitive scenario.

5. Data analysis

5.1 Primary data and interview method

Our primary data found from upper-level management of business development department, IT analysis department, warehouse and logistic departments in **e-commerce industry**. Primary data can be characterized as data collected by the researchers and authors for the research purpose (Bryman & Bell, 2015). It can be obtained by a variety of methods, depending on the research discipline, e.g. surveys within a target group, different types of interviews, independent observations, and experiments (Walliman, 2011). we also run a survey on **consumers** to find out their opinions and preferences about e-commerce buying behavior patterns and facing problems with data sharing, quality issues, Delivery return policy, etc. These are the key supply chain factors that affect consumer buying behavior directly. We ran our survey on 184 consumers online through google doc. Secondly, we collect the data by interviewing management of **six companies**, among them there was higher-level of management as well as mid-level and lower level management from e-commerce industry. Our questionnaire contains both open and close-ended questions where we have asked and analyzed those data with the Likert-scale Method and Arithmetic Mean Formula. Likert (1932) presented a summed scale for assessing the views of survey participants. Individual items in Likert's sample scale had five responses as alternatives: Strongly agree, Agree, Neutral, Disagree, and strongly disagree.

In our study, we included secondary data that we gathered from a variety of online publications mainly research gate, google scholar, scopus. For a Few portions of secondary data, we collect information from various standard articles from reputable sources on the internet so that our research information will be relevant and strong. We discussed with some supply chain specialist and IT specialist who informed us all about supply chain system and studied their relevant article.

5.2 Question for company side

1. In case of ordering product delivery, do you share customer's personal information to the third party, if so, which types of problems are you facing for issue?
Answer: we share personal information if it is needed, for the sharing information, customers hardly face problems. We only exchange consumer information with other companies for the purpose of home delivery.
2. On the way to warehouse to third parties and third parties to consumers, do you face any trouble?
Answer. In general, we are not confronted with any difficulties. However, we occasionally confront challenges with finished items, such as maintenance, packing, and so on, despite our best efforts to deliver superior services to the clients.

3. How do you keep delivery tracking, and how do you keep consumer tracking?
Answer: Most of the time we are using our own tracking system Artificial Intelligence (AI) software. Our Technology staff is in charge of the entire operation.
4. How much transparency can you ensure?
Answer: In Supplier to consumer layer, level it is always not possible to maintain 100% transparency. Some mistakes are made when we do fieldwork sometimes in logistic management, transportation, and warehouse.
5. What types of problems are you facing in refund policy and payment system?
Answer: we do not find any problem in the refunding system. We can refund within 7 working days but when it comes to payment, we face hassle with the payment system
6. Do you use any technology to manage this huge amount of inventory? Are there any automated processes?
Answer: almost 70% of e-commerce companies are using AI technology to support inventory management and 30% of e-commerce are not using technology for inventory management. We are also using AL technology to do our activities fast.

