

Blockchain Attributes in Malaysia: A Qualitative Approach

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ABSTRACT

With a plethora of benefits and innovations, many companies across the world are considering the adoption of blockchain technology for their businesses. Blockchain enables the storage of all transactional data and shared files among participants across the network, regardless of multiple locations or geographical dispersion. Despite blockchain's growth and tremendous demand, little is known about the attributes of blockchain, especially from a finance perspective. Thus, this paper aimed to investigate the blockchain attributes of a Malaysian organisation. This study employed a qualitative method by utilising the case study approach. The interviews were guided by the research objectives, and the data was analysed using thematic coding. The proposed research outcome from this research is in the form of a Blockchain Attributes Taxonomy Model. From a practical point of view, the proposed model will offer some insight to practitioners like accountants and auditors. They may apply their technical competence and know-how more effectively during the deployment of blockchain with an understanding of the attributes themselves to take advantage of the numerous benefits offered by blockchain innovation. For the practitioner, they could carefully evaluate the nature of blockchain in optimising the organisation's capabilities to remain competitive in the market.

Keywords: Blockchain Technology, Qualitative Method, Case Study, Finance Perspective

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INTRODUCTION

Blockchain technology is a peer-to-peer distributed asset database that can be shared between two or more entities across a network without geographical boundaries and is also well-known as distributed ledger technology (Treleaven et al., 2019). It was the core technology used in Bitcoin by Satoshi Nakamoto in 2008 (Nakamoto, 2008). Bitcoin has been used in order to build a platform that can cut out the intermediary from every transaction (Fauziah et al., 2020). According to Parino et al., (2018), Bitcoin is a decentralised digital currency that was invented in 2009 as an alternative to the banking system. Utilising distributed ledger technology (Lansiti and Lakhani, 2020), which subsequently does away with the need for middlemen, is encouraged by the use of bitcoin (Yli-Huumo et al., 2020). According to Yli-Huumo et al., (2020), digital currency is a sort of internet-based money with instantaneous transactions and global ownership transfers that may be used as a medium of exchange similar to fiat currencies or coins. Cryptocurrency, also known as digital currency, has no inherent worth, so it cannot be exchanged for other goods like gold. It also has no physical existence and only exists on network platforms. Since the emergence of Bitcoin as the basis for blockchain, the technology has evolved over time.

Behind the success of Bitcoin, many corporations have shown their interest in using technology, as they wanted to actively participate in blockchain technology and not be left behind (PwC, 2018). Large organisations such as Amazon, Facebook, and Microsoft explored the use cases for technology. For instance, Facebook Inc. has taken further steps to include blockchain technology in the company's restructuring (PwC, 2018). According to PwC (2018), blockchain technology has developed far beyond Bitcoin and is currently being tested and utilised in a wide range of commercial and financial applications, from the public sector to healthcare as well as the financial services industry. Firica (2017), who declared that many industries, including banking, insurance, supply chain, renewable energy, real estate, healthcare, and many more, have used blockchain technology since it was first developed for the financial industry (Catalini and Michelman, 2017), As time has passed and a variety of studies have been conducted, blockchain has been extensively examined for further applications by researchers, academicians, and companies, not only in the financial sector but also in other areas (Grover and Vigneswara, 2018). For

instance, both academia and practise's attention had started to grow on the value of blockchain technology to supply chain finance to utilise capital optimisation and cost reduction (Tiana et al., 2021).

Malaysia has shown a growing interest in blockchain technology in recent years, with various initiatives and projects being developed in different sectors. In 2017, the bank has issued guidelines for digital currencies and digital token offerings. The Malaysian government has also recognised the potential of blockchain technology and has launched several initiatives to promote its adoption. In 2019, the Malaysian Ministry of Education launched a blockchain-based platform called e-Scroll for issuing and verifying academic certificates (Ministry of Education, 2019). The platform uses blockchain technology to ensure the authenticity and integrity of the certificates. In the healthcare sector, Malaysia has also launched several blockchain-based projects. For example, in 2018, a blockchain-based platform called MiPasa was launched to track and contain the spread of infectious diseases (Vasarhelyi et al., 2018). The platform allows health authorities to track the movement of infectious diseases and take appropriate action to contain them. Despite blockchain's popularity, little is known about the attributes of blockchain technology from a finance perspective.

In adopting blockchain technology or integrating the current accounting system with blockchain technology, it is particularly important to understand the attributes of adopting blockchain technology from a finance perspective. The importance of understanding blockchain technology's attributes is beneficial for those who have decided to upgrade their existing accounting system by incorporating the latest technology. Moreover, blockchain technology has the potential to significantly impact the current accounting system in several ways in terms of enhanced security, transparency, efficiency, and auditability. However, the adoption of blockchain technology in the accounting industry is still in its early stages, and further research and development are needed to fully realise its potential. To the best of this study's knowledge, no attempt has been made to develop and categorise the blockchain technology's attributes based on a real-world scenario, specifically in finance (Luo et al., 2020).

