Blockchain Technology Application in the UAE Banking Industry

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Abstract: This study aimed to outline the framework of blockchain technology and its application in the banking sector, focusing on the opportunities it provides for the development of the banking industry. The UAE government launched the "UAE Blockchain Strategy 2021" in April 2018, seeking to become the first government in the world to operate this technology. The study found that the adoption of blockchain in the UAE banking system helped to uncover an estimated 3.75 million fraudulent transactions in the UAE annually, representing 435 million USD in potential losses and it expected that KYC blockchain platform will support the asset quality of UAE banks primarily by reducing operational risk. It was also recommended to activate and expand the use of Blockchain technology to achieve sustainability in the UAE banking industry.

Key words: Blockchain Technology; Banking Industry; The UAE.
Jel Classification Codes : G21, O33

Introduction

Advances in telecommunications and information technology have had a significant impact on the banking industry over the past few years. One such disruptive innovation which is changing the banking sector globally is Blockchain Technology (BCT). The integration of blockchain into banking systems by the financial service providers will get transformed the banking industry as most of the core processes will become transparent, secure and efficient. Blockchain technology is identified as a disruptive innovation of the Internet era. This technology promises to bring revolutionary transformations in the way we transact over the internet, with prospective applications in various domains (Bilgin & Hakan, 2021, p. 75). It represents an emerging technology that is among the most promising and potentially technologies in the future. It was first introduced in October 2008 by an unknown person or entity using the name Satoshi Nakamoto, who presented it as a part of the proposal for Bitcoin (Ante, Sandner, & Fiedler, 2018, p. 54). The Institute of Development and Research in Banking Technology (IDRBT) (established by Reserve Bank of India) released a whitepaper in January 2017 giving positive views on using blockchain in banking and financial sectors (Vijaya Kittu & Aruna, 2018, p. 04).

In April 2018, the UAE government launched the Emirates Blockchain Strategy 2021 with a vision to become the world's first blockchain-powered government that would potentially transform the landscape of the banking industry in the UAE. The emergence of this new innovation technologies has changed traditional banking business models in the UAE. The blockchain-based projects that have been announced in the UAE are still in initial or establishment stages and a few of them are in the experimentation and testing stage, due to the novelty of the technology and the related need of core changes, rules, laws, business structure, and relationships between sectors. Therefore, the **problematic** of this research paper is:

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How could blockchain technology transformed the UAE banking industry?

Hypothesis: To solve this problem we have made the following main hypothesis:

Applying blockchain technology will positively improve the UAE banking sector by making banking operations more secure, faster, transparent, and eliminate intermediaries.

Importance of the study: The importance of this study lies in shedding light on the potential power of blockchain technology and its implementation in the UAE banking industry, while highlighting the opportunities offered by this technology in the development of the UAE banking sector.

Objective of the study: this paper is aiming to study the following:

1.to provide an overview of Blockchain Technology with its benefits in banking industry;

2.to highlight the opportunities offered by this technology in the development of the UAE banking sector.

1. Research methodology

For the writing of our article; we used two techniques for this:

• documentary technique: this technique allowed us to use different books and documents to facilitate our research relating to our theme. In this context, we will develop our personal analyzes on the application of blockchain technology in the UAE banking sector;

• presentation of the field of investigation: Our empirical study was based on a practical case relating on the Emirates Blockchain Strategy 2021 and its implementation in some banking transactions. This approach has a methodological objective: the verification of our hypothesis, sothat we can answer our questions and provide elements of solutions that will lead to recommendations. In order to achieve this objective, many references that were closely related to the topic were adopted in the interest of scientific objectivity.

1. Eric G. Krause & others (2016) study entitled **" Blockchain Technology and the Financial Services Market"** : this paper provides a high-level business-case viewpoint on the potentials and limitations of the blockchain technology. To that end, both promising and nonpromising areas of application are highlighted and discussed. The paper also addressed three main fields of application have been investigated here: Payment transactions, trade finance and the overthe-counter market. The paper gives an analysis of the status quo in each of these fields and shows where and how blockchain technology could be used or is already deployed. (Krause, K. Velamuri, Burghardt, Nack, Schmidt, & Treder, 2016)

2.Holotiuk,F & others (2017) study entitled **"The Impact of Blockchain Technology on Business Models in the Payments Industry"** : This study contributed in the analysis of the impact of new technologies on business models in the payments industry using the example of blockchain technology. The results indicate that blockchain technology will affect the BMs in the payments industry by allowing new services and making some of the current services obsolete. Through this change in services, a subsequent impact on the financial structure of firms in the payments industry is realized, which generates a great potential for new BMs in the market while some existing ones become obsolete. (Holotiuk, Pisani, & Moormann, 2017)

