

# Trade-based Money Laundering: general methodologies Is smart contract blockchain technology a possible solution?

**AUTHOR(S):** Yiu Lai CHAN

## Abstract

This research dissertation is focus on exploration of Trade-Based Money Laundering (“TBML”) as a kind of money laundering method and as an emerging risk area towards banks and other financial institution. The interest of this research project arose while having engagements and projects on banks’ trade-finance business, while after taking a preliminary reading and work experience in Anti-Money Laundering (“AML”) and Know-Your Client (“KYC”) work. The area of TBML research is still under limitation as current literature and academic research publications is still focus on traditional cash-based money laundering methodologies and business cases, while the TBML research is still under development. Currently more publications, including industry and academic publications, had provided more insights on new and complex money laundering methods within shipping and logistics sectors, which is a focus of TBML. Meanwhile, TBML also have raised regulatory concerns around the globe with whilst some examples and simple methodologies in some of the research reports, especially within the Asia Pacific region. This could show the actual situation of how severe money laundering using TBML methods in the globe.

**Keywords:** Trade-based Money Laundering, smart contract blockchain technology, blockchain technology, Anti-Money Laundering,

**IJARBAS**

Accepted 27 September 2022  
Published 30 September 2022  
DOI:10.5281/zenodo.7126375



About Author

Author(s):

**Yiu Lai CHAN**

MSc in Forensic Accounting  
University of Portsmouth, UK  
E-mail: [chanyiulai@gmail.com](mailto:chanyiulai@gmail.com)



A dissertation submitted for the MSc Forensic Accounting at the University of Portsmouth  
By Yiu Lai CHAN  
March 2019

### Acknowledgements

Sincere gratitude is hereby extended to the following who never ceased in helping until this dissertation is structured and finalized: The supervisor: Dr. Imad CHBIB, the thesis adviser, for the unwavering guidance. For the unwavering moral, emotional and financial support of my wife, family and friends within these 3 years of studying this Master degree. Utmost appreciation to the Almighty God for the divine intervention in this academic endeavour.



CHAN Yiu Lai, Charles

### Research Objective and Methodology

This research dissertation aimed to provide a general understanding on how TBML could be a threat towards financial intuitions and banks by showing general methodologies on how launders used in TBML related crimes based on historical and theoretical context and previous methodology on TBML related crimes. With some examples of TBML related crimes to show on how banks and other financial institutions to tackle TBML related crimes. This research dissertation would also aimed to investigate the possibility on how blockchain technologies innovation could help to mitigate TBML related crimes as introducing new operational methods in trade finance business for financial institution by using smart contracts with blockchain technologies could reduce risks and chances of TBML related crimes occurrences.



## Table of Contents

<b>Abstract</b>	1
<b>Acknowledgements</b>	3
<b>Literature review overview</b>	5
TBML methodologies	5
Current practices and methodologies	8
Blockchain and smart contracts	8
How to improve?	10
Data Collection and Analysis	10
<b>Part 1: Trade finance and Trade-based Money Laundering (TBML)</b>	11
Introduction	11
What is Trade Finance?	11
What is Trade-based Money Laundering (TBML)?	13
Problem with TBML	13
General methodologies and illustrations of TBML	14
Case examples related to TBML	18
<b>Part 2: Is blockchain a possible solution to TBML?</b>	20
What is blockchain?	20
How can blockchain help in international trade?	21
What are the limitations for using blockchain in Trade Finance?	23
Examples of blockchain application in Trade Finance.	24
<b>Conclusion</b>	27



## Literature review overview

This research dissertation is being separated into four parts. The first part would be focus on TBML methodologies from both academic and industry literatures. Then the second part would be on literatures which contains the analysis and result on the current practices and methodologies on how financial institutions could discover and tackle with TBML related cases and processes. The third part would be on smart contracts on blockchain as a new innovative technology, together with some implications and use cases on smart contracts in shipping and logistics sectors. The last part of the literature review covers mostly industry reports on the advantages and improvements on smart contracts and blockchain towards the current practices done by the financial institutions.

### *a. TBML methodologies*

The first definition regarding TBML could be traced back to 2006 where Financial Action Task Force (“FATF”) (FATF, 2006) defined TBML as “the process of disguising the proceeds of crime and moving value through the use of trade transactions in an attempt to legitimize their illicit origins.”. After that, FATF further extended the definition of TBML and terrorist financing (“TF”) in 2008 (FATF, 2008) as “refer to the process of disguising the proceeds of crime and moving value through the use of trade transactions in an attempt to legitimise their illegal origin or finance their activities.” This means that FATF linked up TBML with illegal activities including TF in the scope.

Later, in 2012, the Asia / Pacific Group on Money Laundering (“APG”) under FATF continued this study and published a typology report on TBML (APG, 2012), which this report from APG aimed to study on new methodologies and techniques used by money launderers at that time and highlight to financial institutions as a list of possible red flags to detect and tackle with suspicious crime and cases to respond to TBML. The report also listed out the process of trade finance as a guidance to investigators and law enforcements.

The APG report (APG, 2012) drove a conclusion indicating that TBML is acting as an important channel for criminal organizations and terrorists to move money from illicit channel into the economy. While the rapid growth of international trade makes the international trade finance business being exposed to more vulnerabilities and challenges to investigators. There are also a few cases being reported related to TBML in the past. The APG suggest to have a holistic approach in terms of inter-agency coordination and international corporation for policy makers together with standardization of statistics, with targeted trainings and more detailed research. The report from APG makes other regulators to have more focus on TBML.

Other literatures related to TBML are mostly studied and published by other regulators, and organizations within the financial sector. Selected literatures including the Australian Institute of Criminology in 2011, United Kingdom’s Financial Conduct Authority in 2013, The Hong Kong Association of Banks in 2016, the Isle of Man Government in 2017, and the Association of Banks in Singapore in 2018 (Australian Institute of Criminology, 2011;

Financial Conduct Authority, 2013; The Hong Kong Association of Banks, 2016; Treasury Customs and Excise Division, Isle of Man Government, 2017; The Association of Banks in Singapore, 2018). These selected literatures are being more focus on each countries specific risks towards TBML within trade operations, provide guidance for local financial institutions to implement AML programs to combat TBML, with indications of possible red flags and general methodologies of TBML cases within their country.

Other selected literatures outside the financial sectors with highlights on the TBML and TF typologies includes (McSkimming, 2010). McSkimming (McSkimming, 2010) highlighted in a two-fold approach, 1) pricing based and 2) volume based approach. McSkimming also stated that there are two sufficient conditions which need to be fulfilled in order to make TBML to be effective as collusion between parties are required and the nominal value of money being laundered must be exceed the trade finance transaction cost. While these two sufficient conditions are not being highlighted from those industry studies and report from regulators and government organizations.

On the contrary, reports form regulators indeed highlighted other numerous methodologies and techniques for engaging TBML, not limited to price or volume based methods. Other methods highlighted including false described goods and services, related party transactions, trading intangibles and barter transactions. These methods are not only limited the usage of altering pricing and volume-based methods, but including other techniques in documents tampering, hiding beneficial ownerships and the actual real value of the goods in a trade-finance transaction.

### ***b. Current practices and methodologies***

Selected literatures have more focuses on the banking and financial sector, which using the banking's AML / KYC compliance framework as the pivot for how banks could able to detect TBML using its existing AML / KYC compliance functions, with enhanced methodologies and best practices in combating TBML.

However, The Financial Conduct Authority of United Kingdom discovered that financial institutions in United Kingdom are lacking adequate controls and measures to mitigate the risk of money laundering and TF within the trade operations, which requires improvement from financial institutions. On the other hand, on a high level policies and international perspective, the FATF had recommended some best practices for financial institutions to combat TBML in its 2008 report (FATF, 2008), the aim of this FATF report was to improve the ability of the authorities to collect and effectively use and utilize both domestic and international trade data as a risk-based approach to investigate money laundering and terrorist financing. Although FATF excluded domestic trade out from the scope of TBML in its previous reports and publications, the report also includes how to utilize domestic trade information.

Other than that, the FATF 2008 report (FATF, 2008) also aimed to build a stronger awareness for TBML within the financial sectors other than existing 40+9 recommendations. The FATF proposed countries and financial institutions to have a stronger awareness and extend tailor make TBML training to relevant staff, law enforcement agencies and tax authorities. Other than that, FATF also recommend a stronger outreach and raising awareness within the



private sector and enhanced international co-operation as mutual legal assistance in TBML / TF investigations and prosecutions.

On a more practical perspective which focus on daily operations of banks and financial institutions, the Hong Kong Association of Banks issued a research report on the best practice on combating TBML (The Hong Kong Association of Banks, 2016). The association highlighted several key principles related to trade controls including risk assessment on institutional, business, customer and transaction level, extended coverage on collection of information and documents specifically related to the trade-related transactions to mitigate risks. Furthermore, the association further reminded financial institutions on accounts of specific red flags related to trade finance transactions. On the same basis, the Association of Banks in Singapore issued a guideline to banks on how to use its existing AML / KYC compliance functions on tackling TBML, which including but not limited to documentary review of trade finance documents, sanctions screens and payment screening checks, transaction monitoring and suspicious transaction reporting.

Other literatures outside the financial sectors are having wide ranged focus from law enforcements, customs, government agencies and supply chain sectors. Selected literatures includes (McSkimming, 2010; Hoffmann, 2013; Zdanowicz, 2009; and Delston and Walls, 2009). These literatures are having a wide range of focus on how law enforcement agencies, other government agencies, customs to use existing trading databases with new statistical analysis methods to detect and investigate money laundering.

From (Zdanowicz, 2009), the research paper illustrates new statistical profiling methods that can evaluate transactions compared to a country's international trade database what can help to mitigate the risk with TBML, with example on using the United States Merchandise Trade Data Base produced by the U.S. Department of Commerce, Census Bureau which primary use is to determine the U.S. Balance of trade. This database contains all shipping transaction declarations and customs data with other legal documents. Which the research paper drives net detection methods based on counterparty country risk, customs district risk, product risk and transaction price risk to detect suspicious transactions and make the law enforcement and other agencies to detect and minimize TBML. While Zdanowicz (Zdanowicz, 2009) also stated international corporation on including other countries trade data can robust the analysis.