Thus, this research aimed to investigate the attributes of blockchain technology adoption by Malaysian organisations and, hence, develop a

blockchain attributes taxonomy model that may be used by Malaysian organisations. With better knowledge of adoption attributes for blockchain technology, the proposed contribution from this study will enable organisations to embrace technological innovation that aligns with the requirements of Industry Revolution 4.0 (IR 4.0). The construction of a blockchain attributes taxonomy model was the planned study outcome. From a use-case perspective, the proposed model will offer some insights to practitioners like accountants who may apply their technical competence and know-how during the deployment of blockchain technology. Practitioners could also carefully evaluate the nature of blockchain technology in optimising the organisation's capabilities to remain competitive.

This brings us to the research question of this study, which was: “*What are the attributes of blockchain technology adoption in finance applications?*”. The finance application in this study refers to the financial tasks and activities. In response to this question, we structure the rest of this article as follows: In the following section, a comprehensive and systematic literature review as well as a background concept of blockchain technology is provided. The methodology for this study is described in Section 3. Section 4 is dedicated to the attributes of blockchain technology and the proposed methodology. Following that, the discussion will be presented in Section 5, and the final section (Section 6) presents the concluding remarks.

LITERATURE REVIEW

Blockchain Technology Process Flow

Blockchain technology starts to work when someone requests a transaction through a system. When a transaction request is made through a system, blockchain technology begins to function. The requested transaction is broadcast (Bashir, 2017) to a peer-to-peer network of computers called nodes (Lansiti and Lakhani, 2020). In plainer terms, a peer-to-peer network is formed when two or more private computers are linked together and share resources directly with one another, bypassing any additional computers or server software. When the network of nodes uses algorithms to validate the transactions and the user's status, the validation process will start (Karajovic and Laskowski, 2019). Algorithms are a method or collection of guidelines

that must be followed for computers to solve problems in mathematics and computer science. Additionally, it is supported by Swan (2018), which uses a proof-of-work hash method.

The verified transaction is joined with other transactions to produce a new block of data when it has been confirmed by the nodes (Lansiti and Lakhani, 2020). This new transaction is timestamped and hashed onto an on-going chain of transactions, according to Appelbaum and Nehmer (2020) and backed by Ølnes et al., (2017), in which the new block is connected to the preceding block or blocks after it, creating a succession of blockchains. This new block cannot be altered by a single node because it is immutable and permanent (Wang et al., 2019 and Bashir, 2017). The transaction is finished after a new block is chained to an existing block. Figure 1 illustrates blockchain technology in a diagram.

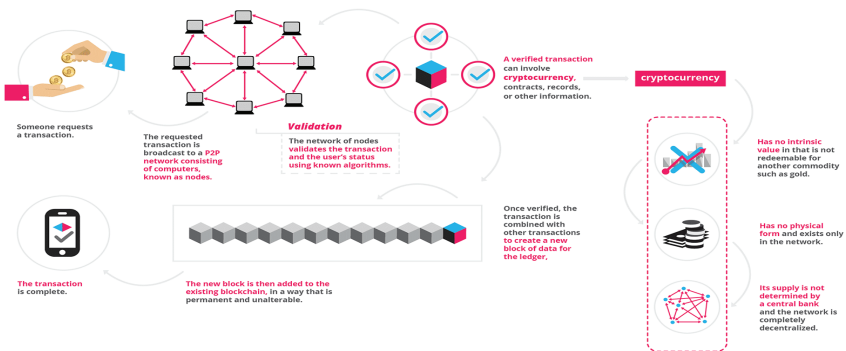


Figure 1: Illustration of Blockchain Technology

Source: Arnold (2017)

To further increase business and individual productivity, the Malaysian government has made efforts and aided in the adoption of a policy regarding the usage of cryptocurrencies in all transactions. Due to their greater competence and resources, corporate activities frequently involve larger transactions and enormous buying power, which has a significant impact on the entire supply chain and the potential to significantly contribute to Malaysia's overall economic growth. There is still hope that Malaysia will accept the use of blockchain technology to modernize how Malaysians conduct business, both in the private and public sectors, given the engagement of the Malaysian government in cryptocurrencies. Despite

blockchain’s popularity, little is known about the attributes of blockchain technology from a finance perspective.

Blockchain Conceptualization

Blockchain terminology and definition

The review of previous literature has identified three basic concepts used to define blockchain technology: “blockchain technology,” “distributed ledger technology,” and “decentralised ledger technology.” The definition of three basic concepts is illustrated in Table 1.

Table 1: Summary of Blockchain Technology Conceptualization

References	Terminology	Definition
Gadekallu et. al, 2021	Blockchain Technology	A chain structure in which all transaction data is packed into blocks and blocks are connected accordingly.
Bashir, 2017	Distributed Ledger Technology	A digital system to record all transactions of assets in which their details are recorded in multiple places at the same time.
PwC, 2018	Decentralized Ledger Technology	A decentralised ledger of any transactions across a peer-to-peer network Using this technology, users can confirm transactions without the need for a central clearing authority.