3. Vikrant, K & Others (2019) study entitled **"Sustainable KYC through Blockchain Technology in Global Banks" :** This study performs a systematic review of the research and adoption progress of blockchain technology in the context of Customer Onboarding and KYC for Global Banks. This systematic review embraces the prominence of the peer-to-peer technology and the substantial role it can play in the complete revamp of the KYC processes for

Global Banks world-wide. The blockchain based consortium KYC approach suggests that the private blockchain can be the true solution to address all the growing compliance costs for all the banks together. This solution not only renders benefits to individual firms but also helps a lot for the industry and nations as a whole to combat the growing challenges of Anti-Money Laundering, Terrorist Financing and Black Money. (Kulkarni & Pratap SINGH, 2019)

2. An overview about Blockchain technology and its implementation in banking industry

2.1 Blockchain's Concept

Blockchain may still be a new term for many researchers. Therefore, it is appropriate to start with a discussion on some Blockchain's definition :

a. « Blockchain Technology is a new technology which is based on mathematical, cryptographic, and economic principles for maintaining a database between various participants without the requirement of any third party or central authority. It is a secured distributed database, wherein, the validity of a transaction can be verified by parties in the transaction. Each group of these transactions is referred to as a "block" » (Gupta & Stuti, 2018, p. 76)

b. « A blockchain is a ledger that is put together on the Internet in a decentralized manner by an indefinite number of contributors » (Yano, Dai, Masuda, & Kishimoto, 2020, p. 03)

c. « A Blockchain is a digital, immutable, distributed ledger that chronologically records transactions in near real time. The prerequisite for each subsequent transaction to be added to the ledger is the respective consensus of the network participants (called nodes), thereby creating a continuous mechanism of control regarding manipulation, errors, and data quality. Simply put, Blockchain is a protocol for exchanging value over the internet without an intermediary » (Patki & Vinod, 2020, p. 69)

In simple words, it is a database in which transactions are recorded and which is simultaneously shared among all parties in a participating network. Data is stored in fixed structures, "blocks", which are always linked to the latest block that has been added to the database. As all blocks are linked together in a chain, the entire history of transactions can be accessed and retraced. The verification of each transaction results from the consensus (validation) of the majority of participants in the network, without the involvement of any intermediary.

For more illustration, we can discuss the conceptual meaning of blockchain in the following paragraphs :

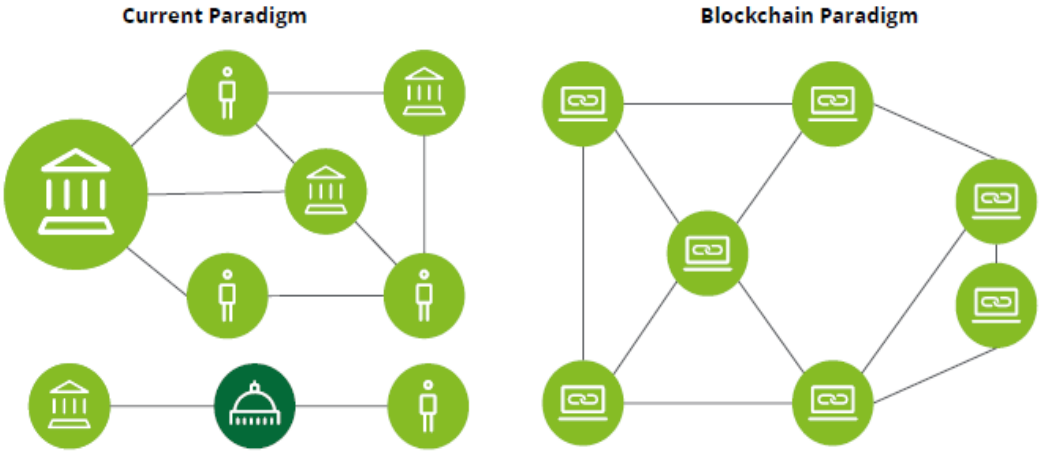
A Ledger is stored in a distributed system that is a single platform whereby two or more individual player work with each other. All players are capable of sending and receiving messages to system, and each of them has his/her own identical copy of the ledger. Distributed system eliminates the need for a central authority or intermediary to process, validate or authenticate transactions (Ozdemir, Ilker, & Erol, 2020, p. 1551). The distributed system is made up of many single nodes (computers) working together. Each node is indirectly connected, and no single node is directly connected to all other nodes. By contrast, in a centralized system, all nodes are directly connected to a single central node. Distributed systems are preferred to centralized systems because of their faster calculation, reduced maintenance costs, greater stability, and easier upgrades (Ko, Jaeram, & Doojin, Blockchain Technology and Manufacturing Industry: Real-Time Transparency and Cost Savings, 2018, p. 03). A blockchain is a new type of database that enables multiple parties to share the database and to be able to

modify that in a safe and secure way even if they don't trust each other (Hileman & Rauchs, 2017, p. 13).