While from McSkimming's research (McSkimming, 2010), the paper highlighted some of the difficulties from law enforcement on combating TBML. Although FATF highlighted the severances of TBML and importance on combating TBML to financial institutions and private sector. Yet there are no specific recommendations on TF related to TBML. The paper also highlighted other organizations focused on ML, including both the Wolfsberg Group and Egmont Group recognized problem related to TBML. Given that both Wolfsberg Group and Egmont Group are primarily focusing on financial sector, which indicate that there are difficulties and lack of guidance on how law enforcement conducting analysis and investigation on TBML related crimes originated from other sectors. The research also indicated that under the current practices and operations, law enforcements and regulators





are hard to carry out monitoring and carry out anti-TBML related regulations which may be costly and ineffective.

McSkimming's (McSkimming, 2010) research also listed out the current analytical techniques for detecting TBML, including unit price analysis and bilateral trade price analysis, which both methods are liaising with the existing customs data and there is no need for making changes on trade related regulations. These two techniques are recorded in FATF's 2008 best practice report (FATF, 2008). However, both unit price analysis and bilateral trade price analysis are not effective in detection of volume-based TBML methodologies. These volume-based methods are required either physical inspection or intelligence investigation methods. Furthermore, these two techniques required a high data quality for calculation of price of goods without valuation bias, classification of the actual designations of the goods as through several major transit ports like Hong Kong, Singapore, Cape Town. In which, as there are different data recording methodologies in different countries and there are full of paper-based documents and data needs to be provided to different customs and other related parties in the supply chain for a trade finance transaction, errors or data discrepancies are common and not accurate.

Hoffmann's research paper proposed (Hoffmann, 2013) a new approach named as Risk-Based Customs Audit to combat TBML, which the customs audit was used in countries to target other trade related crimes such as tax evasion but not have been used to combat TBML. The customs audit means "the audit conducted by the customs on the basis of the account books and vouchers, customs declaration documentations or data, commercial documents and goods of the traders with the purpose of identifying the authenticity and validity of the trade". Hoffmann's paper considered the basis that the level of international corporation in the current stage is not sufficient and there are limitations and conditions on getting mutual legal assistance from other jurisdictions. The paper illustrated the Republic of Korea's current customs audit model could be one of the good TBML customs audit model. Which the Republic of Korea's model conducts on both pre-audits and post-audits before the goods enter to the country and after goods being released.

The Risk Based Customs Audit is a new approach for targeting TBML, there are some modifications compared to the current customs audit model. This targeting TBML model includes a physical inspection on goods and examination on documentations on pre-identified high risk trade transactions, with a post-audit process after the goods released. This method is incorporated with the existing custom audit process with enhanced investigation and due diligence on targeting TBML, which the extra resources required for implementation is less than expected as the same resources and procedures had been implemented to target tax evasion. This Risk Based Audit could be one of the effective and efficient options for countries to protect countries' exposure to TBML.

### ***c. Blockchain and smart contracts***

The rationale on introducing blockchain and smart contracts towards of combating TBML is related to several reasons. As a general trade finance transaction involves several parties, including buyer, seller, customs, shipping companies and several banks acting on behalf of either buyers and sellers.





The existing process of conducting a trade financing transaction and settlement involves a number of process. Regarding the settlement process for a trade finance transaction, before the shipment of goods, the buyer and seller needs to request and authenticate letter of credit, with involvement of two different banks as the issuing bank and advising and confirming bank. After shipment process, the buyer and seller, together with both issuing banks and negotiating bank for the collection of relevant documents, payments and verification of the actual shipment. The process and steps involved are complicated steps and requires a high coordination effort from banks, buyer and sellers. The complicated process also created time delay in making actual payments and documents collection.

Within the existing practice, there are several key challenges on current trade finance business. The Bank for International Settlements issued a report in 2014 (The Bank for International Settlements, 2014) related to trade finance issues, including but not limited to poor customer experience, increasing cost and regulatory requirements. Which part of the rationale behind these issues are raised from TBML and combating with TBML, on the other hand, there is a need for high coordination effort required for all parties involved in the trade finance transaction as there are overly complicated process and procedures to be done. The timeline for handling these procedures are way too long than what is expected today.

The idea of blockchain is raised from an individual named "Satoshi Nakamoto" from his research on Peer-to-Peer Electronic Cash System using cryptography and a peer-to-peer network (Nakamoto, 2009). Satoshi Nakamoto invented blockchain which used as the public transaction ledger of a crypto currency named as Bitcoin. Blockchain is verifiable, unchangeable and immutable which keeps all transaction securely on a permanent basis. It is hard to tamper data on a single block as all the blocks within the blockchain are linked with its previous block using cryptographic hash.

The conclusion of Satoshi Nakamoto's literature (Nakamoto, 2009) is a proposal of electronic transaction systems without rely on trust and intermediaries. Furthermore, after this literature, there are stronger usage and creating of a total new ecosystem of financial technology industry. However, this would be out of the scope of this research dissertation as this research dissertation is focus on how blockchain could facilitate and combat TBML.

Another component as a possible solution for combating TBML is smart contract, the idea of smart contract was raised way before blockchain, from Nick Szabo in 1994 (Szabo, 1994). Smart contract is a computer protocol which intended to facilitate, verify and enforce the negotiation and performance of a contract. From Nick Szabo, the objective of smart contract is to satisfy common contractual conditions, minimize exceptions and minimize the need for trusted intermediaries. Which could further facilitate economic goals including fraud loss, transaction cost and legal enforcement cost.

Smart contracts are front loaded, there is no tampering to change the contract once the contract is automatically handled. The smart contracts are also disintermediated, immutable and trustless, there is no need for third parties to oversight and verify the execution and performance of a contact.

Nick Szabo also include some of the use of smart contracts, including synthetic assets as new form of securities from wide range of securities and derivatives together, including bonds,



options and futures. Even very complex terms and conditions could be built into smart contracts which can run automatically without a high transaction cost. Another example highlighted by Nick Szabo is smart property which further extend the contracts on physical objects with assigning values and linked physical properties into smart contracts.

#### ***d. How to improve?***

There are many industry publications regarding on how blockchain engagement in trade finance could assist to solve the vulnerabilities and problems on the current trade finance operations as well as combating with TBML.

From an industry report from Deloitte (Deloitte n.d.; Deloitte Consulting, 2017), using blockchain and smart contracts in trade finance operations actually reshape the current complicated and lengthy process into simple versions, as usage of smart contracts and blockchain reduced delivery of different versions of paper-based documents. Other than that, there are other advantages including real time review, transparent factoring, proof of ownership, automated settlement of fees. These are raised from the nature of blockchain which is permanent and immutable, all related parties involved in a trade finance transaction could review and look at the transaction on the same blockchain as a shared ledger, there is no data discrepancies on value, unit data to be reviewed by sellers, buyers, customs and banks. Thus the potential on manipulation on price, units, ownership and documentations from money launderers or terrorists is eliminated. Furthermore, there is an elimination for double spending and double invoicing as one of the key challenges and problems to solve by blockchain.

Furthermore, industry reports also illustrate some improvements on trade finance operations using blockchain as an open, trustless and automated platform. The blockchain could allow any user group to initiate transaction using smart contracts with standard workflows and procedures for approval, execution or negotiation with client. This open blockchain platform is also fully transparent in the whole process of trade finance transaction in real-time basis, every parties involved could identify potential issues, problems and could be solved within a short period of time. This also reduced the counterparty risk and intermediary for correspondent banking.

Industry reports and initiatives highlighted the automation on settlement process using blockchain and smart contracts as one key improvements towards the existing practice and procedures. As the nature of smart contracts are front loaded that all the data to be input into the smart contracts must be correct before execution, which reduced contractual ambiguities and errors between parties involved from manual process and communications between bankers. Furthermore, as smart contracts are computer protocol code which could set in pre conditions with automatic execution, there is no extra effort to be paid by bankers for oversight the execution and confirmation for trade finance transactions.

#### ***e. Data Collection and Analysis***

As this research dissertation is focus on general methodologies on TBML with investigation on potential for using blockchain and smart contracts to combat TBML. The data analysis

would be primarily using secondary data on existing research, and public databases. The data analysis would be more focus on how to existing law enforcements, government agencies, and banks to detect TBML related crimes, i.e. price and volume based methods and techniques.

On a qualitative data analysis, which will collect data and proposals from industry reports for feasibility on how blockchain and smart contracts to be implemented and replacing the existing trade finance operations. Which these industry reports are also to be used in data analysis on comparing the new methodologies on tackling vulnerabilities of trade financing business to money launders.

Other than that, qualitative data analysis would be on the methodologies of TBML involved, which these data of methodologies will be obtained from guidelines and reports from international organizations, regulators and industry stakeholders. While the targeted deliverable will be figure out some common methodologies on TBML and how money launders transfer money from illicit activities towards economy with legitimate purposes.

## **Part 1: Trade finance and Trade-based Money Laundering (TBML)**

### ***a. Introduction***

International trade is the exchange of capital, goods and services between nations across borders or territories as one exporter provide such exchange with an importer. From Sterns, Langer (2001), the earliest record of international trade could be traced back to ancient time in the 19<sup>th</sup> century before common era between Assyrian Empire and Kültepe in Cappadocia as a merchant colony. After that, the trading between nations evolves as a merchant colony to the use of entry ports, shipping in the middle ages and to the modern stage as international trade between countries and nations.

In the modern era, the process of international trade is already streamlined with the involvement of financial institutions to facilitate both exporters and importers to meet their contractual obligations. Thus, this raises the trade finance business for financial institutions. At the same page, money launders could also find a possible way to transfer their criminal proceeds to other countries using international trade with a limited scrutiny from government authorities.

This part would define what is trade finance and trade finance facilitates both exporters and importers to fulfil their contractual obligations. Furthermore, several TBML together with methodologies used by money launders would also be discussed.

### ***b. What is Trade Finance?***

Trade finance, or trade financing, could be referred to the provision of any form of financing needs that enables a trading activity to take place. This includes facilitation of procurement of items for sale or storage for future activities, or monetary financing to buyer and supplier to meet their contractual obligations. Trade finance plays an important role in international trade as financial institutions' involvement helps to solve several difficulties for both exporters and importers during international trading transactions. Examples of difficulties including limited access for working capital for exporters and new credit line for overseas purchase on products for importers.

