

THE USAGE OF BLOCKCHAIN IN DIGITALIZATION: CASE STUDY ON DOCUMENTARY CREDIT

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ABSTRACT

Starting with the year 2012, the Blockchain has attracted the attention of many managers in the world thanks to its usefulness. One of these usages is to guaranty the fluidity of traffic information and merchandises. The migration toward Blockchain based digital environment create a source of wealth for the operators by its secure, immutable and shared database. The premises of the Blockchain is affecting the digital world positively by connecting different systems to the same database. The use of Blockchain will streamline and secure the traffic of information in global trade. Our focus in this study is to fluidify the process of the documentary credit by creating a smart documentary credit while using the Ethereum Blockchain. This feature gives the ability to trespass third party interferences by automating processes. These automations are time beneficiary and profitable for exporters and importers which means that the end user will benefit from a fair trade with the best prices thanks to the Blockchain.

KEYWORDS: *Blockchain, smart credit, globalization, crypto-money.*

1. INTRODUCTION

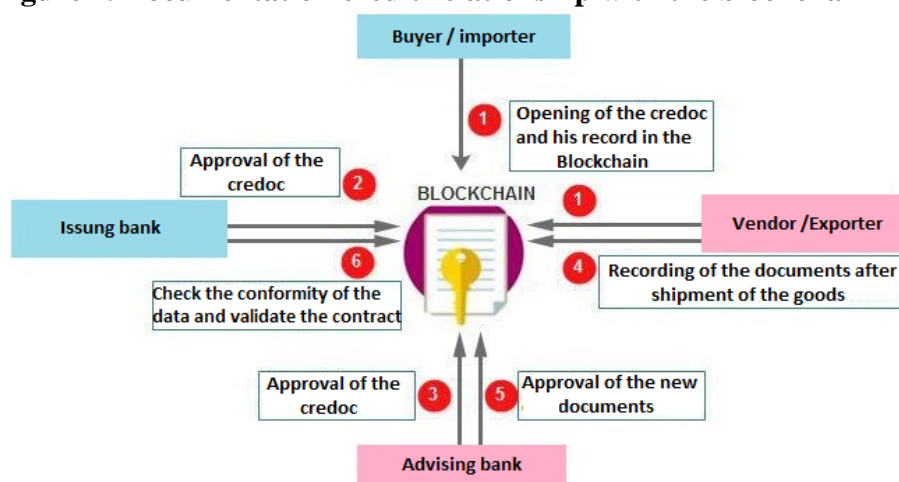
The IT world is continuously changing, traditional operators must quickly find a place in the safe digitalization data systems and to take advantage of the Information Technology innovations. Migration to more sophisticated computer systems creates a new environment that will become a source of wealth for operators, especially after the confidence that has been established through blockchain – based transactions (Hawlitshchek et al., 2018). Actors thus find their opportunities through the transparency and security that the blockchain offers to their investments; hence the main actor always remains the investor. Trust and security are the key issues for economic development and growth. This is often forgotten nowadays in economic policy, such as the monetary policy. With respect to the international information trade, in the supply chain, the blockchain is utile for its advanced applications, by connecting any process initiated by the actors through a decentralization of the system and its database, (Abaie & Rastegary, 2017). The Authors aim is to analyze the efficiency, the confidence, security and cost on the end users, by the utilization of blockchain in documentary credits. Our methodology will start from the specific blockchain concept literature, documentary credits, completed by an experimental method through which several experiences will be carried out concerning the credit documentation as to be able to create virtual automation, based on qualitative and quantitative techniques. To illustrate our aim, we will introduce the concepts of blockchain utilization and documentary credit. Then, we will present the existing Blockchain solutions and point out the type of the companies that could be interested in blockchain technology. And finally, we will propose a prototype of a Blockchain solution that deals with the problem of documentary credit.

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- The documents are transmitted to the buyer, who then takes possession of the goods. The commitment to pay banks is based solely on the strict compliance of the documents.

The principle consists in bringing together the actors of the chain on the same system or "distributed register", the importer (client) and his bank (so-called issuer) on the one hand, and the exporter (seller) and his bank (Called notifier) on the other hand, in order to carry out and validate in real time all the steps necessary for the proper functioning of the documentary credit. Any other actor participating in the exchange must have access to this system, such as the carrier or the port. The Blockchain will ensure consistency and certify the signatures and documents exchanged. In this case, each actor will only have to consult, modify or deposit documents in the Blockchain, which avoids the paperwork and the traditional tedious exchanges. Figure 4, "Documentation credit relationship with the blockchain" shows the progress of the documentary credit regarding the integration of Blockchain.

Figure 4. Documentation credit relationship with the blockchain



Source: The Authors

1. After negotiation of the payment by the documentary credit and the agreement on the conditions, the buyer asks the seller to confirm the terms of the order (mode of transport, insurance, etc.) Buyer issue a proforma invoice. The seller enters the invoice directly into the Blockchain, it can contain the following fields: date of invoice, description of the goods, amount, VAT, expiry date, mode of transport, etc.).

2. On the Blockchain, the issuing bank can see that the buyer has validated the invoice. It can then validate the issuance of the documentary credit.

3. The notifying bank may see the validation by the issuing bank of the documentary credit as well as the seller.

4. The seller delivers the goods to the carrier and records the shipping documents in the Blockchain. The carrier in turn delivers to the customer and validates the correct receipt.