5.3 Question for consumer

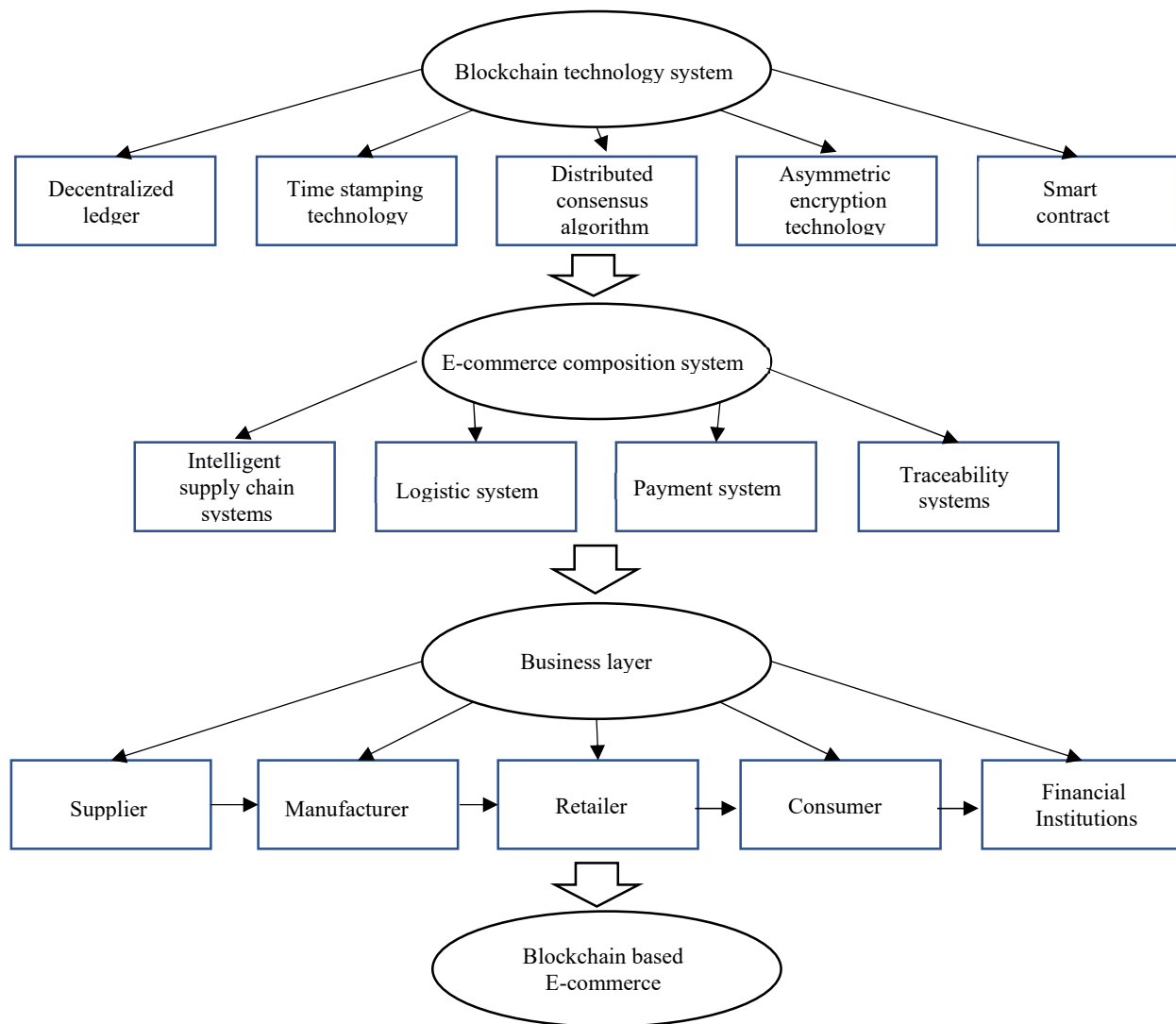
1. How many times did a customer make the purchase of an online e-commerce site that lasted 6 months?
Answer: 3-4 times (approximately)
2. How was your buying experience in online shopping?
Answer: The majority of buyers are dissatisfied with internet platforms due to the absence of transparency, such as real-time tracing and postponed in-home delivery service, among other difficulties.
3. Which types of problems are consumers facing when they purchase products from e-commerce sites?
Answer: Many problems they are facing such as the fake product, an Inflexible return policy, and a wrong product. Based on the survey 33.36 % (approximately) of results come from the survey on inflexible return policy. Actually, e-commerce sometimes faces problems for instance consumers are getting dissatisfied day by day.
4. As a consumer, which sectors should be changed in the e-commerce structure?
Answer: In an online survey, most of the people are students, service holders, and private jobholders whose age is between 20 -and 40 margins (80%). The E-commerce industry is booming nowadays. As a result, we will need to alter portions of its structure in the coming days. In our survey results, we have found that 19% of consumers want to change product development, 22.5% delivery system development, 25.8%, payment system, and 14.9% government rules and regulations.