Financial institutions' involvement in trade finance business includes the following roles:

a) Providing information to buyers and sellers

This includes engaging information of both exporters and importers for business opportunities for the transaction. Financial institutions would play as the advisory role in this case as to engage both parties to conduct a trade transaction.

b) Settlements for Trade transactions

This includes general normal banking operations for both exporters and importers, from opening an establishing a banking relationship, Know-your-client ("KYC") onboarding, the collection of company documents, transactions related documents, making advance payments and application of trade financing from financial institutions.

c) Provide financing

This includes financial institutions to work on providing financial instruments for both exporters and importers. Including but not limited to overdraft, loans, bank guarantees, letters of credit and structured finance and others. Financial institutions would require a collection of collaterals from both exporters and importers for engaging

d) Managing currency risk and market risk

Financial institutions are required to manage the exchange rate fluctuation risk of currencies used during trade transactions. Financial institutions are required to managing their own risk of receiving payments in multiple currencies and required to hedge these currencies by taking reverse positions on financial instruments like options, futures, spots or swap to hedge financial institutions own positions. Financial institutions are also required to managing the price volatility of commodities undertaking in various trade transactions as to guarantee the price in the future under the ever-changing demand and supplies of commodities.

Although financial institutions have such involvements in the international trade system, yet the international trade system is subjected to various vulnerabilities and risks for criminal organizations with the opportunities to launder their crime proceeds and/or provide funding to terrorist organizations with a low risk of detection. As highlighted by the Financial Action Task Force ("FATF") (2006) in their report on TBML (FATF, 2006), FATF highlighted the below vulnerabilities and risks,

a) Huge transaction volume of cross-border trade flows.

The huge cross-border trade transaction volume creates obstacles for law enforcement agencies to detect the suspicious transactions, some small amount individual transactions would be obscured during transaction detection and review. This provides a good opportunity for criminal organizations to make cross-border transfers without detection.

b) The complexity of financing agreements.

Under a single international trade transaction, there are often having multiple foreign exchange transactions involved as payments and fees through buyers, sellers, and financial institutions intermediaries. In this case, it is hard to trace these transactions. Furthermore, extra resources need to be applied for diverse financing agreement between various parties in a trade transaction.

c) Extra additional complexity.

This exists for identifying the illicit origin funds within the existing cash flow from a legitimate business. It is hard to identify such illicit cash flows during a trade transaction when involving parties and intermediaries usually only have part of the transaction information that could not make a complete picture for identifying illicit funds and suspicious transactions.

d) Customs limitation

There is another limitation for customs regarding the exchange of data between countries and resources to detect such illicit trade transactions.

In such a booming international trade environment, it is having more pressures for law enforcement agencies and financial institutions to detect illicit trade transactions given that there is an even faster increasing trend for developing countries. Which in this case, criminal organizations are easier to move illicit funds through international trade as TBML.

**c. What is Trade-based Money Laundering (TBML)?**

TBML was first mentioned by the FATF (2006) (FATF, 2006) which defined TBML as:

*“Trade-based money laundering is defined as the process of disguising the proceeds of crime and moving value through the use of trade transactions in an attempt to legitimize their illicit origins”*

Which this definition of TBML implies money laundering and disguising the proceeds of crime could be through the misrepresentation of price, quantity and/or quality of imports or exports. Furthermore, FATF highlighted that money launders combine TBML techniques with other traditional money laundering techniques for further obscure the money transaction trail.

Unlike other crimes such as tax evasion and capital flight which transfers legitimate funds using illicit way, TBML is using legitimate way to transfer illicit funds as another way around. This is hard for law enforcement to trace such illicit origin funds movement by TBML as the illicit funds had been integrated into the legitimate business for making the transaction and movement of funds. As referring to the three stages of money laundering as defined from (Reuter, 2004), such movement of illicit funds within the legitimate business could be as the layering stage or the integration stage, where illicit funds are appeared to be normal business earnings with a legitimate transaction purpose. From (Delver, 2018) and (Viles, 2008), it is identified that detection and identification of illicit funds associated with TBML through confidential informants.

**d. Problem with TBML**

Miller, e.l. (2016) indicated some consequences associated with TBML, mainly related to economic and security concerns. As Miller, e.l. (2016) mentioned that as there are not much studies on TBML compared to other money laundering techniques by academics and policymakers. Money launders using TBML techniques would create business impact the the legitimate economy. Miller, e.l. (2016) addressed the result from the United States Homeland Investigation that traditional criminal organizations, including money launders, are using a lower price than the market price to dispose products which purchased with illicit funds to the market. This could make other legitimate business companies to face unexpected



comparative disadvantages. Furthermore, from the research report of Organization for Economic Cooperation and Development (“OECD”) (2016), the globalization market provides criminal organizations a less risk and better environment for putting profitable activities with a lower chance being detected. In this case, criminal organizations are easier to connect remote consumers to dispose goods purchased with illicit funds. Thus, this means their business operations could achieve economies of scale and become legitimate compare to other normal business. In this case, this makes harder for law enforcement agencies to detect such illicit funds, and illegal money capital transfers would also damages domestic investment and expenditures.

### ***e. General methodologies and illustrations of TBML***

As highlighted from the FATF (2006) report, TBML is a process of using trade transaction as a legitimate purpose to transfer funds with illicit origin. In actual use, TBML could be achieved using different kinds of misrepresentation on documents presented in an international trade transaction during imports and exports. Another abuse of the financial system involves fraud transactions with a range of financial instruments. The alternation of trading documents is related to price, quantity, description of goods and services.

#### **a) Over / Under-invoicing**

The over or under-invoicing of goods and services is one of the most traditional and common ways for moving money using alternation of the price being too high or too low when compares to the fair price of the goods, which could enable transfer of value legitimately between exporter and importer. The value being transferred is regarded as:

*Money able to be transferred = Amount paid - fair value of the goods*

*Money able to be laundered = Amount paid + fair value of the goods*

This is because the shipped goods are purchased and sold at the fair price in the open market, money launders could use illicit funds to do the purchase in the open market and export to importers, which importers could use illicit funds to make payments to exporters and sell the goods to convert to cash and equivalents in fair price. This makes the illicit funds are able to appear as legitimate and normal funds as the funds are being used as purchase goods for both exporters and importers. The over or under-invoicing could help to facilitate movements of illicit funds by terrorist organizations and drug dealers where the organizations could be both importers and exporters as the controller and ultimate shareholder.

Using over or under-invoicing may have high tax implications, as goods are subjected to value-added-tax. In this case, exporters may require to pay a significant amount of value-added-tax imposed for over-invoicing. Meanwhile, under-invoicing makes importers to enjoy a reduction of import duties paid to the customs. This reflects other than using TBML to move illicit funds, money launders are also willing to have tax deduction through using over or under-invoicing as one of the TBML technique.

On the other hand, customs are more focused on detecting under-invoicing, on the basis that customs are focused on stopping the import of contraband and ensure the collection of

import duties, which further extended to impact on value added tax and income tax.<sup>1</sup> Which the collection of import duties is limited as customs are not able to obtain the trading data to determine the fair market price of the goods, which in this case, customs are hard to determine whether the imported goods are as underpriced.

b) Multiple invoicing of goods and services

This is another technique to move illicit funds through the legitimate business model as TBML. Just invoicing the same shipment more than once, which could enable money launders to make multiple payments to the same shipment. Payments could be even processed by several banks separately to prevent detection from the in-house transaction monitoring system of each bank, provide a legitimate reason to support multiple payments such as advance payment, late fees, payments by stages. Furthermore, it is also not required to misrepresent information on the commercial invoice as fake and forged documents.

c) Over / Under-shipments of goods and services

This is similar to over / under-invoicing TBML technique, which is used in the direct actual shipment of goods. In the most extreme case, there is no actual shipment of goods made between the exporter and importer, but fake shipments record or shipments of empty cargo was presented to pretend that there is shipment made between the exporter and importer. As in the transaction process, financial institution may not able to know these shipments are as the phantom shipment and provided trade finance support to exporters or importers. Therefore, through over / under-shipments, money launders could transfer and launder the value as

*Money able to be transferred = Amount paid - fair value of the goods*

*Money able to be laundered = Amount paid + fair value of the goods*

In terms of cash flows to be transferred cross border and possible amount of money to be laundered, using over / under-shipment is the same as the over / under-invoicing as the similar kind of TBML techniques as manipulating the quantity of goods and services other than the price. In this case, money launders are much more convenient as there is no actual shipments in place to create unnecessary cost on purchasing / selling and shipment cost of the goods.

d) False description of goods and services

In this case, other than misrepresentation on the price and quantity of goods and services, misrepresentation on description of goods and services on the commercial invoice could also be one of the way to transfer huge amount of money between exporter and importer.

