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THE IMPLEMENTATION OF BLOCKCHAIN IN INTERNATIONAL TRADE

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ABSTRACT

The logistics in international trade is become more complex because it involved many parties in the process. The complexity creates some challenges that cannot be resolve by traditional international trade system. A lot of paperwork, inefficiencies and tracking become the problems of international trade. Blockchain is a technology which has great potential to resolve all those problems. This research is aimed to answer the research problem: "is blockchain technology a solution for international shipping?" by providing the reader about potential and challenges for implementing blockchain in international trade. After conducting this research, the researcher finds that blockchain can be a good solution for international trade, if the company can overcome the challenges. The researcher also found that blockchain implementation is not easy, there are many challenges that has to be faced for a company, for example, lack of knowledge and ensuring integration of third application used for blockchain and many more. However, if a company can overcome those challenges, the company will be received great advantages by implementing blockchain.
Keywords: Blockchain, International Trade, Logistics,

INTRODUCTION

In the current era, technology has played an important role in the sustainability of human life. Technology helps all human jobs become easier, especially in the field of logistics supply chain management. Logistics is an important role in the Supply Chain Management (SCM). Currently, logistics becoming more complex since it involved many parties inside the process, especially in global trade logistics which involved "with diverse stakeholders, varying interests, and many third-party intermediaries" (DHL International, 2019). "This complexity is creating challenges related to communication and end-to-end visibility - making logistics process inefficient. At the same time expectations of all participants in the supply chain related to the transparency, reliability and service are increasing" (PWC, 2020).

With the current technology, it is unable to fully facilitate the complexity of logistics, especially for international shipping. Moreover, international shipping has some problems which can't be managed by old technology; First international shipping needs a lot of paperwork. This will be very costly, both costing time and money. Also, paper-based are vulnerable of loss and fraud. Documents like the bill of lading might be subjected to fraud (Popper & Lohr 2017). Taken together, the cost of the trade-related paperwork processing is estimated to be between 15 and 50 percent of the costs of the physical transport (Groenfeldt 2017; Popper & Lohr 2017). Moreover, some exporters also use third parties' services to manage their export documents which will increase the cost of export. In short, a lot of paperwork are led to inefficiencies in the logistics process. Building trusted real-time view on the delivery aspect of supply network will be the next issue of logistics in supply chain where tracking and tracing will be the vital part to be concern. Tracking systems are used to identify the last known position of the shipment and inform the next actor or the received in advance. Without a reliable tracking system, it is almost impossible to find delivered items and often items considered as lost or stolen (Helo, P., & Shamsuzzoha, A., 2020).

Blockchain is one of a technology which are able to manage the logistics complexity. " One major advantage of blockchain is to create transparency and trust as every member of the logistics network has access to the same data, offering a single
point of truth" (Tapscott and Tapscott, 2016). "Blockchain can potentially improve efficiency in global trade by greatly reducing bureau-cracy and paperwork." (DHL International, 2018).

By 'sharing' databases between multiple parties, blockchain essentially removes the need for intermediaries who were previously required to act as trusted third parties to verify, record and coordinate transactions (DHL International, 2018).

With the huge potential for logistics, Blockchain technology also bring some challenges to deal with. First is about how to ensure the data quality which will be uploaded into blockchain. Connected with first challenges, granting trustworthy people to upload those data also become the next challenges company will face. Since blockchain also use another tool (GPS, smart contract, etc.), integrating those tools with Blockchain can be a real challenge for a company.

On this paper, the researcher wants to use an Indonesia company as the research sample of a company who have export transactions. The company will be evaluated about their logistics process especially on their international shipping with blockchain technology. Thus, it will come up with some issues since it involves cross-border transaction, and it will affect the efficiencies. Therefore, the resevarch problem can be formulated as: Is blockchain technology a solution for international shipping problems?

THEORETICAL FRAMEWORK

Blockchain is a sharing digital ledger technology that use decentralized system which able to eliminate the need of intermediaries and also tamper-proof.