5.4 Result Factor

We have done online and offline interviews to get an overview of the barriers to the supply chain. We began to find if a blockchain-based supply chain could be established in Bangladesh. Supply chain management is breaking down lack of transparency, security, and traceability problem. For this research paper we interviewed some warehouse managers and they said if they can establish a better blockchain system, they will be able to accelerate their activities. The cost of a transaction can also be decreased with blockchain technology. We have also seen that companies are very keen to accept this effective technology. Up-level management of a company is adopting AI software to keep inventory under control, for example, by leveraging blockchain technology smart contracts, decentralized ledger, to improve their position in e-commerce industry. Such technologies will result in a better refund strategy, a real-time delivery monitoring system, and a secure means of payment.

6. A theoretical framework for e-commerce Supply chain based on blockchain

In our paper, we design a theoretical framework of e-commerce based on blockchain technology that includes e-commerce composition systems, blockchain technology systems, and an e-commerce business layer. In our research, we focus on four basic e-commerce composition systems namely intelligent supply chain system, logistic system, payment system, and traceability systems besides blockchain technology systems we focus on five systems namely decentralized ledger, time-stamping technology, and distributed consensus algorithm, asymmetric encryption technology, and smart contract. In the e-commerce business layer portion, we highlight the total supply chain part namely Suppliers, manufacturers, retailers, e-commerce financial institutions, and finally consumers. Now we design a blockchain-based e-commerce framework.



Source: Redesign by the author from various sources.

In our framework, blockchain technology systems is consisted with decentralized ledger, time stamping technology, distributed consensus algorithm, asymmetric encryption technology and smart contract. The decentralized ledger can be defined as a computerize blockchain system which decentralizes data storage network form that not only ensures the security systems but also provides efficiency transaction. In time stamping technology we can easily reduce tamper ability of data and trace the e-commerce supply chain. It also provides us time dimension of all data security systems. In our framework, blockchain technology system is distributed consensus algorithm that describes how blockchain technology works. The distributed consensus algorithm is made up of many types of nodes that are created using mathematics and programming techniques. Fourthly, asymmetric encryption systems is an important blockchain technology, which ensures data security by using various types of private and public keys. Finally smart contract is the automatic programming system at same time assures intelligent logistic systems, transaction and reverse system, smart warehousing, and delivery systems traceability etc.

Intelligent supply chain systems, logistic systems, payment systems, and traceability systems provide the foundation of e-commerce composition systems. Our present e-commerce supply chain faces various types of obstacles such as weak life cycle, poor supply chain management system. By using blockchain based on intelligent supply chain systems, we can reduce those problems. Intelligent supply chain system ensures secure database, product standardization, tracking and traceability system and collaborate all parties of blockchain. According our framework the blockchain based logistic systems make sure smart inventory management, reduce delivery time and logistic cost also decrease goods damage and difficulty of product return policy. Payment system is the biggest barrier for e-commerce supply chain but we can remove this barrier by using blockchain based payment system.in blockchain based payment system digital currency will be used for transaction. Finally blockchain based traceability system track all parties who are involved with all part of e-commerce supply chain process namely suppliers to consumers.

After establishing blockchain technology and e-commerce composition systems, e-commerce can start its business activities. To smoothly run e-commerce business activities at first e-commerce needs to find out the parties namely suppliers, manufacturers, retailers, consumers, and financial institutions. Suppliers is the starting party of the e-commerce supply chain that supplies goods or services that usually provides that bulky value of a product. A manufacturer will be a person or company who produce finish goods for the e-commerce industry then the retailer collects the finished foods for consumers and displays them in an e-commerce website so that consumers can choose their product and order it. To order the consumers desire their need financial institution for the paid price. A consumer can use various financial institutions such as bank, credit card, Bkash, Nagad, rocket, M-cash, U-pay, U-cash etc.

