How Blockchain Technology Can Be Used for Trade Finance Processes in Nigeria

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at Dublin Business School

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Declaration

I, Olufikayo Oye-Bamgbose, declare that this research is my original work and that it has never been presented to any institution or university for the award of Degree or Diploma. In addition, I have referenced correctly all literature and sources used in this work and this work is fully compliant with the Dublin Business School’s academic honesty policy.

Signed: [Signature]

Date: 07 January 2019
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Abstract

Purpose - The purpose of this research is to analyse how the blockchain technology can be used for the trade finance processes in Nigeria. The blockchain stands to be a disrupter of current business processes with the potential to eliminate third parties like the banks, however, its’ application in business transactions is shrouded in ambiguity. This study aims to demystify the blockchain technology through the lens of the trade finance process in Nigeria.

Literature review – This review is centred on three main topics which is: (1) The blockchain technology, covering the key features, how it works, the applications and benefits, general misconceptions and barriers to the adoption. (2) Trade financing which covered the common trade finance processes and the different trade products (3) Nigeria in blockchain and trade finance which looked at Nigeria at a glance, trade financing statistics in Nigeria and the Nigeria’s pulse for the blockchain technology. The review was concluded with the recent milestones the blockchain technology has made in different sectors across the globe.

Methodology - A qualitative approach is used based on semi-structured in-depth interviews from subject matter experts in the blockchain and trade finance process. A critical case sampling in a purposive sampling technique was used to target the sample population, and data collected from these population, in addition to secondary data collected, is used to understand and build the theory for the research.

Findings - The blockchain technology in the trade finance process is about the digitisation and automation of the current process thereby reducing turnaround time from about 7 – 14 days to just 24 hours or near real-time, thus making faster settlements. This digitisation takes away the paper process of dispute resolution, contract agreement, document presentation, confirmations, verifications, approvals and the tracking and tracing of shipments.

Recommendations – Further research is needed to understand the blockchain in other business processes to facilitate its global adoption, and also, to see if the blockchain can itself be disrupted by other digitisation technologies in the future.

KEYWORDS: Blockchain technology, Trade Financing, Nigeria, Digitisation
CHAPTER ONE: Introduction

1.1 Background

“Whereas most technologies tend to automate workers on the periphery doing menial tasks, blockchains automate away the centre. Instead of putting the taxi drivers out of a job, blockchain puts Uber out of a job and lets the taxi drivers work with the customers directly”

(Vitalik Buterin – Co-Founder of Ethereum)

Blockchain technology is gaining much attention from financial institutions due to its capacity to be an enhancer and disrupter to existing processes and systems. It has been described as a “game changer and the fifth pillar of the IT revolution after mainframes, personal computers, internet and social media” (Kokina, Mancha and Pachamanova, 2017). Also referred to as distributed ledger technology, it is a new type of real-time database system that allows access of data to multiple parties at the same time, with an unprecedented level of confidence (Carlozo, 2017).

Investments in this technology is on the increase globally with a prediction of the blockchain usage in companies rising from USD 2.5 billion in 2016 to USD 19.9 billion by 2025 (Nair and Sutter, 2018). Companies are exploiting the varied opportunities and applications of blockchain to create new, transparent, efficient and streamlined business models to optimize their ecosystems and reduce risks and uncertainties. The adoption rate is high across different institutions in finance, law, media, real estate and intellectual property predominantly because of three key properties: smart contracts, immutability of records, and, disintermediation of trust (Cohen, Tyler and Buxton, 2017).

Across the different sectors, the disintermediation of trust of the blockchain threatens the financial institutions the most since they are the current trusted intermediary for transactions between parties. According to Young and Labbé (2017), the global estimation of blockchain powered lending will rise from USD 64 billion in 2015 to USD 1 trillion by 2025.
Figure 1. Value of Blockchain Peer to Peer Lending from 2012 – 2025 (USD bn)

With such staggering statistics in just one financial lending product, it comes as no surprise that the banks and financial services providers have the highest adoption rates for the blockchain.

Trade finance is amongst the recent and earliest successes in the application of the blockchain technology in the financial services industry. It is the financing for both domestic and international trade transactions, involving buyers and sellers of goods and services, with major transactions in importation and exportation (The Economist Intelligence Unit, 2017). Despite the risks, international trade transactions are a richly rewarding business involving both contractual and commercial factors that affect the security and profitability.

Banks play a major role in intermediating for trade finance transactions by evaluating the potential import or export contract and applying a suitable terms of trade which could be done as an open account, a documentary collection, letters of credit, bills for collections and advance payments (Creighton, 2016). The banks also offer discounting options, bonds, guarantees and standby letters of credits, all of which are a rich source of income.
With the blockchain platform in trade finance, much of the transactions done by banks will become obsolete, hence the reason for the quick adoption of the blockchain. By adapting their processes, they can compete with other financial technology (fintech) companies and continually remain strategically positioned to ward off the disruption.

Countries like Nigeria, that are heavily dependent on international trade, would either benefit immensely with the blockchain or be disrupted by it. As digital disruption shrinks the role and relevance of banks, it can also simultaneously create a faster, cheaper and more efficient institution.

- What exactly is the blockchain technology?
- How is it applied to business processes?
- How can it be applied to trade finance process?
- What are the potential benefits and risks involved?
- Why should Nigerian banks adopt the technology?

The goal of this research is to provide an understanding of the application of the blockchain technology through the lens of the trade finance process in Nigeria: to understand what the current trade finance process is and to see how the blockchain process can be adapted to this process.

### 1.2 Aims for the Proposed Research

This overall aim of this research is to investigate how the blockchain technology can be used for trade finance processes in Nigeria.

#### 1.2.1 Research Question

How can blockchain technology be used for trade finance processes in Nigeria?

#### 1.2.2 Research Aim

- To investigate the current trade finance process in Nigeria
- To understand what really happens when the blockchain technology is used in a transaction process
- To show how the technology can be adapted to the current trade finance process in Nigeria.
To show the potential benefits and/or risks involved in the adaptation of the blockchain

1.3 Rationale for the Proposed Research

Blockchain technology has been said to have the same disruptive tendencies to the traditional financial institutions as the internet technology did to traditional media (Workie and Jain, 2017). Whilst the technology may not immediately replace the current financial ecosystem, its’ relative impact could be transformational and equally detrimental.

Trade financing accounted for USD138bn in 2017, constituting 37% of total GDP in Nigeria and generating USD1.4bn in profits to the government per quarter (National Bureau of Statistics, 2017). With such a dependence on imports and exports for economic growth, it is important for the banks processing these transactions to key into the blockchain revolution.

The blockchain “genie” is out of the bottle and there is no turning back. Understanding the process is of necessity, so that such a major source of income to the banks and the economy at large would not be crippled.

Figure 2. GDP for Nigeria from 2012 to 2017

Whilst it is of increasing interest, the blockchain process is still vague and clouded in ambiguity, with many associating the technology to just cryptocurrencies.

This research is of relevance to:

- Demystify the blockchain technology process by understanding how it can be used in the Nigerian trade finance process.
- Provide a report that shows the importance and necessity to adapt the technology to trade finance process.

Christine Lagarde, the Managing Director of the International Monetary Fund (IMF) said that “Not so long ago, some experts argued that personal computers would never be adopted, and tablets would only be used as expensive coffee trays” (Lagarde, 2017).

Tablets were adopted, and traditional computers suffered the consequences of underestimating its influence. Blockchain technology is not to be pushed aside or disregarded, as the traditional financial service providers might suffer the consequences of not understanding its application.

1.4 Dissertation Roadmap

This research is structured into seven chapters. These are;

i. **Chapter 1**: This will introduce the research and give a background of the topic, which includes the research questions, objectives and scope of the research.

ii. **Chapter 2**: This will give an extensive literature review on the blockchain technology, an overview of the trade finance process, and Nigeria’s trade statistics. It will also provide the context and relevance of the study.

iii. **Chapter 3**: This will explain the research methodology, detailing how the research was conducted and what methods were used.
iv. **Chapter 4:** This will present and analyse the data and findings in the research and form the basis for discussion in the proceeding chapter.

v. **Chapter 5:** This will discuss and review the work done, interpret the results and answer the research question.

vi. **Chapter 6:** This will give the conclusions and summary of the research findings and analysis and possible recommendations.

vii. **Chapter 7:** This will provide an informal self-reflection on the researcher's experiences during the course of the dissertation and the master's program in general.

### 1.5 Scope and Limitations of the Research

This dissertation is conducted in the context of understanding the blockchain technology in a business process, through the lens of the Nigerian trade finance process. The scope centres around analysis from five interviews in total, three of which are on the trade finance process in Nigeria, while the remaining two, are on the blockchain technology. It also includes research and analysis from other research studies and white papers relating to this subject.

The main limitation of the research is that analysis is based on the interviewee's perspectives in this regard, and as such, there is no means of validating the accuracy of the information provided. Further limitations will be discussed in detail in chapter 3.

### 1.6 Major Contributions of this Study

As earlier mentioned, this research aims to get a deeper insight and demystify the blockchain technology, which is a current wave in the business world. This report can be used by companies and individuals to understand the functionality of the blockchain technology and how it can be applied to business processes.
CHAPTER TWO: Literature Review

2.1 The Blockchain Technology

Blockchain technology is a distributed ledger or a digital record of transactions that allows for the creation of immutable records that is shared by a network of participants, offering transparency, speed and enhanced security (Lewis, McPartland and Ranjan, 2017)

There is a widespread enthusiasm in the potential of the blockchain technology’s ability to change the way transactions are arranged, recorded and verified, with business leaders across several industries harnessing this potential in streamlining business processes from a centralized structure towards a decentralized system (Acker, 2017). The aim for this decentralized system, in addition to streamlining business processes, is to enable new business models which could in turn reshape industries.

The current system across different sectors, uses a centralized ledger system whereby transactions between parties are concluded with the help of trusted intermediaries, like the bank, with each party keeping its own record or ledger.

The distributed ledger system is a permissionless system that uses a global distributed network of computers to record transactions in such a way that they cannot be altered once approved. There is no separate ledger reconciliation or centralized clearance as transaction reconciliation are done real-time and updated on the network where each party of the transaction has direct access.
2.1.1. The Key Attributes of the Blockchain Technology

According to Cohen, Tyler and Buxton (2017), there are three key properties that gives the blockchain technology its disruptive tendencies;

1. **Integrity and immutability of records/ Tamper proof**
   Once transactions are added to the blockchain network, it cannot be altered and becomes permanent. For any alteration to be done, every single party in that chain must approve and a consensus given. If there is a new record inputted or breach in one block, it automatically alerts every other block for an approval or rejection. This property makes a breach or fraud in the chain impossible.

2. **Smart Contracts (The new trusted intermediary)**
   These are software-driven rules that enforces the terms agreed by all parties involved in a contract or business transaction. It is an automated legal contract written in computer codes that execute automatically once certain conditions, specified in the contracts are met. This smart contract property becomes the trusted intermediary that would disrupt the role of
the traditional financial intermediary. Once conditions for a particular transaction is met and terms are agreed, the smart contract would enable the execution for the completion of the transaction and the exchange of payments for the resource.

3. **Disintermediation of Trust**

Each party in the blockchain is identified with a cryptographically secure token that creates the digital ownership certificate, which then gives each party its digital signature. This digital signature works exactly like the fingerprint, hence, also called digital fingerprint in some texts.

Like the fingerprint, it is virtually impossible to forge or replicate thus increasing the security of the blockchain. It also means, that “strangers” to the block cannot transact on the network as the digital fingerprint would be required to initiate and approve transactions.

### 2.1.2 Terminologies in Blockchain / Blockchain Jargon

#### 2.1.2.1 Distributed Ledger Technology (DLT)

Distributed Ledger Technology (DLT) is essentially “a decentralized data storage technology that enables users to share, synchronize, and replicate data in multiple network nodes, multiple physical addresses, or multiple organizations” (Huawei Technologies, 2018). It has two main distinguishing factors:

1. It is based on consensus rules with no central authority unlike the traditional storage system that is controlled by a central node or authority.
2. While in the traditional storage system, data is divided into many parts and then stored, with the DLT, each node has an independent and complete copy of data, such that all copies are synchronized and have the same information.
2.1.2.2 Consensus

A consensus is simply the agreement mechanism that enables trust within the blockchain process (IBM, 2018). For consistency and trust among all participants of the blockchain, a consensus algorithm is used to reach an agreement. This algorithm varies from blockchain to blockchain but generally includes the following:

1. **Proof of Work (PoW):** Used in a public blockchain and is the algorithm adopted by the bitcoin system although it is been gradually replaced by the PoS (Huawei Technologies, 2018)

2. **Proof of Stake (PoS):** This is also used in a public blockchain and is the foundation for a consensus. For transactions to be validated here, the validators must hold a certain percentage of the network’s total value, thus, have an increased protection from malicious attack on the network (IBM, 2018)

3. **Multi-Signature:** In this algorithm, majority of the validators must approve and agree, before a transaction is validated. This means that in a system that has five validators, three out of the five must approve for a consensus to be reached.

4. **Practical Byzantine Fault Tolerance (PBFT):** This is used in a private blockchain system and it is the algorithm used to settle disputes among network participants, when one participant generates a different output from others in a set (IBM, 2018)

2.1.2.3 Smart Contracts

Smart contracts are computer protocols that allow the performance of trusted transactions without third parties, and are intended to digitally facilitate, verify, or enforce the performance of a contract. (Huawei Technologies, 2018). They provide security that is superior to the traditional contract law and it is also cost effective.

2.1.2.4 Cryptography

This is the coding technology that ensures information and communication security in the blockchain by the use of various systems, such as the hash algorithms, symmetric encryptions, digital signatures and digital certificates (The Economist Intelligence Unit,
The major features of the cryptography are for integrity, confidentiality and identity authentication (Acker, 2017)

1. **Integrity**: Hash algorithms are used to protect the integrity of ledgers against tampering. As it is impossible to produce the same hash value for a different input data, it makes it easy to quickly detect the presence of tampering as changing any record in the blockchain would mean changing all the hashes in other records in the blockchain.

2. **Confidentiality**: Encryption technologies are used to generate a key to encrypt and decrypt data in the blockchain.

3. **Authentication**: Digital signatures and certificates are used to verify the peer identity which is used to prevent fraud or forgeries, as the signatures are impossible to duplicate.

Other blockchain nomenclature as explained by United Nations Economic & Social Council (2018) are:

2.1.2.5 **Node**: This is the system that hosts a full copy of the blockchain ledger

2.1.2.6 **Validation**: This is when a consensus algorithm is achieved when the work performed by all nodes in parallel that verifies transaction, give rise to a mutual validation. All the nodes then commit or record the transaction onto their blockchain

2.1.2.7 **Block**: This is the data that is added to a ledger after a consensus is achieved. Once a block is added to the chain, it cannot be altered

2.1.2.8 **Hash**: This is a fixed size, unique cryptographic fingerprint of data that allows users to confirm that no changes have been made. It is a one-way function that cannot be reverse-engineered such that it cannot be used to re-create another data.

2.1.2.9 **Ledger**: This is a type of journal database system where transactions are recorded once and not subsequently updated. This ledger could be kept digitally or with paper records and can be read multiple times but written only once.
In summary therefore, a blockchain database is:

“a sequence of data blocks that have been added in a specific order, by consensus of the network operators, to each of multiple copies of the ledger and where each block contains a fingerprint (hash) that can be used to verify the content of all the previous blocks” (United Nations Economic & Social Council, 2018)

2.1.2 How Does the Blockchain Work?

IBM’s blockchain for dummies (IBM, 2018) explains the blockchain process as thus:

1. Transaction data are stored in blocks that are linked together to form a chain, hence, the name blockchain.

2. The blockchain grows as the number of transaction grows. New transactions are verified using a network algorithm before it is added.

3. The network is governed by rules agreed on by the network participants, which is used before transactions are logged into the blockchain.

4. Each block contains a hash (a digital fingerprint or unique identifier), timestamped batches of recent valid transactions, and the hash of the previous block.

5. The previous block hash links the blocks together and prevents any block from being altered or a block being inserted between two existing blocks.

6. In this way, each subsequent block strengthens the verification of the previous block and hence the entire blockchain.

7. The method renders the blockchain tamper-evident, lending to the key attribute of immutability.
Thus, a new record in the distributed ledger is written to a cryptographically signed block that independent nodes must verify. The new block is written to the ledger after it is verified and then linked to previous blocks - creating immutability (United Nations Economic & Social Council, 2018).

A simpler pictorial illustration of the blockchain process by Lewis, McPartland and Ranjan (2017), is as shown below:

**Figure 4: Stage 1-4 of a Typical Blockchain Technology Process**

**Stage 1: Distributed Ledger Technology (DLT) Setup**

| **Operator** | Each node operator is able to update his/her record in the ledger, communicate the information to the network, and reconcile his/her ledger with the other nodes in the network |
| **Consensus** | Each node communicates with the others to ensure consensus after an addition to the ledger |
| **Node:** | Each node in the DLT network has an identical copy of the data |

Source: (Lewis, McPartland and Ranjan, 2017)
Stage 2: DLT network – All records are updated

This is the current state of the ledger

Source: (Lewis, McPartland and Ranjan, 2017)
Stage 3: DLT network - New record added and state changes

<table>
<thead>
<tr>
<th>Icon</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>✗</td>
<td>When a node operator updates his/her records and digitally signs the ledger, it will invoke a reconciliation/consensus fail alert.</td>
</tr>
<tr>
<td>!</td>
<td>Represents a change in the state of the ledger. In this example, the state of the ledger changes from chicagofed0 to chicagofed100.</td>
</tr>
<tr>
<td>!</td>
<td>When the states of the ledgers do not match, there is an alert that notifies node operators about the change.</td>
</tr>
</tbody>
</table>

Source: (Lewis, McPartland and Ranjan, 2017)
Stage 4: DLT network – Reconciliation and Consensus achieved.

When all node operators agree to the change and consensus is reached, the entire network will update their own ledgers. This ensures the immutability of records for the network participants and end-users.

Source: (Lewis, McPartland and Ranjan, 2017)
In summary, transactions are verified through consensus, participants confirm changes with one another and cryptographically ensures the integrity and security of the information. This eliminates the need for a central certifying authority (PwC, 2018)

Figure 5. Summary of How the Blockchain Transaction Works

2.1.4 Applications and Benefits of the Blockchain

Blockchain is poised to change and create extraordinary opportunities for how businesses can be done in new ways. As a tamperproof distributed ledger, it does not just free up capital, cut out intermediaries, lower transaction cost, increase speed and reach, and provide security and trust, it also offers greater transparency and traceability for many business processes (PwC, 2018)
The blockchain is of relevance to businesses particularly if the nature of the business involves four or more of the conditions stated below (Acker, 2017)

- If several participants share a common data or needs the views of a common information.
- If several participants are involved in the update or change of a data
- If there is the need to trust or verify that actions recorded are valid
- If the absence of a central authority will prove to be cost effective and less complex
- If there is a need to reduce the delay in transaction processing time or for time sensitive interactions
- If the transactions are created by multiple parties that are dependent on each other

According to Lewis, McPartland and Ranjan (2017), the applications and benefits of the blockchain includes:

1. **Digital currencies**
   The blockchain facilitates financial transactions with a decentralized currency that crosses borders and eliminates intermediaries. These were the first applications of the blockchain technology as it was the tool behind cryptocurrencies such as the bitcoin. In the era of online and digital banking, cryptocurrencies are becoming increasingly popular and been accepted as a currency exchange in lieu of cash.

2. **Digital assets**
   The transaction and settlement time for physical assets that require a great deal of verification and examination, such as real estate, stock certificates or gold, is significantly reduced with the blockchain. The verification process is faster, and the risk of fraud is eliminated

3. **Record keeping and contract management**
   A digital audit trail of every transaction is kept, and the details of all parties involved are registered. The blockchain ensures that contracts
are executed according to the listed conditions. The records are also immutable and easy for interested parties to access or query. Consumers can share records across multiple entities while safeguarding data privacy

4. **Finance**
The settlement periods between trade transactions can be reduced significantly thereby fostering greater liquidity particularly for trades that have lengthy settlement cycles.

The blockchain service with digital identities can be used to reduce settlement times for the foreign exchange sector that uses the global payment system which involves multiple regulatory checks, in addition to passing through settlements banks and commercial banks to facilitate movement of currencies.

