

# APPLICATION OF BLOCKCHAIN TECHNOLOGY TO THE INTERNATIONAL TRADE AND CUSTOM REGULATIONS

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## **Abstract**

*Blockchain is a technology, which has several advantages to be used in quite wide areas such as payment solutions to transportation. Using blockchain technology in international trade may have impressive promises and potentials.*

*In our research, we aim to discuss the potential and existing implementation of blockchain technology into international trade and customs practices. It is important to make comprehensive due diligence of the blockchain technology to determine which functions of the blockchain technology can be implemented in the international trade environment.*

*In this paper, we put forward to claim that blockchain can be implemented into customs procedures for faster and more secure trade. To understand underlying concept, first we will summary existing regulative framework of the international trade and customs and then the following of blockchain in brief, we illustrate potential ways to implement blockchain into custom procedures. We will use literature review and quantitative research in order to support our claim and analyse relevant international practice of using blockchain on customs.*

**Keywords:** *Blockchain, Trade, Custom Procedures, Supply Chain,*

## **1. Existing Regulative Framework of the International Trade and Customs**

To better understanding the potential implementation of blockchain into global trade, it is important to see the regulative structure of global trade and custom. The process of international customs compliance process takes the attention of several stakeholders of international trade in recent years. The consensus view seems to be that compliance procedures should be transparent, simple, and predictable. International trade regulations have been testing especially in terms of health conditions during the recent Covid Pandemic.

World Customs Organization (WCO) is one of the most important organizations for global trade bodies. It has been founded in 1952 as an intergovernmental organization. WCO has prepared WCO Kyoto Convention and it was adopted in 1973 as the International Convention on the Simplification

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and Harmonisation of Customs Procedures, which is entered into force in 1974 with 63 contracting parties. It was a quite important step to support the trade and simplify the customs procedures. The same logic is underlined by the Revised Kyoto Convention (RKC) (as full name: Protocol of Amendment to the International Convention on the Simplification and Harmonisation of Customs Procedures), which came into force in 2006. The new amendment on the protocol contains improving efficiency, harmonization, and simplification of customs procedures, and aims to foster international trade.

WTO Trade Facilitation Agreement (TFA) is one of the recent agreements on international trade. It came into force in 2017 after the ratification of the majority of World Trade Organization Members.

The TFA contains provisions for expediting the movement, release, and clearance of goods, including goods in transit, and sets out measures for effective cooperation between customs and other appropriate authorities on trade facilitation and customs compliance issues and additionally contains provisions for technical assistance and capacity building in this area.<sup>2</sup>

UNCITRAL has several regulations and studies in terms of electronic transferable records. The central issue addressed here is the relationship between blockchain records and UNCITRAL regulations. Convention on the Use of Electronic Communications in International Contracts, Model Law on Electronic Transferable Records (ETR), Model Law on Electronic Commerce, the Model Law on Secured Transactions, the Model Law on Electronic Transferable Records, the Model Law on Electronic Signatures, United Nations Convention on Contracts for the International Carriage of Goods Wholly or Partly by Sea (Also known as Rotterdam Rules) are regulations in force, have connections with blockchain promises on custom procedures discussed below sections.

The growing complexity of trade rules, free trade agreements, and audit initiatives create burdens for companies. The recent trade war between China and the USA shows that political decisions may create new burdens for custom procedures. It is estimated that the tariffs impose an additional burden of between 500 million to 1 billion US dollars on US, the EU, Canada and Mexico, which are the countries hit hardest by increased US tariffs on Chinese imports.<sup>3</sup>

Border security concerns about international terrorism-monitoring or health concerns with the recent covid-19 pandemic showed that global trade could be fragile and its importance for the supply chain. Increasing bureaucracy on custom procedures may cause economic loss. Blockchain has the potential to minimize bureaucracy.