*Money able to be transferred = Amount paid - actual fair market value of the goods*

*Money able to be laundered = Amount paid + actual fair market value of the goods*

Similar to the over / under-invoicing and over / under-shipment, false description of goods and services implies that money launders are manipulating the invoice in order to alter the amount paid from importer to exporter as the products are pretended to have a higher (or

<sup>1</sup> Media article from The Himalayan Times Dated on September 06, 2017 revealed that Nepal government is targeting to solve the huge impact on under invoicing from detection of customs. <https://thehimalayantimes.com/business/black-economy-thrives-as-under-invoicing-in-import-rampant/>



lower) fair value than the actual market fair value of the goods and services. Meanwhile, as mentioned for detection of over / under-invoicing by the customs, since there is no share database and trade data of the actual fair market value of goods and services in the shipment, it is hard for customs agency to determine the actual fair market value of the shipment goods.

e) Informal value transfer system (“**IVTS**”) - Hawala and Black market Peso exchange agreements (“**BMPE**”)

f)

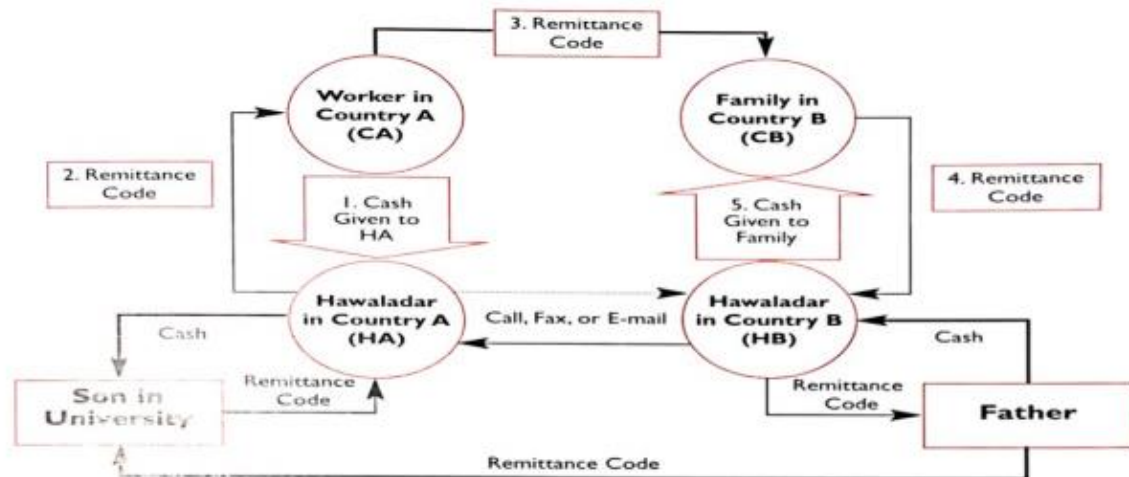
IVTS is different from the TBML techniques listed from a) to d), from United States Department of the Treasury Financial Crimes Enforcement Network (“**FinCEN**”) (2003) report (FinCEN, 2003), the IVTS is defined as

*“Any system, mechanism, or network of people that receives money for the purpose of making the funds or an equivalent value payable to a third party in another geographic location, whether or not in the same form. The transfers generally take place outside of the conventional banking system through non-bank financial institutions or other business entities whose primary business activity may not be the transmission of money”*

The IVTS could be referred as an alternative remittance and underground banking system which could be dated back to 5800 BC for settling outstanding balance accounts between villages in Asia. Currently the settlement of IVTS is similar back to 7000 years ago where IVTS as an alternative remittance system involves a sender, a recipient two IVTS brokers located in the sender and recipient countries. Sender will provide funds to the local IVTS broker and receives a code, then sender will provide the code to recipient. Recipient exchange the code with funds from the country’s local IVTS broker. From FinCEN (2003), the two IVTS brokers involved will settle their accounts by using accumulation of trading liquid money instruments, over invoicing, smuggling commodities such as gold or other jewellerys for settlement.

Using IVTS could help for prevent reporting foreign currencies control, paying taxes and leaving audit trail for investigation. As IVTS could provide security, anonymity, and versatility to the user, which IVTS appears to be attractive to criminals for engaging in money laundering, and facilitating in TBML activity. Further from FinCEN (2010), cases identified IVTS operators also involved in normal business operations as a facilitation to transfer illicit money for their IVTS operations. Examples of TBML activities using IVTS includes Hawala and BPME.

A traditional illustration of IVTS could be referred as below:



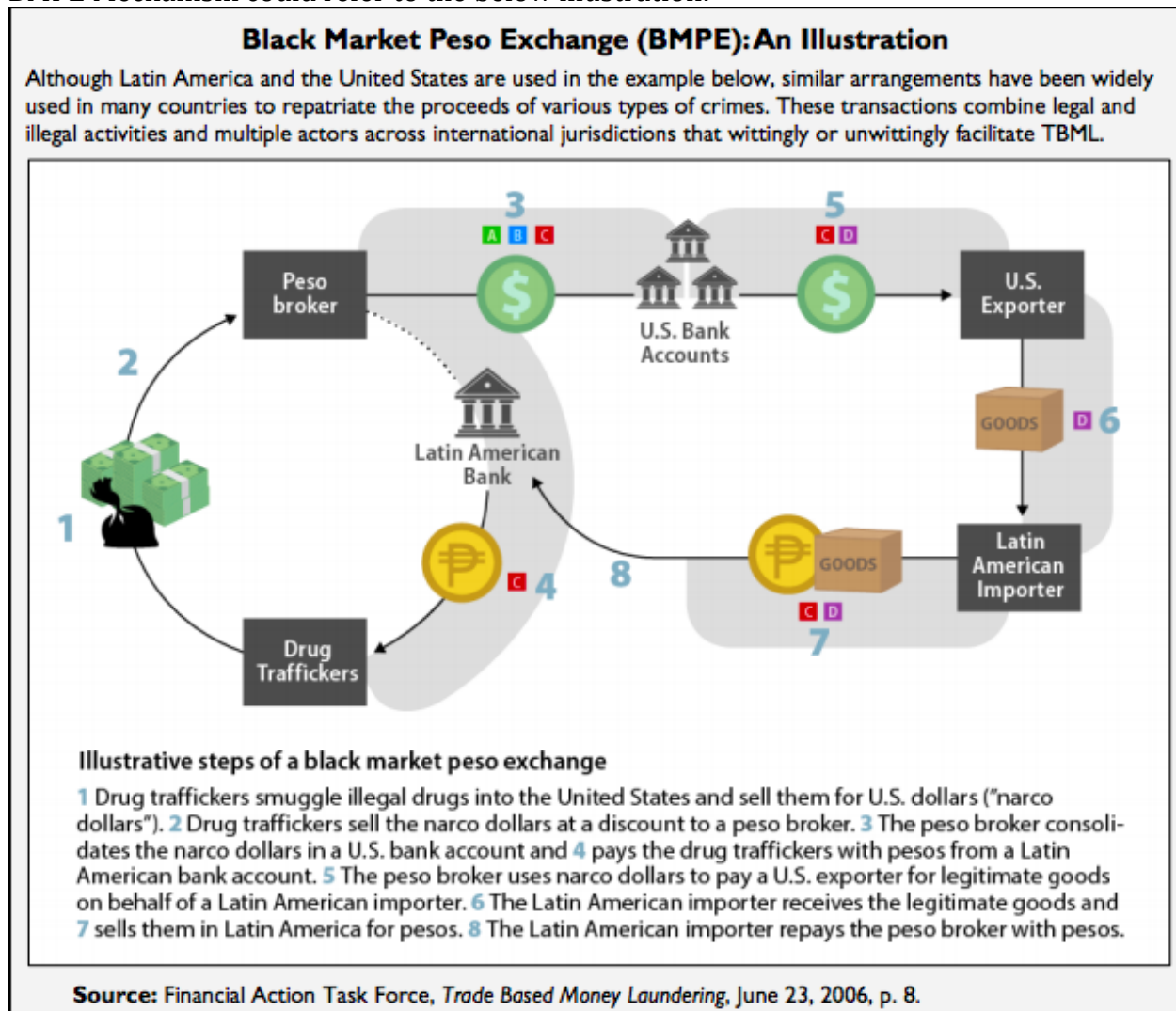
Source: Informal Funds Transfer Systems - An Analysis of the Informal Hawala System (A Joint IMF–World Bank Paper Mohammed El Qorchi, Samuel Munzele Maimbo, and John F. Wilson) (2003)

Hawala is a form of IVTS originated in the Middle East and Africa. Hawala transfers are common as the village communities in Africa and Middle East are remote and funds could be transfer to the recipient within a day. Hawala system network is usually involves a network of several family members under trust, Hawala brokers account settled with minimal movement of funds between these family members. As a money settlement network operated between several trusted families and its members, from Cassara (2016), Hawala network is difficult for outsiders and western law enforcement agencies to investigate and penetrate. Cassara (2016) highlighted that western law enforcement agencies are required to understand the family tree, relationships between communities members first before investigate the case. One the other side, Soudjin (2015) found Hawala operators are reluctant to provide information to of their clients to law enforcement agencies during investigations or even does not engage in normal KYC process as the Hawala network is build on trust within several communities and families. Thus, since Hawala demonstrated extra complexity and difficulty for investigation compared to other IVTS, Cassara (2016) mentioned that Hawala appears to be attractive to criminals and terrorist organizations.

Another example of IVTS as the BMPE, which combines various money laundering techniques into one as a complex operation specialized by criminal organizations. This TBML technique could be traced back to 1980s when Colombia became of the the dominant exporter of drugs

to the United States and Peso broker needs to launder the illicit US dollars gain from the drug traffickers.

BMPE Mechanism could refer to the below illustration:



Within the BMPE mechanism, we could identify that the mechanism involves shipments of legitimate goods and services from the US to Latin and resell in Latin market in order to convert illicit US dollars deposited into Pesos within a legitimate business transaction and pretend the funds are legitimate. During such international trade transactions, TBML techniques from a) to d) would be used for shipments and transfer of Pesos. Financial institutions are also involved in these TBML schemes as they offer services to settle, facilitate and finance these international trade transactions through the financial products.

### ***f. Case examples related to TBML***

From FATF (2006), FATF (2008), Asia/Pacific Group on Money Laundering (“APG”) (2012), there are several example of money laundering cases using TBML techniques reported from FATF or APG members. Meanwhile, from Milner e.l. (2016), Soudjin (2015) and Cassara (2016) also mentioned several other money laundering or terrorist financing cases using TBML techniques.

Some of the selected cases are as below:

- a) As reported from the United States that the States had identified one of the Lebanon’s bank had been facilitating the Hezbollah, the Lebanon’s leading political party, derived financial support from drug sales proceeds and money laundering schemes, including TBML.

It is identified that TBML is being facilitated in managing drug and money laundering proceeds being integrated into the financial system as layering. Drug proceeds are being as bulk cash to be deposited into the Lebanon bank, then wire remittance to car dealers which are related parties to drug dealers to purchase used cars. These used cars are then being sent to West Africa or Lebanon for sale. Hence, the actual drug proceeds are being considered as proceeds of used cars sales after such integration.

On the other hand, these drug dealers also used the drug proceeds to purchase consumer goods from Asian supplier which ships the goods to Latin America’s drug dealer network, which drug dealer could convert these consumer goods back into local currencies and pretend the source of fund of their business is selling of these consumer goods instead of drug proceeds.

- b) Another case is associated with the usage of TBML for structuring the drug proceeds, which drug dealers are using bulk cash deposit or direct small value banking transfer by various zombie accounts. Then further structured by making purchase of easily sellable toys to United States, then re-export to Latin america for resale, the resale proceeds will be remitted back to the drug dealers as a cycle to transform the proceeds of dealing drugs as sales of toys.