There also 3 most important properties of Blockchain; decentralized, verified, and immutable which explained by Hackius and Petersen (2017).

1. Decentralized: every member can run the entire network instead of relying on central authority like centralized system that established trust. Every transactions are shared across the Blockchain's peer-to-peer network and every members keep their own local copy of the ledger.
2. Verified: when participants use public-private-key cryptography to sign transfers before exchanging them with the network. As a result, only the owner of the private key will start them. Members will remain anonymous, though, so the keys are not connected to real-world identities.
3. Immutable: due to its consensus algorithm, which groups together one or more transactions to form a new block. The transactions in the block can be checked by all network users. If no agreement is made on the authenticity of the current block, it is refused. Similarly, if there is agreement that the transactions in the block are legitimate, the block is attached to the chain. For each block, a cryptographic hash is created. Each block contains not only transaction information, but also the hash of the previous block. This establishes a block interdependency that connects to a chain – the Blockchain.

Blockchain in International Trade

International trade is very complex since it is involved multiple parties in it, i.e exporter, customs, forwarder, port, and importer. With multiple parties involved, it is created communication challenges amongst stakeholders. Communication problems relate to the lack of transparency between stakeholders, which sometimes can occur due to the absence of openness between stakeholders, thus disrupting the global trade process. For example, when an exporter already delivered their product to the importer, but the product still on the way which means the product still on the forwarder hands. If there is no adequate technology, the importer didn't know where the product is, whether it is already delivered or no. Thus, they need a technology which able to provide information to the importer about their product which also a technology that provide transparency, like Blockchain.

Not only about communication, but most of international trade transactions also still adopt paper based. With multiple parties, it is also needed a lot of paperwork. A pile of paperwork needed to be submitted in international trade. Furthermore, not only do these different paper-intensive procedures raise communication and administrative costs, but they are often vulnerable to mistakes, losses, and fraud. Despite significant progress, complete digitalization of cross-border trade transactions in products is still a long way off. The complexities and costs associated with foreign trade in goods have prompted a growing number

of companies and governments to explore how Blockchain could be used to reduce paperwork and improve processes involved in the export of goods, ranging from trade finance to border procedures and transportation, in the hope of moving closer to genuinely paperless trade (Ganne, E. 2018).

How Blockchain Support International Trade

Letter of credit is one of transactions that usually occurs in global trade as a form of trade finance. It is a payment mechanism which is a document issued by a bank to another bank usually used for international trade to serve as a guarantee of buyer's payment to seller.

Even letter of credit is widely used as a payment mechanism of international trade, it is also still having some challenges to faces. Current traditional trade finance or letter of credit is often facing with high costs and burdensome procedures, since it is a paper-heavy process. (Ganne, E. 2018). Both parties must exchange and verify official and legal records. Furthermore, the payment is activated solely based on the paperwork and not on the actual condition of the products. (Al Amaren, E., et.al, 2020). This conventional approach has a significant impact on the letter of credit and makes it a time-consuming process to complete between the borrower and the issuing bank.

According to (Al Amaren, E., et.al, 2020) on their article, they explained about how the process of blockchain in L/C is, as follows:

1. First, the importer generates an L/C application in the network. The importer bank then reviews it and stores it on the blockchain. Following the completion of the L/C, the importer uploads the document to the blockchain for the issuer bank to accept, deny, or suggest amendments. The letter of credit is provided on a distributed ledger technology network comprised of participating nodes that include importers, exporters, banks, and other entities. The applicant will create the L/C terms and conditions, which are then automatically stored on the blockchain as a draft.
2. The issuer bank is notified to verify the L/C and can approve or reject it based on the information given by the applicant. If the applicant request has been reviewed and approved by the issuer bank, access is automatically granted to the conforming bank for approval. Before being submitted to the seller, the L/C may be updated and accepted by other involving banks, including the advising bank.
3. The conforming bank is notified to verify the L/C and will approve or reject it depending on the data exchanged by the applicant and the issuer bank. If the conforming bank authorized the credit, the seller (exporter) may review the letter of credit condition and terms. The letter of credit is finalized as a contract between the issuing bank and the exporter after being reviewed and accepted by the seller (exporter). Any changes or modifications to the L/C may be organized by a 'multi-signatory process,' which provides approval and viewing permits to buyer, seller, and participant banks depending on the scope of the relevant amendments.
4. The seller (exporter) attaches the commercial invoice and export application details and uploads all other required information before dispatching the freight. Once the shipment crosses the country's borders, it needs approval from various legal bodies, customs, port authorities, monitoring and rail companies, and so on. These legal entities each have a representative node (access link) that is linked to the private blockchain network and replicates trade information as it occurs on the network at any time. The blockchain will be used to sign their approvals, informing all trading parties that the shipments have arrived at their destination.
5. The documents are reviewed by the conforming bank first, followed by the issuer bank, which may approve or deny the documents, noting any inconsistencies for the claimant to check (importer). When the banks and the borrower accept the letter of credit, it advances to the completed status.

Future of International Trade

The future of international trade platform objective is about minimizing international trade barriers and increasing efficiency across international supply chains. Furthermore, the platform's goals are to integrate and support the supply chain ecosystem. A global network of interconnected shipping

corridors that connect ports and terminals, customs authorities, shipping lines, third-party logistics (3PLs), inland transportation, shippers, and other players.

Maersk, one of the sector's leading players, has been aggressively collaborating with IBM to create TradeLens, a Blockchain-based global trading network that seeks to link the different parties engaged in foreign trade – from freight forwarders to government agencies – and to digitalize the supply chain from end to end, with the goal of streamlining and promoting procedures (Ganne, E. 2018).

The ClearWay trade document module helps importers, exporters, customs brokers, and trustworthy third parties, such as customs and other government departments, to engage in cross-organizational business processes and allows for the automation of different business processes, such as import and export clearance, through smart contracts. The platform's performance will largely be determined by whether the different players participating in foreign trade are able to sign up. (Ganne, E. 2018).

Advantages of Implementing Blockchain

Blockchain could be an ideal solution for logistics industry issue, which is lack of transparency. It helps everyone to monitor variations or anomalies throughout the chain of supervision. (DHL International, 2018). One significant benefit of blockchain is that it creates accountability and trust because any member of the logistics network has access to the same data, providing a common source of truth. (Tapscott and Tapscott, 2016). Blockchain distributed system, have advantages over centralized system where it provides verified information to all members. Hence, it also resolves the lack of trust issue. (Tapscott & Tapscott 2016).

Blockchain can potentially improve efficiency in global trade by greatly reducing bureau-cracy and paperwork (DHL International, 2018). For example, a multi-stakeholder process with a lengthy paper trail could be replaced with an automated process storing information in a tamper-evident digital format. Another example is the automation of services that currently require an intermediary such as insurance, legal, brokerage, and settlement services. Blockchain could be used to track a product's lifecycle and own- ership transfer from origin to store shelf, even as it changes hands between the manufacturer, logistics service provider, wholesaler, retailer and consumer. It would facilitate and automate each business trans- action, enabling a more direct relationship between each participant (e.g., automating payments and transferring legal ownership between parties).

Payment process automation on blockchain allows quicker guaranteed payments through avoiding conflicts resulting from contract ambiguities, and avoids payment delays by early detection of inconsistencies and the cost and complexity of amending due to discrepancies. Blockchain technology eliminates the need for actual paper display, allowing the process quicker and simpler for letter of credit groups. Using blockchain technology, the entire letter of credit exchange can be completed in a single day. It also ensures that both involved have access to the procedure and can evaluate the documentation submitted by the vendor.