5. **Asset traceability**
Goods can be tracked along the supply chain and throughout the life cycle to improve decision making about inventory management and repairs

6. **Tax and Customs**
Authorizing and streamlining compliance burdens by executing transactions precisely and reliably while automatically generating documentation

7. **Identity Management**
Authenticating identity on a blockchain for credential, identity, loyalty and rewards program management

8. **Audit and Compliance**
It enables real-time transaction level assurance and provides additional transparency to stakeholders
2.1.5 Misconceptions about the Blockchain Technology

According to Huawei Technologies (2018), there are two general misconceptions about the blockchain technology.

1. **The blockchain is the bitcoin:** Many people regard the blockchain as the same as the bitcoin or other cryptocurrencies. However, the cryptocurrencies are just one of the applications of the blockchains, howbeit the first and the most popular application.

2. **The blockchain is such a powerful technology that it can replace other technological infrastructure, the internet and other database systems:** some people believe the it would replace other centralized databases such as the Oracle, however, this is an exaggerated view of the blockchain’s potential. Blockchain is mainly based on cryptography and consensus algorithms which still have to be integrated into existing technologies.

   The distributed ledger is a supplement that works with existing databases, as independent data storage is a necessity that cannot be replaced. The blockchain therefore needs other technologies, databases and the internet, to build its model (Huawei Technologies, 2018).

   While the blockchain contains transaction data, it is not a replacement for databases, messaging technology, transaction processing, or business processes but contains verified proof of transactions (IBM, 2018)

2.1.6 Barriers to the adoption of the Blockchain

Although blockchain has the potential to deliver significant cost reductions, increase efficiency and transform business models, many obstacles currently lie in its way, some of which as explained by Lewis, McPartland and Ranjan (2017) are:
2.1.6.1 Regulatory Uncertainty

**Uncertainty:** There are currently many uncertainties on the appropriate rules across various regulatory agencies as the existing regulations can cause major hurdles for DLTs.

**Currency control:** Central banks are yet to find appropriate control mechanisms through which it can maintain control over digitized currencies. This is necessary to ensure that when commercial banks place money in special accounts and then digitize the money on the bank’s blockchain, the digital currency issued does not exceed the amount held as central bank reserves.

**Legal uncertainty:** In cases of failure, fraud and bankruptcy issues, firms, particularly those that operate in multiple jurisdictions, do not currently have clarity over the laws and regulations that will apply to DLT implementations.

2.1.6.2 Collaboration Challenge

**Achieving consensus:** There is a need for consensus among a blockchain network’s members as any protocol changes must be approved by all. This could be resolved if in a permissioned network system, one or a few participants are given the authority to make protocol changes that were binding upon the entire network. It however means a significant amount of trust would be required in the authorized participants.

**Standardization:** Due to a lack of standardization of blockchain network designs, many businesses are wary about its implementation and are reluctant to accept. Although, many national and international organizations are trying to establish generally accepted technical standards.

**Interoperability:** There is the possible challenge of the interoperability of blockchain platforms with the existing internal systems of businesses. Many businesses are awaiting to also see how blockchains from multiple businesses might operate with each other.
2.1.6.3 Complex Technologies

Immutability: A key feature in the blockchain is the immutability of records, such that, once a transaction is added to the blockchain, it is permanent and cannot be altered. This would pose a serious challenge when regulators demand a reversal of trade transactions, as it means, an equal and offsetting trade must be initiated which all the parties involved in the original trade will both need to accept.

2.1.6.4 Trust Issues

Privacy: Some firms may be concerned about the confidentiality and information transfer in the blockchain and may be reluctant to participate in a shared database in case of information leakage that could cost the firm’s business.

Security: Cybersecurity is an on-going threat particularly to any system that relies on the internet network. The blockchain’s distributed nature creates a security concern as the more participants there are in the network, the more points of attack it creates for cybercriminals to target. If cybercriminals can successfully steal a user’s information necessary to submit a trade, they could invariably create fraudulent transactions on the network that would be immutable.

2.1.7 Vectors of Progress in the Adoption of Blockchain

Despite the barriers in the widespread adoption of the blockchain, there has been notable progress in driving its adoption. According to Schatsky, Arora and Dongre (2018) from Deloitte Insights, there are five vectors of progress driving the blockchain adoption. These are:

1. Increasing throughput and higher performance models by developing newer consensus mechanisms which improves the speed significantly and reduce the number of nodes that must validate a transaction for it to be considered final.

2. Enhancing standards and interoperability, as efforts are gaining good grounds in ensuring a standardized operating model for the blockchain. In just one year, as many as 600 members signed up to the Etherium blockchain software for
their business and 250 organisations joined the Hyperledger foundation for cross-country blockchain technologies.

The big tech companies like IBM and Microsoft, are improving on the interoperability by implementing data standards that can be used for supply chain businesses

3. Tech giants such as Google, Amazon, IBM and Microsoft now provide cloud-based and new software platforms for the blockchain technology in a bid to reduce complexity and high costs associated with the blockchain adoption. These clouds and platforms are providing easy-to-use automated blockchain templates that reduce the application development from months to days, thus fostering a greater adoption on the technology over time.

4. Regulatory support is gaining momentum as more and more legislatures and bills are being passed in support of the blockchain technology. These includes 17 US states legislatures passing dozens of bills, the US Congress Joint Economic Report that coordinated a regulatory framework that provided clarity for blockchain developers, and, the US Financial Stability Oversight Council together with the US Trade Commission that formed groups to examine how their objectives could be affected by the technology.

5. A growing number of blockchain consortia is a bullish sign of the growth in the adoption of the technology, with an increase to about 61 consortia globally when compared to 2017. These consortia are groups of companies that are collaborating to advance shared objectives for the technology, such as from defining use cases, setting standards, developing infrastructure and applications, and operating a blockchain network, to educating, conducting research and providing advice to its members.

These five vectors of progress would over time foster the adoption of the blockchain by lowering the cost and any associated risks involved in deploying the technology, and more and more enterprises engage in the practical applications of the technology (Schatsky, Arora and Dongre, 2018).
2.1.8 Recent Milestones in Blockchain Technology

Some notable and recent examples of the different accomplishments in the application of the blockchain technology are:

**In October 2017:** Japan’s three biggest banks (Mizuho Financial Group, Sumitomo Mitsui Financial Group, and Mitsubishi UFJ Financial Group), partnered with Fujitsu, the Japanese multinational IT provider, to field trial blockchain money transfers (World Advertising Research Council, 2017).

**In November 2017:** TradeIX, a leading trade finance company, together with AIG and Standard Chartered, completed the first blockchain-enabled end-to-end invoice finance transaction for a global logistics company (TradeIX, 2018).

**In March 2018:** IBM, the tech company, partnered with Unilever, the consumer-packaged goods manufacturer, to experiment with using blockchain technology in the media-buying process, to tackle the several problems associated with the process (World Advertising Research Council, 2018c).

**In April 2018:** Alibaba, the Chinese e-commerce giant piloted a blockchain supply network, using blockchain technology and controls, to improve the transparency and boost consumer confidence in the source of food products shipped from Australia and New Zealand, that is sold on its Tmall online marketplace (World Advertising Research Council, 2018a).

**In July 2018:** A group of financial giants (Deutsche Bank, HSBC and Rabobank) performed the first cross-border commercial transaction through the Hyperledger fabric of the blockchain platform of IBM’s “we.trade” (IBM, 2018).

**In September 2018:** Ripple, a Fintech company that is modernizing global payments and offices across the globe, signed up PNC Bank, the 9th largest bank in the United States by assets with about 8 million customers, on the Ripple blockchain platform for cross-border payments- RippleNet. This RippleNet enables banks and payment providers worldwide to transact easily across its robust network (Ripple, 2018).
In October 2018: Anheuser-Busch InBev, a multinational drink and brewing holdings company in Belgium and the World’s largest brewer, used a blockchain solution to run an innovative mobile advertising campaign and was able to achieve high levels of transparency and viewability. The solution also allowed them to verify the delivery of brand messages, gain a clear view about whether the media plan was reflected in the final campaign, and track results (World Advertising Research Council, 2018b)

National Bank of Canada in partnership with IT and business consulting services firm CGI, and blockchain start-up company Skuchain, ran a pilot test with blockchain, to simplify complex Processes by leveraging smart contracts to replace e-mail based procedures (Suberg, 2018)

HTC, a mobile telecommunications company, announced that people could sign up for the pre-order of blockchain enabled phone to be released later this year. The blockchain feature in the phone is a wallet in a secure area of the phone that is protected and separate from the Android OS. It can also only be purchased in cryptocurrencies (Liao, 2018)

Visa, a global payment provider, is integrating an open-source blockchain code from the Hyperledger Fabric that allows for cross-border payments between businesses, ahead of the commercial launch of its own blockchain service for enterprise payments in Q1 2019 (CCN, 2018)

With these milestones, it is evident that the global adoption of the blockchain is growing and more companies are adapting their processes with the technology. As Ginni Rometty, the current CEO of IBM stated:

“What the internet did for communications, blockchain will do for trusted transactions” (IBM, 2018)
2.2 Trade Financing

Trade finance applies to both domestic and international trade transactions, requiring exchange of goods and services through financial intermediaries, mainly the bank, to facilitate these transactions (Hansen and Kokal, 2018). It covers different activities in financing imports and exports through different parties that include importers, exporters, banks, insurers and other export financiers.

Trade financing is defined as the “introduction of a third-party to transactions to remove the payment risk and the supply risk, while providing the exporter with payments according to the contract, and the importer with extended credit” (National Bureau of Statistics, 2017). This is done through several activities that includes lending, the issuance of letters of credit, factoring, export credit and insurance.

Banks are the popular third-parties involved in trade financing as they have the dynamic capability to manage payments effectively and easily, secure export contracts and payment for export goods, extend credit terms, secure the delivery of imported goods and improve cash flow on the payment receivables (Hwang and Im, 2017).

2.2.1 The Trade Finance Process

In an international trade transaction, two key players are involved; the exporter who requires payment for their goods or services, and, the importer, who wants to make sure they are paying for the correct quality and quantity of goods (Global Trade Review, 2018). In most cases, these players are unfamiliar with each other and as such, have to overcome certain risks that could occur during the process. These risks are:

1. Payment risk: This is the uncertainty around either the exporter receiving its full payment at the appropriate time, or, the importer receiving the quality and quantity of goods ordered for, after payment has been made.

2. Country risk: This is the uncertainty around doing business transactions across borders, such as, fluctuations in foreign exchange rates and political risks
3. Corporate risk: This is the uncertainty around the integrity of the two players such as their credit ratings or any prior history of non-payment.

Banks and other financiers have come up with several trade finance products to reduce the risks associated with the trade transactions

2.2.2 Trade Finance Products

The Global Trade Review (2018) explains the five popular trade finance products, which are either short-term finance products maturing within a year, or medium to long-term trade finance products that is from five to twenty years. These are:

2.2.2.1 Letter of Credit (LC)

An LC is a guarantee issued by a bank on behalf of its importing client assuring the exporter that the correct payment would be made within the specified time frame if the exporter complies with certain terms and conditions and the right goods are sent (Global Trade Review, 2018). Thus, in the event of a default in payment from the importer, the bank would be held liable for the payment.

With the LC, the bank steps in to avert the payment risk in the trade transaction. The exporter is assured of receiving payment and the importer is assured of receiving the correct goods (Hwang and Im, 2017).

This is the oldest and most common form of short-term trade finance.
2.2.2.2 Supply Chain Finance (SCF)

SCF is a short-term financing process from the bank to the supplier and buyer, that optimizes the working capital (funds for general day-to-day expenses for the company) for both parties, by lowering financing costs and improve business efficiency (Global Trade Review, 2018).

With SCF, the supplier sells their invoices to the bank at a discount, thus enabling them to have faster access to funds to use as working capital, whilst the buyer has gotten more time to pay.

In transactions involving a small supplier and a big buyer with high ratings, the supplier can get their invoices paid at a discount from the bank rather than wait for the due date of payment from the buyer, granting them quick access to funds rather than having it tied up in unpaid invoices. This process is a supplier finance program.

In a reverse process, the bank gives credit facilities to the buyer to pay the supplier immediately and repay the bank on the required due date of the transaction. This process is a buyer finance program.
Unlike the LC where the banks are dealing with just one trade transaction, with SCF, they would be supporting a continuous flow of goods. This has become increasingly popular with globalization and the complex process involved with supply chain management (Hwang and Im, 2017)

2.2.2.3 **Structured Trade and Commodity Finance**

This is a long-term financing of cross-border commodity flows involving high-value supply chains. This is done in several ways: (Global Trade Review, 2018)

1. **Pre-export finance (PXF):** Here, the bank uses the export contracts as collateral when providing the finance for the trade.

2. **Borrowing base facilities:** Here, the bank provides credit facilities to the business to be used as working capital. The collateral for this credit is the current assets of the company.

3. **Revolving credit facilities (RCF):** The bank provides flexible financing option, usually to a big commodity trading house, who can draw from and pay back as needed, thus benefiting from extra flexibility.

4. **Warehouse financing:** Here, the bank accepts the commodities in the warehouse as collateral for financing the producer of the commodities.

2.2.2.4 **Export and Agency Finance (ECA)**

ECAs are public government-owned agencies and entities that provide government-backed loans, guarantees and insurance for international export operations to domestic companies, particularly when the trade involves developing countries and emerging markets (Global Trade Review, 2018)

Here, political and country risks are averted in order to promote export in the country and also providing credit facilities for the export at the pre-shipment or post-shipment stages.
2.2.2.5 Trade Credit and Political Risk Insurance

Trade credit insurance is given to protect against non-payment due to a default, insolvency or bankruptcy.

Political risk insurance is given to protect against non-payment due to exposure to political and country risks which includes, default in payment due to actions of the foreign government, acts of terrorism, war and other political violence (Global Trade Review, 2018).

Unlike the other trade finance products where the bank bears the risks in the trade transaction, with trade credit and political insurance, the risks are borne by private insurance companies. These private insurance companies offer specialist insurance protection against credit and wider political risks to the banks and other financial institutions, exporters and importers, commodity traders and foreign investors (Global Trade Review, 2018).
## 2.3 Nigeria in Blockchain and Trade Financing

### Nigeria at a glance

<table>
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<tbody>
<tr>
<td>President</td>
<td>Maj Gen (Rtd) Muhammadu Buhari</td>
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<td>Vice President</td>
<td>Oluyemi Osinbajo</td>
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<td>Number of States</td>
<td>36</td>
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<td>Region</td>
<td>West African.</td>
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<tr>
<td>Independence Day</td>
<td>1st October 1960</td>
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<tr>
<td>Nationality</td>
<td>Nigerian</td>
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<tr>
<td>Religion</td>
<td>50% Muslim, 40% Christian, traditional beliefs 10%</td>
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<td>Official Language</td>
<td>English</td>
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<tr>
<td>Population (000, 2017)</td>
<td>190,632,261</td>
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<tr>
<td>National Currency</td>
<td>Naira (NGN)</td>
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<tr>
<td>Natural Resources</td>
<td>Natural gas, petroleum, tin, iron ore, coal, limestone, niobium, lead, zinc, arable land</td>
</tr>
<tr>
<td>Labor force</td>
<td>60.08 million (2017 est.)</td>
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<td>Unemployment rate</td>
<td>13.4% (2017 est.)</td>
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<tr>
<td>Political Environment</td>
<td>- High level of corruption with Corruption Perception Index of 27% ranking 148 out of 180 countries</td>
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<td></td>
<td>- Political instability due to high level of terrorism for militant groups and Boko Haram Islamic terrorist group</td>
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<tr>
<td>Economy</td>
<td>- GDP – USD 1.1 trillion in 2017</td>
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<td></td>
<td>- Giant of Africa with largest economy and second largest producer of oil in Africa</td>
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<td></td>
<td>- Heavily dependent on oil as the main source of revenue and foreign exchange</td>
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<td>- Corporate Tax stands at 30%</td>
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<td>- Personal Income Tax is 24%</td>
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<tr>
<td>Legal Structure</td>
<td>- Legislative, Executive and Judicial</td>
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<tr>
<td></td>
<td>- Legal system comprises English, Islamic and Traditional law</td>
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Source: (CIA World Fact Book, 2018)
2.3.1 Trade Finance in Nigeria


Figure 8. Trade Summary from 2013 to 2017 (1 USD = 360.50 N)

The international trade in Nigeria composes more of exports than imports, with the exports leaning predominantly on crude oil. The popular trade items are crude oil, energy goods, agricultural goods, palm produce, raw materials, solid minerals and manufactured goods.

The economy thrives on international trade and the banking sector is the facilitator of these transactions. The popular trade financing transactions done by the Nigerian banks are:

- Import Finance Facility
- Unconfirmed and Confirmed Letters of Credit
- Export Financing
- Bills for Collection
- Shipping Guarantees and Structured Commodity Financing.
- Invisible transactions

The top five export and import trading partners with Nigeria are from China, India, USA, UK and Spain (National Bureau of Statistics, 2017).

Statistics in the half year economic report of 2017 released in June 2018 from the Central Bank of Nigeria shows an increase in the value of the aggregate external trade from NGN10,196.42 billion (USD28.1 million) the second half of 2016 to NGN11,340.49 billion (USD31.3 million) in the first half of 2017.
This gave rise to an increase in GDP contribution during this period, from 18.1 percent to 21.2 percent. There was also a trade surplus of NGN1,338.73 billion (USD 3.7 million) against a deficit of NGN 548.03 billion (USD 1.5 million) in 2016.

**Figure 10. Export, Import and Trade Balance from 2016 to 1st Half of 2017**

Source: Central Bank of Nigeria

### 2.3.2 Nigeria's Pulse for The Blockchain Technology

Earlier in October 2017, a committee set up by the Central Bank of Nigeria and the Nigeria Deposit Insurance Commission investigated the possibility of accepting and regulating the virtual currencies. However, a press release issued by the Central Bank of Nigeria on February 28 2018, in furtherance to the circular issues in January 2017, cautioned Nigerians to be wary of investments in cryptocurrencies, reiterating that virtual currencies are still not a legal tender in Nigeria (Central Bank of Nigeria, 2018).

This was because the virtual currencies are traded in exchange platforms that are still unregulated globally, and, are largely untraceable thus making it susceptible to money laundering activities and terrorism financing.
In June 2018, economic experts urged the government to adopt the blockchain technology as it had the potential to attract foreign direct investments (FDI) into the country (Okonji, 2018). They further urged that it was regrettable that Nigerians had fallen prey to wonder banks and ponzi schemes, however, cryptocurrencies and the blockchain should not be linked with such questionable schemes. With effective industry collaboration and appropriate government support, the adoption of the blockchain would boost investors’ confidence and become a major source of FDI for Nigeria (Popoola, 2018).

Quite recently in September 2018, members of the House of Representatives called on the Central Bank and the Nigerian Deposit Insurance Commission to put together a regulatory framework for the blockchain technology (Olagunju, 2018). This comes as no surprise as the global adoption rate for the technology is increasing and other countries have begun regulating the industry.

In addition to the fast-global adoption rate, there has been some notable facts in the use of the blockchain technology in Nigeria. These are:

1. Recently in July 2018, The Nigeria Customs Service adopted the Oracle’s blockchain technology and migrated the Excise Trade Automation Services unto the platform. With this migration, it is expected that a 50 percent increase in revenue could be achieved, as revenue leakages, arising from corrupt practices, would be eliminated (Ogundeji, 2018).

Aber Benjamin, The Assistant Comptroller General in Customs stated:

“The aim for this adoption is to drive trust and transparency in Nigeria’s excise trade by providing irrefutable data in goods manufactured in Nigeria. This would drive investments in goods manufactured in Nigeria because trusted information on all products will be available on the platform” (Ogundeji, 2018).

With the customs on the platform, it invariably means that all companies involved in the export process including the banks and government agencies, would be required to join the platform.
2. SureRemit is a Nigerian non-cash remittance business that enables immigrants to send e-vouchers that can be used to purchase goods and services with different quality merchants, and also pay bills globally. In January 2018, they were able to raise USD 7 million in its initial coin offering (ICO) in partnership with South Korea’s cryptocurrency fund company – Hashed (Olagunju, 2018)

3. Pundix, an Indonesian cryptocurrency and payments company, launched a Point-Of-Sale terminal at a shop in Nigeria which accepts virtual currencies as a means of payment (PundiX, 2018)

According to the World Bank Press (2017), Nigeria received USD 22 billion in remittances in 2017 accounting for the fifth largest globally, coming after India, China, Philippines and Mexico. The press release stated that these remittances are a lifeline for developing countries as it is a good contribution to the GDP. The cost of remittance is however high at an average of 7.2 percent.