## 2. Blockchain in a Nutshell

Blockchain is a technology behind the most famous cryptocurrency, Bitcoin. It is a software-based, open-source, peer-to-peer technology, which has been launched by the unidentified programmer under the name of Satoshi Nakamoto in 2009. Since then the system itself claims that it is unhackable and it seems that it has been proved until today. The most promising feature of blockchain is any data on the blockchain cannot be changed or deleted on the system as long as the majority of the whole blockchain network confirms it. Through the growing popularity of

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<sup>2</sup> Accessed on: December 21, 2020. [Online]. Available: [https://www.wto.org/english/tratop\\_e/tradfa\\_e/tradfa\\_e.htm](https://www.wto.org/english/tratop_e/tradfa_e/tradfa_e.htm)

<sup>3</sup> Mao Haiou, Görg Holger, Friends like this: The Impact of the US – China Trade War on Global Value Chains, 2019, KCG Working Paper [Online]. Available: <https://www.kcg-kiel.org/wp-content/uploads/2019/07/KCG-Working-Paper-No.17.pdf>

cryptocurrencies (8.172 Cryptocurrency, more than 825B \$ Market Cap<sup>4</sup>), every day more people become part of the blockchain database. Hence the system itself increases its safety with increasing hashes and chains.

There has been an inconclusive debate about whether Blockchain technology is trustable or not, by today it has been proved that data is secure and immutable (as long as there is no consensus of the whole blockchain network to change). Hence the main theoretical premise behind blockchain is that without the need of any 3rd party either governmental or institutional, the system itself provides more trust than anybody else. The central issue addressed here is the relationship between trust and blockchain.

Additionally, several features and products have been improved on the blockchain technology such as time stamping, tracking of all records from beginning to end, and smart contracts (which is the software version of vending machines, self-execute when certain conditions are met). In this paper, the discussion centers on how blockchain technology can be used in international trade and custom. Blockchain can be used for international trade with the features of shared ledger, smart contract, data privacy, and consensus.

Categories of blockchain are public blockchains as no specific entity manages the platform, private, the platform is controlled by a single entity or consortium of companies. Another commonly used classification is permission-less blockchain, which is open to everyone as Bitcoin, or permissioned blockchain, which has restrictions for participants.<sup>5</sup>

### **3. Potential Implementations of Blockchain on Customs**

#### **3.1. Clearance of Custom Documentation**

Main parties of international trade are traders, governments, business consortiums, insurance companies, financial bodies as banks or creditors. Custom procedures are one of the most bureaucratic steps of international trade. The problem that both sides of the import and export customs should check the documentation of shipping, country of origin proofs, the validity of the whole documents from beginning to end. For instance, manual cross valuation of the customs declarations takes plenty of time and human force during international trade transactions. Blockchain can automate these procedures.

In the international trade process, there are several documents, which will be checked and confirmed by the authorities. These are packing list, bill of landing, export documentation, advance declaration, pre-paid invoice, certificate of origin, shipping introductions, ISF (Importer Security Filing), geography-specific certificate, dangerous goods declaration, cargo-specific certificate, customs clearance, and commercial invoice.

Blockchain platforms can globally manage records, import-export declarations, bills of lading, invoices and certificates of origin, and any sort of documents. Customs documents can be processed and tracked through blockchain solutions. Hence it provides better audibility and expedites the processing of international trade.

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<sup>4</sup> Accessed on: January 5, 2021. [Online]. Available: <https://coinmarketcap.com/>

<sup>5</sup> G. Emmanuelle, Can Blockchain revolutionize international trade? World Trade Organization, 2018

The biggest motivations to use blockchain technology in custom procedures are cost reduction, faster and safer trade. Blockchain's decentralized and transparent features can be used against fraudulent documents and fake signature submissions. Utilizing the immutability of the blockchain, pre-approval can be facilitated and it optimizes the risk, request for advance rulings can be submitted.