To verify the transaction information, the form of collecting transactions that occurred for 10 min is called a block, and conceptually, it is called a blockchain in which the blocks are sequentially connected. The blockchain, all members of the network collectively record, verify and store transaction information, so that they can secure the reliability of transaction records without being notified by a "trusted third party" (TTP) such as a central bank or an administrative agency. It is also a very secure technology because it updates all the ledgers that are kept by each member every time a new transaction occurs. For example, a person A wants to transfer money to person B. It is usually performed with the help of a third trusted party. The working of blockchain is described as follows: A sends the money to the third party and the third party identifies the B as the right person/account to transfer. This took 3–4 days typically. What blockchain does here? Blockchain avoids involving the third party and therefore perform the action faster and cheaper than the traditional method (Kim & Chandra Deka, Advanced Applications of Blockchain Technology, 2020, p. 02). The blockchain cannot be counterfeited or hacked because it is counterfeit only when more than 51% of the participants are synchronized by recording transaction details on the dispersal ledger (Yoo, Blockchain based financial case analysis and its implications, 2017, p. 313).

Furthermore, blockchain technology enables tracking the ownership of assets along with right-to-use in the events of assets being leased to a third party. Simply put, anything of value can be recorded, tracked, leased, and exchanged on a blockchain platform and duplicate records of these transactions are simultaneously shared with participating agents in a network. The records are further protected with mathematically configured or cryptographic keys to ensure their security (Dogru, Mody, & Leonardi, 2018, p. 02). The main goal of the technology is to create a decentralized environment where no third party is in control of the transactions and data. Simultaneously, it allows for transaction platforms that are highly secure, cheap, fast, and less prone to error. This innovation will change not only the interaction between individuals and organizations, but also business-to-business (B2B) collaboration, raising the overall productivity of the economy(Ante, Sandner, & Fiedler, 2018, pp. 54-55). Fig.1 demonstrates the deference between traditional database versus blockchain database.

Fig.1. Traditional database vs. Blockchain based distributed ledger



Source: Deloitte, 2010, p.10

From Fig.1 we can compare the two models as follows (Deloitte, 2017, p. 10):
In the **traditional model** we find:
• the central authority is responsible for transferring the actual value between the parties;
• multiple intermediaries required to facilitate the transfer of assets and create trust.
In contrast to the **blockchain model** we find:
• distributed nodes (computers) that maintain a common source of information;
• trust is enabled by encryption algorithm.

2.2 Blockchain Technology's Principles

A blockchain transaction between two parties starts when one of the participants signals a message to the network about the terms and conditions governing the transactions between the two stakeholders. Then, the other participant broadcasts its acceptance to the network, which by default triggers the request for the network participants to authenticate and verify the transaction. Consequently, network members automatically play the role of authenticators that validate and guard the transaction against double spending through a validation system called "proof-of-work", which represents a competition among network members to validate the transaction. At this point, when the transaction is validated, the public ledger (blockchain record) as well as the users of network will be collectively updated with the status of the recently added transaction. This mechanism helps in establishing trust between concerned stakeholders through the use of a decentralized public ledger as well as cryptographic algorithms that can guarantee approved transactions cannot be altered after being validated (Morabito, 2017, p. 23). The following points summarize the five basic principles underlying this technology (Tapscott & Tapscott, 2017, p. 02) :

a. Distributed Database: Each party on a blockchain has access to the entire database and its complete history. No single party controls the data or the information. Every party can verify the records of its transaction partners directly, without an intermediary.

b. Peer-to-Peer Transmission: Communication occurs directly between peers instead of through a central node. Each node stores and forwards information to all other nodes.

c. Transparency with Pseudonymity: Every transaction and its associated value are visible to anyone with access to the system. Each node, or user, on a blockchain has a unique 30-plus-character alphanumeric address that identifies it. Users can choose to remain anonymous or provide proof of their identity to others. Transactions occur between blockchain addresses.

d. Irreversibility of Records: Once a transaction is entered in the database and the accounts are updated, the records cannot be altered, because they're linked to every transaction record that came before them (hence the term "chain"). Various computational algorithms and approaches are deployed to ensure that the recording on the database is permanent, chronologically ordered, and available to all others on the network.

e. Computational Logic: The digital nature of the ledger means that blockchain transactions can be tied to computational logic and in essence programmed. So, users can set up algorithms and rules that automatically trigger transactions between nodes.