5. The notifying bank shall approve the new documents registered by the seller.

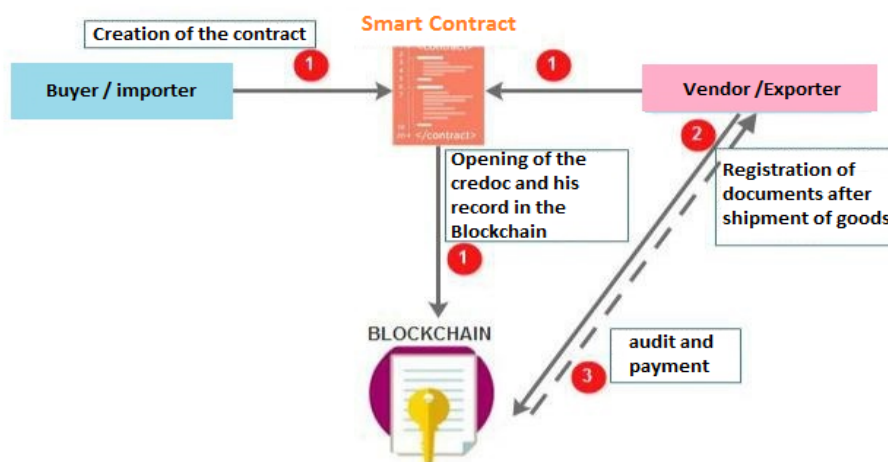
6. The issuing bank checks the conformity of the data, validates the contract and makes the payment to the notifying bank (bank of the seller).

There are also other possibilities not listed, such as customs clearance and customs clearance of goods, or underwriting of currency hedges, etc. However, it is true that this prototype considerably reduces the complexity of the use of documentary credit in terms of time and cost, but it does not reduce the number of intermediaries involved in the exchange operation. To do this, we proposed another prototype that allows us to involve the minimum number of actors, which we will detail in the next section.

3.2. Proposed prototype for the documentary credit without banks

In this context, the principle of the Smart Contracts usage, mentioned above (in the section 2.5) guarantees the security of the transactions, as well as the crypto money to make the payments automatically. In this figure the Authors show the phases needed while having the ports authorities' systems connected to verify that products have been verified to verify automatically without having to present a single paper document.

Figure 5. Documentation credit model without Bank involvement



Source: The Authors

Process Description:

1. The buyer and the seller have virtual currency portfolios; they negotiate payment by documentary credit and agree on the conditions. Then, they write a computer program called Smart Contract that capsules the details of their contract. The seller enters the invoice in the Blockchain. This transaction must contain the Smart Contract code.
2. The seller delivers the goods to the carrier and records the shipping documents in the Blockchain. The carrier delivers to the customer and validates the correct receipt.
3. The Smart Contract checks automatically that all conditions of the contract have been met and transfers a virtual currency transfer to the seller.

The prototype has greatly reduced the risk of errors, the number of intermediary interventions, the complexity of processing and verifying the data and documents exchanged. Since the issuing and notifying banks no longer required their involvement, the cost and time required to set up the documentary credit have been optimized. For this prototype, the Authors are using the public Ethereum Blockchain because of:

- effortless programming Smart Contracts.
- possibility of carrying out financial transactions thanks to crypto currency.

The Authors have presented various Blockchain solutions that exist. With respect to the Blockchain solutions adapted to the port systems as well as the companies that are interested in this technology. Finally, the Authors proposed prototypes on the documentary credit that helps for the transportation of goods using the principle of Blockchain. Blockchain technology still an emerging innovation and continues to develop day after day. It has a positive impact on different fields and in this study, we focus on documentary credit simplification. This technology can meet the needs of fluidification, and secured data exchange offered by the Blockchain in order to obtain a safe, fluid, fast and low-cost system.

4. THE AUTHORS HAVE DEFINED THE LIMITATIONS OF THE PROTOTYPE BLOCKCHAIN ANALYSIS

The Blockchain is an emerging architecture which knows many technological limits:

- Blockchain security is problematic at the end of the chain: if the end user loses his private key and transactions are executed without his consent, the data will be unalterable.
- In order for the Blockchain to be secured, it must continually increment new blocks in order to secure the previous blocks. If the sum of the computing powers of the honest users is less than the calculation sum of the users wanting to cheat, then the Blockchain will be corrupted.
- The Blockchain continually records new information without ever deleting it, so we have a problem of exponential storage that is not a priori unreliable in the long term.
- The performance problem (the Bitcoin mining keep on getting harder to solve the problems of the Proof of Work in order to add a block: in some cases, the cost of electricity becomes higher than the profitability to mine) or problems Scalability (Bitcoin can process no more than 7 transactions per second) (Haliplii et al., 2020).

5. CONCLUSIONS

Blockchain technology is still under development, it could be in the unavoidable future, from document certification to transactions between individuals or others. It allows data protection, the authenticity of the documents sent as well as the storage of the data as it uses a database which contains the history of all the exchanges that have been made since its creation. However, this exponential growth of the Blockchain could pose problems of storage and synchronization in the future. The Authors presented the Blockchain technology which has considerable advantages, notably in the automation and fluidification of data exchange and security of transfer of assets. It is a database that contains the history of all the exchanges between its users since its creation. This database is secure, transparent and shared by its different users, which allows each user to check the authenticity of the chain. Data digitization facilitates the transmission, sharing of information and improves the environmental efficiency of the port. Most ports are interested in the concept of Smart Ports thanks to its remarkable advantages in terms of energy consumption and the environment. In analyzing the utilization of the blockchain in documentary credit, by introducing the concept of open and decentralize systems to transportation, by connecting all transportation ecosystem into one network and one platform and creating a system of systems that interacts with data, objects and users it reduced time.

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