In recent years, paperless trade becomes a purpose by several international trade stakeholders and there are a few examples to be reached out by 90% paperless trade. However, the rest 1 to 10% is the most difficult to implement. Blockchain may be the solution for the rest. For instance, the International Port Community Systems Association has been working on blockchain pilots and trials relating to bills of lading. IPCSA Blockchain BoL project aims to convert processes from paper to paperless by transforming from paper form to digital file and transfers the process to a common ledger – a distributed database that all authorized players see at the same time.<sup>6</sup> Hence cargo can be released earlier and save the storage costs, reduce paper chase, increase the security to avoid risks of delay, loss, or forgery, and has the potential to add other documentation as insurance and phytosanitary

Bill of Landing (BoL) can be used multiple times with copy and paste method. Using smart contract and workflow will reduce handling time, when changes are made in a BoL.<sup>7</sup>

It is important to comply with existing regulations before implement blockchain. For instance, to use blockchain on the bill of lading, Rotterdam Rules must be checked, which cover the electronic bill of landings as negotiable electronic transport records.

One another potential to use blockchain is free trade agreements (FTA). FTA verification process remains paper-heavy, inefficient, and ridden with errors, which may cause penalties. Blockchain-based FTA verification has the potential to eliminate cargo delays, penalties, fraudulent or incorrect document filings.<sup>8</sup>

### 3.2. Tracking of Operations

One of the features of blockchain is traceability, which enables parties to record a chain of transactions and the movement of goods internationally with instant and accurate information. The multiple players of the international trade claim huge paperwork load either for traders or government agencies and 3rd parties as banks and carriers. There are middlemen to check and record payments, movements, details of the good. Blockchain has the potential to solve these complexities of the procedures simultaneously.

Recent Covid Pandemic showed that traceability of goods plays a significant role in health safety. At the beginning of the pandemic, few questions have been raised about whether the virus is infectious through products or not. It accentuates the realization that tracking any product coming from Wuhan Food Market or China might have a significant risk to spread the virus across the world.

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<sup>6</sup> IPCSA Bill of Lading Project, Accessed on: December 30, 2020. [Online]. Available: <https://ipcsa.international/initiatives/ipcsa-bill-of-lading/>

<sup>7</sup> Blockchain in Trade Facilitation: Sectoral challenges and examples, 28 March 2019, Economic Commission for Europe Executive Committee Centre for Trade Facilitation and Electronic Business

<sup>8</sup> Angert, Svetlana, Blockchain Technology Implementation in The Us Custom Environment, Naval Postgraduate School (U.S.), 2019, Available at <https://www.hsdl.org/?view&did=831027>

Blockchain has the potential to provide significant tracking options as a solution to the growing concern of product quality and safety. The advantage of blockchain here is whole data on the blockchain can be tracked by whole stakeholders simultaneously in real-time. In the case of a public blockchain, anyone can track whole chains from beginning to end. The difference between any tracking software and blockchain is trustable and irreversible data on the blockchain without interference by any 3rd party. However, on normal software, the data chain may be interfered with by a 3rd party for commercial concerns. In this respect, transparency of Blockchain can play a significant role to fight against bribery on custom procedures especially on the trade between most corrupt countries.

There are several pioneers to implement blockchain into traceability platforms. VeChain has developed a food traceability platform based on the blockchain for Walmart China and launched in 2019. Traceability system based on the blockchain enables to product information across the food supply chain, such as producing and processing, transportation, warehousing, retailing and shares data ports with stakeholders on the supply chain, and encrypts and stores data and uses blockchain (distributed ledgers) synchronously and records on the chain with timestamps.<sup>9</sup> The Department of Homeland Security has been testing blockchain to use for security cameras and other devices at United States' ports of entry with the aim of detection and stopping intruders who try to impede the devices or manipulate the data they collect.<sup>10</sup>

### **3.3. Acceleration of Whole Procedures of Trade and Customs**

Globalization and the extremely growing value of e-commerce make foreign origin products easier to access to end customers and attract big players to enter the market. Companies are forced to deliver their products quite fast due to increased competition and the expectation of costumers to get their products in hours sometimes. On this side, blockchain has the potential to accelerate whole chains of international trade, especially for the transactions, which has parties who have no trust each other as different governments, instructions, and providers.

The basic premises of the blockchain technology for international trade are simplified business processes, secure by design, transparency, and immutable audit trails and workflows across organizations of the trade. It is important to bear in mind that blockchain can track and guarantee that uploaded data is not tampered with, nevertheless does not guarantee that the recorded data is accurate.