2.3 Blockchain's types

there are three types of it: public, private (Shah, Shailak, & P K, Applications of Blockchain Technology In Banking : A Conceptual Approach, 2018, p. 14), and hybrid blockchain (Attaran & Gunasekaran, 2019, p. 16).

a. Public Blockchain, in which:

Anyone can write data, without permission granted by another authority. Anyone can read data, without permission granted by another authority. for example, the Bitcoin

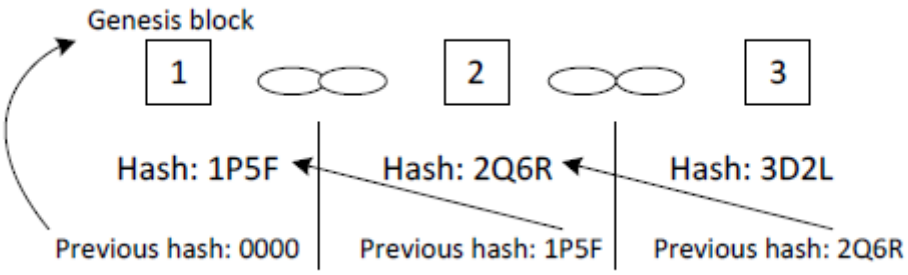
b. Private Blockchain, in which: the participants are known and trusted and there is a level of confidentiality. As an example of this type, we have: LINQ a stock exchange platform for Nasdaq unlisted companies (Forum, 2020, p. 05)

c. Hybrid Blockchain: This type of blockchain offers the benefits of both public and private blockchains. Hybrid blockchain consists of the public blockchain (that all participants are a part of) and a private network (permission or invitation-based) that restricts participation. There are several real-life examples of hybrid blockchain. For example: Ethereum.

2.4 Blockchain's framework

The blockchain is a collection of blocks, which is totally open to everyone. The open ledger in the blockchain is distributed in nature. The important feature of blockchain is that once the data is recorded into the ledger, then that data can't be erased. Every block present in the chain consists of the data, hash (a hash is a function that converts an input of letters and numbers into an encrypted output of a fixed length) to that particular data and the previous hash. The data recorded in the blockchain depends on the type of the blockchain. If the blockchain is related to bitcoins, it will store data for transactions, the information about the sender and receiver and the number of bitcoins presents in the network. Each block in the chain is having a hash value that can be compared with the fingerprints (Kim & Chandra Deka, Advanced Applications of Blockchain Technology, 2020, p. 03). As the new block is created, the hash of that particular block will also be generated. The hash of the block will be changed with the modifications made in the block. Therefore, the hash value is a very important factor while making modifications in the block. If the hash value of any block will be changed, then it will not be considered to be in the same block. Other than the hash of the current block, the block also holds the hash of the previous block. This helps to make a chain by linking the current block to the previous block. These features of a block in the chain makes blockchain more secure. Consider an example of a chain having three blocks. As shown in Fig.2, every block consists of the hash value of the current block and the previous block. In the figure, the block number 2 is pointing toward the block number 1, block number 3 is connected to block number 2 using the previous hash. The previous hash of the first block is 0000 because it a special block which is not pointing back to any block. This block is known as **the Genesis** block. Now suppose somebody wants to tamper block number 2. With the tampering of the block, the hash value of that block will also be changed. In that case, the third block and the following blocks connected in the chain will stand invalid because there is no valid hash present at that moment. Therefore, changing one block in the chain will result in invalidating all the following blocks (Kim & Chandra Deka, Advanced Applications of Blockchain Technology, 2020, p. 03).