The figure below shows the contribution of just private home remittances in the first half of 2017 as N 3,155.93 billion (USD 8.7 million). This was 5.8 percent contribution to the GDP at that period (Central Bank of Nigeria, 2018).

**Figure 11. Private Home Remittances from 2016 to 2017**

Source: Central Bank of Nigeria
Global remittances are now done at a cheaper rate with fintechs like Ripple providing a cheaper platform and with other international banks subscribing to it (Ripple, 2018). Suffice it to say that the contribution to Nigeria’s revenue from remittances, would be the first to be hit with this advancement.

Understanding the blockchain process in trade finance would be a good start in positioning the Nigerian Bank for the new wave. As with a good business strategy, identifying the business need equates to a solution half solved.

2.4 Conclusion

The literature review provided an extensive overview of the blockchain technology on its meaning, terminologies, misconceptions, benefits and current applications. It discussed the trade finance process with particular emphasis on the process in Nigeria.

Previous researches have explained the benefits and impact of blockchain across various sectors and processes with many giving a general overview of the potential impact of the blockchain in business applications. Analysis by Woodside, Augustine Jr. and Giberson (2017) showed the acceptance and future use of blockchain technology in the financial industry. Hoelscher (2018) described fully how the blockchain technology evolved past the bitcoin and cryptocurrencies to find new uses in almost every sector of the economy.

According to The Economist Intelligence Unit (2017), it is important that economies, not just companies, embrace the blockchain revolution,

Understandably, the technology is new, and most studies only give a theoretical analysis with little or no understanding of the practical application or process. The first blockchain-enabled trade finance transaction was done in September 2017, through Standard Chartered Plc and the insurer AIG. Just recently, in July 2018, financial giants – Deutsch Bank, HSBC and Rabobank, performed the first cross-border commercial transaction through the blockchain platform of IBM’s “we trade” (IBM, 2018).
However, not much has been done to explain what really happens or the transaction dynamics involved when a business process adopts the blockchain.

This research seeks to know the step-by-step practical process involved in adapting the blockchain technology to the trade finance process. This is necessary to understand the new evolving technological ecosystem and, to know how to embrace the change. Institutions that understand and embrace the change early, will have the first-mover advantage of reaping the rewards.

Trade financing is just one of the many processes that can benefit from the technology, however, since, it is a major source of income for most banks around the world, particularly in the Nigerian economy that is dependent on international trade, understanding this blockchain concept through the lens of the of the trade finance process would prove to be a resourceful and beneficial study.

In summary, the literature review provides the theoretical base for the research and has answered key concepts regarding the focus of the study, which will be used for the analysis and evaluation of findings in this research.
CHAPTER THREE: Research Methodology

3.1 Overview of Research Methods

The research methodology refers to the plan and procedures to conduct research that involves the world view assumptions of the researcher, procedures of inquiry (strategies), specific methods of data collection, analysis and interpretation (Creswell and Creswell, 2018)

Many factors come to play that leads to the eventual choice to data collection and analysis in the research. This can be further explained with the research onion in the figure below.

Figure 12. The Research Onion

Source: (Saunders, Lewis and Thornhill, 2015, p. 124)
Before the data collection and analysis, the researcher’s philosophy, approach to theory development, methodological choice, strategies and time horizon must be understood, for the proper alignment of the research process.

### 3.1.1 Research Philosophy

Research philosophy are the beliefs and assumptions relating to the development of knowledge and the nature of that knowledge (Saunders, Lewis and Thornhill, 2015, p. 122). Either consciously or subconsciously, there are four basic research philosophical approach to research

1. **Positivism:** involves the use of an existing theory develop an hypothesis in a highly structured and methodical approach. It is a scientific approach where the researcher does not influence or is influenced by the research and mostly used in traditional sciences. It tends towards quantitative data collection

2. **Realism:** it accepts that reality exists despite any scientific observation. It is concerned with what kinds of things there are and how these things behave

3. **Interpretivism/constructivism:** involves the construction and reconstruction to give multiple interpretations, thus inductive, and theory building. It believes that individuals and groups make sense of situations based on their individual experience, memories and expectations.

4. **Pragmatism:** involves using a practical approach to assessing situations, as researchers apply whatever methods that seems right in the situation presented.

### 3.1.2 Research Approaches

According to Saunders, Lewis and Thornhill (2015, p. 145), there are three main approaches used in research, which are the inductive, deductive and abductive approach.
1. Inductive: generalises from the specific to general with known premises used to generate untested conclusions. Generally aimed at generating new theory and mostly used in qualitative data. Theory is generated and built.

2. Deductive: generally aimed at testing a theory and mostly used in quantitative data collection. Generalises from the general to the specific. Theory is either falsified or verified.

3. Adductive: generalises from interactions between the specific and general, with data collection used to explore a phenomenon. Theory is either generated or modified.

3.1.3 Research Strategies

1. Quantitative research: involves the use of survey (to understand trends, attitudes, or opinions) and experimental research (to determine if a specific treatment influences an outcome) for complex experiments with many variables and treatments (Creswell and Creswell, 2018, p. 12)

2. Qualitative research: there are several strategies in this category described in (Creswell and Creswell, 2018);

   a. Ethnography – studying an intact cultural group in a natural setting over a prolonged period.

   b. Grounded theory - researcher develops a general abstract theory of process, action, or interaction based on the views of the participants.

   c. Case studies – researcher explores an event, program or activity in an in-depth way
d. Phenomenological theory – identifies the essence of human experiences about a phenomenon described by the participants

e. Narrative research – where the researcher studies the life of individuals and ask one or more individuals to provide stories about their lives.

3.1.4 Time Horizons

This is either longitudinal where the researcher has extended time in years to complete the research, or cross-sectional, used for one-off studies or short-term research

3.2 Research Methodologies for this Study

3.2.1 Research Philosophy

The research philosophy is based on interpretivism/constructivism worldview which is subjective in nature. This research builds a theory by relying on the views of others to understand the blockchain technology, and the trade finance process, and the evaluation of the research is based on the analysis of the participants of the research.

According to Saunders, Lewis and Thornhill (2015, p. 122), the constructivism philosophy is an inductive, theory building view that believes that, individuals and groups make sense of situations based on their individual experiences. The goal of the constructivist worldview philosophy is to rely, as much as possible, on the participants' views of the situation being studied (Creswell, 2013, p. 8).

This philosophical style is suitable for this research because of the inductive and theory building style used to analyse the study that is based on the subjective experiences of the participants.
3.2.2 Research Approach

This research applies an inductive approach by using a grounded theory design of inquiry and reasoning. With a grounded theory style, Creswell (2013, p. 14) stated that “the researcher derives a general, abstract theory of a process, action or interaction grounded in the views of the participants”.

As the objective of this study is to understand how the blockchain technology can be used in a trade finance process, a general theory of the process based on the participants’ view, is used to analyse the study.

According to Saunders, Lewis and Thornhill (2015, p. 145), the inductive style generates theory, while the deductive style tests a theory. As this research builds a theory rather than test an existing one, the inductive, grounded theory approach is the most suitable research approach.

3.2.3 Research Strategy

A qualitative research method is used as this research is not about studying trends or performing an experiment as with a quantitative strategy. The time horizon is also cross-sectional as it is a short-term research undertaken within twelve weeks.

According to Creswell (2012, pp. 47-48), a qualitative research is used when; a problem or an issue needs to be explored, individuals needs to be empowered to share their story, and, to develop theories, and this is done through in-depth structured, semi-structured or unstructured interviews.

As this research’s goal is to demystify the blockchain technology through the lens of the trade finance process in Nigeria, a qualitative strategy is used to explore both the trade finance process and the blockchain technology through a semi-structured interview approach. This informal style allows an in-depth interview process that allows for the subject matter experts to talk freely about the blockchain and trade finance process. The semi-structured style used, allows the interview participants to elaborate on the topics, thus, providing more flexibility in elicitation.
A quantitative study would be unsuitable as the blockchain technology process is a new global phenomenon and there are not many people that are knowledgeable with the functionality or how it can be applied to a business process. The real applications in financial transactions started late in 2017 and the procedures are still being tested. Hence, only a semi-structured interview with subject matter experts is the most suitable option.

3.2.4 Research Population and Sampling

3.2.4.1 Research population

The research population for this study is a targeted population of trade finance experts working in the Nigerian banking sector, and, blockchain technology experts.

As the research topic is to understand how blockchain technology can be used in the trade finance process in Nigeria, the targeted population used are experienced bankers that handle trade finance transactions in Nigeria, and, IT experts that have handled blockchain-related transactions.

The sample size for this research is five.

3.2.4.2 Sampling Technique

A critical case sampling in the purposive sampling technique is used to conduct this research.

With purposive sampling, the researchers’ judgment is used to select the cases that would be best in answering the research questions and meet the objectives (Creswell, 2012, p. 158). Critical case sampling selects cases that will produce critical information, such that the data collection that is used to understand each critical case can be used to provide a logical generalization and maximum application of information to other cases (Saunders, Lewis and Thornhill, 2015, p. 156). The underlying assumption for this sampling technique is that if it is true of this one case, it is likely to be true of all other case.
This sampling technique is most suitable for this study as a targeted population of experts in the fields of study is selected, and information from data collected from these population is used to understand and build the theory for the research.

3.2.4.3 Sample Selection

In other to understand the trade finance process in Nigeria, three internet-mediated interviews were done with trade finance banking experts in Zenith Bank Plc.

This study targeted Zenith Bank Plc, as it is the third largest company in Nigeria with a market capitalization of NGN 351.6bn (approximately USD 970m) (Nigerian Stock Exchange, 2018), with about 500 branches across all states in the country.

Interviews with the experienced bankers with a minimum of ten years' work-experience in the bank and five years in the trade finance department are considered as subject matter experts, and are the representative sample population, to research the trade finance process in Nigeria.

To understand the blockchain process, one interview was done with a software engineer in Oracle in Nigeria, which was responsible for adapting the Nigerian Customs Service’s excise trade process unto the blockchain platform. The second interview was done with a software engineer at Murex Advanced Technologies in Ireland, which develops financial services software, for capital markets and risk management.

Two interviews with blockchain technology experts is used for this research as experts in this field are few, thus are the sample population used to understand the blockchain process. Although blockchain technology is not a new technology, its’ potential applications have just been recently harnessed, and companies are just beginning to adapt the process to their systems, with the first blockchain-enabled trade finance process done in 2017 (TradeIX, 2018).
Table 1: Sample Population

<table>
<thead>
<tr>
<th>Participants</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Female</td>
<td>Male</td>
<td>Female</td>
<td>Male</td>
<td>Male</td>
</tr>
<tr>
<td>Subject Matter Expert</td>
<td>Trade Finance</td>
<td>Blockchain</td>
<td>Trade Finance</td>
<td>Blockchain</td>
<td>Trade Finance</td>
</tr>
</tbody>
</table>

3.3 Data Collection

This research used a multi-method choice that is a combination of interviews and secondary data, and analysis is solely dependent on the information provided from these sources.

This data collection focused on the research objectives, which are:

- To investigate the current trade finance process in Nigeria
- To understand what really happens when the blockchain technology is used in a transaction process
- To show how the technology can be adapted to the current trade finance process in Nigeria.
- To show the potential benefits and/or risks involved in the adaptation of the blockchain

3.3.1 Primary Data Collection

The primary data collection for this research is from one-on-one semi-structured interviews with subject matter experts in trade finance and the blockchain process. The researcher used this means to fully explore the research objectives and answer the main research question, in an atmosphere that was comfortable for the participants.
Four of the interviews were internet-mediated through Skype, as the experts involved are based in Nigeria, while, the fifth interview was a face-to-face interview involving the expert in the field of blockchain.

In total, three interviews were done in relation to trade finance while two was done in relation to the blockchain process.

All interviews were recorded and later transcribed, and interview protocols were duly observed for asking and recording the interview. Information consent was also signed by all participants. Participants stressed that the data provided is strictly based on their personal experiences and perceptions, and not representing the companies they work for, in any way.

3.3.2 Secondary Data Collection

Secondary data was obtained from white papers, articles, statistics from the appropriate government websites, and journals of previous studies within context. These data are used to support and expound on the information received from the primary data and form the base for comparison to the previous researches that have been done.

3.4 Data Analysis Procedures

The strategy used for the data analysis in this research can be categorized into three as described by Creswell (2012, p. 180). These are:

- Editing
- Coding
- Analysis

Editing- the primary data was obtained appropriately and properly transcribed and given to participants for confirmation and validation. All the transcripts were used to organise the data. Participants were duly informed about the use codes and all duly signed the consent forms in compliance with the ethical considerations and protocols.
Coding- suitable coding techniques was employed to protect the anonymity of the participants, and this started once all the data was fully transcribed. The researcher is coded as KO in the transcripts while the participants are coded as P1 - P5 respectively.

Analysis – the field notes from the interviews were interpreted, summarized and evaluated against the different research objectives. There is a final data verification done to validate the research by rechecking the transcripts against the codes used. Highlights from all data collection was used to build the theory for this research to a satisfactory conclusion.

3.5 Research Ethics

For this research, the ethical considerations adhered to are:

1. The research Purpose and questions was clear and unambiguous, such that the participants did not misunderstand the intent of the research. The research aim is clear, concise and understandable, and directly addresses the research problem.

2. The data collection, the confidentiality and identity of participants was addressed, and appropriate consent given to use information obtained. All participants consented to the use of their information provided. It was made known that they are speaking for themselves and not on behalf of the company they work for, and thus, details provided is based on their own experience and perceptions only. A copy of the interview transcripts was passed to the participants for them to edit any information that they would consider inappropriate or harmful to their careers.

3. For the data analysis and interpretation, anonymity of individuals was discussed and consent to use their details was received. The analysed data was interpreted correctly and coded correctly, in addition to verifying transcripts from participants.
4. In writing and disseminating the research, words used was not biased against persons because of gender, age or ethnicity. Suppressing or falsifying information was avoided, and participants were given a copy to read the research themselves and to ascertain the credibility of the study. All journals, articles and secondary data used were appropriately referenced and passed through the plagiarism tool for accuracy.

3.6 Limitations of Methodology

The main limitation of this research is that, the analysis is based on the interviewee’s perspectives in this regard, and as such, there is no means of validating the accuracy of the information provided. Other limitations experienced are:

1. Transcribing of interviews was difficult to interpret as some parts of the internet-mediated interviews were not clear due a drop in the network clarity.

2. As the blockchain technology in a new area, there was not much articles or research done in understanding its’ process flow in a business transaction, hence, the basis for comparisons of the research outcome was limited.
CHAPTER FOUR: Data Analysis and Findings

4.1 Introduction

This chapter illustrates the key findings from the interview process in relation to addressing the four main objectives of this research. All interviews were conducted in the English language and transcribed in same (see Appendix 1-5). A brief profile of the participants is first presented before the key findings are illustrated. Important points from the secondary data was accentuated in relation to research objectives.

4.2 Participant’s background

- Participant 1 is Mrs Maria Adaora who works in Zenith Bank Plc and currently heads the trade services documentation unit in one of the branches in Lagos, Nigeria. She has been handling trade services transactions for 7 years and is considered a subject matter expert on the trade finance process. Her contribution to this research is relevant as she thoroughly explained the application forms and documentations involved in the different trade finance transactions. She is coded as P1 and her interview transcript is appendix 1.

- Participant 2 is Mr Daniel Buckman who is a software engineer and works at Murex Advanced Technologies in Dublin, Ireland. Murex develops financial services software for capital markets and risk management. He is considered a subject matter expert in the blockchain field as he explained the benefits and applications of the blockchain technology. He also gave insights into the possible adoption of the blockchain in the financial services sector. He is coded as P2 and his interview transcript is appendix 2.

- Participant 3 is Mrs Martha Kolawole who is the head of the customer services unit in one of the branches of Zenith Bank Plc in Lagos, Nigeria. She has worked in the bank for 11 years and has worked in the trade services functions for 8 years, thus, considered a subject matter expert on the trade finance process. She is relevant to this research as she gave an overview of
the trade finance process as it being handled at the branch level. She is coded as P3 and her interview transcript is appendix 3.

- Participant 4 is Engineer Bolu Coker who is a software development manager at Oracle Nigeria. Oracle is responsible for adapting the Nigerian Customs Service onto their blockchain platform. He is considered a subject matter expert on the blockchain process as he explained how the blockchain technology is currently being used in a business process and how it can be used for the trade finance process. He is coded as P4 and his interview transcript is appendix 4.

- Participant 5 is Mr Femi Owolabi who also works in Zenith Bank Plc and has been in the bank for 13 years and has worked for 11 years in the trade services department in the bank’s Head Office in Lagos, Nigeria. He is considered a subject matter expert in the trade finance process. He is relevant as he explained the process flow of the different trade finance services offered by the bank. He is coded as P5 and his interview transcript is appendix 5.

4.3 Findings

4.3.1 Research Objective 1: The current trade finance process in Nigeria

Question: What trade finance transactions do you do?

P1 explained that the trade transactions are split into two categories, which is the valid trade and non-valid trade. The valid trades are commonly done through Letters of Credit and Bills for Collection, with most of the transactions being Letters of Credit, while the non-valid does not involve the bank in remitting funds.

P3 categorized the trade transactions into imports and exports, stating that the imports can be done as a valid or non-valid transaction as explained by P1, while all export transactions are valid.

P5 however explained the process with a slightly different perspective. He said that,
“for me, the trade financing we do, is of two types; risky non-valid deals and non-risky valid deals. You see, because both processes involve two unknown people buying and selling to each other. The only difference is that, one type takes the risk and deals directly with each other while the other type involves their different banks”

*Question: Who are the parties involved in a trade transaction?*

P1 explained that a trade transaction starts with the importer and the exporter and that the other parties are the participating banks, the Central Bank of Nigeria, the Nigerian Customs Services, insurers and the regulatory bodies such as NAFDAC for food and drug products, and SONCAP for equipment and machineries.

P3 supported this statement by saying,

“well, we have the buyer here in Nigeria and the seller in another country, we have the buyers bank and the sellers bank, and the intermediating banks. There is also the almighty CBN and the customs”

P5 however gave a more detailed list when he said;

“depending on how smooth or not a transaction goes, generally, there is the buyer or importer, the seller or exporter, buyer’s bank known as the issuing bank, the seller’s bank which is the accepting bank, confirming and negotiating banks. Of course, our governing bodies, which is the Central Bank and the Nigerian Customs. Let’s not forget the shipping companies and insurance companies also”

*Question: What documentation is required to complete the process?*

P1 gave a comprehensive list as she handles the documentation in the trade process. She explained that for both valid and non-valid transactions, the documents required are the:

1. Proforma invoice – which must be signed and dated within 3 months
2. Insurance certificate
3. The customer’s company registration certificate
4. NAFDAC or SONCAP certificate
5. The completed application form (Form M)
6. The certificate of value and origin (CCVO)
7. Packing list
8. Manufacturer’s certificate
9. Bill of lading
10. Final invoice
11. Pre-arrival assessment report (PAAR)
12. Customs assessment report
13. Duty receipt

For valid transactions, in addition to these, there is the contract agreements, bill of exchange, Single Goods Declaration (SGD) and Goods Exit Note.

P5, in addition to the documents mentioned, listed the export documents required, which are the;

1. Nigeria Export Proceeds form (NXP)
2. Proforma invoice
3. Nigeria Export Promotion Council registration certificate (NEPC), which is required for non-oil transactions
4. Export Clearance Permit for oil exports
5. Export application form
6. Letter of assurance of repatriation

He also clarified that the list is not exhaustive, as more documents are required depending on the complexity or challenges that may arise during the process.

**Question: What is the process flow in a typical trade transaction?**

P1 gave the most detailed process workflow. She explained that it starts with the customer or importer bringing the proforma invoice, insurance certificate and the regulatory certificate from NAFDAC or SONCAP. The details in these documents are
logged into the Central Bank of Nigeria’s trade portal for approval. On approval, two sets of numbers are generated which must be sent to the seller to state on all shipping documents. Goods are shipped, and shipping documents are sent to the customer’s bank for further processing. She stated that shipping documents

“comprises of em, the bill of lading, which has the MF and BA number which I told you about earlier, the commercial invoice, the packing list, the certificate of origin, that’s the CCVO”

Once the shipment arrives at the port in Nigeria, the Nigerian Customs gives an assessment report which is used in paying the duties at the bank. Upon payment of the duty charges, the shipping documents are released to the customer, who then clears his goods for the customs.