The above mentioned cases are using techniques money laundering involving TBML in similar way, which is using international trade as the method to pretend the income derived from drug proceeds into the normal sales of commodities, which is the targets of drug dealers and terrorists. From the cases, there are several red flags which could be noticed by the banks, customs or shipping companies during their handling process of various documents required during the international trade.

Normal red flags could be noticed during international trading could be identified as:

- Re-export of products to sensitive jurisdictions. As noticed from the cases, both drug dealers or terrorists require “Legitimate” funds for them to perform activities in their active jurisdictions, which there must have provision of funds or supplies to their active jurisdictions.
- Cash deposit as the major channel of incoming funds to the account. As the absolute anonymous approach of using cash in a transaction or deposit, drug dealers or terrorist could claim their source of funds are derived from normal cash intensive

business such as fast food restaurants, wholesale of daily necessities, convenience stores. Hence, they could include the drug proceeds and pretend as normal business proceeds into the financial system.

- Overvalue of goods with different valuation method. As one of the cases are involving trading of used car for sale in West Africa and Lebanon, these commodities does not have a standard pricing all over the world as compared to normal brand new cars, cameras valuables which has a suggested price provided by the manufacturer. The commodities are in a large variation that there could have manipulation or deflation of goods in order to receive more income or declared as loss for tax evasion purpose.

As complex nature of TBML related crimes created difficulties on investigation by law enforcement agencies, and there is no systematic methods to keep track of TBML related crimes. The below is to investigate whether the current evolving blockchain technology could able to help to tackle TBML related crime.

## Part 2: Is blockchain a possible solution to TBML?

### a. What is blockchain?

The idea of blockchain was first raised from Szabo (1994) as smart contract, that a smart contract is a computer protocol which intended to facilitate, verify and enforce the negotiation and performance of a contract.

Blockchain is conceptualized and realized later by an individual or group writing under the name of Satoshi Nakamoto published a paper entitled “Bitcoin: A Peer-To-Peer Electronic Cash System” (2008), that Nakamoto described a peer-to-peer version of sending cash from one entity to another entity directly without using a financial institution as an intermediary, which further realized the concept of cryptocurrency named as Bitcoin as one of the blockchain application. Nakamoto (2008) sought out to solve the accounting problem of “Double spending” with using transactions being linked to previous transactions as a public open ledger, which is the prototype of current blockchain technology. Later Bitcoin was being implemented later in January 2009 with exponentially increase in terms of user base and popularity.

The second generation of blockchain named Ethereum was invented by Buterin (2013), which Ethereum introduced blockchain in the form of “a decentralized platform that runs smart contracts.” In this case, the blockchain is further being evolved from being simply just a public transaction ledger storing just payment information as cryptocurrency transactions to create markets, debts, store instructions and execute once the conditions are met and many other features that to be created. This second generation of blockchain is visualize and realize the idea from Szabo raised in 1994. As in the current stage that smart contract turns to be one of the key applications of the blockchain.

As from Zheng e.l. (2017)'s report as an overview of blockchain, the blockchain is a sequence of blocks, which is a complete transactions as a public transaction ledger. Which one blockchain only has one genesis block as the first block, the other blocks behind the genesis block along the chain would contain the block header, which is the hash value of the previous





block with all the transactions, timestamp, threshold for validation and nonce as the algorithms within the chain.

Other than block header, a typical block would also contains the block body, which contains all the transactions the block could contain. The number of transaction of a block can contain depends on the block size and the size of each transactions. Blockchain's transactions are being authenticated by using asymmetric cryptography mechanisms as digital signatures, which contains the public key and private key of the users during validation of the particular transaction in the block as consensus mechanism. There are several different kinds of consensus mechanism could be used in blockchain, for example, proof-of-work mechanism as to process difficult data to easy for others verify transactions within the blockchain network, proof-of-stake mechanism which the consensus mechanism is based on the resources that each participant within the network.

In general, blockchain exhibits the following characteristics, first, blockchain is decentralized, there is no need to use a central trusted third part to verify the transactions, blockchain is used peer-to-peer network and consensus algorithms to validate transactions. Second is immutable, within the blockchain peer-to-peer network, various participants are using the network to validate the transactions, there is no chance to delete, alternate or rollback the validated transactions along the blockchain, which means blockchain's transactions are irreversible. Third one is Anonymity, the users within the blockchain network are identified with their address only, there is no information of the actual identity of the users in the blockchain, there is also no centralized trusted third party in between the a node to node transfer, such transfer only requires address. The forth one is transparent, each participant as node along in the blockchain network could check the public ledger up-to-date transaction record. At last is the auditability, since blockchain stores data of all transactions occurred alongside in the chain, the status of the transactions could be verified and traced.

As the blockchain technology is evolving, there are several types of daily applications could be used on blockchain. The first one as mentioned, is cryptocurrency as an online payment solution. Using crypto technologies and encryption, international or local fund transfer does not further need involvement of correspondent banks or SWIFT as intermediaries. Cryptocurrencies transactions are recorded on blockchain without any leakage of private personal identity information.

Another application is smart contract as mentioned above as the first initiation idea of blockchain and as the feature that being realized on the second generation of blockchain, Ethereum. The objective of smart contract is to satisfy common contractual conditions, minimize exceptions and minimize the need for trusted intermediaries. This could further facilitate economic goals including fraud loss, transaction cost and legal enforcement cost. Users could also create other smart contracts and applications using ethereum blockchain.

The last application is Hyperledger, which as an open source blockchain platform initiated in December 2015 by Linux Foundation. The Hyperledger is designed to support business transactions for technological, financial and supply chain companies as to further improve performance and reliability. The Hyperledger is currently develop several protocols and



standards as to modularize and support different features and future generations of blockchains.

***b. How can blockchain help in international trade?***

With reference to industries researches, there is a huge potential for improving the efficiency and effectiveness of implementation of blockchain into trade finance. Research from Deloitte indicates that the future vision of trade finance would be in a faster way with using blockchain's application. It is possible to provide a real-time review of the financial documents in real-time basis by the financial institutions as documents are linked and accessible in the blockchain, reduces transportation time and cost. Furthermore, the factoring and financing would be transparent as all transaction data are available on the chain.

As a feature of blockchain that there is no so called trusted third party involved to validate the transactions, same feature could be applied in blockchain trade finance as there is no need to have correspondents banks to be involved as the third part to assume risk in the trade finance. There would also eliminate the need of monitoring and confirmation of delivery of the goods as blockchain smart contract can automatically execute on real time basis on the blockchain once the contract conditions are met. This also includes automatic settlement of funds with reduced transaction fee from correspondent banks since the payment is initiated directly from the buyer to seller via blockchain transaction as the automatic execution of the smart contract between the buyer and seller once the goods delivered.

Blockchain in trade finance would also help to reduce the counterparty risk as all the documents are being traceable on blockchain, including the bill of lading that double spending problem is eliminated, together with the double spending potential. Ownership of the goods are also transparent and could provide a real time transfer on the blockchain on real time basis with reference to the progress of the goods shipment. At last, to eliminate the risk of TBML in a trade finance transactions, law enforcement agencies and financial institutions are clear with the pricing, quantities and goods description which there is no multiple documents in different versions for misunderstanding and money laundering using over / under invoicing techniques.

In banking perspective, blockchain could provide some improvement in efficiency and effectiveness, from the industry research of DiCaprip, Jessel (2018), the blockchain could improve efficiency. The research indicated that the financial institutions faced difficulties in dealing with trade finance transactions due to lack of information, and compliance KYC concern, these are also the redflags that criminal organizations conducting money laundering. Stakeholders and financial institutions could not able to measure and access the risks associated with no information. Using blockchain to record transaction could enable financial institutions to access the metadata of the performance of their clients and counterparties with all the information available on blockchain. Other than this, with the same set of information is available on blockchain for all stakeholders, financial institutions could align all the information available as a whole on blockchain instead of piecemeal information which needs to be derived via open source information, to organize the data around the assessed entity for analysis. This could also reduce possibilities of TBML as all the previous transactions are known and being validated by all stakeholders involved.





The other concern from financial institutions is the compliance KYC concern, as the regulatory oversight on financial institutions is a critical role in the current financial era after several financial crisis since the last decade. Study from Asian Development Bank (2017) reveals that financial institutions rejected one-fourth of trade finance transactions due to KYC concerns, this makes financial institutions has a high transaction cost for dealing with existing trade finance transactions. Using blockchain could enhance the efficiency of conducting KYC and due diligence for financial institutions as documents would be stored on blockchain without any amendments or alternation after being stored, which makes a higher realibility of information that provided to financial institutions for checking. Blockchain could also provide complete audit trail for future checks by regulators.

### ***c. What are the limitations for using blockchain in Trade Finance?***

The blockchain technology is currently the most evolving technology since 2008, this technology has showed high potential in changing the current trade finance environment. However, the blockchain technology is also facing numerous challenges which may limit the use of blockchain technology in practical solutions.

The first one is scalability, as the blockchain is a public ledger that records all transactions without any deletion of old and legacy transaction records. With the amount of transactions are being increased every single day along the chain, the chain will become very bulky. Furthermore, each single peer node in the blockchain network needs to store the entire blockchain's transactions for validation and verification of the current and ongoing transactions. On the other size, as there are limitations on block size and time interval for blocks generations, for example, the bitcoin blockchain could only process 7 transactions per second, which could not fulfill the worldwide requirement for millions of transactions on a real-time basis, or even the trade finance related transactions in a limited banking network. A typical block size is very small as several MBs, while within a trade finance related transactions, there are a lot of information required, including but not limited to, logistics company, shipping information, goods description, banking and transactions details. With these information, the size of one single transaction could be larger than the block body size of several MBs. Moreover, as a transaction is being verified within the blockchain network as miners and users, these miners required to use more energy and time to verify one single trade finance transactions than other general cryptocurrency transfers.

Another limitations for the blockchain is related to security issue. From Lin and Liao (2017), it is mentioned that blockchain consensus mechanism could face various securities attacks. The proof-of-work mechanism could face the majority attack, as in this mechanism, the generation of the block is by the work done by each participant node, which under this rule, there will have more participants are willing to purchase more nodes for the computing power, when someone potentially has more than 51% as the primary dominance in terms of blockchain computation power, the individual could take control over the entire blockchain. Under such control, the dominant could amend the transaction data, amend consensus mechanism and prevent other participants to continue to verify further transactions. This means the entire blockchain would be able destroyed and create entire loss for other participants.