Challenges of Implementing Blockchain on International Shipping

1. Knowledge and Awareness

Data immutability and decentralized is what make blockchain different from other technologies. Since every people can entered the data to the Blockchain and unfortunately, people always make mistakes, this can be a serious challenge to implement Blockchain on the supply chain. In reality, according to a 2018 survey conducted by North Carolina State University, only 15% of respondents (including those in senior supply chain and procurement management roles) believe their current structures can deliver safe, trustworthy results. Although, with a blockchain, it can be more difficult to correct wrongly entered data than with a non-blockchain framework.

Any data-related behaviour is considered as a transaction on a blockchain. In a blockchain, data cannot be fixed in the traditional sense; it can only be updated. The further changes you make, the more transactions you must handle and the more time you must devote to doing so.

2. Ensuring data quality

One way to resolve data quality challenge is by granting data access rights in detail. Apparently, it is also important to whom we granted those access. Selecting the right people to be responsible to the data is very crucial to avoid data leaks and financial losses.
One way to address the previous challenge is by granting data access rights granularly. To avoid data leaks and financial losses, it's important to share your critical data with the right people and under the right circumstances.
Determine various types of data protection such that unauthorized persons, including third parties, cannot have access to information they are not allowed to use. Users may also create a list of tasks with corresponding access privileges and delegate them to those who will be using the supply chain management system.

3. Ensuring smooth integration of a blockchain powered solution

Logistics connect multiple parties, including exporter, forwarder, bank, port, and importer. Therefore, they rely on different tools: ERP systems, management applications, tracking solutions and so on. Integrating a blockchain platform with all these tools can be a real challenge.

RESEAERCH METHODOLOGY

The researcher will be retrieved information by collecting related article and respondent who has information about international trade. Initially, the researcher has clear understanding about the topic by gathering information from another articles. Then, the researcher starts to arrange interview with respondent to search for information regarding to the topic. The interviewees have an important role as they provide reliable information regarding the process of international trade and the problem of current international trade in real world.

Data Collection Techniques

Qualitative approach is used in this research. Qualitative approach is used to gathers information focused on understand some ideas or experiences. Performing interviews and focus group are some of examples to retrieved data by qualitative approach. The data that will be used to this research is both primary data and secondary data. The researcher retrieved primary data from first-hand sources, like interview with a company who has experienced of international trade. Since the pandemic, the interview is conducted via online meeting (zoom meeting). And the secondary data is collected from existing data like articles, journals, books, and websites in public and previous research or literature studies about blockchain in international trade.

Interview Summary

Ahmad Jazilussurur Hakim and his company business activities is about exporting charcoal. Jacotama Charcoal Bqiette started their exporting activities since the beginning of 2021. Even his company can be categorized as a new company who experienced international trade, but it still as a reliable source for gathering information.

Firstly, the process of international trade based on my interview is making an agreement with the importer, including product quality, quantity, and payments. After they have an agreement, the exporter start to contact forwarding company to notify them that the export wanted to do exporting to importer country at the agreement date. The exporter needs to provide the Certificate of origin, invoice, and package list. There are also other documents related to the maintenance of the product delivery on the containers. After the product is ready, the forwarding will come with the containers and start to load the product. After the product loaded to the container by forwarding, the container is delivered to the port first, and at that time, the forwarding notifies the importer about the cost freight and the cost needed to be pay immediately to make further progress. After that, the forwarding will send Bill of Lading to exporter. The exporter will notify his buyer/importer about bill of lading by document scan via online to fully pay the product after the export got the bill of lading. Unfortunately to pick the product from the port, importer need original bill of lading, hence, the exporter need to delivered the original bill of

lading after he got fully paid by delivery agency via post. The need of original bill of lading for importer can be a problem and it is not efficient since it is generated extra cost to deliver the bill of lading.

PT Jacotama payments method is not by L/C but bank transfer. The use of bank transfer is riskier since there is no guaranteed instead of L/C. PT Jacotama made payment agreement that when the product loaded to the containter the payment should paid 50 percent of the total payments, the other half should be paid when the exporter notify importer that the bill of lading already send to importer.