P3 also explained that the trade application form is called Form M, and the numbers generated on approval are called the MF and BA numbers, which, as stated by P1, must be sent to the exporter and stated on all shipping documents. She stressed that

“for the insurance, you have to make provision for 110%. There should be additional 10% to cover the insurance because of the fluctuating rate, dollar rate in the economy”

She further explained that after the goods are cleared, exchange control documents are given to the customer from the customs, who in turn submits same to the bank. In a valid transaction, these documents are a requirement before the necessary funds are sourced from the central bank and remitted to the supplier.

P5 agreed with P1 and P5 on the process flow, but however stated that it was typical for LC transactions. He clarified that for bills of collection, in addition to the shipping documents mentioned by P1, a bill of exchange is included which has must be accepted by the buyer before the buyer can clear his goods. This bill of exchange clearly states when payments must be made, which is generally 90 or 180 days from the date on the bill of lading. He also explained that process with the banks’ role in the trade as,

“firstly, the Form M is approved on the central bank’s portal, but that approval is done by customs. This approval is sent to supplier, who then ships. the
supplier sends 3 sets of shipping documents, this is 3 copies each of the CCVO, bill of lading, packing list, manufactures certificate, bill of exchange and collection instructions. He sends these things through his bank. His bank prepares a bill history, that states all the documents they will be sending and covers information such as the importer and exporter's full name and address, terms and condition of acceptance, charges or interest to be collected, and then the bank details that will receive the remitted funds"  

P5 also explained that the general export process is a simpler process, provided the necessary documents, which are mentioned earlier, are available for processing. He however stated that all the export proceeds are in foreign currency and usually repatriated within 90 days from the shipment date for oil-exports, or 180 days for non-oil exports.

*Question: Is it the same process across other banks in Nigeria?*

P1 explained that the transaction process is the same for all banks, however, transaction fees and credit lines offered to customers differ. She said,

“really, we all do the same thing. It’s the same documentation process, the same CBN, insurance and banking procedure. Our charges and credit lines are just different”

P3 reiterated what P1 said stating that it’s the same set of banks, insurance procedure and documentation process

P5 also stated that it is the same standard procedure across all banks, as all banks initiate trade transactions on the same central bank’s portal and go through the same clearance process from Nigerian customs, as he said,

“all we do is the same. We start with the central banks’ portal and do the same customs clearing. The process is pretty much the same”

*Question: Have you heard of the blockchain technology or has the bank mentioned it in any regard?*
P1 and P3 stated they have never heard about the technology. However, P5 claims to have known about it in the news from the Nigerian Customs, and from few of the export customers asking them about it. He also stated that he is unaware of any intentions of the bank in adopting the blockchain.

4.3.2 Research Objective 2: The blockchain technology in a business process

Question: Kindly give an overview of your understanding of the blockchain?

P2 explains that the blockchain first made waves as the technology behind the bitcoin, but it is a technology or system of trust that can be applied in several ways and in different contexts. He said it is a digitised system where a chain of companies can be linked together in a trusted and validated relationship, thereby making transactions with each other in a faster and reliable state. He stated that transactions on the blockchain can be done between companies that do not necessarily know each other or be in the same location, and once transactions are done, it cannot be reversed. It is seen as disruptive because its digitised nature allows for transactions to be completed without a central governing system. He further clarified that there is an inherent security system in it, whereby records can be tracked and cannot be tampered with.

According to (Lewis, McPartland and Ranjan, 2017), the technology is a distributed or digital record of transactions that allows for the creation of immutable records that is shared by a network of participants, offering transparency, speed and enhanced security. Cohen, Tyler and Buxton (2017) explained that the three properties that makes the blockchain technology a force to be reckoned with, is its tamper-proof ability that ensures integrity and immutability or records, its smart contracts which is the new trusted intermediary, and its cryptographic nature that works like a digital fingerprint that cannot be copied.

P2 however gave an opinion that contrasts with the tamper-proof ability of the blockchain, as he believes with time, the system could be hacked. He stated that,
“It's good theoretically, but with everything, if there are no human elements, it's easy. As you bring human elements in it, because yes, it's a nice system that has been built, which if left on its own, and there's trust, it should work. It's like, for every system, and there are individuals, especially young people, young, brilliant people who have time on your hands, who are smart, who are restless, they have nothing to do with and they want a challenge. And if you tell them, this thing is unbreakable, guess what, they are going to try and find the ways to break it”

P4 simply explained it as an “online digital system that builds trust and accountability between different parties”

**Question: What does a typical blockchain transaction process look like?**

P2 explained that the blockchain network is a peer-to-peer network that consists of individuals or businesses known as nodes, with each node having information to the different ledgers in the network and each having its own hash code. Once a new transaction is initiated, other peers in the network are alerted for a verification. There has to be more than 50% agreement from the other nodes before a consensus is reached. He further explained that there is a proof of work concept, through which new participants are screened, which prevents fake and unauthorised transactions to go through the network. He also stated that,

“if you add the proof of work, and add the distributed nature, and the fact that it is very transparent, and everyone knows everything, then it, it takes away fraud, it takes away errors, human errors, because it's a self-accounting thing. So, you don't need a lawyer to verify, you don't need humans, the system tracks everything and all the records are there, and they actually duplicated”

According to IBM (2018) blockchain for dummies, the process begins with the transaction data stored in blocks that are linked together to form a chain. As new transactions are added, they are verified by a network algorithm in the technology, which is governed by the participants that all have a unique identifier. This chain grows
as the number of new transactions increases, with each block strengthening and verifying each other such that the chain becomes tamper-proof and cannot be altered.

Lewis, McPartland and Ranjan (2017) explained the blockchain process in stages. In a distributed ledger setup, when an operator initiates a transaction, the same information is passed to all other nodes / operator in the network for a consensus, before the transaction is approved and added to the network. Whenever a new record is added, it changes the state of the ledger and sends a consensus or fail alert to every node about the change. If approved through the consensus mechanism, every node’s ledger will automatically be updated with the new record, thus ensuring the immutability of records.

A typical blockchain transaction as explained in PwC (2018), starts when someone requests a transaction, it is broadcasted to the P2P network comprising of nodes, these network of nodes validates the transaction through an algorithm involving cryptography or contracts, after which the new transaction is added with other transactions on the network, becoming a new block of data. Once added to the existing network, it becomes permanent and unalterable.

P4 however gave a practical explanation of how the blockchain technology works with the excise trade process in the Nigerian Customs Service (NCS). With the NCS, the blockchain platform is a digital platform, that was created to automate all the excise trade processes. He stated that,

“the excise trade process was manually done, thus, there was no predictable data trace of what an item contains or the origin of the product. There was also the challenge of people trusting Nigerian-made goods”

The blockchain automated the excise license process, such that, every business involved in assembling, producing or manufacturing, have their licence verified. This new process starts from the approval process of getting the export licence, to establishing the factory, thus, enabling a digital system that validates the person or company and their licence. He said, “each producer has got an identity that can be assessed and validated globally”.
In addition to automating the licence process, the procedure it takes to produce an item is also logged, from the raw material to the finished product, to ensure traceability of goods produced. This also makes manufacturers more accountable. Furthermore, the blockchain platform integrated a “Tank & Trace” system. P4 explained this by stating that,

“The Nigerian Customs currently integrated a technology called “Tank & Trace” where the finished products are properly identified and stamped with bar codes, such that, anywhere the item is located in the world, its origin can be traced. So that is also factored into the blockchain”

Lastly, the blockchain platform enabled an excellent accounting system that predicts revenue for the customs. He elucidated on this by saying,

“with the manual process before, there was no reliable data on, like, how many excise traders exist or how many manufacturers there are in the country. In trying to automate the process, it was discovered, interestingly, that there was a big gap in the manufacturers registered with the Manufacturers Association of Nigeria, that’s the MAN in short, and the registered excise trade members. So, by going through all these processes and closing these gaps in the system, such that, we factor in the number of manufacturers in Nigeria, to what they are producing, and checking the quantity and quality of goods made, you know, it then becomes easy for the platform to easily predict how much revenue can be generated from excise trade”

**Question: Is the blockchain really going to eliminate third parties like the banks?**

P2 explained that while he sees the blockchain a definite disruptor to the current processes, he does not think the third parties would be eliminated in a very long time. He said for retail businesses, many third parties could be eliminated, and jobs for the lower skilled workers may become redundant, however, for the corporate finance and capital markets, that involves buying of stocks, derivatives and bonds that are intangible, people would still need to rely on the expertise of the banks for such. He also stated regarding the decision makers in the banks, that,
“I don't for a second believe that they will, because they can control the extent to which this would be adopted or not and if this gets adopted mainstream in the, in the financial services industry, it will be because these guys have seen the benefit and they have seen that, oh, this is actually going to help us make a lot of more money”

P4 however explained that from his practical experience, he sees more collaborations and convergence of networks on the blockchain, particularly for financial transaction. He explained this by saying that,

“It is not that each bank or shipping company would have its own blockchain. No. What happens is that, there is a blockchain consortium for shipping companies, which registers the different shipping companies globally, the same for banks and insurance companies. So, if possible, for us, if we can achieve to log in all the banks in Nigeria, we can be the blockchain consortium for Nigerian Banks or even Africa as a whole. So, we then would connect to other blockchain consortium of other banks across the world. That’s what I mean, by more of collaboration, and not each party having its own blockchain network”

He further explained that smaller businesses, which is where majority of traders fall in, might still need the banks to process their transactions but larger companies and conglomerates with the capacity, can directly join the blockchain consortiums.

4.3.3 Research Objective 3: How the blockchain can be adapted to the trade finance process in Nigeria

**Question: How can it be used for trade finance in Nigeria?**

P4 explained that he sees the blockchain in trade finance as a collaborative effort between different blockchain consortiums. He said,

“different blockchain consortiums will collaborate to make it work. Otherwise, there’s just be too many participants on the network. So, what I mean is, eh, for a typical LC transaction, we have many participants involved, that is, the importer’s bank, the exporters bank, the confirming bank, the issuing bank, insurance companies, shipping companies, and the rest. You know, so, it is not
that each bank or shipping company would have its own blockchain. NO, what happens is that, there is a blockchain consortium for shipping companies, which registers the different shipping companies globally, the same for banks and insurance companies. So, if possible, for us, if we can achieve to log in all the banks in Nigeria, we can be the blockchain consortium for Nigerian Banks or even Africa as a whole. So, we then would connect to other blockchain consortium of other banks across the world. That’s what I mean, by more of collaboration, and not each party having its own blockchain network”

He went on further to explain that,

“currently, most banks across the world are already on a digitised network, where they communicate. I am talking of the SWIFT. So, the same way banks are connected through SWIFT for international transfer of funds, the whole LC process can be digitised. Already, there is and electronic bill of lading, that is eBL that is integrated into this trade finance blockchain platform. This eBL ensures that a transaction is entirely paperless.

So, you see, the blockchain technology would really be used to digitise the whole process, reducing processing time, cost and issues and discrepancies would no longer arise. The shipping companies are logged on the eBL platform already, so you see, with all connected to the platform, LC transactions would be completed in a shorter time by allowing the transfer of documents and agreements electronically, in real-time, so no more, you know, going back and forth with the confirmations or communications between the parties. Settlements in this case is also faster”

A recent webinar hosted by HSBC on how the blockchain could transform trade finance explained how the blockchain was used for two different trade transactions in October and November, 2018 (Sharna, Mendonca and Kroeker, 2018). They explained that Voltron, the blockchain application, built on R3’s Corda blockchain and integrated Bolero’s eBL capabilities, was able to offer simpler, faster, greater transparency and enhanced security to the letter of credit processed.

The letter of credit processed on the blockchain, mirrored the existing paper-based document process, which entails the, application, contract agreement credit terms,
settlement process, discrepancy solutions, issuance, advising, amendment requests and its approval. All participants involved in the transaction were on a single blockchain platform, which used the eBL to process the application digitally, allowing the parties to exchange the bill of lading in an end-to-end digital flow, and using the blockchain to track and trace information as it moves between parties (Sharna, Mendonca and Kroeker, 2018).

The summary of these transactions is as shown below;

**Figure 13. Blockchain-enabled Trade Finance Transaction details**

<table>
<thead>
<tr>
<th>Transaction</th>
<th>Buyer</th>
<th>Seller</th>
<th>Issuing Bank</th>
<th>Nominated/ Advising Bank</th>
<th>Goods</th>
<th>Shipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tricon Energy</td>
<td>Reliance Industries</td>
<td>ING Geneva</td>
<td>HSBC India</td>
<td>Single container of containerised polymers</td>
<td>India to Peru, with shipping company ‘MSC’</td>
</tr>
<tr>
<td>2</td>
<td>Cargill</td>
<td>Rio Tinto</td>
<td>BNP Paribas</td>
<td>HSBC Singapore</td>
<td>Iron Ore</td>
<td>Australia to China, with shipping company ‘U-Ming’</td>
</tr>
</tbody>
</table>

Source: HSBC factsheet

**Question: Has there been any progress so far, regarding using the blockchain in trade finance?**

P2 explained there has been progress with peer-to-peer transactions and he knows some logistic companies are already considering it. He also stated that,

"we deal with banks, there's big interest. They are all looking at it because they see all the issues that they currently have, and they see all the kind of bottlenecks that they have, and to be frank, most of the banking systems that are in use, are archaic. It’s appalling to think the systems that they use are so old, so outdated. But, they work, they are trusted, and they are not going to quickly move to something fancy at the risk of losing millions. So they are very, very, very careful, but they do know that they need to change with the times and they do know that they want the improvement because they see how this
is holding them back, but they want something that will give them the same level of security and the quality that this system, this old systems, give them”

According to the article from the Global Trade Review by Wass (2018), a Voltron blockchain platform, which was the first trade finance prototype built by eleven global banks on the Corda blockchain framework, is about the enter the second pilot phase. It made headlines in May 2018 when HSBC and ING did their first live commercial trade finance transaction, which was a letter of credit for Cargill, an agri-food trading giant, on the blockchain. This transaction time was reduced to just 24 hours for the cargo of soybeans exported from Argentina to Malaysia, rather than the standard five to ten days. The Voltron consortium will be expanding its platform to include insurers, carriers and authorities that are involve in the trade ecosystem.

The article stressed that,

“While HSBC and ING were the first to conduct a live pilot, the next phases will see other banks use the Voltron platform as well. So far, NatWest, BNP Paribas and Standard Chartered are confirmed participants in the project, while R3 is still finalising discussions with the remaining banks about joining the next stage. Other banks in the original consortium include Bangkok Bank, BBVA, Intesa Sanpaolo, Mizuho, Scotiabank, SEB and US Bank” (Wass, 2018).

There is also the electronic bill of lading service by Bolero, who is currently working with R3 to upgrade its platform to the blockchain for better connectivity with other networks (Wass, 2018).

Another notable progress with the blockchain in trade finance was in November 2017, when TradeIX, a leading trade finance company, together with AIG and Standard Chartered, completed the first blockchain-enabled end-to-end invoice finance transaction for a global logistics company (TradeIX, 2018).

P4 stated that big IT companies like theirs, and other fintechs are creating more and more awareness, whilst trying to get many banks and larger global companies onto the platform. He further explained that he is aware that there is an electronic bill of
lading (eBL) that forms part of digitising the trade finance process, which shipping companies around the world are logging on to. He stated that,

“The shipping companies are logged on the eBL platform already, so you see, with all connected to the platform, LC transactions would be completed in a shorter time by allowing the transfer of documents and agreements electronically, in real-time, so no more, you know, going back and forth with the confirmations or communications between the parties. Settlements in this case is also faster”

### 4.3.4 Research Objective 4: Benefits or risks involved in the adaptation of the blockchain technology

*Question: What are the benefits or risks associated with the blockchain?*

P2 explained that the distributed nature of the technology makes tampering with records difficult and the risk of losing records eliminated. He stated that the system is open and self-regulated, thus allowing for transparency and trust within the network. He further said that the removal of intermediaries or third parties allows for transactions to be completed quickly and in real-time.

He however stated, that the main risk with the blockchain, which is also the primary reason for its slow adoption rate, is the risk of the network being hijacked or crippled.

P4 added that the blockchain also allows for processes to be streamlined properly and allows a reliable system for tracking and monitoring revenue streams. With the NCS, the benefit for them was automate their processes which allowed them to identify the gaps in the system and block income leakages, and, to build trust in the Nigerian trade system, which improved the country’s reputation in doing business. He said that,

“the customs have had to deal with our exported goods being returned for various reasons, you see, especially the Agric products are returned based on reasons like, em, em, fake certification of goods, or, em, em, fake documentations used. And really, all these were due to manual processes
involved with no proper data or verification process in place and people circumventing the process for their gain. But now, with the blockchain, there is a reliable system of validation and identification of the Nigerian-made goods and we can place our products in the international markets”.

According to Lewis, McPartland and Ranjan (2017), some benefits and application includes its applications in digital currencies such as bitcoin, Litecoin and Etherium, record keeping and contract management through smart contracts, quicker settlements for financial transactions, asset traceability and identity management, and also, in audit and compliance processes. These were discussed in detail in the literature review, section 2.15 of this research.

**Question: Why are people sceptical about the adoption?**

P2 explained that people are sceptical because they are wondering what underlying failures could occur with its use. Also, there is the debate on the possibility of the network being hacked and tampered with, without being detected. He then concluded that, for most businesses, they are not okay with the idea of “openness”, and different people having access to their files.

P4 also agreed with P2 and explained that for security reasons, and for the banks where a single error could translate to billions of dollars lost, everyone wants to make sure it works. He stated that the NCS gave their company just a foothold by just adopting the excise trade process to the blockchain network, but with the potential results they are expecting, they are opening to adopting the whole trade finance process. This, he clarified, would still take time.

**Question: How soon do you think businesses will fully adapt the blockchain to their process?**

P2 suggested it would take a long time for the adoption, with the retail and lower scale productions adopting in about five years. However, for the banks, his opinion is that it could still take up to about ten years or more. He said,
“if you mean that, in the next one or two years, are big banks like Lloyd’s and Royal Bank of Scotland, are they going to remodel and transform their system to use blockchain? It’s a big NO. Even the software that we develop for them, when we have an upgrade, it takes about three years, for them to adopt it. There’s a period of testing, that you set up a test environment that they'll put the transaction in. They'll stress test, and then, there’s a period where they’ll run the two systems in parallel and do everything twice so to make sure that it’s working”

He further stressed that as more and more businesses test out the technology, and successes are recorded, the capital markets would most likely be the last to fully adapt the process, and for that he said,

“I don’t expect even in the next ten years. But that’s my pessimistic side. But I don’t expect it to get to that level, just not yet. Because it takes, it takes a lot of time”.

P4 also agreed with P2 that it is going to take a very long time for the financial institutions to fully adopt the process. He stated that it took about nine months to test just the proof of concept for the NCS. This proof of concept was just a test to determine the reliability of the blockchain technology for the internal business processes of the customs service. That test is just one of many tests to be done, and on a tiny portion of a trade process. He however clarified that, the adoption will happen even though it might take a while for everyone to come on board. In concluding, he stated that,

“But the ball is rolling, and everyone will eventually catch up. The good thing now, how can I say this, you see, it’s like we can see the future, and so, we can plan towards this, and develop ourselves and position ourselves towards this”

4.4 Analysis of data obtained

The research findings from the participants and secondary data was able to thoroughly address the research objectives. The findings were grouped into four sections, with each section addressing a research objective with relevant data obtained.
In understanding the current trade finance process in Nigeria, P1, P3 and P5 discussed the different trade transactions done, the parties involved, the documentation required, and the process flow of a typical trade transaction. The data obtained from these participants support each other, thus bring clarity and understanding.

In summary, the current trade process is split into valid and non-valid transactions, which is a function of the risk involved in these transactions. There is the import and export process, that primarily involves letters of credit and bills of collection, with the documentation process explained. The process flow and participants involve the buyer and seller, the different banks and insurers, the Central Bank of Nigeria and the Nigerian Customs Service.

In understanding the blockchain technology in a business process, P2 and P4 gave an overview of their understanding of the blockchain, described what a typical blockchain transaction process looks like, and touched points on if the blockchain would really eliminate third parties like the banks. Secondary data used in the literature review was also used in support of the points made by P2 and P4.

In summary, it was seen that the blockchain technology is a means of digitising transactions in a trusted and secure platform for a quicker turnaround time. The process flow shows a consensus mechanism in place for every new transaction to be approved and subsequently added as a new block to the chain. P2 and P4 however agree, that in practice, they do not think the third parties would be eliminated completely in a blockchain, as there would be more collaborative efforts in a transaction.