Fig.2. Blockchain structure

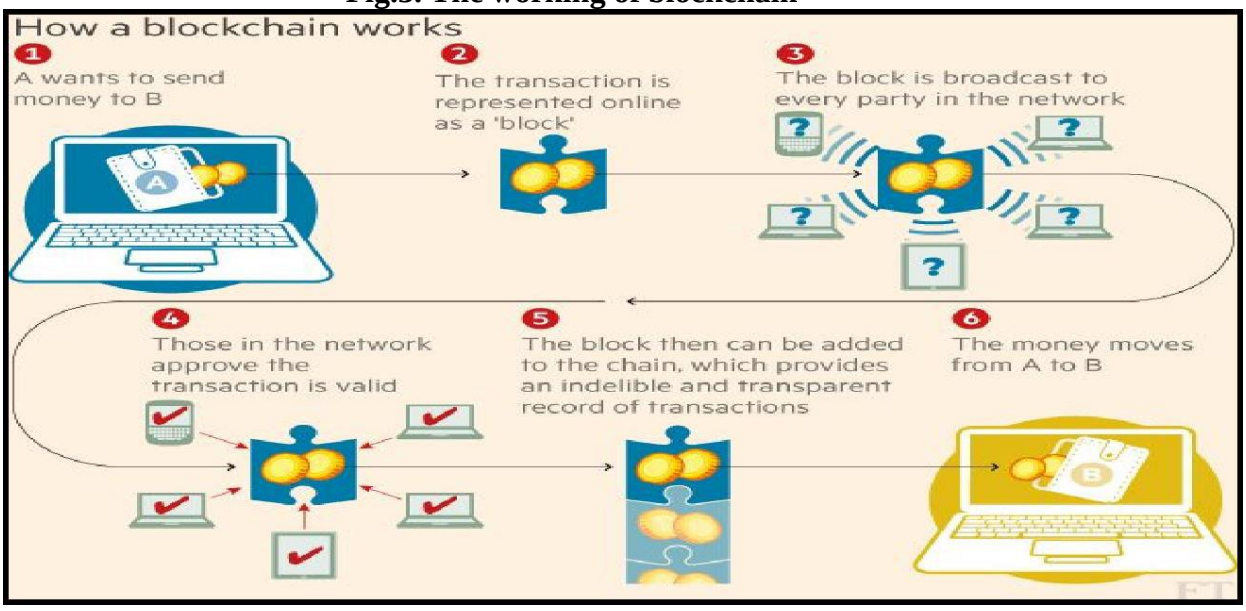


Source: Shiho Kim, Ganesh Chandra Deka, 2020, p.03

The blockchain ensures integrity by chaining blocks of transactions together in such a way that altering any block breaks the link with the next block. It is impossible to change one block without changing the next block, which in turn forces a change in the next and so on till the very last block. This ensures that while new blocks can be added at the end, older blocks remain

immutable. The chaining of blocks is obviously not physical, but it is based on a cryptographic hash. The hash is a digital fingerprint that uniquely identifies a piece of text. Every tiny change in a large file cause major changes in the hash. The most important properties are that (a) it is computationally infeasible to find two distinct texts that have the same hash, and (b) that given a specific hash-value, it is computationally infeasible to find a text with that hash. So, the blockchain is a set of blocks that have been chained together with cryptographic hashes. Each block (except the first) contains the hash of the previous block. If a crook alters an old block, say block 1000, the blockchain would fail the integrity check because the hash of block 1000 would no longer match the hash stored in the next block (block 1001). So, the crook has to alter block 1001 so that the hash of the previous block stored there matches the hash of the altered block 1000. But this changes the hash of block 1001, and so the crook has to correct the hash stored in block 1002. This process goes on until the last block is reached. If all participants in the blockchain keep track of the last block they are indirectly guarding the integrity of the entire chain even if it has grown to millions and billions of blocks (Varma, 2019, p. 02). As a way to order transactions in a distributed ledger, blockchains offer a record of consensus with a cryptographic audit trail that can be maintained and validated by multiple nodes. It lets contracting parties dynamically track assets and agreements using a common protocol, thus streamlining and even completely collapsing many in-house and third-party verification processes (Treleaven, Gendal Brown, & Yang, 2017, p. 15). Fig.3 describes the working of blockchain be it public or private (Shah & Shailak, Applications of blockchain technology in banking & finance, 2018, p. 08):

Fig.3. The working of blockchain



Source: Shah, T., & Shailak, J, 2018, p.08

Let us consider 5 participants in our blockchain, A, B, C, D, E who are on a decentralized, distributed network. This blockchain example will implement the blockchain technology in the bitcoin system.

(1) A want to send 50 bitcoins to B.

(2) This transaction of 50 bitcoins is represented online as a block.

(3) This block is then broadcasted to each and every participant in the network [C, D and E].

(4) In this example, C, D and E will serve as the validators in our network. This approve that the transaction is valid.

(5) This block containing the transaction which is added to the blockchain.

(6) The 50 bitcoins are transferred from A to B.

In Step 4, the validator, C, D and E execute cryptographic algorithms and conduct an evaluation and verification of the history of the individual blockchain under consideration. If the evaluation proves that history and the hash values are all valid, then the transaction is accepted. This is known as distributed consensus. If C, D and E for some reason cannot validate the information in the blockchain, then the data is rejected and entry for the block is denied and it is not added into the blockchain.

The block in the blockchain contains the header which is the hash value of the previous block and the content which is the bitcoin transaction itself. So, the Block 2 contains the hash value of Block 1, Block 3 contains the hash value of Block 2, Similarly Block N contains the hash value of Block N-1. The first block is called the genesis block and it is different from the other blocks in the sense that it does not contain a hash value of another block and hence, produces an unspendable subsidy. The new blocks are added and linked to the older blocks of the blockchain. This chain is continuously updated so that every ledger remains the same. The presence of this hash value is what makes the blockchain robust. If say Block 3 is to be modified, then the hash values in all of its subsequent blocks (Block 4, Block 5…. Block N) is also modified, thus giving rise to a regenerated blockchain. This decentralized, transparent mechanism makes the blockchain secure, robust and free from damage. The validators and the generators add to the blockchain only if they verify that it is the latest block in the longest valid change. Another point to be noted here is that in a blockchain. A blockchain is said to be valid if (Shah, Shailak, & P K, Applications of Blockchain Technology In Banking : A Conceptual Approach, 2018, p. 09):

(1) all the blocks in the blockchain are valid;

(2) all the transaction contained in the blocks are valid;

(3) the blockchain starts with the genesis block.