Another security issue is related to software upgrade as fork. As blockchain technology is an evolving technology that there will have blockchain software upgrade as fork. During this upgrade, the consensus mechanism would also be changed to participant nodes. Thus the entire blockchain network would need to decide whether or not to validate the transactions between nodes agree and not agree with the new consensus rule. Which in this cases, nodes with new consensus have to compete with those nodes using old consensus rules. Thus there will have potential of losing computation power as the entire blockchain network will be separated into two parts if the network does not have a major agreement on consensus algorithm, for example, during the fork of the third largest cryptocurrency bitcoin cash in November 2018, there network participants are choosing from the new consensus algorithms as bitcoin cash ABC or bitcoin SV. This dispute of algorithms created losses of computing power within the network and stability, as the chances of majority attack would be larger than the expected. This security issue limits usage of blockchain in trade finance related transactions.

Other than the security issue, there are privacy challenges with the implementation of blockchain. As a public transaction ledger, third party individuals could able to check the transaction amount, balance of each address, which transaction pattern could be observed. In terms of business perspective, which means there may have potential leak of private business information, for example, the company's potential future strategy and operations.

However, in the trade finance related transactions, the privacy issue of the blockchain would also create some money-laundering related issues. In blockchain's network, there could have mixing as layering for providing anonymity by using multiple addresses to control and hiding the actual source of fund within the blockchain network. For example, criminal organization could use multiple accounts as layering for the pretending the source of fund is not from criminal proceeds Although blockchain as a public transaction ledger which the transaction details are visible to each and everyone, however, as the visible information are only the addresses and there is no information on the person or organization behind to confirm the ownership of the addresses, as such, this limits the ability to use blockchain in trade-finance related transactions as a drawback and indeed as a facilitation of using blockchain as TBML.

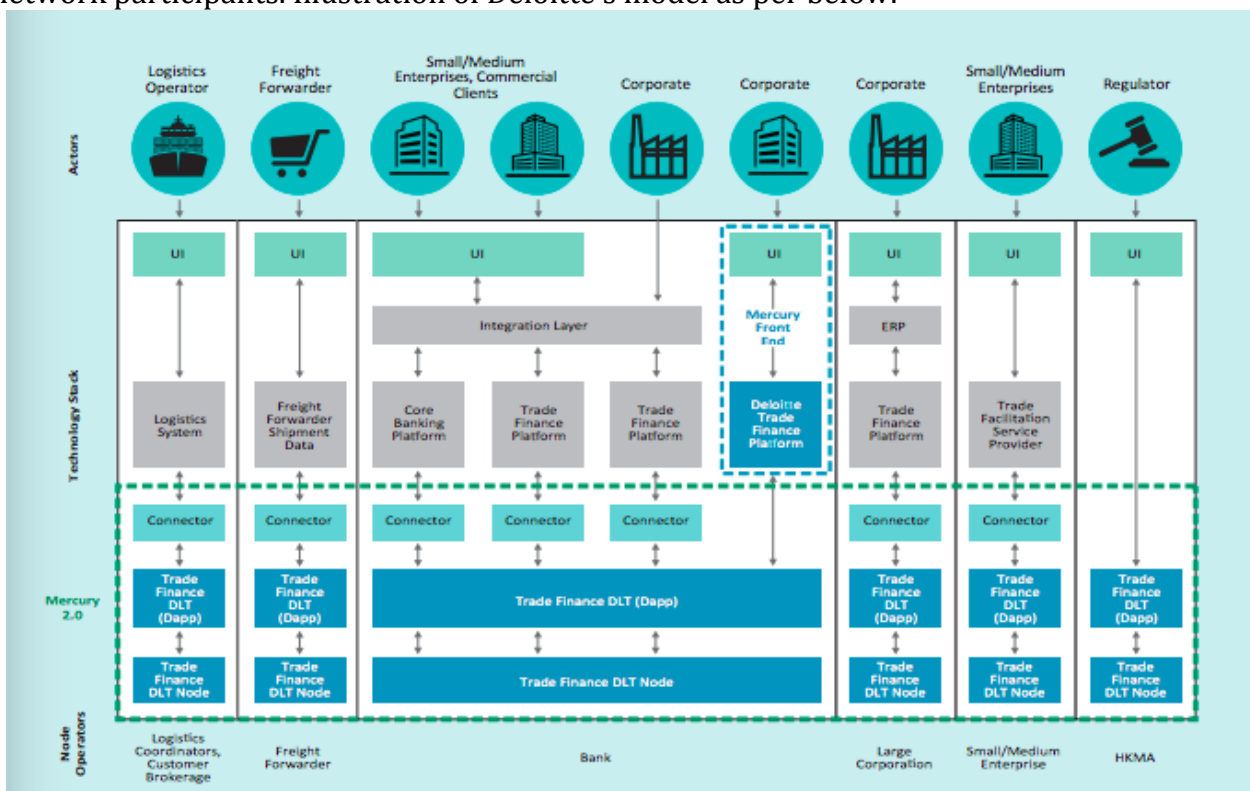
The last limitation arises from private selfish mining, from Eyal and Sirer (2013) showed that the blockchain network is vulnerable even if a small portion of computational power is used to cheat in the network, the selfish miners would keep their mined blocks on their own without broadcasting into the blockchain network. In this case, if the chain contains the private block is longer than the current open chain, there would have a private branch and all the network participants would always prefer the longer chain in current consensus mechanism. Thus, all the network participants are wasting their resources, computational power on the useless branch and selfish miners would get higher revenue. In the trade finance environment, which selfish mining could also cause the majority attack as the selfish miners could easily dominate the entire chain, therefore, all the transactions data could be mutable and amended.



**d. Examples of blockchain application in Trade Finance.**

Financial institutions, regulators and technology companies are progressing to utilize blockchain into trade finance transactions. Euro Banking Association (2016) illustrated that using smart contracts and instant payment function as blockchain applications and utilize distributed ledger in trade finance.

For smart contract, as mentioned above that smart contract is self-executing computer codes that automatically carry out functions as conditions of the smart contract is met as trigger event, which all stakeholders could be notified if there are any conditions change upon the contract. From a recent study conducted by Deloitte in Hong Kong (2017), Deloitte has proposed a trade finance prototype named “Deloitte Mercury” with two layers, which the underlying layer is for data distribution and consensus facilitation with using an open source blockchain network, with using application programming interface for integration; meanwhile, the upper layer consists of various application programming interface applications that could be used in trade finance, which all standardized application programming interface could be accessed using a common application by all blockchain network participants. Illustration of Deloitte’s model as per below:

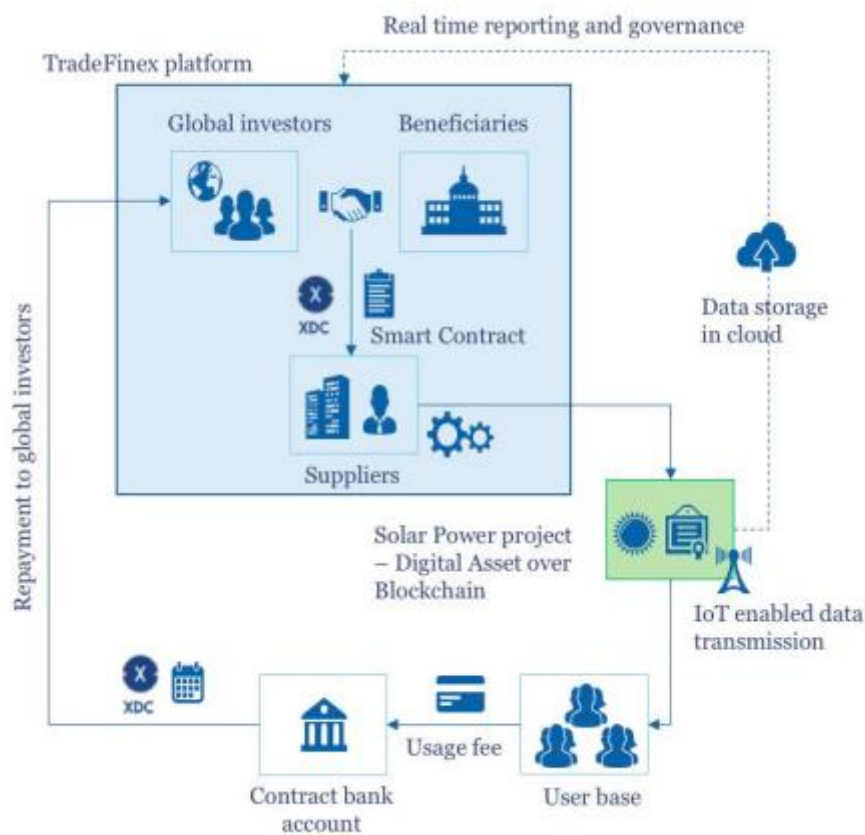


Deloitte proposed trade finance platform Deloitte Mercury

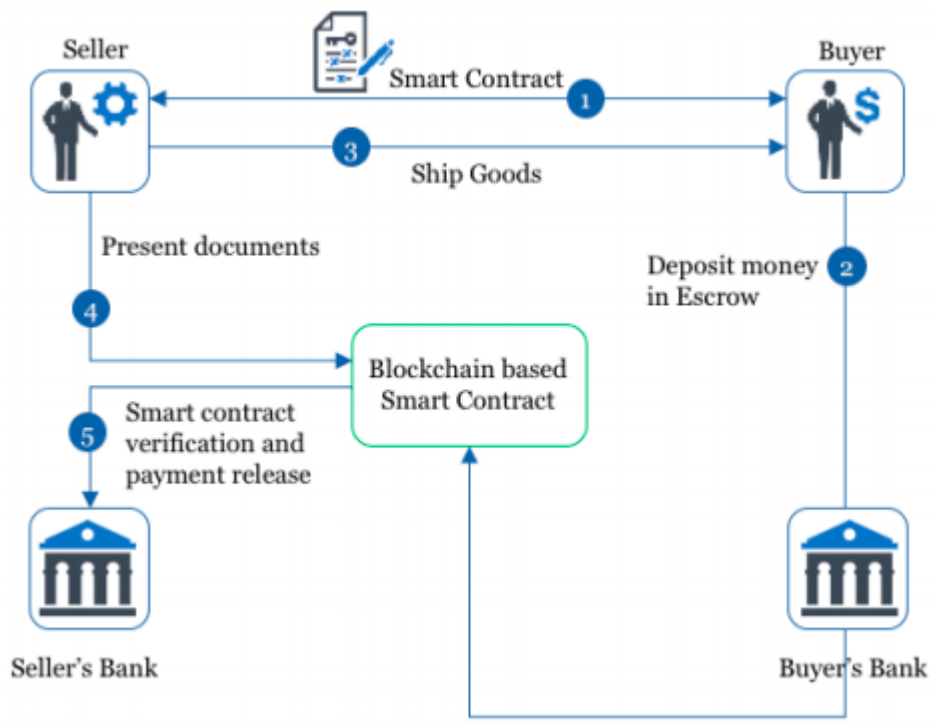
Using this model, participants could either use their existing applications to integrate with the blockchain or using the blockchain network directly to conduct business. Law enforcement agencies or regulators could also able to retrieve real-time data for analysis.