In understanding how the blockchain can be adapted to the trade finance process in Nigeria, P4 explained how it is being used in the excise trade process for the Nigerian Customs Service. In addition, an HSBC factsheet from a webinar hosted explained how the blockchain technology was used in completing two recent trade finance transactions.
In summary, data from both sources reveals that the blockchain in a trade finance process is more about digitising the existing paper process and interconnectedness with other blockchain consortiums.

In understanding the benefits or risks involved in the adapting the blockchain technology, P2 and P4 addressed the benefits and risk with it, why people are sceptical about the blockchain and how soon they think businesses would fully adapt it. Data from the literature review was also used to give a deeper understanding for this.

In summary, the benefits can be applied to processes across different sectors and includes faster turnaround times on a trusted platform. The data shows the retail and logistics sectors would be first to adapt the blockchain with the financial sectors being the last. The risk is the fear of the network being hijacked for fraud. P2 and P4 also agree that the blockchain will happen, it will be adapted across all business, but not in the next 5 – 10 years.

4.5 Conclusions

This chapter highlighted the key findings from the primary and secondary data obtained, and the subsequent analysis of the data provides deep insight and understanding into the research objectives. This research in its entirety, is rich with enough information to demystify the blockchain process and build a theory on its adoption to the trade finance process in Nigeria., which is done in the next chapter.
CHAPTER FIVE: Discussion

5.1 Review of Work

This study provides deep insight into the blockchain technology and how it can be used in a business process with particular emphasis in the trade finance process in Nigeria.

The literature review explained in detail about the blockchain technology otherwise called the distributed ledger technology, and the key features that gives it the disruptive tendencies, which includes the consensus mechanism, smart contracts and cryptographic nature. As the technology provides a trusted platform that ensures immutability of records, its application and benefits cuts across different sectors, and businesses across the globe are already piloting its use. The review covered extensively the different applications, benefits, misconceptions and barriers of the blockchain, as well as the vectors of progress in the adoption, and the recent milestones accomplished with businesses that have used the technology.

To better understand how the blockchain works in a transaction process, this study used a qualitative approach through in-depth interviews with five participants which are considered subject-matter experts based on their work experience in trade financing and blockchain processes. This research is limited to the information provided by these participants and the secondary data collected. The primary information used therefore, is based on the personal opinions of the sample population and is therefore subjective.

Despite the subjective nature of the study, the data collected was rich with the required information necessary for the research. Participants 1,3 and 5 gave enough information to understand the process flow in the trade finance process in Nigeria, while participants 2 and 4 talked about the practical application of the blockchain. Out of these participants, data from P4 was the climax of the research as it directly addressed the research question of the blockchain in trade financing.

All these information has given clarity and understanding into the blockchain technology and demystified how it can be used in a trade finance process, which was the aim of this research.
5.2 Interpretation of Results in Relation to Research Question

Based on the analysis of data collected, the trade finance process in Nigeria can be explained in the process flow below:

Table 2: The trade finance process in Nigeria

<p>| Step 1: | The seller/ exporter / supplier sends a proforma invoice (PFI) to the buyer/ importer / customer. This PFI must be dated within three months, stamped accordingly, has the suppliers contact details, buyer's details, country of origin and supply of the goods, port of loading and discharge, and freight charges. |
| Step 2: | The buyer takes the proforma invoice to his bank, and also includes the necessary regulatory certificate which could be from the National Agency for Food and Drug Administration and Control (NAFDAC) for food and drugs or Standards Organisation of Nigeria Conformity Assessment Program (SONCAP) for machineries or electronics, and also the insurance certificate (valued at 110% to make up for currency fluctuations). |
| Step 3: | The bank gives the customer the trade application form known as Form M to complete and submit with the aforementioned documents |
| Step 4: | The bank checks the PFI for all necessary information. Where there are errors or omissions, it is returned to customer who informs the seller to make the necessary amendments and sends a new PFI |
| Step 5: | With the correct PFI, the bank logs the Form M in to the Central Bank of Nigeria’s (CBN) trade portal. All the documents are also attached on the portal before it is submitted |
| Step 6: | The CBN trade portal is linked to the Nigerian’s Customs Service (NCS), such that once the application is submitted, it flows to the NCS for approval |
| Step 7: | On approval, two numbers are generated, known as the MF and BA numbers, which is passed on the customer, who passes this on to the supplier |</p>
<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>The supplier appends MF and BA numbers on all shipping documents (Final Invoice, Bill of lading, Certificate of Value and Origin, packing list, manufacturers certificate)</td>
</tr>
<tr>
<td>9</td>
<td>For non-valid transactions, the buyer pays the seller. The seller scans copies of shipping documents to the buyer and post originals to the buyers bank, then ships goods to port of discharge in Nigeria</td>
</tr>
<tr>
<td>10</td>
<td>For valid transaction, which could be a letter of credit or bills for collection, the issuing bank forwards LC terms through the remitting bank and confirming bank to the advising bank</td>
</tr>
<tr>
<td>11</td>
<td>The supplier presents 3 sets of each shipping documents in addition to collection instructions, or a bill of exchange for bills for collection, to his bank</td>
</tr>
<tr>
<td>12</td>
<td>The suppliers bank prepares an LC advise or bill history to cover the shipping documents and sends to the issuing bank. Necessary amendments can be made at this stage on receipt of the advice or bill history</td>
</tr>
<tr>
<td>13</td>
<td>The goods are shipped to port of discharge in Nigeria</td>
</tr>
<tr>
<td>14</td>
<td>For both valid and non-valid transactions, once the shipping documents arrives at the customer’s bank, the bank sends the details of shipping to NCS</td>
</tr>
<tr>
<td>15</td>
<td>The NCS generates a pre-assessment arrival report (PAAR) and an assessment report, which customer uses to pay duties at the bank</td>
</tr>
<tr>
<td>16</td>
<td>Once the duty is paid, shipping documents are released to customer who in turn, clears his goods at the NCS</td>
</tr>
<tr>
<td>17</td>
<td>For non-valid transactions, the process ends at this stage</td>
</tr>
<tr>
<td>18</td>
<td>For valid, once goods are cleared and meets conditions stated in contract agreement, the bank purchases foreign exchange (FX) from the CBN and remits to advising bank in accordance with agreed dates and terms</td>
</tr>
<tr>
<td>19</td>
<td>Finally, the customer submits the exchange control documents to the bank to conclude the transaction. These are the Single Goods Declaration, duty receipt, used PAAR and goods exit note issued by NCS.</td>
</tr>
</tbody>
</table>
Table 3: How the blockchain technology can be applied to this trade process?

<table>
<thead>
<tr>
<th>Step 1:</th>
<th>The buyer and seller initiates a trade transaction through their respective banks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 2:</td>
<td>The buyers bank which is the issuing bank is connected a blockchain consortiums (Example would be The African Financial Institutions Blockchain Consortium). The issuing bank in Nigeria, is also connected to the blockchain platform for the NCS. The sellers bank would be connected to its blockchain consortium (example would be The European Financial Institutions Blockchain Consortium) The different blockchain platforms are interlinked such that, the NCS platform is connected to the consortium for African banks which is connected to the consortium for European banks</td>
</tr>
<tr>
<td>Step 3:</td>
<td>All the steps 2 – 19 in the process flow in table 2, would be digitised and automated in the respective blockchain platforms, with the help of the electronic bill of lading (eBL), such that the transaction turnaround time would reduce from 7 – 14 days to 24 hours or near real-time.</td>
</tr>
</tbody>
</table>

As seen in Table 3, the adoption of the blockchain technology to the trade finance process, has digitised all the paper processes involved in the transaction dynamics in Table 2. Once the buyer and seller initiates contact and informs their respective banks, every process from then on, would be on the blockchain platforms.

With the banks interconnected through the blockchain, terms of the trade, contract agreement and all document processing from the checking and validating of the proforma invoice to resolving amendments and discrepancies, transmitting of shipping documents and final settlements, would be done through the platform. With the Nigerian Customs Service on its own blockchain platform, the verification of regulatory certificates, approval from the Central Bank, generating assessment reports for duty payments and the final documents release for the clearing of goods would be digitised.

The platform would undoubtedly reduce cost and turnaround time from about 7 – 14 days to just 24 hours or near real-time, and for all parties the involved, create an
environment of trust between two unknown people or businesses, and finally, improve faster settlements which would allow for resources to start another transaction cycle.

The summary of this process is shown in figure 14 below.

**Figure 14. Summary of The Blockchain and Trade Finance Process in Nigeria**

**THE PROCESSES DIGITISED WOULD BE:**

1. Verification of Regulatory certificates
2. Approval of CBN Form M
3. Assessment sheet
4. Pre-Arrival Assessment Report
5. Confirmation of Duty Payment from the bank
6. Release of Exchange Control Documents

**THE PROCESSES DIGITISED WOULD BE:**

1. Smart Contracts • LC contract agreement
2. eBL Integration • Documents presentation
   • Amendment requests & approval
   • Discrepancies are resolved
   • Track and Trace shipment
3. Turn-Around time • 24 hours or near real-time
4. Final settlement • Faster settlement
5.3 Implications of Research

This research shows that the application of the blockchain in different processes is still in its pilot phase and only a few milestones have been accomplished in this regard. In a typical blockchain process, the distributed nature means transactions are verified through consensus and there is no need for a central certifying authority (Lewis, McPartland and Ranjan, 2017; PwC, 2018).

However, this study reveals that with the trade finance process, the blockchain technology would not eliminate the role of the banks, but rather, the banks would still play a major role in the transaction process, and in the facilitation of trade between two parties. While the buyers and sellers involved in trade financing might not necessarily be connected to the blockchain, they would expect their transactions to go at the speed and transparency that the blockchain technology offers, and hence would expect their banks have upgraded and be connected to the blockchain.

In this stead, the banks would not be acting as the central certifying authorities that would be checking and handling the documentations but as a provider of the blockchain platform through which the trade transactions would be done.

As the result from this research reveals, the blockchain platform in the trade finance process improves, not just the turnaround time in the overall transaction time to near real-time, but the different complexities with the trust, contract agreement, documentation, approvals, verifications, auditability and traceability, would no longer exist, as the digitised platform automates and checks all these processes.

It is therefore recommended that the banks invest in and adopt the blockchain technology to remain of value to their customers, as the technology would be of immense benefit, not just for trade financing, but for other processes as well.
CHAPTER SIX: Conclusions and Recommendations

6.1 Summary of Findings

The overall findings from this research are limited primarily on the insights based from five participants as well as other secondary resources, with reference to the research focus. The study has been able to demystify the blockchain technology and how it works in a business process through the lens of the trade finance process in Nigeria.

As it stands, the blockchain is as important for trusted transactions in the same way the internet is for communications. The technology is being piloted across different industries, as it is still within the innovation phase in terms of understanding its application in business processes. Although it has gained traction by proving its functionality, it would still take many years to see growing normalization and acceptance, as the adoption of the blockchain would have to overcome obstacles such as its’ integration with legacy systems, government regulation and stakeholders support. There is no doubt however that the global adoption of the blockchain would be inevitable in the same way the use of the internet and technology was.

The trade finance industry has made major accomplishments in realising the efficiencies of the blockchain technology, with major banks like HSBC, Santander, and Standard Chartered, already successfully using it for real-time trade transactions. Countries like Nigeria that are heavily dependent on trade financing have shown major interests in the technology by also adopting it. Surprisingly, despite Nigeria’s high corruption perception index of 27% and ranking of 148 out of 180 countries (CIA World Fact Book, 2018), the Nigerian’s Customs Service has adopted the Oracle’s blockchain platform for the excise trade process, majorly to combat the corruption associated with the exports and improve the reputation of Nigerian-made goods.

The quantifiable benefits from the implementation of the Oracle blockchain platform by the Nigerian Customs Service as explained by The Assistant Comptroller General of Customs, is an expected 50% increase in revenue generation, as the platform provides irrefutable data in made-in-Nigeria goods which would drive investment,
proper accounting and predictability of data, and blocking revenue leakages from corrupt practices (Ogundeji, 2018).

Blockchain in the trade finance process in Nigeria would be about banks adopting the technology and connecting to other blockchain consortiums that is necessary to complete the transaction. These blockchain consortiums would digitize the trade process such that the turnaround time is reduced from 7-14 days to about 24 hours or near real-time.

In conclusion, this study showed that the blockchain in trade financing is about digitising and automating the process for a faster turnaround time. And, unlike the assumption that the blockchain might eliminate the banks in this process, many businesses would have to do their trade financing through the banks, who would have adopted the blockchain and be interconnected to other blockchain consortiums across the world.

6.2 Recommendations for Future Research

This research provides an interesting opening for further research focus as the blockchain is relatively new and many companies are still researching into its potential applications in their business processes.

Based on this research findings, further research is still needed to understand how the blockchain can be tailored to different processes across the financial sectors. Although this project focused on just the trade finance process, the blockchain can still be used for different departments in the finance sector such as audit, stocks and bonds and loans.

As blockchain has gained momentum in logistics companies, research is needed to explore how it is used in a logistics process. This would enable better understanding of how it can be applied to other sectors and also, speed up the adaptability of the blockchain.
One of the barriers to the adoption of the blockchain is the regulatory uncertainty. A look into the real-time statistical benefits of the blockchain in different economies will prove useful to the different governments and help to hasten the governments acceptance to put the necessary regulations in place.

Finally, since the blockchain in trade financing is about digitising the process, it would be worth researching other means of digitisation, outside the blockchain. This is key to show how the blockchain would remain competitive as new applications are developed with evolving technologies. Could this disrupter be disrupted?
CHAPTER SEVEN: Personal Reflection

7.1 Introduction

This chapter is where I, the researcher, reflects on my experiences through the dissertation and the Master’s program as a whole. This personal reflection is essential and key in learning as it provides a means to evaluate how the learning experience fits into one’s personal and professional advancement in life (Saunders, Lewis and Thornhill, 2015, p. 662).

7.2 My Learning Style

“Learning is the process whereby knowledge is created through the transformation of experience” (Kolb, 1984, p. 38).

According to McLeod (2017), there are four distinct learning styles from Kolb’s learning theory, and people naturally prefer a certain learning style. Learning progresses through four stages in a continuous cycle of experience, reflection, conceptualizing and testing (Kolb, 1984, p. 21). This learning cycle is explained in the figure 15 below.

Figure 15. Kolb’s Learning Cycle

![Kolb’s Learning Cycle Diagram](source-image-url)
Based on this theory above, I fit perfectly in the converging learning style of thinking and doing which falls under the abstract conceptualization of thinking. I like thinking through a process and finding solutions to problems whilst experimenting with new ideas and concepts. I can also say I do a lot of watching as I like using a wide range of information and organising it in a clear and logical format.

This observation from Kolb’s learning cycle agrees with the results I found from the Honey and Mumford’s Learning Styles Questionnaire (Appendix 6) which reveals highest scores as a reflector and pragmatist.

Figure 16. Personal Result from Honey and Mumford’s Learning Style Questionnaire

Relating this learning style to my project and the MBA course in general, it comes as no surprise as this research project is about analysing a new concept. I believe this model also fits into my career choice of being a business and financial analyst that requires a great deal of insight and objectivity.

7.3 Dissertation Learning Experiences

The process of coming up with an appropriate research topic was the most challenging experience. My focus was to get a practical knowledge of where I intended to work in future. However, fitting the project ideas into the context and requirements of the research proposal was not an easy task. Getting ideas was easy, however, thinking
through the feasibility of these ideas felt like I was a real-life project manager where I had to factor so many things before the project commences.

With the research methods course in the second semester, I was finally able to understand the whole research process and think through the process with each idea I came up with the lecturer.

My breakthrough came in one of the courses - operation and governance of financial markets. Each week, two people were paired to give a news broadcast on financial events in the week. When I did my broadcast, one of the news was on the launching of a blockchain-enabled phone where with each usage of the phone, the customer becomes a shareholder and earns points, which could be converted to cash. I became intrigued about this “blockchain” and what it meant and how it is used.

Finally, I was able to narrow down a desired topic and when the research proposal was approved, it was easier to build upon it for the full dissertation proposal.

Carrying out the actual research was interesting and a bit stressful as getting the participants and information for the research was not as easy as I had thought. I made as much contacts as possible, read different white papers and followed any news on the blockchain progress. I signed up to webinars discussing my topic of interest and attended events in Dublin discussing the blockchain. I was eventually able to gather as much research materials for this work with a clear understanding of the topic.

Overall, the experience was a good challenge for me, as it stretched me beyond my comfort zone and made me reach out and network as much as possible. My writing and communication skills greatly improved and most importantly, analysing a process workflow for the blockchain is a great skill for my future career prospect as a business analyst.

7.4 Master of Business Administration in Finance

My MBA program started on the 22nd of January and the first lecture week was an introduction into the degree and the required expectations for the completion of the
program. I was really agitated and worried that I would find the whole program difficult as it had been a long while since I completed my first degree or even doing any form of academic work.

As time went on and reflecting on the courses I liked and found less stressful, I would say it was those that had more calculations. Thus, the financial analysis and corporate finance were easier for me as they leaned more on calculations, or perhaps, it was because that’s where my professional interests lie. I liked how all the courses were structured as it allowed for deep research from the assignments given and thorough understanding of the topics handled. This made it a much more rewarding experience as after each course, it literally felt like I was already a subject matter expert in those fields, particularly in the international management and business strategy courses.

The personal portfolio assignment in the personal and professional development course was an eye-opener for me as the different activities showed how merging our life experiences to our personalities can help us achieve our set goals. I must admit that thinking through and writing about my life experiences was not an easy process as it made me realise what I could have achieved, had I done this course years ago.

The group assignments, meeting assignment deadlines, and dealing with the social issues as the class representative made me realise that, irrespective of the place or people involved, I love being with people, I love helping people and I could still handle pressure even though it is a separate country. I have been told here that I am patient in relating with other students which I thought was a virtue I did not have.

In summary, I know I made the right decision in my choice of study and my choice of college. The experiences and contacts gained through this dissertation and the MBA course has increased my confidence in aiming for higher goals and made me realise that I can conquer even in a competitive environment. I am grateful for the staff, lecturers and fellow students that made it easier to complete the course and provided the platform for me to enhance my research, critical thinking, interpersonal, leadership and analytical skills.

I had no reason to be fearful at the beginning of the course after all.


PundiX (2018) r/PundiX - Nigerians To Make Purchases In Bitcoin, Thanks to PundiX, *reddit.* Available at: https://www.reddit.com/r/PundiX/comments/9ke6fv/nigerians_to_make_purchases_in_bitcoin_thanks_to/ (Accessed: 26 October 2018).


Interview Transcript on Trade Finance with P1 on 23\textsuperscript{rd} November 2018

Maria Adaora – Trade Services Documentations at Zenith Bank Plc, Nigeria

KO: Hello, my name is Olufikayo, you can call me Kayo. I'm doing my project on how blockchain technology can be used for trade finance processes in Nigeria. So, um, I just want to talk to you about the trade finance aspect for you to talk through the process, you know, the documentations, everything that you check, um, regarding the trade finance transactions that you do based on the fact that you are subject matter experts, um, and um, in the matter. So if you could just, I just wanted you to talk freely and openly about what you do, the day to day transactions on how you handle a typical trade finance transaction from the beginning to the end, from when the customer starts to what's, you know, all the parties that are related to the final release of a document or the final phase of the transaction. I just, I just want you to talk through the whole process with me. Thank you.

P1: Okay Kayo, good afternoon. My name is Maria Adaora, I work with Zenith Bank. Concerning what you just asked about trade finance, let me talk about em, form m. when a customer walks in and em wants to open a form m with the bank, for importation of goods into the country, we have our own requirements. You know, which, em, is a standard from the central bank of Nigeria. Which all customers are mandated, you know these documents are, customers are mandated to provide these documents for them to import this form m

The customer provides us with the proforma invoice. You know the proforma invoice has the address of the supplier outside the country. Um, we look out for the email address, the phone number, the country of origin, Where these goods are coming from, the country of supply, the port of loading and the port of discharge, The port of discharge must be a port in Nigeria or em if it’s coming via aircraft, it has to be at a port, sorry, at an airport here in Nigeria. Then the proforma invoice should be dated. The date on the proforma invoice should not be more than 3 months. The customer has to also state the description of goods coming into the country, yea, the currency, the unit price and the quantity of goods they are importing into the country. And of course, since the goods are going to be shipped via, into the country or coming through an aircraft, you know, the customer has to pay for the freight charge. So the freight charged also has to be included on that proforma invoice. Then it also has to be signed or, usually, if the customer, if the customer, if the supplier signs off or puts their stamp on it, we can work with that.