7. Impact of blockchain on supply chain in the e-commerce industry

7.1 Traceability

Traditional e-commerce follows the track the product was not the proper way to monitor It should facilitate product traceability by making information and origin more easily accessible and thus

improving product safety and quality (Sabeti et al., 2019). For example, it enables company goals to be achieved, as the origin of the raw materials can be traced right through to the product. Due to the complexity within a network, errors can occur resulting in incomplete or missing information, which in turn hinders traceability (Francisco & Swanson, 2018). Alternatively, service for all parties involved and the quality of the products can therefore be verified (Lu & Xu, 2017).

Electronic product codes, which are part of the GSI system, are used to track inventory. The inventory flow from one location to another is scanned using blockchain technology, which creates a history of all inventory goods as they move through the supply chain process from suppliers to end users. In a blockchain-integrated supply chain system, for example, when a product is manufactured in a factory, it is assigned a unique code, and when it reaches the warehouse, it is assigned a new unique code based on the previous code. It also has unique codes at the distribution and retail levels to ensure that items are not tampered with and customers receive the genuine products.

7.2 Security

Security plays a vital role in consumer trust, which depends on data sharing traceability. Software protocols are used to implement basic security mechanisms to hinder tampering and misuse of power (Robach, 2018) to create a new form of trust. Nevertheless, there are still security gaps as the technology is still in development (Babich & Hilary, 2019).

E-commerce merchants generally send invoice receipts and some other after-sale service conditions through email or paper copy. All of this information may now be protected and saved in a block of data. This will make it simple for a customer to request a service and for a shop to offer the requested service.

7.3 Automatic execution of contracts

Blockchain enables contracts to be automatically performed according to predefined criteria and conditions. Blockchain technology allows for more efficient processes because of its integrated management methods.

When inventory levels fall below a predefined limit, the system alerts all parties involved, including warehouse managers, procurement managers, and suppliers. The refund procedure can be automated using blockchain technology, resulting in a quick reimbursement to the customer. If a customer changes their delivery address while the goods are in transit, this technology can automatically update the address and notify the appropriate parties; the same is true if a customer changes their delivery date.

7.4 Cost-effective

One of the most evident advantages of blockchain is the ability to quickly reduce overhead costs. There are numerous examples of demonstrable gains and cost reductions that have resulted from the adoption of blockchain at the corporate level.

Supply chain companies may use blockchain technology to communicate and agree on crucial bits of information. In other words, companies do not need to hire a middleman to handle the complicated talks that come with establishing regulations before giving over sensitive corporate data. Complex contract discussions may be conducted in a true peer-to-peer fashion, eliminating the need for costly central intermediaries to assist this function, thanks to blockchains' ability to synchronize data throughout the network in a verifiable manner.

Because transactions are allowed by contract by a system of countless individuals, the use of transaction facilitators like payment networks and payment systems will be minimized. By eliminating the requirement for third-party transaction management and record keeping, it has the potential to drastically lower transaction costs.

7.5 Economical performance

The implementation of blockchain technology in the supply chain can have many economic effects. Petersen et al. (2018) The aspects of the blockchain, such as tracing items inside the supply chain, tracing back to the point of origin, and alternatives for funding deals, have been highlighted as having an impact on the economy. In addition, Kshetri (2018) states that blockchain technology within the supply chain is particularly visible through effects such as reduced costs and uncertainties and at the same time increased process speed, data security and quality. This makes blockchain based processes faster, more effective and more cost-efficient than traditional supply chain management processes (Chod, Trichakis, Tsoukalas, Aspegren & Weber, 2019), and could change the way business is done by what, how and where it is done (Allen et al., 2019). In particular, inter-organisational processes can be executed without an intermediary, trade financing can be facilitated (Chod et al., 2019) and processes with third parties that are not trusted can be more secure (Mendling et al., 2018). Therefore, the blockchain can contain data about the liquidity or the financial trustworthiness of the trading partner (Jahanbin et al., 2019).