2.5 The usage of blockchain in banking Sectors

Banks are continuously exploring new ways to perform transactions quicker for an enhanced customer service, while ensuring cost efficiency in its operations and assuring transparency to customers and regulators. For this, blockchain potentially provides a solution for banks as it inherently helps eliminate intermediaries, maintain immutable log of transactions and also facilitates real-time transactions' execution. This could potentially reduce costs of manual work, and leading to enhanced customer service and satisfaction (Shah & Shailak, Applications of blockchain technology in banking & finance, 2018, p. 09). Also, it can simplify business processes while creating safe, trustworthy records of agreements and transactions (Treleaven, Gendal Brown, & Yang, 2017, p. 14). The algorithms in turn become an online intermediary under the Blockchain system, thus lowering the infrastructure costs and transaction fees while increasing the security of payment. Blockchain technology offers a decentralized network with more secure, transparent and reliable infrastructure. Banks compete by investing heavily in technology in attempts to improve the efficiency of the financial innovation system. They launch a broad range of financial services such as Automated Teller Machine (ATM cash dispenser), electronic fund transfer at the point of sale (EFTPOS), phone banking, Internet banking, mobile banking, Bitcoin wallet, Blockchain banking, etc (Harris & Jarunee, 2019). The real motivations, for international financial giants and local commercial banks to apply Blockchain are as follows (Sankaranarayanan & Kumar Rajagopalan, 2020, p. 7385):

a. Disintermediation: Blockchain provides transaction immutability and a distributed ledger architecture, which are key requirements for eliminating the need for an enforcer of trust in the ecosystem. Tamper-proof distributed data enables an environment in which trust is not an issue

and allows counterparties to operate with the knowledge that they all have the same version of the truth at all times and its history cannot be altered.
b. Transparency: Blockchain technology will significantly increase transparency between market participants. Blockchain implementations promote the creation of a public record of activity in the ecosystem to which all market participants have access in real time.
c. Provenance: Blockchain maintains an immutable record of transactions and therefore asset ownership since the time the asset first appears in a transaction on the blockchain. This significantly reduces risk and the need for associated mitigating operations for multiple asset types. This capability will enable the reduction of the occurrence of theft, fraud and misselling of high value assets and intellectual properties. It will also help for assets where its provenance determines value by creating a digital footprint on the blockchain.
d. True essence of blockchain: An immutable, unhackable distributed ledger of digital assets is a platform for truth and trust.

2.6 Blockchain and Banking Efficiency

While banks are wary of using blockchain technology linked to cryptocurrencies because of the lack of regulation and technical problems, they are embracing blockchain's underlying distributed ledger technology, particularly private or permissioned blockchain, thanks to the many benefits it may offer. As explained in the previous section, since a permissioned blockchain is a closed system between pre-defined organizations, it does not suffer from public blockchain's regulatory issues. Also, it requires lower costs and computational power to work than public blockchains, thus mitigating scalability concerns. By exploiting the "good side" of blockchain (i.e., the fact that the information is distributed and shared only among those with permission and in an immutable way, guaranteeing cybersecurity). Many financial players suggest that the distributed ledger technology of blockchain may solve most of the problems currently affecting traditional banking processes, such as efficiency, transaction lags, fraud and operational risks, by cutting costs, boosting process efficiency and increasing security. Blockchain may be applied to change the ways financial services are offered and will improve traditional financial institutions 'competitive advantages by enabling smart contracts, maintaining immutable logs of transactions and facilitating the real-time execution of transactions. Hence, if banks can integrate blockchain's distributed ledger technology into their business model to provide their services, they may exploit its benefits to improve their efficiency in terms of reducing operational cost and time. Specifically, blockchain has the potential to reshape traditional banking processes, which can help banks to automate inter-organizational processes, improve transparency and reset existing operational benchmarks. It may reduce infrastructure costs for eight of the world's 10 largest investment banks by an average of 30%, which means $8 billion to $12 billion in annual cost savings for those banks, including: a 70% reduction in central financial reporting; a 30% to 50% reduction in compliance; a 50% reduction in centralized operations such as know-your-customer (KYC) operations and client on-boarding; and a 50% reduction in business operations such as trade support, clearance and settlement (Martino, 2021, p. 39).