So the proforma invoice should not be more than 3 months. Then apart from the proforma invoice, depending on what the customer is importing, you know,
if the customer is importing drugs into the country, eh, customer needs to provide us with a NAFDAC certificate, for drugs and raw, and um, food products

KO: Oh, okay

MA: Yes. Drug and food products into the country. The regulatory body for that is, NAFDAC. So they need a certificate from nafdac, you know, giving them that permission to bring such products into the country. After it has checked that whatever is coming in is okay for people to consume, you know, in the country.

KO: Oh, okay

P1: If the customer is importing em, em, finished products, some machineries into the country, we need the customer to provide us with the SONCAP certificate, you know, issued by the standard organisation of Nigeria. You know, meaning that em, this body would have checked, you know, to be sure that, the products coming into the country is em, is of a high quality for people to use in Nigeria. Then apart from that, we tell the customer to provide us with an insurance certificate, because you know, the goods need to be insured. So it covers from the port of em loading to, it depends on the kind of insurance cover the customer wants. If he wants to, to, if he wants a full cover on the goods he’s importing, then of course, you know, they will pay a higher premium for that, So the customer also needs to provide us with the insurance certificate. So after all this we open the form m for the customer, it generates the BA and MF number, which the customer sends to their supplier outside the country. So having done this, …

KO: Um, sorry, what is that? The BA and MF number. What, why is it, at what stage do you generate those numbers? As in when. So when..

P1: that is ..

KO: Okay, continue

P1: Okay that is generated once the form m is opened.

yes, when the form m is opened. The customer gets the BA and MF number. So this number, this would be sent to the supplier abroad, because the BA and MF number needs to be stated on all their documents. All the shipping documents.

KO: Okay

P1: yes, so once that is done, it depends on the type of form m the person opens. The form m could be a non-valid form m or a valid form m. when I say em, when I say the form m is non-valid, a non-valid form m, it means the customer would source for funds to pay the supplier.
KO: What do you mean by that? I don’t understand?

P1: You know in Nigeria here, our currency is naira. The customer is dealing with your supplier outside the country. so if the customer is remitting funds, the customer would not em make payment to that supplier through the bank. The customer would have to source for funds, not through the central bank of Nigeria or the bank. The customer purchase eh, eh, his own funds in that currency, be it pounds, euro or dollars. Yes, and pays this to the supplier, based on the agreed.

KO: Okay

P1: Then the other is em, the valid form m. valid form m means that the customer has an agreement with the bank, for the bank to pay his supplier at an agreed rate, which is, it can be 90 days, it can be after 180 days, depends on the agreement the customer has with the supplier outside the country.

And then, at this point, the customer’s bank would be involved, the suppliers bank is involved.

KO: So that’s for the valid. So um, from, from what you just said, if i just get you, em, understand what you’re saying, is that, em, for the valid transaction, the customer there in Nigeria, it’s the Nigerian bank, the customer's bank in Nigeria will be the one to send, remit the funds to the supplier's bank, is that what you’re saying? Okay. But for the non-valid, the customer on his own will be the one to get the dollars or the pounds or euros. And do his transactions without the bank, without the banks help in that regard.

P1: Yes

KO: Okay. All right. Thank you.

P1: Okay, em, after that, the customer liaises with em, depending on, the supplier liaises with his own bank that’s if the customer is opening a valid form m, if the customer opens a valid form m with the bank. the supplier will liaise with his own bank, give his own bank the necessary em documents, necessary shipping documents, which includes eh, the bill of lading. And also, the there would also be the bill of exchange stating the amount which must be accepted by the customer within 90days. Which must be accepted by our own customer within 90 days. so the documents, the supplier sends through his bank to our own customer’s bank here in Nigeria comprises of em, bill of lading, which has the MF and BA number which I told you about earlier, the commercial invoice, the packing list, the certificate of origin, that’s the CCVO. These documents, the suppliers bank sends to the customer’s bank herein Nigeria
KO: So, I just need you to explain, you know, the content of this document, this shipping documents, that like the commercial invoice, is that the same as the proforma invoice?

P1: Yes

KO: But it will now contain the MF and the BA number. And then the parking list. What's is in the parking list? What is the content of the packing list?

P1: Well, it's um, its um, it contains what the customer is importing and the mode of packaging

KO: Okay. Okay. And then you said the cert, the certificates of origin. What, what's that?

P1: Yeah. It is called the CCVO. Certificate of value and origin.

KO: Okay. What, what's, what's the contents of that?

P1: Okay, it contains em, it contains em, it gives us an information of where these goods are coming from. Basically about the description of these goods the importer is bringing in.

KO: Okay. All right. Thank you very much. You can continue.

P1: Okay so, upon acceptance of the bill of exchange, the customer returns that same bill of exchange to the bank for further processing. So the customer is meant to accept the bill of exchange within 90 days. Here in Nigeria, we make customers importing into the to make some payments called the duty payments. Yes, duty payments for all goods coming into the country, before you can clear your goods from the port or at the airport. And the body in charge of that is the Nigerian customs service. They are the body in charge of that.

So em the customer comes with em, a copy of his assessment issued em by the Nigerian customs, the arrival assessment report – PAAR, created by the Nigerian customs to show the duty payment. After that has been done, the bank issues the duty receipt to the customer, which he takes to the port to clear his goods. But once the duty payment has been made, the customer only has access to the shipping documents sent by the supplier after the duty has been paid

KO: After the duty has been paid.

P1: Yes. Because anything contrary, anything contrary to that will make the bank pay heavily

KO: Okay. So after he pays the duty, So, um, from what you said now, so when the goods arrive. Em, Okay. So let me start from the bill of exchange, which states the
amount the importer is meant to pay. So once they pay this funds, em the supplier will ship the goods. So when the, when the goods now arrive, the Nigeria customs service they issue an assessment, which will inform, how much duty the importer is going to pay.

P1: Yes, and depending on the type of goods the customer has imported.

KO: Okay. So there are different assessments based on the nature of the goods. Okay. So then the customer comes and makes this duty payments at the bank and then takes it back to customs the duty receipts to customs.

P1: Yes

KO: Okay. So, um, so with the duty receipts, do they automatically then release the goods? Is that okay?

P1: Yes, they do.

KO: Okay. So when they released the goods, what happens next? Is that the end of the transaction with the bank?

P1: No. but I also want to mention that em, if the customer does not pay the fees on time, when the goods arrive at the port, the customer pays for demurrage

KO: Oh, okay

P1: Yes, when the customer fails, when he fails to pay on time.

KO: Okay. why would the customer not, when the customers goods have arrived, what would cause delay that, that would lead to him paying demurrage?

P1: um, sometimes it depends em, the goods may arrive even early before the agreed time, or the customer may not even have enough money to pay the duty

KO: to make the duty payments. Oh, is that duty payment usually high then?

P1: No, just like I said earlier, it depends on the item of import

KO: import, okay. So you can continue. after they clear the goods from customs, so what happens next with the bank.

P1: Okay. After the goods have been cleared, the, uh, the customer, you know, the customer would have accepted the bill of exchange, then, once em, the bank is eh, once the bank is ready to remit the payment within the stipulated period of time, the bank, eh, the customer funds his own account with the bank,
The bank goes to the central bank of Nigeria to purchase foreign currency, if its dollar, the bank would go to CBN for that, of course the customer’s account with the bank must be funded, so they can buy the other currency.

Okay. So you’re saying after the goods is cleared, um, so the bank will now remit the funds to the supplier.

P1: Yes

KO: Oh I taught at the point of the bill of exchange, funds are remitted?

P1: No.

KO: Okay. They just accept that they will, they are okay with the amount stated. Oh, okay, so it’s after the goods have been cleared and then the importer will now remit funds through the bank to the suppliers bank. Okay, I understand what you are saying now. And then what happens next?

P1: Okay, so, when the bid is successful, that means that the bank will be able to buy the money in that currency, the bank remits directly to the suppliers bank

KO: Then what happens, is that the end of the process, when the suppliers bank receives the funds, that’s the end of the process?

P1: Okay, after the goods have been cleared, you know, the Nigerian customs issues em a document to the importer, that’s given the payment, that’s the exchange control document

KO: Okay, that’s the final document that’s released after payment has been made by the bank

P1: Yes, yes, exchange control document.

KO: So, they give this to the importer or to the bank?

P1: No, they give this to the importer. So the importer submits this at his own bank.

KO: Okay, So what, what do you do with those documents?

P1: Okay. Em, when the customer, when the bank receives this document, it comprises of the duty receipt, assessment, the used PAAR, that’s the pre-arrival assessment report, then there’s also a document called SGD. Yes, SGD and also em, terminal delivery order. They are all the documents the customer needs to submit

KO: Sorry, I can barely hear you. Could you speak louder? I can’t hear you anymore
**P1**: The pre-arrival report, the commercial invoice the form M, the bill of lading, then also SGD and terminal delivery order. The customer returns these back to his bank with the stamp of the Nigerian customs on it.

Yes, to show that the customer has cleared his goods, and afterwards, the bank releases money to em, to the importers bank. So that’s just the cycle.

**KO**: That’s the end of the process. Okay. Okay. So are there any, um, I’m aware that there are different. Like you said, the main thing from the beginning of a transaction is that there is a valid one and there’s a non-valid one. So, em. like for the valid, that’s where I’m, I’m aware we have the letters of credits and the bills for collection. So how does that, how does the payments for those ones, em, work? As in, In terms of the process, how does it differ?

**P1**: Okay, the bills for collection, really, is all about the customer receiving the bill of exchange, accepting the bill of exchange within 90days and then payment been remitted from the customers bank to the suppliers bank but for the letters of credit, it means the customer has an agreement with the supplier. I buy on credit and probably after certain days I remit funds to you.

**KO**: Okay, okay. So the letters of exchange, funds are remitted once goods have been certified okay but for the bills for collection, funds are remitted at a much further date

**P1**: Sorry, no, no, that’s the letters of credit

**KO**: Okay. So when do you remit funds for the bills for collection

**P1**: Once em, em, the goods have been cleared at the port

**KO**: Okay, so for both of them, the goods, the funds are remitted after the goods have been cleared.

**P1**: Yes, but for the letters of credit the customer has an agreement with the buyer to pay at later date

**KO**: and this process, is it the same for other banks in the country?

**P1**: really, we all do the same thing. It’s the same documentation process, the same CBN, insurance and banking procedure. Our charges and credit lines are just different

**KO**: A final question please, have you heard of the blockchain technology?

**P1**: Blockchain? I can’t say that I have. Doesn’t really sound familiar. It’s possible I’ve heard it in passing, but can’t really say I know what it’s about.
KO: Okay. Alright. thank you so much for the time you took for this interview. Em, Please note that em in, em in compliance with the consent form that I already sent with you, a copy of the transcripts of the interview will be sent to you for you to certify and please feel free to, to let us, to let me know if there's any parts of the information you have stated that you don't want to be mentioned in the projects. It is your right to let me know. And you also know, of course you can withdraw from the participation of the project also, but I would like you to know that your anonymity and confidentiality will be protected. Your name or the bank's name will not be mentioned in the course of the project. It's strictly in compliance with the completion of my MBA dissertation, so just exactly as it's stated on the consent form. Um, so you can complete that and then sign and send back to me. Thank you so much for your participation. Um, do have a lovely day. Thank you.

P1: Have a good day. Thank you. Bye.
Appendix 2: Interview Transcript with P2

Interview Transcript on Blockchain Technology with P2 on 4th December, 2018

Daniel Buckman - Software Engineer at Murex Advanced Technologies, Ireland

KO: Okay. Hello, my name is Olufikayo, you can call me Kayo. I'm doing my MBA dissertation on how blockchain technology can be used for trade finance processes in Nigeria. Um, so I just would like you to specifically just talk about the angle of a blockchain technology. Um, how, what, what exactly is the blockchain technology? How do you see it's um, how does it work, how do you see it emerging? what are the benefits, what are the pitfalls? Just basically everything you can say about the blockchain.

P2: Okay, so, What is block chain? Okay, so you're kind of familiar with what a ledger is in accounting, so you have a ledger, you have different types of ledgers and have different types of transactions happening every time. So you'd go to the supermarket, you buy something, they put it in a computer, it gets recorded into a ledger. You're do something with your ATM, it gets transferred through certain systems and then it goes on your electronic ledger in a bank somewhere, with a database somewhere.

So mainly the the issue about the financial system is that, everything has to be centralized. Number one, it has to be highly regulated and it has to be a lot of intermediaries because of trust issues, because when you're dealing with money, you'll have to validate and verify and all that. So when you go with your card, when you go with your ATM card, and you go to a shop, they have to trust that you will have the money in your bank account to spend. And how do they know that, they don't have a direct link to your bank's system to check your account.

So then, there are all these chain of companies, MasterCard, Verizon, all of these intermediaries, that will vouch that, okay, we checked the systems linked, like, oh, we check that this, um, account in that bank, in that country, and they claim that we can pay this, so you can take the payment and we will reimburse you later. And then, so you find that your account will be blocked. They can take the money immediately because it was a good through systems, I guess when you're a whole new era, has lots of headaches and all of this and all of that is necessary. The point is that, is all of that is necessary for financial transactions, for trust, and to avoid fraud and to avoid all of these things.

Blockchain is basically a digital ledger x. Okay. So that's not entirely true. Blockchain in itself is not a ledger. It's simply is a technology that can be applied in several ways, in any naturally different contexts, but it just happens to be the first application, the first major application that made waves was with Bitcoin, which essentially in which case, it was used as an electronic ledger. So what happens is this, when they talk about a blockchain, first of all, It's a ledger. It's called a block because every transaction becomes something like a block is
like one block. So when you have a transaction, you can have a counterparty, and there's an account to debit there's an account to credit. It can be something, not just cash transactions. It can be exchange of properties. So you have a shop in Nigeria and you are selling it to somebody. So you, uh, you are letting go of, of a shop and you are expecting money back. But so there's an account where the money is coming from. This is going to and all of that transaction becomes a block and that block. So the way the system of blockchain works is that, each block is linked to the previous block. And to understand that, the first thing to understand is that, in case of, you know, traditional banking applications, every bank has their own centralized ledger. That is, em like, it's for the bank and no one has access to it and certain people who work in the bank. So everyone has their own ledgers and their own, um, there's no link between them. So if you have to do reconciliation, that's why there are settlement banks and in intermediaries that try to reconcile.

And so for a simple transaction like that in the traditional way, your bank, let's say your bank is an investment bank. It's in Nigeria. There'll be two separate ledgers and two separate accounts kept. There can be a mistake anyway. So your um, somebody could actually debit the account in, in, in Nigeria, but then the credit would have to go through interbank to know that, and eventually it might not even hit your account here. So the two very separate. But in terms of blockchain, it's one ledger and one system, so the effect is immediate. When, when a transaction is recorded as, and there are no intermediaries, It's one platform, so the effect is immediate. So the debit to one accounts, credit to the other account and that block gets created on the system. And the other thing is that, it's not owned by just a, any one person it's centralized, I mean it's not centralized is distributed.

So for a typical bank account, everything is centralized in one particular bank but with blockchain, the network, every node on the network and nodes on the network can be individuals, people's personnel pieces. Every node has the whole of the ledger and that's what actually as to the security is very difficult to tamper a transaction. So in theory, once the transaction is done, it's booked, you cannot change it. If you want to change because they, so it works and em. So technologically, the block is just a record of data about details about that transaction. And there's something called a hash code. I don't know if you know what a hash code is. Okay so, so, so, uh, hash code is a number that uniquely identifies something. It can be a string, it can be a block of data structure or whatever, but a hash functions are not reversible, and they always mostly like it's guaranteed that you have a unique number and you're going, you're going to do have this same number on that particular data every time.

So if you change anything, the hash will be wrong and that's how nodes on the system will know that this particular transaction has been changed, or something happened. So you can't edit the transaction. You can't eject any new once is booked. And the thing is that, not that transaction is not on just one machine, it is on all the nodes on that network. So with something like Bitcoin,
actually that is not regulated, that is not for a particular organization, it's on the Internet. Every node on the Internet that has the bitcoin mining software has all the transactions that has ever been done. So it's difficult to dispute a transaction once it's done. Oh, I didn't actually do that, the record is there, and it's not only on one machine, it's on every one. So even if you hack this machine and break it, then you have to hack all the machines and you have to change all of them.

And also because the um, so each block stores the hash code of the previous, that's where the chain comes. So they form a chain and that's why it's like a chain of blocks. So it's a chain of transactions. It's very structured. They're very more, when at work, it's initially created the very first block that is critical. I think it's called the genesis block or so. That's the one that will not have any, any previous one, it's the very first one. And then after that for any new block to be added, and this will get a little technical here because um, yes, it's difficult to, so it's not impossible to tamper with a transaction because once you tamper with the transaction and the hash code changes, you can actually update all the other nodes, that depending on the number of nodes in the network. If it's something like bitcoins, you're talking about millions and millions of nodes that you have to have an update. But with the rights supercomputers. Good. So that's where the the the scepticism also would come in.

Okay, because in theory, it's a perfect system, just as long as certain parameters at kept. Because with the right super supercomputer that is so fast, you can change a transaction, and run the script, and go through all the nodes, and to update as quickly as you can. So to avoid that, that's why, first of all it's actually distributed on so many nodes to make sure that you have to, and the thing is, you have to do it in a short time. Yeah, before the network actually detects that. So you have to think, theoretically, you have to to change at least 50, more than 50 percent of their nodes, so that those nodes will propagate the changes in others the others that have the right. Because there's a built-in check, in in this particular transaction, if it's wrong, it's fake, and the way it does that is that it checks with their peers.

So it's um, it's a peer to peer network. So, so it checks with all the peers, hey guys, I'm getting this transfer with this code, what do you have? Does it match? So to get away with it, you'd have to have changed more than 50 percent. So if more than 50% say that's okay, it's okay then. Then everybody else will say, okay, fine. It's okay and that's not easy to do.

And also they've put in something they call it, I think it's proof of work, which is an interesting thing. Then it's like when do you want to create a new transaction, you can't just join the network and say, hey, I've done this, this, this new new new transaction, we've agreed on this business deal and we are transferring this. And then, all the nodes would be like, Hallelujah, all right, who, who would take the transaction. There's um, there's, there's a mechanism where there's, um, it's like, it's like a puzzle that you have to solve and they've made it
intentionally difficult that it doesn't, it takes, it would take like 10 minutes also to be able to solve.

So if a computer is taking 10 minutes to solve a problem, it's very kind of computationally intense, and it's intentional to slow the network down, to slow the system, so that you cannot quickly, um, tamper with the transaction and make the changes. So they've put in something called a proof of work, that has to be solved and that has to be sent to all the nodes. And I think the first node that that is a able to solve the puzzle, it gets, em, it gets to create that block. For bitcoin you actually have, you actually get a reward every time you are the first, I think that's how like they mine coins. They're more of the, of the puzzles you are able to solve, the, you get like a reward, you get more, more bitcoins. But the main idea there, is actually to put a check in, to make sure that em to put a security in, so that transactions are not, fake transactions are not propagated through the network. If you add the proof of work, and add the distributed nature, and the fact that it is very transparent, and everyone knows everything, then it, it takes away fraud, it takes away errors, human errors because it's a self-accounting thing, so you don't need a lawyer to verify, you don't need humans who have caused, the system tracks everything and all the records are there and they actually duplicated.

So if one is lost here, then there's thousands and millions there. So there's an inherent security in there, and it builds trust as well because we can all, once we agree on a transaction, and the deal is done, you can't come back later and tell me something else or ask your bank to change that. There are millions of evidences that we're. So actually, if you need to change the transaction, you can't. You have to create a new block that will offset the previous one. But we also understood that, so let's say that I transfer 200 euros to you and you thought the deal was for two thousand dollars. and I need to add maybe 1,800 more. I can't delete the, the 200 and give you 2000. I can create a new block for 1800 or I can, you can transfer back the 200 which would be negative 200, and then I can give you positive 2000. But all that I said, everything that happens, all the record is still there and permanent. And so we can always track and say, oh, this happened here, and that changed there, that has been there, that has been here. So the blockchain itself is the underlying technology that allows for all of these by the application can be different. So the, the base technology is that it's, it's a distributed record actually because, because ledger is very specific but it doesn't have to be just a ledger, but it's a distributed record that is um, it's self regulated and it's very transparent and it's very open and it's replicated a lot of times. So like, there's a lot of details and there's low risk of losing your record, there's no tampering, so there's no incidence of errors and trust and it takes away the need for the intermediaries.