Private permissioned blockchains managed by parties of international trade has the potential to create business-friendly, fast, accurate, and low-cost international trade procedures. It is important to standardize the infrastructure and make authorities to accept to use of these platforms.

Blockchain implementation on the letter of credit and origin procedures is possible to avoid bureaucracy and speeding up the documentation. Cloud-based permissioned blockchain can be utilized allowing to control the identifies of involved stakeholders and blockchain performs very efficiently to store and tracking different information and regarding the processing and origin of goods and items in general. Electronic certificate of origin initiatives has started to develop

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<sup>9</sup> Walmart China Blockchain Traceability Platform, European Chamber, 2020, Available: [https://www.european-chamber.com/en/members-news/3303/walmart\\_china\\_blockchain\\_traceability\\_platform](https://www.european-chamber.com/en/members-news/3303/walmart_china_blockchain_traceability_platform)

<sup>10</sup> Nash K. Sam, Homeland Security Looks To Blockchain To Track People, Goods Across Borders, 2017, Available: <https://www.wsj.com/articles/BL-CIOB-11267>



streamline the transferring electronic certificate for goods exchanged internationally and make processes simpler, transparent, and secure by reducing the risk forged declarations.<sup>11</sup>

One another benefit of blockchain may play a significant role to support small-medium enterprises. Self-executing contracts (Smart Contracts) enables small-medium enterprises to join international trade using low cost and less bureaucratic barriers of the trade. It may reduce the legal and procedural costs of the process and secure against the risk of non-payment while the procedures are shortened. Custom procedures are sometimes so complex and need expertise on custom, tax and legal side while required expertise. Main reason behind all these complexity is bureaucratic system, which is designed to secure system and have several control mechanisms. If blockchain manage to avoid this control mechanism with its secure immutable system, costs and numbers of this steps will be lower. Hence small-medium enterprises can join the international trade easier and cheaper. Blockchain-based custom practice can provide access to trade finance and facilitating trade procedures for small-medium enterprises.

#### 4. Other Potential Implementations

Blockchain-based on the Bitcoin platform while smart contracts based on the Ethereum platform and such examples working on distributed ledger technology are still relatively new technologies and studies on these technologies examine new ways to implement blockchain into international trade.

Transparency on Blockchain as noted earlier has the potential to track transactions from beginning to end. However financial technology behind Blockchain, Bitcoin represents anonymity and flexibility, which make it vulnerable to money launderers.<sup>12</sup> But in terms of tax frauds on custom, it is possible to use blockchain technology to prevent tax frauds. With new emerged solutions, money laundering and international money transfer would be more transparent than existing solutions. In this respect, Combat Trade-Based Money Laundering (TBML) and Financial Action Task Force (FATF) would be fields to use blockchain. The most frequent Trade-Based Money Laundering methods are over-under-multiple invoicing, over/under shipment, and quality misrepresentation. With using of Blockchain, all transactions on the trade procedures can be transparent, secure, and immutable. Hence the data on the whole procedure after hashing on the blockchain, corruption would be prevented. These arguments suggest that transparent data on the blockchain and using cryptocurrency for payments rather than cash, blockchain would promise to fight money laundering. Blockchain increases the visibility of transactions and accuracy through automation, especially tax administration.<sup>13</sup>

One another field to use blockchain would be trade finance. Trade finance, and its instruments, have become a high-risk business over the past years because it may be used in certain financial crimes, as 21% of respondents reported increasing requirements for their bank guarantees and standby letter of credits, 15% of banks reported an increase in injunctions, and 13% of respondents reported an increase in charges of fraud according to the survey conducted by the International Chamber of

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<sup>11</sup> Blockchain for supply chains and international trade, Panel for the future of science and technology, May 2020.