3. The application of the blockchain in technology in the UAE banking industry

Over the past four years, the UAE has successfully leveraged blockchain to help build its position as a fintech capital of the world. The banking sector, which is entirely reliant on transaction security, efficiency and accuracy, has been a key beneficiary of the speed, automation and immutability which is intrinsic to blockchain technology. In April 2018, the UAE Government launched the Emirates Blockchain Strategy 2021. The strategy aims to capitalize on the blockchain technology to transform 50 % of government transactions into the blockchain platform by 2021. The blockchain technology will help save time, effort and resources and facilitate people to process their transactions at the time and place that suit their lifestyle and work. By adopting this technology, the UAE government expects to save (Bashir &

alfaham, 2018): 11 billion AED in transactions and documents processed routinely, 398 million printed documents annually and 77 million work hours annually. This interest has recently resulted in a series of developments in the financial field and the issuance of government strategies and plans for new development projects and legislation based on the nature of blockchain technology and its effects on administrative procedures and processes used in these sectors, which means that blockchain will play an influential role in the development processes in the government, commercial and financial sectors in the coming years in the Gulf states. The blockchain-based projects that have been announced in the UAE are still in initial or establishment stages and a few of them are in the experimentation and testing stage, due to the novelty of the technology and the related need of core changes, rules, laws, business structure, and relationships between sectors. Here some implementation in the UAE blockchain - based banking industry.

3.1 Detection of fraudulent transactions

Successful blockchain-based banking projects launched in the UAE in recent years include Etisalat Digital's launch of "UAE Trade Connect''(UTC) in June 2019. This brought together eight major UAE banks to apply blockchain as a verification layer to detect fraud in invoice financing. This project has already helped to uncover an estimated 3.75 million fraudulent transactions in the UAE annually, representing $435 million USD in potential losses (Forum, 2020). Emirates NBD leveraged blockchain to develop a wire fraud prevention system in March 2018. Under this system NBD witnessed a 99% reduction in cheque fraud and from January to November 2019, the project verified over 35 million cheques (Staff, 2020). Also in 2019, Abu Dhabi Commercial Bank (ADCB) was the first bank in the UAE to run an end-to-end blockchain trade finance transaction with full document automation. ABCD reported that this blockchain based system offered corporate customers greater confidentiality, the ability to keep a closer tab on the flow of the goods and documentation, faster turnaround, and enhanced fraud prevention (Abu Dhabi, 2019, p. 01).

3.2 The UAE KYC Blockchain Platform

Abu Dhabi Global Markets (ADGM) recently announced key initiatives using blockchain to facilitate the regulatory requirements of know your-customer (KYC) processes (Syed, 2018). The UAE KYC Blockchain Platform is a national ecosystem for the exchange of verified "know your customer" data between licensing authorities and financial institutions. This initiative was launched in February 2020 by Dubai Economy in partnership with founding member banks. The platform comprises members such as Emirates Islamic, Emirates NBD, Commercial Bank of Dubai, Abu Dhabi Commercial Bank, HSBC, RAKBANK and Mashreq Bank as well as Dubai Economy and DIFC. The UAE KYC Blockchain Platform has transformed the investor bank account journey by significantly reducing the time it takes to establish relationship with banks. This will positively improve UAE's ranking in global Ease of Doing Business index (Report, 2021). Moody's, the investor services/credit rating body expects the KYC blockchain consortium will support the asset quality of UAE banks primarily by reducing operational risk and improving compliance with local and international KYC regulations while reducing the risk of data theft and also it will help credit risk management with better data for client underwriting and debt collection. (Blom, 2020).

3.3 The UAE Central Bank Digital Currencies (CBDCs)

The current trend of central bank activities clearly shows that central bank digital currency (CBDC) is likely to be the future of banking and payments. In late 2020, the international financial institution owned by central banks, Bank for International Settlements (BIS), surveyed more than 60 central banks about their engagement in digital versions of fiat currency work and

found that 86% (up from 80% in 2019) were looking at CBDCs (Kshetri, 2021, p. 53). 40% of central banks had progressed from the conceptual phases to experiments or proofs-of-concept (a proof of concept is meant to determine the feasibility of the idea or to verify that the idea will function as envisioned.), with another 10% all from emerging-market economies (Hawser, 2020). In November 2020, the central banks of Saudi Arabia and the United Arab Emirates (UAE) concluded a joint Central bank digital currency PoC (proofs-of-concept), referred to as the "Aber" project. It is the first dual issued wholesale Central Bank Digital Currency (CBDC) pilot implemented on distributed ledger technology(blockchain). The goal was to test the viability of a shared digital currency between the two countries. In addition to the two central banks, six local commercial banks participated to run the nodes. A key finding was that, compared to centralized payment systems, the use of blockchain can improve domestic and cross-border commercial bank settlements. The Aber project built on earlier trials conducted in other countries, such as Singapore's Project " Ubin" and Canada's Project "Jasper" (Kshetri, The Economics of Central Bank Digital Currency, 2021, p. 54). What distinguishes Aber from all other CBDC pilots are the fact that two central banks and six commercial banks from both countries were involved in the project; further, real money was used. The use of real money focused attention on security. The wholesale CBDC was based on the Saudi Riyal (SAR) and the Emirati Dirham (AED). SAR and AED are pegged to the US Dollar (USD), Aber was derived at a fixed rate to either of its progenitors (SAR or AED) and remained at a fixed rate to convert to the both currency (Bharathan, 2020). In the light of the new experiments and researches both central banks led this project as an innovative driven initiative. The initiative sought to explore whether distributed ledger technology could enable cross-border payments between the two countries to be reimagined: using a new, dual-issued digital currency as a unit of settlement between commercial banks in the two countries and domestically.