So if it was, so if we go back to the initial example where you go to a shop with your ATM card within the, if, if the shop and the banks and everybody was using the blockchain, yeah, that wouldn't be a need for Visa or Verizon, or because the shop will be on the blockchain network and your account will be
on the same network, and your bank would also be on the same network. So as soon as that transaction is done, its immediately on the network and we know that money has changed from here to there, so we don't have to wait for three, five days to do a settlement. We don't need the settlement banks because everything is done and everything is plain, and we will know whether you have money in your account or not because the network is there, its open, and you can see, can she pay for this or not?

KO: Okay. With it being such a robust system with all these benefits. What, why, why is there a slow adoption rates? What do you think is causing that? It sounds very good. It sounds, you know, he has all these benefits, so why aren't people embracing it as fast as it sounds.

P2: It's good theoretically, but with everything, if there are no human elements, its easy. As you bring human elements in it, because yeah, it's, it's an, it's a nice system that has been built which if left on its own, and there's trust, it should work. But it's been operated by human beings and especially in the financial system where it, an error means somebody losing the money. and it could mean somebody losing their livelihood. and their pension. and their savings, it is not a joke to simply say, oh, this didn't, it's promising let's all jump on it. It would take time. because it needs to be tested and retested. Like, um, when I'm, um, bitcoin came. like it was, everybody was jumping until like two years ago, somebody in, in, in, in, in, in Japan hacked their system and got like what? Millions and millions. And those are, its like, for every system, and there are actually individuals, especially young people, young, brilliant people who have time on your hands, who are smart, who are restless, they have nothing to do with and they want a challenge. And if you tell them, this thing is unbreakable, guess what, they are going to try and find the ways to break it. And for every system, like if you're a software engineer there's a saying that we have received, that bugs, uh, uh, are part of life. A bug is, um, it's, it's an error in a computer program. Most of the time, it's that an error that has not manifested yet. So it works fine and we've tested it and everything, but most of the time, it’s like a corner key somewhere, that in this particular circumstances, if you have this kind of bandwidth and this and this and this and this, this and there's an exposure here that nobody thought of, and somebody will find it somehow and they'll use to kind of em, exploit the system, and then we'll put a fix in, until the next bug.

So I think people are sceptical because they don't know yet all the underlying failures that can happen. Em, that's number one. If if somebody is able to hijack the network and find a way to break and a way to tamper with with, with transactions, without being, without it being detected, that would be because, the whole thing, that is trust and we know that it's difficult to tamper with transactions, so if I can do it secretly and is not being detected, that's a serious issue. Number two is also the whole idea of openness. It sounds brilliant, but not everybody is happy with openness. Not everybody wants their transactions
in the public domain like okay, I want everybody to know, so, so actually this is that.

There are different ways of applying this, so actually they have. There's the public network that is public, that is, everyone can see. But within an organization you can have like a private network where only people in that organization can see it, can access transactions and then, there are other ones, that it's like, they create like a private network between certain entities and people have access rights and not everyone can have. And when you get into those details, then it gets, because the whole idea of openness and transparency at all, then you come with security, privacy. Then if it is not something that is easy to to solve. So, they're are like, most banks at the moment that I know, if you talk to most of the, the, the decision makers, because we actually, we actually develop banking software, so we, we, we are in our interest is to develop what the banks want, and we, we tend to listen to them and look at the trends, and go like, in the next 10 years, this is the big thing that they're going to need and we need to make sure that we develop it now so that when the time comes they can use it.

But when it comes to blockchain, most of the big banks, the whole narrative is that, they know that this has the power to transform the business. Everyone, everyone is aware of it. Everyone knows it, but they're not jumping on, just yet. There's a feeling of yeah, we know, let's get ready to use it when it matures, but let's wait and see. So that's a bit of okay. So they actually, they actually follow a lot about how it's been applied, and I think there's this, there's this new company, this is a Canadian guy, this young guy, 19 years old and he built a blockchain system that is different from bitcoin. It's called Etherium, and what he did basically, it's pretty good actually, like if you look at your phone, if you either have an android phone or an apple IOS, but the android or the IOS or even facebook, it can be an application that people use or we can think of it as a platform to build applications on top.

So if you look at facebook, people built games like candy crush and all of this, that are specifically for facebook applications, for facebook, that people go and use those applications. Yes. And then people build applications for your android phone. So anybody can write a program in any language that they want and install it on the android and it works. And he thought of developing a blockchain system that's like a platform where you can develop different applications on top of it. Either a financial system or something to do trade finance, something to do land acquisitions. And they have, I think the application that they did first was something called smart contracts and I don't know the full details, but it sounds very interesting, if you want to look at that. It is like you know, how like legally, you have a contract and the contract is binding, so, he thought of, if you look at certain things that we do, there are implicit implicit kind of contracts in them, that when the parties involved obey the rules of those contracts. Then secondly,
So if you go to like like a vending machine, it's there, if you can put the €2 in and press B3, water would come out, if you can put a €3 and press A1, Coca Cola will will come out. That's a contract, and as long as you obey the contract, you just get the desired result. So they have this idea of smart contracts when they are building block chain contracts, so with the same idea of openness and transparency and immutability. Immutability is you are unable to change. So once two parties enter into a contract, and a contract is established and it's there, then whatever was stipulated into the contract, the computer would decide. So you don't need any human being to come in and force it, it's like the computer itself says, okay, once this is done and that is done, this gets done. So you don't say that it takes away, 

So sometimes you want maybe, let's say a loan, and then somebody has to do risk assessment and then send to the back office and then someone at the back office has to do the compliance and check this, and then approve, and then somebody has to also do another thing, and then people will do this, and then eventually someone will approve and do their transfer. But if all of these are actually coded like a contract, from the, uh, the, the, the contracts, for the computer can quickly assess and know all of this and like, okay, that's done. It meets the compliance, it meets the risk assessment. It meets the limit on this and okay, bam, bam bam, and then tie it all up, And it's all built on top of blockchain. So the, the, the applications are huge. You can do a lot with it and it's exciting.

KO: so, do you really see, as in, with all these other parties that are might be eliminated, because one of the, from the literature review I was doing, one of the pitfalls or one of the reasons why everybody is fearful is the fact that it has the potential to be a disrupter. So like the banks or the central body that authorizes, or the people in the back office that might no longer have a job, So do you really see it as it disrupter in that sense? Did you really think its going to put the bank out of business, so to say, what's your take on that? On that aspect of it?

P2: I think definitely it's a disruptor. Definitely a disruptor is anything that changes the, the, the status quo, changes the way things are, because systems have been built in certain ways for a reason. So it's definitely a disruptor.

But in terms of what, and in terms of the extent is what I don't think it's going to put banks out of business, because, we're not just talking about retail business where, where you are uh, you're just doing, you're buying something in those terms, that's fine. But em for cooperate finance, when you get to the capital markets, where you're buying derivatives, you are buying stocks and bonds and, and all of these huge things that are not even tangible, there's a lot of, you're not going to, you need banks. There's a lot of regulation that goes into this. Like people, when people are buying, when you, uh, you, you hear that, oh, Facebook is worth 10 billion now, and based on that information you're going to buy Facebook stock, because you hear that in the next five years or five months, of Facebook stock is going to grow by five percent or whatever.
Most of that, that is not tangible. Most of that is based on, the calculations and projections of bankers, of stock brokers, of asset managers, who know the underlining economics and the financials and that kind of expertise, is not easily replaceable.

So, so blockchain is a tool, but it's not, it is not easily, it is going to change, it's going to, so those guys, the decision makers and the, and the power brokers, they would actually get to decide how far this goes. Okay. So there, there are certain industries where people can adopt this and it would work fine, but um, when, when it comes to business to business transactions, where millions of dollars are being transferred and the loans being given at certain rates, and I think the, the, the guys who make those decisions, they would decide what works best for them, and if they see that actually actually blockchain makes their life more easy, and it's easy to use and, and, and it frees them to have more time to focus on more important things, then that's that. Because it does takes away a lot of the paper work, and the bureaucracy. And in terms of that, then some people might lose jobs. If all you do is just data entry and you are keeping the records, yes then, in that case yes, em, it's going to make some people redundant, but not the specialists. So it's going to make, maybe, let's say, for lack of a better word, lets say lower level knowledge workers? If that makes sense

KO: The lower skilled workers?

P2: Yes, yes, it can make some of their jobs, redundant. Because the whole idea is to cut intermediaries and to cut cost as well. But when it comes to high level skilled knowledge workers, I don't think they are under threat at all and I, and I think most of the time when I hear that, oh the banks are scared. The idea is that these power brokers are scared that this is going to put them out of business.

I don't for a second believe that they will, because they can control the the extent to which this would be adopted or not and if if this gets adopted mainstream in the, in the, in the, in the financial services industry, it will be because these guys have seen the benefit and they have seen that, oh, this is actually going to help us make a lot of more money, because they are in it to make money, and into, to maximize their profit. So there will be more than happy, and there is interest for most of the the big decision makers, that we deal with, in the banks, there's big interest. They are all looking at it because they see all the issues that they currently have and they see all the kind of bottlenecks that they have and and and to be frank, most of the banking systems that are in use, are archaic.

They are like if you look at the cutting edge technology available in certain industries like social media and Google and everything, and then you look at the financial world, it's appalling to think the systems that they use are so old, so outdated. But, they work, they are trusted, and they are not going to quickly move
to something fancy at the risk of losing millions. So they are very, very, very careful, but they do know that they need to change with the times and they do know that they want the improvement because they see how this is holding them back, but they want something that will give them the same level of security and the quality that this system, this old systems, give them. They have lots of regulations to meet, lots of compliance, and they need systems that will help them to meet all of these.

KO: So, You don’t really think, its not something that is going to be adopted like very soon in the next one year, two years?

P2: It’s still going to take like a long time. It depends, if you mean that, in the next one or two years, are big banks like Lloyd's and Royal Bank of Scotland, are they going to remodel and transform their system to use blockchain? It’s a big NO. Because first of all applications, applications have to be developed on top of blockchain that would do the financial transactions that these guys are doing. That, and there are, there are some of these applications are being done, but it’s not at a scale where and actually practically from experience. Even the software that we develop for them, when we have an upgrade, it takes about three years, for them to adopt it.

KO: Wow, wow

P2: There’s a period of testing that you set up a test environment that they’ll put the transaction in, they’ll stress test, and then, there’s a period where they'll run the two systems in parallel and and do everything twice so to make sure that it's working, and feedback, and until finally, they’re like, okay, yes, okay, now we are very sure. So they are not just simply going to, no, it’s not going to happen in the next five years. But in the next five years I think is going to make inroads in certain areas like retail and other maybe.

KO: Logistics?

P2: Yeah. And maybe lower scale transactions like transactions that are more like peer to peer, that are more like and maybe there’s going to be more trust and more trust, and I think this is where, this is something that a blockchain community doesn't like.

The whole idea of regulation, like having somebody being there. But I think if it's going to be widely adopted, regulation will come in because we, because people are not easy with the idea of something that is just open and there's no control control. Anybody can do anything. So yeah, so I think it's been proved initially there were a lot of sceptics, but I think people are getting more and more, more convinced about the practicality of, of, of how it can be applied. It’s just left to to really iron out how it gets imported into the current business processes, because there are business models and business processes that it can’t easily fit in as as it is. So either either new models have to be built that
can, kind of leverage the blockchain or the whole model around the blockchain has to change, or the business models themselves have to change.

I personally think it will be along all three axes. I think new models will be formed, business models will change, and there will be new changes because the, the, the blockchain as it was in, in Bitcoin has been, it has been evolving and it's been changing with Litecoin and with Etherium, and all of this, and then it's going to get to a place where, a state of evolution where people will be more more comfortable, that, okay, this is more, we can use this and then they can adopt it. But when it comes to capital market, especially when it comes to the stocks and bonds and equities in stock exchange and those, I don't expect even in the next 10 years. But that's my pessimistic side, but I don't expect it to get to that level, just not yet. Because it takes, it takes a lot of time.

KO: Thank you very much for your time. I really appreciate it.

P2: My pleasure
Appendix 3: Interview Transcript with P3

Interview Transcript on Trade Finance with P3 on 20th November, 2018

Martha Kolawole – Head of Customer Services Unit, Zenith Bank Plc, Nigeria

KO: Hello my name is Kayo, my name is Olufikayo, you can call me Kayo. I'm doing a research on how blockchain technology can be used for trade finance processes in Nigeria and the research is strictly for projects and research purposes and in compliance and completion for my MBA dissertation. So I just need you to talk freely as a subject matter expert regarding what you do as per the trade finance processes in Nigeria. so basically I would like you to talk about what exactly are the different products when customers wants to import or export? What's the process involved? Thank you.

P3: Good afternoon, my name is Martha, I work at Zenith Bank PLC Nigeria one of the biggest bank in Nigeria. I have been in the company for 10 years and have worked in the trade department for about 6 years now. Basically, all I do is process form M for import and NXP for export. When a customer wants to import, they first of all get to your proforma invoice from the importer, from the exporter, sorry, so they now bring that to us with an insurance. Insurance has to be from Nigeria. they give that to us and the necessary regulatory documents. Let’s say for medical medicine and the rest of it will be NAFDAC certificate. Items such as cars and the rest will get the SON product certificate, then for used items you get the NESREA certificate. So with that, we key it in on our system, on the CBN trade portal, that’s what it’s called, and then we send the document to our head office, which, am not there, we send to our head office for further processing. For the export, the customer gives us his own proforma invoice, we key in the portal, and the documents are sent down and processed. That one is a much more simpler transaction and he processing, we send it to our head office who now sends it to COBALT, if the customer is using, that’s if the inspection agent is COBALT, they'll send to COBALT, and then the customer can now be cleared for export.

KO: Can you explain the parties involved in a typical trade transaction?

P3: well, we have the buyer here in Nigeria and the seller in another country, we have the buyers bank and the sellers bank, and the intermediating banks. There is also the almighty CBN and the customs

KO: Okay, now, so, I need you to talk a bit further, like when you say, like for the import. I am aware there are different trade finance processes, transactions, like the letters of credit and the bills for collection, so I said it could you just explain what these differences are in terms of the processes involved, what do you do when it’s a letter of credit, what documents do you require when it’s a bills for collection. what exactly is that?
P3: Letter of credit is more like a credit line. You are, most of the time, processed by two entities two customers who don’t really know each other or don’t really have a long term relationship. The importer, the exporter actually want to be secure that he’s going to get his money he’s not going to be defrauded. They now request for it, which is what letters of credit is. There’s the confirmed letters of credit and the unconfirmed letters of credit. Basically, I don’t really, I can’t really give you an in-depth information on that, being that we have a desk for that and am not in that unit. But all the customer will tell us is, there are going to do the LC, we have a form which the customer fills and its stamped with the postal stamp, they state the conditions and the requirements, that’s when you know if its confirmed or unconfirmed letters of credit. For bills of confirmation, its mostly processed by customers that have a long-standing relationship with each other or where a sister company is exporting to its other company in Nigeria. So we don’t really require any, all the customer has to do is tell us it’s a bills for collection. That’s basically all for that.

KO: Okay, so, then you also mentioned the CBN, that you log on to the CBN portal. so what exactly is that process, what are the information required? you mentioned the insurance, so you know could you just explain what exactly are those details on the form? because I’m just trying to understand the process and see how the blockchain technology can be adapted to the process. So that portal that you log on to, what information is there? can customers log on to the portal themselves or they have to actually come to the bank? Or, you know, I just need you to explain a bit further regarding that.

P3: Okay, for the CBN portal, it’s just a website which the CBN created to make the process faster for everybody. can be used by the bank and by the customer. anybody can actually have access to it. The information you need, apart from the documents, which is the proforma invoice, the insurance and regulatory documents which is that SONCAP, you have the information of the exporter, input the name, the address, the phone number, email, which our customs will definitely require. It also has the information of the importer, the address, the verifiable address and the registration number to be sure it is actually being created for form M, the taxes, the tax identification number ……… for verification purposes, to be sure they are actual tax payers. That’s what’s on the website.

KO: Okay. So, are there any specifications regarding the different countries, or importing from different countries, are there different regulations or it’s the same process regardless of where you are importing from?

P3: It’s the same process for almost all the countries, apart from the middle east countries, like Iraq or war-prone countries like Iraq, Afghanistan which there is
actually in ban for now. So to actually import from there, you have to get, go further, and the customer would have to go further and write to get approval to actually import from CBN. Same with some items which the country is actually expected to produce internally, which we are not expected to import, examples like plastic, rubber items like tyres, buckets and all of that. For the customer to be able to import it, the customer has to write to CBN, and get approval from CBN before the form M can be processed. Before any trade transaction can be done on their behalf.

KO: Okay, to just give a summary of what you said so far, and so if the importer will fill a form, if the importer wants to bring in something from another country, there’s a form they have to fill, and then they will do, the insurance you are talking about is, they are insuring the products that they want to import

P3: Yes

KO: Okay, is it the same process across other banks in Nigeria?

P3: Yes. Really, we all do the same thing. It’s the same documentation process, the same CBN, insurance and banking procedure. Our charges and credit lines are just different

KO: Okay, so in addition to the insurance and the other regulations ... 

P3: Sorry, I actually forgot something, that the insurance, you have to make provision for 110%. There should be additional 10% to cover the insurance because of the fluctuating rate, dollar rate in the economy

KO: Oh, okay, FX rate. I understand what you are saying now. So in addition to, they fill the form that this is what we want to bring in from this exporter and then they just fill the form with the invoice the exporter has given to them, so they bring all these documents to you, and you log on to the CBN portal, and then like an approval process is done, then once its done, once its done and approved, they can now go ahead with the importation. So what then happens when the goods actually come in? What other process is done? Is there any additional documents that’s done when the exporter finally sends the goods?
P3: Okay, when the exporter actually sends the goods, its going to come by sea most of the time. So it has the shipping documents, the container number, if it comes by air, we have the air bill number, we have the documents, everything comes before the customer now takes to the port to go and get it cleared. So, they use that, they clear the goods, bring it back to the bank with all the stamps from customs showing that these goods actually came, its not fraud, it actually came, its been cleared, duly paid for, and the customer is free to go. So the customer brings the documents and that’s all.

KO: And then you process that. And is that the same process, you mentioned that the export process is a bit simpler, because they just bring the proforma invoice, only this time, they are the ones sending the proforma invoice and the other party is doing this, are there any checks in place to make sure that they actually exported those goods or what are those regulatory checks that are in place just to ascertain that its not a fraudulent transaction? Either for the export or for the import? Is there any extra check on the part of the customs? Are there anything the custom would ask the bank for? Just to understand if this process is good or not?

P3: Okay. Customs don’t need to ask the bank for any other things apart from the form, but the bank would still ask the customer for proof of repatriation. there’s going to be the proof from customs, the inspection agent showing that, yes, its been done and the quality is accepted its approved by the requirement of the importer’s country. That’s all.

KO: So all the parties involved form beginning to the end, from what you are saying, we have the exporter, we have the importer, we have you the bank that is the one that process the transaction, and we have the Nigerian customs. The Nigerian customs that clears the goods. so those are all the parties involved in a typical trade transaction in Nigeria.

P3: Yes

KO: One final question please, have you heard about the blockchain technology or has the bank mentioned it in any capacity?

P3: No. Not sure I know wat that is. Sounds familiar though, but can’t say I know about it.
KO: Alright thank you very much for answering. I really do appreciate the time and the effort you put into this. Please note that you can request for any other material and of course the transcripts of this call would be forwarded to you for the approval. Also, a consent form would be sent to you for you to sign, just for you to understand the process. And so once the transcript is given to you, if there is any part of the transcript you do not want to be mentioned, you can let me know for it to be taken out. It’s in your full interests and right for you to take any part of this interview out of the research, if you would like to do that. So thank you very much for your corporation and do have a lovely day. Thank you

P3: Thank you too. Bye.
Appendix 4: Interview Transcript with P4

Interview Transcript on Blockchain Technology with P4 on 27th November, 2018

Engineer Bolu Coker - Software Development Manager at Oracle, Nigeria

KO: Hello, Good day, I am Kayo. As explained earlier, I am doing a research on how blockchain technology can be used for the trade finance processes in Nigeria. As you are part of the Oracle team that established the blockchain platform for the Nigerian Customs Service, I would like you to explain how the blockchain process works on this platform.

P4: Hello Kayo, thank you. Uhhhh, well, as you may already know, the blockchain technology is all about an online digital system that builds trust and accountability between different parties. With the Nigerian customs, their goal was to rebuild the trust and confidence in doing business in the country, well, and of course to block income leakages as a result of the corrupt practices within the system.

I wont go into more detail on that.

KO: Yes, I understand.