<sup>12</sup> Bryans, Danton, Bitcoin, and Money Laundering: Mining for an Effective Solution. 89 Ind. L.J. 441 (2014), Available at SSRN: <https://ssrn.com/abstract=2317990>

<sup>13</sup> McCARTHY, KILLIAN J., ed. The Money Laundering Market: Regulating the Criminal Economy. Agenda Publishing, 2018. Accessed March 31, 2021. doi:10.2307/j.ctv5cg8z1.

Commerce in 2016.<sup>14</sup> Trade financing forms, which financial intermediaries are providing working capital, lending, or liquidity have changed in the past couple of decades, in particular to accommodate the expansion of international supply chains.<sup>15</sup> Trading of finance on supply chain covers lending, the issues of letter of credit, cargo insurance, and factoring. Blockchain can increase transparency in the trade finance process. Hence it would decrease the risk and in turn, expand the supply of credit available.<sup>16</sup> The way of using blockchain to increase transparency is public and trackable data on the chains.

Smart contracts can be used for commercial contracts of international trade. It can automate and authenticate the processes where the participants in a process need to be able to rely on and trust exchange or supply chain.<sup>17</sup>

## 5. Conclusion

Supply chains have three core modern era challenges, namely data visibility, process optimization, and demand management.<sup>18</sup> As an answer to these challenges Blockchain technology's promises are transparency, audibility, automation of the paper-based process, efficiency, immutability.

Government to government relationships is the most challenging part of blockchain-based solutions since both party acceptance is significantly important to have full functionality.

The underlying argument against using blockchain technology in the customs procedure is the interoperability of standardization. It is important to have standardized software to be accessed and accepted by international traders and by both sides of custom bodies. For instance, the International Organization for Standardization (ISO) published a Blockchain and distributed ledger technologies report in 2016 to describe functions of the smart contracts as a basis for technical specification.<sup>19</sup>

There has been an inconclusive debate about whether blockchain technology is reliable or not. Interoperability and scalability of early-stage technology have been discussing by relevant authorities. Hence, regulatory and legal acceptance is still a big question. A major threat to the whole blockchain infrastructure is the 51% attack, which happens in the case of the majority of the whole network taken over by hackers or private groups. Cost efficiency and not commonly using blockchain remains questionable. Notwithstanding I am not alone in my view that blockchain promises technology-driven solutions to speed up customs procedures while providing a more secure trade environment. Speeding up money transactions, reducing time losses, and bureaucracy

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<sup>14</sup> ICC Global Survey on Trade Finance 2016. (2016) as cited in Anatolevich, Vladimir & Шеверева, Елена & Burmistrova, Mikhailovna & Nikolay, & Bodin, Borisovich & Alexander, & Chursin, Alexandrovich & Shevereva, Aleksandrovna. (2018). A letter of credit as an instrument to mitigate risks and improve the efficiency of foreign trade transaction Carta de crédito como instrumento para mitigar riesgos y mejorar la eficiencia de la transacción de comercio exterior.

<sup>15</sup> Auboin Marc, International Regulation and Treatment Of Trade Finance: What Are The Issues?, 2010, Staff Working Paper ERSD-2010-09

<sup>16</sup> McDaniel, Christine & Norberg, Hanna. (2019). Can Blockchain Technology Facilitate International Trade?. SSRN Electronic Journal. 10.2139/ssrn.3377708.

<sup>17</sup> National Blockchain Roadmap, February 2020, Australian Government Department of Industry, Science, Energy, and Resources Available: <https://www.industry.gov.au/data-and-publications/national-blockchain-roadmap>

<sup>18</sup> Shantanu Godbole, Ph.D., How Blockchain can transform global trade supply chain, IBM Center for Blockchain Innovation IBM Research, IBM Academy of Technology, P.2

<sup>19</sup> Blockchain And Distributed Ledger Technologies Report, Accessed on: December 10, 2020. [Online]. Available: International Organization for Standardization (ISO) <https://www.iso.org/committee/6266604.html>

would increase the liquidity of the companies rather than wait for payment on the corresponded bank and support small-medium enterprises to enter the international custom market. Paperless and without 3rd party necessity, the trade would be safer and faster while costs, risks, frauds are lower.

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