3.4 Digital currency Project "Aber"

In 2020, the Central Bank of United Arab Emirates (CBUAE) and the Saudi Arabia Central Bank (SAMA) released a report on its year-long joint effort, named "Project Aber: Joint Digital Currency and Distributed Ledger Project", which explored the viability of a single dual-issue digital currency as an instrument of domestic and cross-border transactions between the two countries (UAE & the Saudi Arabia). Project Aber results affirmed that it was feasible for central banks to create payment systems at the domestic and cross-border levels via the distributed ledger technology. The name Aber was selected because, as the Arabic word, for "crossing boundaries", it both captures the cross-border nature of the project as well as our hope that it would also cross boundaries in terms of the use of the technology (Bank & U.A.E, 2020, p. 06). The project used Hyperledger Fabric, which is a permissioned blockchain associated with Linux Foundation and IBM (Kshetri, 2021, p. 54). The high-level objectives of this initiative were (Bharathan, 2020) :

- ✓ to explore, experiment, and gain a deeper understanding of distributed ledger technology (DLT) and analyses its maturity;
- ✓ to explore an alternative DLT-based cross-border payment solution that can overcome inefficiencies in existing cross-border interbank payment approaches;
- ✓ to understand and experiment with the dual issuance of a central-bank digital currency;
- ✓ benchmark findings against those of other central banks.

In the case of Project Aber, the two countries were focused on developing a CBDC that would be used as an instrument of settlement by participating commercial banks and would not be made available to the general public: hence, it considered a wholesale CBDC (Bank & U.A.E, 2020, p. 2020).

Conclusion

Advances in telecommunications and information technology have had a significant impact on the banking industry over the past few years. The rise of the financial technology (fintech) sector has also played an important role, with new technologies like blockchain having the potential to change the UAE banking industry in faster and more disruptive ways than ever before. Nowadays, the blockchain technology is considered as the most significant invention after the Internet. If the latter connects people to realize on-line business processes, the former could decide the trust problem by peer-to-peer networking and public key cryptography (Efanov & Roschin, 2018, p. 116)**.** The UAE government launched the "UAE Blockchain Strategy 2021" in April 2018, seeking to transform the banking process to a new level and to become the first government in the world to operate this technology.

Results: we can summarize the results of this study in these points below**:**

- ✓ the Blockchain is an encrypted and distributed digital filing system designed to support unalterable and real-time transactions. It is a public account of every transaction executed and exchanged between all the concerned parties;
- ✓ the record of each transaction is verified by the consent of a majority of the participants in the system. All participants mutually agree and are aware of the transaction processed along with the identities of all individuals involved in the transaction;
- ✓ blockchain will evolve as a disruptive force in transforming UAE banking sector by making banking transactions more secure, faster, transparent, and cost effective;
- ✓ the adoption of blockchain in the UAE banking system helped to uncover an estimated 3.75 million fraudulent transactions in the UAE annually, representing $435 million USD in potential losses;
- ✓ it expected that KYC blockchain platform will support the asset quality of UAE banks primarily by reducing operational risk and that it will ensure improved compliance with local and international KYC regulations while reducing the risk of data theft and helping credit risk management;
- ✓ applying the UAE KYC(know your customer) will positively improve UAE's ranking in global Ease of Doing Business index KYC;
- ✓ the "Aber" project is the first dual issued wholesale Central Bank Digital Currency (CBDC) implemented on distributed ledger technology(blockchain);
- ✓ project Aber results affirmed that it was feasible for central banks to create payment systems at the domestic and cross-border levels via the distributed ledger technology;
- ✓ with the advent of BCT, UAE's banking and financial systems can be expected to transform the banking process to a new level.

The recent results prove that our hypothesis that blockchain positively improve the UAE banking sector by making banking operations more secure, faster, transparent, and cost effective by eliminating intermediaries.

Recommendations: The study recommends the following points:

- ✓ Awareness of Blockchain should be spread through various trainings, workshops, and by incorporating it in the curriculum in educational institutions;
- ✓ Blockchain technology has been recommended for the sustainability in the UAE banking industry, owing to its benefits in terms of real-time transparency and cost savings;
- ✓ Despite that Blockchain Technology (BCT) offers to the banking sector, its applications are still only intended for some applications. Therefore, it is recommended to expand the adoption of this technology in wider financial applications.

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