Upon using this model, a trade finance transaction will be bounded by a smart contract for storing various status within the trade, and to distribute the logic for trigger event for transaction validation and status change to all blockchain network participants. Thus, all participants on the blockchain network could able to check the full visibility of status of goods and payments, it is also highlighted that it is harder to forge a trade finance transaction as it is hard to forge all the stored transactions along the chain and being validated by other blockchain participants.

Another study conducted by XinFin Organization (2018) that proposed a blockchain trade finance platform named TradeFinex, which the platform is designed for suppliers, buyers and other stakeholders, with using of smart contract on blockchain with conditions as milestone that could automatically initiate the payment from the buyer to supplier. The platform utilizes cloud storage for real-time reporting and could able to match suppliers and buyers globally. Similar to the Deloitte Consulting (2017)’s model, that all parties could also review the contract on real time basis for checking the status of smart contract on blockchain.



Financing using TradeFinex Platform



Process map of trade transaction with TradeFinex Platform

**Conclusion**

It is no doubt that TBML is one of the methods that used by criminal organizations and terrorist to transit funds for enhancing their organizations development in an illicit way. With the current global trade environment, it is hard for stakeholders such as financial institutions, regulators, logistics companies, customs, investigations agencies, suppliers and and customers to work independently to tackle TBML. As the blockchain technology is evolving and advancing, there is still possibilities to tackling TBML with using blockchain as a tool by various stakeholders. In the current stage, it is recommended that there are still many technical difficulties and other concerns to progress before we can enjoy the advantage that blockchain could bring to us in combating TBML.

## References

- Asian Development Bank (2017). Trade Finance Gaps, Growth and Jobs Survey. ADB Brief, No. 83. [online] Available at: <https://www.adb.org/sites/default/files/publication/359631/adb-briefs-83.pdf> [Accessed 28 Mar. 2019].
- Asia/Pacific Group on Money Laundering (2012). APG Typology Report on Trade Based Money Laundering. [online] Available at: [http://www.fatf-gafi.org/media/fatf/documents/reports/Trade\\_Based\\_ML\\_APGReport.pdf](http://www.fatf-gafi.org/media/fatf/documents/reports/Trade_Based_ML_APGReport.pdf) [Accessed 8 Oct. 2018].
- Association of Certified Anti-Money Laundering Specialists [ACAMS]. (2017). Trade-Based Money Laundering. [online] Available at: <http://www.acams.org/amlresources/trade-based-money-laundering/> [Accessed 28 Mar. 2019].
- Australian Institute of Criminology (2011). Trade-based money laundering: Risks and regulatory responses. [online] Available at: [http://search.ror.unisa.edu.au/record/UNISA\\_ALMA51151142790001831/media/digital/open/9915909176101831/12151106920001831/13151117200001831/pdf](http://search.ror.unisa.edu.au/record/UNISA_ALMA51151142790001831/media/digital/open/9915909176101831/12151106920001831/13151117200001831/pdf) [Accessed 8 Oct. 2018].
- Bank of China (Hong Kong). (2017, July 6). Trade Based Money Laundering Challenges and Recommendations. [online] Available at: <http://www.hkma.gov.hk/media/eng/doc/key-functions/banking-stability/amlcft/20170816e1a3.pdf> [Accessed 28 Mar. 2019].
- Bethencourt, D. (2018, February 23). Colombia-based Hezbollah 'Associate' Knew Anti-Money Laundering Protocols. [online] Available at: <https://www.moneylaundering.com/news/colombia-based-hezbollah-associate-knew-antimoney-laundering-protocols/> [Accessed 28 Mar. 2019].
- Bruyn, A.S. (2017). Blockchain: An introduction [online] Available at: [https://beta.vu.nl/nl/Images/werkstuk-bruyn\\_tcm235-862258.pdf](https://beta.vu.nl/nl/Images/werkstuk-bruyn_tcm235-862258.pdf) [Accessed 28 Mar. 2019].
- Buterin, V. (2014). A Next Generation Smart Contract & Decentralized Application Platform. [online] Ethereum White Paper. Available at: [http://www.the-blockchain.com/docs/Ethereum\\_white\\_paper-a\\_next\\_generation\\_smart\\_contract\\_and\\_decentralized\\_application\\_platform-vitalik-buterin.pdf](http://www.the-blockchain.com/docs/Ethereum_white_paper-a_next_generation_smart_contract_and_decentralized_application_platform-vitalik-buterin.pdf), 2016 [Accessed 21 Mar. 2019].
- Cassara, J. Trade-Based Money Laundering: The Next Frontier in International Money Laundering Enforcement (Hoboken, NJ: John Wiley & Sons, 2016). [online] Available at: [https://the-eye.eu/public/concen.org/01052018\\_updates/Secrets%20of%20Money%2C%20Banking%20%26%20Federal%20Reserve%20-%20Collection%2010/Cassara%20-%20Trade-Based%20Money%20Laundering%20%282016%29.pdf](https://the-eye.eu/public/concen.org/01052018_updates/Secrets%20of%20Money%2C%20Banking%20%26%20Federal%20Reserve%20-%20Collection%2010/Cassara%20-%20Trade-Based%20Money%20Laundering%20%282016%29.pdf) [Accessed 28 Mar. 2019].



Crosby, M., Nachiappan, Pattanayak, P., Verma, S. and Kalyanaraman, V. (2015). BlockChain Technology Beyond Bitcoin. [online] Scet.berkeley.edu. Available at: <https://scet.berkeley.edu/wp-content/uploads/BlockchainPaper.pdf> [Accessed 28 Mar. 2019].

Deloitte (n.d.). How Blockchain Can Reshape Trade Finance. [online]. Available at: <https://www2.deloitte.com/content/dam/Deloitte/global/Documents/grid/trade-finance-placemat.pdf> [Accessed 8 Oct. 2018].

Deloitte Consulting (2017). Trade Finance Contribution. [online] Ffo.hkma.gov.hk. Available at: [https://ffo.hkma.gov.hk/docs/default-source/media/doc/key-functions/finanical-infrastructure/whitepaper\\_annex.pdf?sfvrsn=62e50d6b\\_6](https://ffo.hkma.gov.hk/docs/default-source/media/doc/key-functions/finanical-infrastructure/whitepaper_annex.pdf?sfvrsn=62e50d6b_6) [Accessed 28 Mar. 2019].

Delston, R.S, Walls, S.C (2009). Reaching beyond Banks: How to Target Trade Based Money Laundering and Terrorist Financing Outside the Financial Sector, Case Western Reserve Journal of International Law VOL. 41(1) [online] Available: <https://scholarlycommons.law.case.edu/cgi/viewcontent.cgi?referer=https://www.google.com.hk/&httpsredir=1&article=1237&context=jil> [Accessed 8 Oct. 2018].

DiCaprio, A. and Jessel, B. (2018). Can Blockchain Make Trade Finance More Inclusive?. [online] Available at: <https://www.r3.com/wp-content/uploads/2018/07/Can-Blockchain-Make-Trade-Finance-More-Inclusive-1.pdf> [Accessed 28 Mar. 2019].

Delver, S.G. (2018). Trade-based money laundering and terrorist financing: Combating TBML/FT in the financial institution. [online] Available at: <https://search.proquest.com/openview/9b5ac9869aade25a2bab275e0180ae31/1.pdf?pq-origsite=gscholar&cbl=18750&diss=y>

EBA Working Group on Electronic Alternative Payments (2019). Applying cryptotechnologies to Trade Finance. [ebook] Available at: <https://www.abe-eba.eu/media/azure/production/1549/applying-cryptotechnologies-to-trade-finance.pdf> [Accessed 28 Mar. 2019].

Eyal, I and Sirer, E.G. "Majority is not enough: Bitcoin mining is vulnerable," CoRR, vol. abs/1311.0243, 2013.

Financial Action Task Force (2006). Trade Based Money Laundering. [online] Available at: <http://www.fatf-gafi.org/media/fatf/documents/reports/Trade%20Based%20Money%20Laundering.pdf> [Accessed 8 Oct. 2018].

Financial Action Task Force (2008). Best Practices Paper Best Practices on Trade Based Money Laundering. [online] Available at: <http://www.fatf-gafi.org/media/fatf/documents/recommendations/BPP%20Trade%20Based%20Money%20Laundering%202012%20COVER.pdf> [Accessed 8 Oct. 2018].

Financial Action Task Force [FATF]. (2010). Money Laundering vulnerabilities of Free Trade Zones. [online] Available at:



<http://www.fatfgafi.org/media/fatf/documents/reports/ML%20vulnerabilities%20of%20Free%20Trade%20Zones.pdf> [Accessed on 28 Mar. 2019]

Financial Conduct Authority (2013). Banks' control of financial crime risks in trade finance. [online] Available at: <https://www.fca.org.uk/publication/thematic-reviews/tr-13-03.pdf> [Accessed 8 Oct. 2018].