P4: Well, but suffice it to say, then, that the overall goal for the custom service, was

1. To block income leakages (you know, which I would say was the primary goal for them),
2. To build trust in the Nigerian trade system and this in turn would improve the reputation on doing business in Nigeria.

Soo, that’s when we come in. Of course, for us as a company, eh, the goal is get the banks, financial institutions and businesses on our blockchain platform, and even though, the Nigerian government is not buying into cryptocurrencies, the blockchain technology is a different ball game. And it is a HUGE and major accomplishment for us to have gotten to provide this service for such a governmental body as the Nigerian customs.

So, the Oracle’s blockchain cloud service was provided to the customs service to fully automate the excise trade business processes and procedures. Eh..

KO: The excise trade? Just that?

P4: well, for now, it was just the foothold we needed, to launch our blockchain services in the country. Like I said, it was a major accomplishment for us, because with time, you know, ehh, you know, what I want to say is, we hope that with time, we hope that the successful integration with the customs would cause, like a ripple effect, you know, if I can use that word, yes, a ripple effect.
that would make the banks, insurance companies and other businesses, to use our platform.

So, for now, the customs wanted to try out the blockchain with just the excise trade process. With just this process, the target is to improve transparency and trust in Nigerian made goods, eliminate corruption and of course, increase their revenue which would drive investment in the Nigeria.

**KO:** Could you run through the blockchain’s role in this excise process?

**P4:** Umm, yes, I can? Umm, let me think …, I am thinking about what kind of information I can give? Umm. Okay. I will give a sketch about what we did. Wont go into the nitty-gritty details of the whole process, but will touch the main points.

**KO:** Okay, Thank you

**P4:** so like I said, the platform created, is for the automation of the excise trade. The excise trade process was manually done, thus, there was no predictable data trace of what an item contains or the origin of the product. There was also the challenge of people trusting Nigerian-made goods.

So, with the blockchain platform, we started with the laws that ensures that anyone interested in assembling, producing or manufacturing, must first and foremost obtain the custom excise licence. So, we automated that process, from getting the necessary approval of the excise licence to establishing the factory. So, the platform validates the person or company, that they are authorized to produce, and their certification is logged in the blockchain.

**KO:** Oh, that’s good

**P4:** Yes, it is. So, now, each producer has got an identity that can be assessed and validated globally.

Secondly, we log in the procedure it takes to produce the item. That is, from the raw material to the final product.

The Nigerian Customs currently integrated a technology called “Tank & Trace” where the finished products are properly identified and stamped with bar codes, such that, anywhere the item is located in the world, its origin can be traced. So that is also factored into the blockchain.

**KO:** wow! that is a good achievement. Being a Nigerian myself, that’s a major leap in authenticating our products

**P4:** Exactly! you know, once trust is established, it’s only a matter of time for there to be a tangible growth.
So, the third thing the blockchain platform did for the customs was to deploy an excellent accounting system which ensures reliability and also predicts revenue or income.

**KO:** How does it exactly predict revenue for them?

**P4:** em, you see, with the manual process before, there was no reliable data on, like, like, how many excise traders exist or how many manufacturers there are in the country. In trying to automate the process, it was discovered, interestingly, that there was a BIG gap in the manufacturers registered with the Manufacturers Association of Nigeria, that's the MAN in short and the registered excise trade members. Umm, you see, you see, that's part of, you know, the corrupt system.

So, by going through all these processes and closing these gaps in the system, such that, we factor in the number of manufacturers in Nigeria, to what they are producing, and checking the quantity and quality of goods made, you know, it then becomes easy for the platform to easily predict how much revenue can be generated from excise trade.

**KO:** em, that sounds like a lot of work and effort put into the whole process

**P4:** Oh, yes! Definitely! (laughs) you know, as the popular saying, nothing good comes easy. A lot time is firstly spent, you know, to understand each process. You see, with IT and product upgrades, it takes a lot of time that run into YEARS to get the system to work. You see, we did, em, em, what we call the proof of concept, POC in short. You see, the POC is like a test case that is used to establish and determine the reliability of the blockchain technology for the internal business processes of the Nigerian Customs. So, like, every single detail in the different processes of the customs service was factored in when developing the platform for use. This proof of concept aloe took about 9 months to run, and, it was done at no cost to the custom service. The charges were borne by our company.

**KO:** oh, that’s good

**P4:** Yes, like I said, the focus is on the bigger picture. So, with the test case, the POC is made available to the trading public so their details can also be integrated. You see, it’s the plan that once everyone gets into and starts understanding clearly the process, and sees the transparency in the new process, it can foster trust among parties and gets rids of unnecessary bottleneck in the process. You see, em, because, apart from revenue generated from the excise tax, the plan is to get a whole lot more from direct foreign exchange earnings through export of Nigerian goods. You see, the customs have had to deal with our exported goods being returned for various reasons,
you see, especially the Agric products are returned based on reasons like, em, em, fake certification of goods, or, em, em, fake documentations used. And REALLY, all these were due to manual processes involved with no proper data or verification process in place and people circumventing the process for their gain.

But now, with the blockchain, there is a reliable system of validation and identification of the Nigerian-made goods and can place our products in the international markets.

**KO:** so, are we ready now, is the blockchain platform fully integrated into the excise process? Are you seeing any results yet?

**P4:** (laughs). No, no, no no. you see, the product was just launched after the proof of concept was done and its now made available to the public to then come on board. Yes, there are tangible results as every form of trade transaction within and outside the country is registered with the Nigerian Custom Service, so people have to register or in a lot of cases, re-register with the proper details and certification.

Ehh, it will take time, but the good thing is, the ball is now rolling and there’s no turning back. So, everything, is still in its testing phase. The benefit for the Nigerian Customs, is that, with the blockchain platform, there is a reliable system of validation for Nigerian-made goods which the international market can accept, and a reliable system of tracking and monitoring revenue streams.

**KO:** so, I want to ask then, how do you think the blockchain can be used for the whole trade finance process then? Giving your experience with the excise trade procedure?

**P4:** Well, you see, like I said, the aim is to automate the whole trade process and I am glad the blockchain momentum is gradually building up. You see, the Nigerian government and even the Nigerian Customs are looking at ways to diversify the economy and eh, boost the non-oil economy, so, it comes as no surprise that they are willing to strengthen and tighten all loose corners in this regard. You see, It is projected that Nigeria’s balance of trade for exportable goods will also increase, so the expectations are really high on what the blockchain can deliver.

My understanding is that the customs would eventually automate the whole process, however, in stages. You see, there are many procedures, licences, permits involved in trade finance, but customs took just one, as a, as a, a test run. Then gradually, adopt it to other procedures.

So, once the success from the blockchain-enabled excise process becomes evident, then, we can move onto the next stage.
So, you asked how the blockchain would work for other trade processes?

KO: Yes exactly

P4: Uhh, well, I will also give a sketch in this regard with what I know the different blockchain consortiums around the world are doing in trade finance.

You see, for importation, particularly for Letters of Credits, which is the most common means of import globally, there would be a lot of collaboration and like, convergence of networks.

KO: I see

P4: Yes, you see, different blockchain consortiums will collaborate to make it work. Otherwise, there’s just be too many participants on the network. So, what I mean is, eh, for a typical LC transaction, we have many participants involved, that is, the importer’s bank, the exporters bank, the confirming bank, the issuing bank, insurance companies, shipping companies, and the rest. You know, so, it is not that each bank or shipping company would have its own blockchain. NO, what happens is that, there is a blockchain consortium for shipping companies, which registers the different shipping companies globally, the same for banks and insurance companies.

So, if possible, for us, if we can achieve to log in all the banks in Nigeria, we can be the blockchain consortium for Nigerian Banks or even Africa as a whole. So, we then would connect to other blockchain consortium of other banks across the world. That’s what I mean, by more of collaboration, and not each party having its own blockchain network.

Secondly, you see, blockchain in an LC transaction means digitising the process.

KO: What do you mean?

P4: You know the existing process has to do with agreeing of certain contracts terms, there are several applications to be done, issuance of credits, we have the advising banks, the confirming banks, and so on. Don’t forget, there’s also the issues of discrepancies and amendments where necessary, documentations and then the final settlement.

(laugh) you know, just listing the whole process is exhausting in itself. And to think each process has several parties involved. So you can just imagine the amount of time it takes to complete a transaction.

But currently, most banks across the world are already on a digitised network, where they communicate. I am talking of the SWIFT. So the same way banks are connected through SWIFT for international transfer of funds, the whole LC process can be digitised.
So, to what I was saying, digitising the process means ALL THESE participants are on a single the blockchain platform and every transaction is done online real-time.

And, yes, I know, you probably want to ask how it is possible. But it is. With collaboration. There are already successes recorded for blockchain-enabled trade finance transactions. So, you see blockchain consortiums like ourselves, logging on businesses to the platform. Because IT IS really the future of global transactions.

Already, there is and electronic bill of lading, that is eBL that is integrated into this trade finance blockchain platform. This eBL ensures that a transaction is entirely paperless.

So, you see, the blockchain technology would really be used to digitise the whole process, reducing processing time, cost and issues and discrepancies would no longer arise. The shipping companies are logged on the eBL platform already, so you see, with all connected to the platform, LC transactions would be completed in a shorter time by allowing the transfer of documents and agreements electronically, in real-time, so no more, you know, going back and forth with the confirmations or communications between the parties. Settlements in this case is also faster.

KO: Hmm, that's really interesting. So, what of the issue of safety or security? can any importer or exporter login?

P4: Oh, no no. well, that's debatable. For now, you see, I think these people still need to transact through the bank, because it's the bank that is logged on to the blockchain. However, I said debatable because, large businesses and conglomerates, can also transact with each other if they are on the platform. Because, its not just the banks and financial institutions that can use the blockchain, other big multi-nationals can participate. For the general trader though, which would be where most traders would fall in, particularly here in Nigeria or Africa, they would do theirs through the bank.

KO: Yes, I understand, it would not make sense to register every single business person on such a platform. there has to be some control?

P4: You see, with the banks, because of the nature of transaction and the fact the any error could translate to BILLIONS of dollars lost. We'd use what we call a permissioned blockchain network, which restricts the participants and only shares data with participants on a need-to-know basis.

KO: Oh, that explains that

P4: You know, like I said, its going to take a long while for everyone to come on board. The regulatory bodies are yet to agree and you know, there are other glitches. But the ball is rolling and everyone will eventually catch up. The good thing now, how can I say this, you see, its like we can SEE the future, and so,
we can plan towards this, and develop ourselves and position ourselves towards this.

Uhh, so, that’s it, I hope I’ve helped you in some way.

KO: Oh, yes, definitely, you have been a really big help. Thank you so much for your time.

P4: You’re welcome
Appendix 5: Interview Transcript with P5

Interview Transcript on Trade Finance with P5 on 13th November, 2018

Femi Owolabi – Trade Finance Manager at Zenith Bank Plc, Nigeria

KO: Good afternoon sir and thank you for meeting with me. As I explained earlier, I would like you to go through the trade finance process there in Nigeria. Firstly, what trade finance transactions do you do?

P5: Okay. Hello Kayo. For me, the trade financing we do, is of two types; risky non-valid deals and non-risky valid deals. You see, because both processes involve two unknown people buying and selling to each other. The only difference is that, one type takes the risk and deals directly with each other while the other type involves their different banks. You understand?

You see, with the non-valid, the importer pays the exporter directly, and then the exporter sends the goods. I call it risky because, you see, there are MANY cases, in fact, we have seen many instances where our customers have been defrauded. They send money to people they don’t know, or maybe met on a business trip in China or, you know, wherever, after which, they no longer hear from the exporter anymore. You understand? You know, despite the risk of being defrauded, many people still use this means of importing because it is cheaper as the bank charges are excluded.

You understand? However, with valid, the popular type is the letters of credit, and the bills for collection and these can be used for both import and export trade. You see, this is the non-risky type because the bank intervenes with the payment and agreement terms. Payments is made only if the goods have been received in the quantity and quality as agreed. Hmm, overall, a more expensive route but with no risk. You understand?

KO: Yes. So, who would you say are the parties involved in a trade transaction?

P5: Hmm, well, depending on how smooth or NOT a transaction goes. Generally, there is the buyer or importer, the seller or exporter, buyer’s bank known as the issuing bank, the seller’s bank which is the accepting bank, confirming and negotiating banks. Of course, our governing bodies, which is the Central Bank and the Nigerian Customs. Let’s not forget the shipping companies and insurance companies also.

KO: Okay then, what documentation is required to complete the process?

P5: Well, how do I explain this. Okay, so, you see, for both valid and invalid, we’d require the:

1. Proforma invoice
2. Insurance certificate
3. NAFDAC or SONCAP certificate depending on if it’s a food or drug or if it’s an equipment
4. The application form.
5. If valid, the terms of agreement
6. CCVO that’s the certificate of value and origin
7. Final invoice
8. Packing list
9. In some cases, manufacturers certificate
10. Bill of lading or airway bill
11. If its bills, you need the bill of exchange
12. If it’s LC, collection instruction

For export trade transactions, we need;

7. Nigeria Export Proceeds form which is the NXP
8. Proforma invoice
9. Nigeria Export Promotion Council registration certificate (NEPC), which is required for non-oil transactions
10. Export Clearance Permit for oil exports
11. Export application form
12. Letter of assurance of repatriation

You see, the list is not exhaustive, as more documents are required depending on the complexity or challenges that may arise during the process.

**KO:** What is the process flow in a typical trade transaction?

**P5:** Firstly, the Form M is approved on the central bank’s portal, but that approval is done by customs. You see, this approval is sent to the supplier, who then ships. The supplier sends 3 sets of shipping documents, that is, 3 copies each of the CCVO, bill of lading, packing list, manufactures certificate, bill of exchange and collection instructions. He sends these things through his bank. His bank prepares a bill history, that states all the documents they will be sending and covers information such as the importer and exporter’s full name and address, terms and condition of acceptance, charges or interest to be collected, and then the bank details that will receive the remitted funds.

You understand? So, the suppliers’ bank sends this documents to the buyer’s bank. We then give the customer the bill of exchange to sign and accept. If he accepts, we release the shipping documents which he’d use to clear his goods from the customs.

The export process is a simpler process, provided all the necessary documents, are available for processing. All the export proceeds are in foreign currency and usually repatriated within 90 days from the shipment date for oil-exports, or 180 days for non-oil exports.

**KO:** Is it the same process across other banks in Nigeria?
P5: All we do is the same. We start with the central banks’ portal and do the same customs clearing. The process is pretty much the same.

KO: Have you heard of the blockchain technology or has the bank mentioned it in any regard?

P5: Hmm, sort of, you see, I mean, I have heard about it from the news from the Nigerian Customs, and maybe from few of the export customers asking them about it. You understand? But from the bank, I am not aware of any intentions in them adopting this blockchain you are talking about. It may be in the pipeline already, but I am unaware of it.

KO: Okay then, thank you so much for your time, I really appreciate it.

P5: good, good, Kayo. You are welcome.
Appendix 6. Honey and Mumford’s Learning Style Questionnaire

Honey and Mumford: Learning Styles Questionnaire

There is no time limit to this questionnaire. It will probably take you 10-15 minutes. The accuracy of the results depends on how honest you can be. There are no right or wrong answers. If you agree more than you disagree with a statement put a tick. If you disagree more than you agree put a cross by it. Be sure to mark each item with either a tick or cross. When you have completed the questionnaire, continue this task by responding to the points that follow.

☐ 1. I have strong beliefs about what is right and wrong, good and bad.
☐ 2. I often act without considering the possible consequences.
☐ 4. I believe that formal procedures and policies restrict people.
☐ 5. I have a reputation for saying what I think, simply and directly.
☒ 6. I often find that actions based on feelings are as sound as those based on careful thought and analysis.
☐ 7. I like the sort of work where I have time for thorough preparation and implementation.
☐ 8. I regularly question people about their basic assumptions.
☐ 9. What matters most is whether something works in practice.
☐ 10. I actively seek out new experiences.
☐ 11. When I hear about a new idea or approach I immediately start working out how to apply it in practice.
☒ 12. I am keen on self-discipline such as watching my diet, taking regular exercise, sticking to a fixed routine etc.
☒ 13. I take pride in doing a thorough job.
☐ 15. I take care over the interpretation of data available to me and avoid jumping to conclusions.
☐ 16. I like to reach a decision carefully after weighing up many alternatives.
☒ 17. I’m attracted more to novel, unusual ideas than to practical ones.
☐ 18. I don’t like disorganised things and prefer to fit things into a coherent pattern.
☐ 19. I accept and stick to laid down procedures and policies so long as I regard them as an efficient way of getting the job done.
☒ 20. I like to relate my actions to a general principle.
☐ 21. In discussions I like to get straight to the point.
☐ 22. I tend to have distant, rather formal relationships with people at work.
☐ 23. I thrive on the challenge of tackling something new and different.
25. I pay meticulous attention to detail before coming to a conclusion.
26. I find it difficult to produce ideas on impulse.
27. I believe in coming to the point immediately.
28. I am careful not to jump to conclusions too quickly.
29. I prefer to have as many sources of information as possible - the more data to mull over the better.
30. Flippant people who don’t take things seriously enough usually irritate me.
31. I listen to other people’s point of view before putting my own forward.
32. I tend to be open about how I’m feeling.
33. In discussions I enjoy watching the manoeuvrings of the other participants.
34. I prefer to respond to events on a spontaneous, flexible basis rather than plan things out in advance.
35. I tend to be attracted to techniques such as network analysis, flow charts, branching programmes, contingency planning, etc.
36. It worries me if I have to rush out a piece of work to meet a tight deadline.
37. I tend to judge people’s ideas on their practical merits.
38. Quiet, thoughtful people tend to make me feel uneasy.
39. I often get irritated by people who want to rush things.
40. It is more important to enjoy the present moment than to think about the past or future.
41. I think that decisions based on a thorough analysis of all the information are sounder than those based on intuition.
42. I tend to be a perfectionist.
43. In discussions I usually produce lots of spontaneous ideas.
44. In meetings I put forward practical realistic ideas.
45. More often than not, rules are there to be broken.
46. I prefer to stand back from a situation and consider all the perspectives.
47. I can often see inconsistencies and weaknesses in other people’s arguments.
48. On balance I talk more than I listen.
49. I can often see better, more practical ways to get things done.
50. I think written reports should be short and to the point.
51. I believe that rational, logical thinking should win the day.
52. I tend to discuss specific things with people rather than engaging in social discussion.
53. I like people who approach things realistically rather than theoretically.
54. In discussions I get impatient with irrelevancies and digressions.
55. If I have a report to write I tend to produce lots of drafts before settling on the final version.
56. I am keen to try things out to see if they work in practice.
57. I am keen to reach answers via a logical approach.
58. I enjoy being the one that talks a lot.
59. In discussions I often find I am the realist, keeping people to the point and avoiding wild speculations.
60. I like to ponder many alternatives before making up my mind.
61. In discussions with people I often find I am the most dispassionate and objective.
62. In discussions I'm more likely to adopt a "low profile" than to take the lead and do most of the talking.
63. I like to be able to relate current actions to a longer-term bigger picture.
64. When things go wrong I am happy to shrug it off and "put it down to experience".
65. I tend to reject wild, spontaneous ideas as being impractical.
66. It's best to think carefully before taking action.
67. On balance I do the listening rather than the talking.
68. I tend to be tough on people who find it difficult to adopt a logical approach.
69. Most times I believe the end justifies the means.
70. I don't mind hurting people's feelings so long as the job gets done.
71. I find the formality of having specific objectives and plans stifling.
72. I'm usually one of the people who puts life into a party.
73. I do whatever is expedient to get the job done.
74. I quickly get bored with methodical, detailed work.
75. I am keen on exploring the basic assumptions, principles and theories underpinning things and events.
76. I'm always interested to find out what people think.
77. I like meetings to be run on methodical lines, sticking to laid down agenda, etc.
78. I steer clear of subjective or ambiguous topics.
79. I enjoy the drama and excitement of a crisis situation.
80. People often find me insensitive to their feelings.
Scoring

You score one point for each item you ticked. There are no points for crossed items. Circle the questions you ticked on the list below:

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Totals
- Activist: 14
- Reflector: 18
- Theorist: 13
- Pragmatist: 16

Plot the scores on the arms of the cross below.

Your result may show that you have a particular learning style. It may be useful to bear this in mind as you approach tasks. Was the approach you adopted the best one in the circumstances? Would adopting another learning style have improved your performance?

At this point you may also find it helpful to read through Characteristics of the Four Learning Styles, which follow. This provides more detail and should help you clarify your sense of your own preferred style(s).