Beyond these internal and inter-organisational processes, the usage of blockchain in the supply chain can have indirect economic effects. The blockchain offers the possibility to link physical objects with a digital identity, so that the authenticity of the products as well as their origin can be proven within the framework of traceability (Montecchi, 2019). As consumers become more aware of the sustainability of the products, they buy and their supply chains (Jahanbin et al., 2019), this could lead to competitive advantages or incentives to buy.

8. Barrier of adopting blockchain technology in e-commerce

Block chain technology is a totally a new concept in Bangladesh so it has a plethora of limitation to be established. The biggest problem of introducing blockchain technology in Bangladesh is inadequacy of technical knowledge. Still, most of the individuals have no minimum knowledge regarding block chain technology.

There is no enough research on block chain as well as training center that can help concerned people to develop a better blockchain system. For this reason, people do not know how to control this technology. so people are fear of operating of it.

Bangladesh government is yet to recognize block chain technology and has no proper policy which is another issue here. Although a few large corporations seek to integrate this technology into their supply chain management systems, the Bangladesh government is not fully supported.

In the developed countries, block chain is a name of a huge business. We can see many block chain companies are doing well in their position named ScienceSoft, Ripple labs inc, Leewayhertz, Blockchangers and so on.. However, blockchain companies are hard to find these days in Bangladesh. As a result, we have been unable to develop this industry in our country.

Nowadays we can see the light of hope because our government is thinking about this technology recent years. The ict minister has said government has been thinning in this regard. We are very optimistic that very soon we are going to overcome the discussed drawbacks to keep our data secure and make this sector profitable

Blockchain offers a technological solution to all existing difficulties in the supply chain. Many businesses have started to adopt it in order to have a competitive advantage.

In theory, the blockchain can work, but supply chains are very hard to change and adapt. (Mougayar, 2016, 123). Mougayar thinks, that companies spend years putting supply chains in place and refining them. It is not very easy to insert a new technology inside established supply chain systems because the integration challenges are not to be underestimated.” (Mougayar, 2016, 124-127).

This study is issued due to the currently still young topic of the possible implementation of blockchain technologies in the supply chain. The increasing inexorable digitalization in industries is constantly revealing new insights and thus creates new gaps for further research. The introduction and use of blockchain technologies in supply chains are currently still at an early stage and require more time to achieve the full acceptance, application, and potential of this innovation (Philipp Manuel Block & Sophia Katharina Marcussen-2019)

8.1 Intra organizational barrier

8.1.1 Financial restrictions

Initially, the implementation of blockchain technologies within companies can lead to financial restrictions. The implementation of blockchain technologies requires high costs in order to successfully integrate the technology into the company. On the other hand, it provides possibilities to execute data transactions securely and at low rates, which leads to a cost-efficient and flexible supply chain. (Korpela et al., 2017)

Especially at the beginning, the costs for the acquisition and implementation of new technologies are high (Heilig, Lalla-Ruiz & Voß, 2017). Additionally, staff training to deal with these changes is costly, but vital.

8.1.2 Obstacles in cultures and policies

When a company decides to employ new technology such as blockchain, the existing culture of the organization can be affected since new guidelines are required to use new technology. With the implementation of blockchain technology, there is a new distribution of roles as well as responsibilities and competencies shift (Mendling et al., 2018).

8.1.3 Absence of experienced workforce

Since there is no clear standardization, companies are unsure how to use technology effectively. However, the lack of knowledge about the long-term success of the implementation can be partly compensated by a stable environment (Sternberg & Baruffaldi, 2018).

8.1.4 Long time for approval

In our culture, most of our young company plays a defensive role when it comes to adopting a new technology that is a little familiar in the industry. They tend to be the late mover and observe how another competitor is doing with that technology.

The implementation of technology can be rejected if this is accompanied by changes in the company structure (Jharkharia & Shankar 2005), which limits a far-reaching implementation process. As a result, diffusion with blockchain technologies is slow (Korpela et al., 2017).