Fiser Consulting (2017). Blockchain: The key to Trade Finance challenges? [online] Available at : [http://www.fiser.nl/wp-content/uploads/2017/10/FINAL-Blockchain-for-Trade-Finance\\_29092017.pdf](http://www.fiser.nl/wp-content/uploads/2017/10/FINAL-Blockchain-for-Trade-Finance_29092017.pdf) [Accessed 28 Mar. 2019]

Hoffmann, L (2013). A Critical look at the Current International Response to Combat Trade-Based Money Laundering: The Risk-Based Customs Audit as a Solution, Texas International Law Journal, [VOL. 48(2), p.325-348] [online] Available at: <http://www.tilj.org/content/journal/48/num2/Hoffmann325.pdf> [Accessed 8 Oct. 2018].

Khanna, M. (2016). Trade-Based Money Laundering – Capturing the New Frontier through Analytics. [online] Available at: [http://files.acams.org/pdfs/2016/Trade\\_Based\\_Money\\_Laundering\\_Capturing\\_M\\_Khanna.pdf](http://files.acams.org/pdfs/2016/Trade_Based_Money_Laundering_Capturing_M_Khanna.pdf) [Accessed 8 Oct. 2018].

Levitt, M. (2013). Party of Fraud: Hezbollah's Criminal Enterprise in America. In M. Levitt, Hezbollah: The Global Footprint of Lebanon's Party of God (pp. 317-353). Washington, D.C.: Georgetown University Press. [online] Available at: <https://www.counterextremism.com/threat/hezbollah> [Accessed on 28 Mar. 2019]

Lin, I.-C & Liao, T.-C. (2017). A survey of blockchain security issues and challenges. International Journal of Network Security. 19. 653-659. 10.6633/IJNS.201709.19(5).01.

Maimbo, Samuel & El Qorchi, Mohammed & F. Wilson, John. (2003). Informal Funds Transfer Systems: An Analysis of the Informal Hawala System. IMF Occasional Paper N..

Mauro, J.S. (2015). The New Economy in Financial Crimes: Understanding the effects of Under-Invoicing, Double Invoicing and False Invoicing in Trade-Based Money Laundering and Terrorist Financing (TBML & TF) Schemes. [online] Available at: <http://www.acams.org/wp-content/uploads/2015/08/The-New-Economy-in-Financial-Crimes-S-Mauro.pdf> [Accessed 8 Oct. 2018].

McSkimming, S. (2010). Trade-Based Money Laundering: Responding to an Emerging Threat. Deakin University. [online] Available at: <https://ojs.deakin.edu.au/index.php/dlr/article/view/116> [Accessed 8 Oct. 2018].

Miller, R.S, Rosen, L.W, Jackson, J.K. (2016). Trade-Based Money Laundering: Overview and Policy Issues. Congressional Research Service [online] Available at: <https://fas.org/sgp/crs/misc/R44541.pdf> [Accessed 28 Mar 2019].

Nakamoto, S. (2009). Bitcoin: A Peer-to-Peer Electronic Cash System. [online] Available at: <https://bitcoin.org/bitcoin.pdf> [Accessed 8 Oct. 2018].

- Nkini, G. (2005). Trade Finance Roles of Banks. [online] Available at: [http://siteresources.worldbank.org/FSLP/Resources/Trade\\_Finance\\_Policy.pdf](http://siteresources.worldbank.org/FSLP/Resources/Trade_Finance_Policy.pdf) [Accessed 28 Mar 2019].
- OECD (2016), Illicit Trade: Converging Criminal Networks, OECD Reviews of Risk Management Policies, OECD Publishing, Paris. [online] Available at: [http://www.keepeek.com/Digital-Asset-Management/oecd/governance/charting-illicittrade\\_9789264251847-en#page3](http://www.keepeek.com/Digital-Asset-Management/oecd/governance/charting-illicittrade_9789264251847-en#page3). [Accessed 28 Mar 2019].
- Okazaki, Y. (2018). Unveiling the Potential of Blockchain for Customs. [online] Available at: [http://www.wcoomd.org/-/media/wco/public/global/pdf/topics/research/research-paper-series/45\\_yotaro\\_okazaki\\_unveiling\\_the\\_potential\\_of\\_blockchain\\_for\\_customs.pdf?la=fi](http://www.wcoomd.org/-/media/wco/public/global/pdf/topics/research/research-paper-series/45_yotaro_okazaki_unveiling_the_potential_of_blockchain_for_customs.pdf?la=fi) [Access 28 Mar. 2019].
- Razah, W. (2018). Role of Customs in Identifying and Combating Trade Based Money Laundering in Guyana Invoice Frauds or Mis-invoicing The elusive TBML versus the ever vigilant, conquering, compelling & counterattacking Regulators and Law enforcement. [online] Available at: [http://files.acams.org/pdfs/2018/Invoice\\_Frauds\\_or\\_Mis-invoicing\\_W\\_Razah.pdf](http://files.acams.org/pdfs/2018/Invoice_Frauds_or_Mis-invoicing_W_Razah.pdf) [Accessed 8 Oct. 2018].
- Reuter, Peter (2004). Chasing Dirty Money. Peterson. ISBN 978-0-88132-370-2.
- Stearns, Peter N.; William L. Langer (2001). The Encyclopedia of World History: Ancient, Medieval, and Modern, Chronologically Arranged. Houghton Mifflin Company. ISBN 0-395-65237-5.
- Soudjin, M. (2015). Hawala and money laundering: Potential use of red flags for persons offering hawala services. European Journal on Criminal Policy and Research, 21(2), 257-274. doi:10.1007/s10610-014-9238-6
- State of New Jersey Office of Homeland Security and Preparedness. (2016). DEA: Hizballah Drug Trafficking and Money Laundering Arrests. [online] Available at: <https://www.njhomelandsecurity.gov/analysis/hizballahbundle> [Accessed 28 Mar. 2019].
- Szabo, N. (1994). Smart Contracts. [online] Fon.hum.uva.nl. Available at: <http://www.fon.hum.uva.nl/rob/Courses/InformationInSpeech/CDROM/Literature/LOTwinterschool2006/szabo.best.vwh.net/smart.contracts.html> [Accessed 8 Oct. 2018].
- The Association of Banks in Singapore (2018). Best Practices for Countering Trade Based Money Laundering. [online] Available at: <https://abs.org.sg/docs/library/best-practices-for-countering-trade-based-money-laundering.pdf> [Accessed 8 Oct. 2018].
- The Bank for International Settlements (2014). Trade finance: developments and issues [online] Available at: <https://www.bis.org/publ/cgfs50.pdf> [Accessed 28 Sept. 2022]
- The Capital Markets Company N.V. (2016). Blockchain Trade Finance. [online] Available at: <https://www.capco.com/Intelligence/Capco-Intelligence/Blockchain-Trade-Finance> [Accessed 8 Oct. 2018].

The Hong Kong Association of Banks (2016). Guidance Paper on Combating Trade-based Money Laundering. [online] Available at: [https://www.hkma.gov.hk/media/eng/doc/key-functions/banking-stability/aml-cft/Guidance\\_Paper\\_on\\_Combating\\_Trade-based\\_Money\\_Laundering.pdf](https://www.hkma.gov.hk/media/eng/doc/key-functions/banking-stability/aml-cft/Guidance_Paper_on_Combating_Trade-based_Money_Laundering.pdf) [Accessed 8 Oct. 2018].

Trading with the Enemy: Trade-Based Money Laundering is the Growth Industry in Terror Finance: Hearing before the Task Force to Investigate Terrorism Financing of the Committee on Financial Services. (2016, February 3). 114th Cong. [online] Available at: <https://financialservices.house.gov/uploadedfiles/114-70.pdf> [Accessed 28 Mar. 2019].

Treasury Customs and Excise Division, Isle of Man Government (2017). Trade-Based Money Laundering. [online] Available at: <https://www.gov.im/media/1348726/notice-1000-man-trade-based-money-laundering-29-sep-17.pdf> [Accessed 8 Oct. 2018].

United States Department of the Treasury Financial Crimes Enforcement Network (2003), FinGen Advisory: Informal value transfer systems [online] Available at: <https://www.fincen.gov/sites/default/files/advisory/advis33.pdf> [Accessed 28 Mar. 2019].

United States Department of the Treasury Financial Crimes Enforcement Network (2010), FinGen Advisory: Informal value transfer systems [online] Available at: <https://www.fincen.gov/sites/default/files/shared/FIN-2010-A011.pdf> [Accessed 28 Mar. 2019].

Winter, C. (2016). Drug agencies unravel Hezbollah terror financing ring. [online] Available at: <http://www.dw.com/en/drug-agencies-unravel-hezbollahterror-financing-ring/a-19017825> [Accessed on 28 Mar. 2019].

Wolfsberg Group, International Chamber of Commerce and BAFT (2017). Trade Finance Principles. [online] Available at: <https://cdn.iccwbo.org/content/uploads/sites/3/2017/01/ICC-Wolfsberg-Trade-Finance-Principles-2017.pdf> [Accessed 8 Oct. 2018].

XinFin Organization (2018). Blockchain for Trade Finance Business Whitepaper. [online] Xinfio.io. Available at: <https://www.xinfin.io/pdf/whitepaper/XinFin%20Business%20White%20Paper.pdf> [Accessed 28 Mar. 2019].

Zdanowicz, J. S. (2009). Trade-based money laundering and terrorist financing. *Review of Law & Economics*, 5(2), 3. [online] Available at: <https://www.researchgate.net/publication/46556338> [Accessed 8 Oct. 2018].

Zheng, Zibin & Xie, Shaoan & Dai, Hong-Ning & Chen, Xiangping & Wang, Huaimin. (2017). An Overview of Blockchain Technology: Architecture, Consensus, and Future Trends. 10.1109/BigDataCongress.2017.85.

### Cite this article:

Author(s), Yiu Lai CHAN, (2022). "Trade-based Money Laundering: general methodologies Is smart contract blockchain technology a possible solution?". **Name of the Journal:** International Journal of Academic Research in Business, Arts and Science, (IJARBAS.COM), P, 1-33 , DOI: <http://doi.org/10.5281/zenodo.7126375> , Issue: 9, Vol.: 4, Article: 1, Month: August, Year: 2022. Retrieved from <https://www.ijarbas.com/all-issues/>

### Published by



AND

*ThoughtWares Consulting & Multi Services International (TWCMSI)*