CONCLUSIONS

Blockchain technology do has many advantages if it is implemented on the international trade. The major advantage is about transparency and efficiency. With the decentralized architecture of blockchain, it is enabled for all members to run the network without relying on central authority like centralized system. Blockchain facilitate international trade transform from paper based into digitalized. The use of smart contract helps this transformation because in the smart contract or blockchain, the documents can be uploaded through the network, which means it doesn't need physical paperwork anymore. The use of paperwork also leads to the inefficiencies where people need to fill many documents which very time-consuming.

Even with plenty of advantages, blockchain also has some challenges that will be faced by a company. First is about the lack of knowledge of awareness since the study of blockchain is not familiar yet. Next is about ensuring the data quality and granting access to the right person. This aspect is very important for the success of blockchain implementation. Afterwards, if the data quality is not accurate and the person who granted access is not right, it could result in leaked of inner information and loss in financial aspect.

Although there are some challenges hinder the successfulness of blockchain implementation, blockchain still become the best solution to overcome international trade problems. The challenges faced are very worthy to be faced when compared to the benefits that will be obtained.

In this chapter, the researcher provides an illustration about the implementation of blockchain in Indonesia company in international trade. The illustration will use figure 2 and figure 3 in the chapter as a reference for blockchain implementation.

1. Both exporter and importer will make an agreement about the quality, quantity and price, and also about how the payment will be made. In this scenario, the payment will be used L/C. Both parties will make an agreement using smart contract and the agreement and the L/C will be uploaded on the network. Uploading of L/C is necessary because it will be check by the bank whether it will be approved or rejected.
2. Exporter also will make a contract with forwarding company for the delivery of the product to overseas. Exporter will upload the detail transactions with the importer to the network as to fill the contract with the forwarding company.
3. Before the forwarding company pick up the product from exporter company, both exporter and forwarding will upload all the necessary documents, including invoice, package list, certificate of origin and other particular documents to the network.
4. Exporter need to upload bill of lading before the importer pick the product up. When the product arrived, the importer will use the bill of lading that already uploaded to the network as a requirement to pick the product up.
5. When all the conditions are met, the payment will be automatically execute.

POLICY AND LIMITATIONS

Blockchain technology has various advantages that will improve companies' performances. With its decentralized system, blockchain can improve efficiency, transparency and enable automation. In the next paragraph, the researcher will come up with some advice and suggestions for company about implementing blockchain in international trade based on the real condition in Indonesia.

Blockchain technology can be categorized as a new technology that emerged in Indonesia, because of that there are not so many developers who has expertise on it. Lack of knowledge about blockchain technology is another issue that will faced by Indonesia on implementing blockchain in international trade. Despite with the lack of knowledge, implementation of blockchain in Indonesia is still possible. Even tough, in researcher's opinion it will take some time because the blockchain in Indonesia is not that familiar, Indonesian companies need to learn more about blockchain to ensure the successfulness of blockchain implementation. The lack of knowledge doesn't mean there is no blockchain expert in Indonesia. However, in Indonesia there is an association called Indonesia Blockchain Association that one of their goal is to educate people about blockchain technology. Thus, company who wants to study about implementing blockchain can learned from Indonesia Blockchain Association to gain better understanding about it.

Despite with the lack of blockchain knowledge in Indonesia, there are also a few businesses who already use blockchain technology as their system in Indonesia. For example, there are TaniHub and Sayurbox that implementing blockchain on their system to ensure the quality of agriculture product from production into customer. Even tough, the business model is different between those example and international trade, but an international trade company can also learn from those businesses to expand their insight about blockchain technology.

The author acknowledges that there are some limitations came up in this research. The researcher only found one international trade company because of the lack of connections. For the results, the researcher cannot obtain more information about how the international trade process is based on the real evidence on Indonesia. Being unable to contact with businesses who already implementing blockchain technology is become another limitation researcher has. Hence, the researcher cannot find much information about how the blockchain in Indonesia is. Consequently, the future research needs more information by increasing the number of interviewees in order to get better research result based on real evidence.

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