8.2 Inter-organisational barriers

8.2.1 Competitive disadvantages

Although the exchange of information and data via blockchain can make the supply chain more accurate and effective in terms of traceability, transparent data may create worries about mistakenly disclosed information being passed on to other players. The competition can enjoy the benefits of the info that has been supplied.

8.2.3 Role reorganization

In addition to the cooperative effort hurdles, there is a new role allocation inside the blockchain along supply chain players. Companies must take on new and unexpected tasks, particularly during the deployment phase of technology in the supply chain, which can be discouraging. However, if supply chain participants are compelled by some other party, this transfer of duty may result in the formation of the blockchain.

8.3 Technical barriers

8.3.1 Inadequate technological access

A lack of access to technology (Saberi et al., 2019) is often a major problem within a supply chain. In order to add value from a digital supply chain, the necessary information must be transparent for all participants in the supply chain (Apte & Petrovsky, 2016) as well as all participants must use the same method or technology. However, this is not possible due to the different possibilities of several enterprises. For example, not all companies are able to afford the high establishment costs (Korpela et al., 2017).

8.3.2 Condition of infancy

Moreover, blockchain technology is in an immature stage of development (Tijan et al., 2019). Since the establishment in the supply chain is still at an early stage, problems may arise for which there are no yet solutions, as not all possible problems have been investigated (Kim & Laskowski, 2018).

8.4 External barriers

8.4.1 Competition

The competition can represent such a possible factor. Within the framework of a technological trend around blockchain and in order to maintain competitiveness, blockchain-based technology is adapted, even if these circumstances are not suitable for the existing supply chain and do not offer added value (Seebacher & Schüritz, 2019).

8.4.2 Laws and legal issues

In addition, legal aspects and laws can be a crucial hurdle in the introduction of blockchain technology into the supply chain. In times of globalization, supply chains are globally networked and goods traffic within them is a complex topic from a legal point of view due to a multitude of different actors and laws (Wang et al., 2019a). Moreover, it is aggravating that there is still no clear legal rule or act regarding the use of blockchain technology. Legal uncertainties can therefore constitute an external barrier and an obstacle to implementation (Poszler et al., 2019; Seebacher & Schüritz, 2019; Wang et al., 2019a).

9. Study Limitation

While we are attempting to represent the appropriate scenario of a blockchain-based supply chain in the Bangladesh e-commerce industry, accurate information is required. However, the main issue is that there have not been enough publications about blockchain-based supply in the Bangladesh scenario. This is one of the main reasons why there is not a lot of relevant literature on blockchain-based e-commerce supply chains. The most important factor is that Bangladeshi people and businesses are only familiar with cryptocurrency-based payments, which creates skepticism about the blockchain system. Even some representatives of e-commerce companies refuse to share their information with researchers, despite the fact that the goal of this research paper is to assist their supply chain management. Though we obtained permission from many e-commerce authorities to visit and interview them for a few questions, we did not consider all interviewees because some of them do not conduct their operations properly. However, we are almost done with contracts with the leading e-commerce companies in Bangladesh (daraz, chaldal, hungnaki, Foodpanda, Shazgoz, and so on) who want to use blockchain technology in their supply chain management.

10. Conclusion

In this research paper, we focus on the scenario of a blockchain-based supply chain. We have tried to show the impact of using a blockchain-based supply chain system through some evaluations.

We have talked to some individuals about their thought centering on blockchain technology. According to them, they all are so keen on this blockchain-based technology.

We wanted to show how many beneficiaries Bangladesh's e-commerce can be by introducing a blockchain-based supply chain management system. In this industrial revolution century, Bangladeshi people should be eager to accept the new technology and idea to enhance our e-commerce industry. In fact, there is no substitute for embracing the new technology to compete with the other countries in the fourth industrial revolution. The more we will be flexible, the faster our e-commerce will get the benefit. Therefore, the time has come to cope with the new technology like blockchain-based supply chain system.

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