While blockchain, distributed ledger, and decentralised ledger technology are sometimes used interchangeably, these terminologies are the features that make up what the blockchain is. This is because blockchain technology is a distributed and decentralised ledger technology that was created to eliminate the use of a third party or middleman in every transaction to reduce human errors and minimise the cost of transactions.

Trend of blockchain technology

Since blockchain technology has quickly developed and is being used throughout the world, Malaysia is not exempt from accepting this new IT innovation. For example, the multinational company IBM Corporation that is involved in the IT development of hardware and software via its IBM Malaysia Branch IBM has generated a blockchain prototype that manages to capture information about product shipment (O’Leary, 2017). O’Leary (2017) further stated that the employment of blockchain in IBM is

demonstrated through the permission granted for participants in the supply chain to track the movement of products, particularly while a specific container is in transit. In another scenario, DHL employed blockchain for its postal and logistical operations. DHL is a division of Deutsche Post DHL Group, the largest postal and logistics firm in the world. Its business groups include DHL Express, DHL Parcel, DHL eCommerce, DHL Global Forwarding, DHL Freight, and DHL Supply Chain.

Due to the widespread use of cryptocurrencies, one of the uses of blockchain, authorities have been forced to take a variety of techniques and regulatory measures, and Malaysia has joined the growth (Fong, 2017). To increase transparency of digital currency activities in Malaysia, the Central Bank of Malaysia issued a request for public input regarding the designation of digital currency exchanges as reporting institutions under the “Anti-Money Laundering, Anti-Terrorism Financing, and Proceeds of Unlawful Activities Act 2001 (AMLA)” (Fong, 2017). The AMLA is a law that establishes the crime of money laundering, the precautions to be taken to prevent money laundering and terrorism financing offences, the penalties for property involved in or derived from such offences, as well as terrorist property, proceeds of an unlawful activity, and instruments of an offence, as well as matters incidental and related thereto (BNM, 2001). This was done to ensure that the transactions are free from laundering and any illegal activities, including gambling, human trafficking, and terrorist activities as the volume of transactions involving cryptocurrency is ongoing and will continue to rise in the next few years,

Also, it is noted by the Central Bank of Malaysia (Bank Negara Malaysia) that there is an absence of consumer protection, especially from the investor side, if they encounter any losses when dealing with cryptocurrencies (BNM, 2018). These become one of the reasons for the asset’s owners and institutional investors to avoid investing in the digital currency. Based on the study by the Fletcher School of Tufts University, dealing with digital currencies exposes stakeholders to regulatory uncertainty (Buang, 2018). The reason for this is that certain cryptocurrency developers come from dubious firms, or some of the companies have ties to people on the Central Bank of Malaysia’s watch list (BNM, 2018).

General Attributes of Blockchain Technology

There are four general attributes of blockchain technology: “distributed ledger technology,” “immutable,” “cost reduction,” and “transparency.”. Using consensus procedures, which ensure that information will only be modified when all parties agree to it, is predicted to increase the dependability of information (Swan, 2018). By using distributed ledgers that are hard to alter, security is generated (Ølnes et al., 2017). According to Tapscott and Tapscott (2017), data is kept in several databases utilising encryption keys, making modification harder and simultaneous hacking less feasible.

The written accounting entries cannot be changed or deleted since the data is unchangeable (Karajovic and Laskowski, 2019). In addition, blockchain can improve present financial services by managing back-office transaction processing. Normally, a time-consuming back-office procedure is required to record transactions when a financial institution sells a customer a syndicated loan or derivative. To complete the transaction, these procedures rely on written contracts with several connected lawyers and communication between the parties. The average time to settle a syndicated loan exchange is about twenty (20) days. Costs will be reduced as a result.

A wide variety of stakeholders must be able to readily access the transaction and see it in real time (Potekhina and Rumkin, 2017). Other than that, each node has a full picture of all transactions, and the transaction history is still available (Karajovic and Laskowski, 2017). Information is recorded on several distributed ledgers, making it impossible for hackers or illicit transactions or changes to go undetected (Cai and Zhu, 2015). Table 2 illustrates the general attributes of blockchain technology used in previous studies.

Table 2: General Attributes of Blockchain Technology

Types	Distributed Ledger Technology	Immutable	Cost Reduction	Transparency	Description of Types	References
1	X				A distributed and shared database maintained by consensus in peer-to-peer distribution networks.	Zeyad et al., 2019.
2		X			Something, data, or value cannot be changed over time.	Vincenzo, 2017.
3			X		Process of decreasing an organization's expenses to maximize its profits.	Karajovic et al., 2019.
4				X	All participants in a public blockchain have a full copy of every transaction.	Wang and Kogan, 2018.

From a theoretical perspective, this study highlights the general attributes of blockchain technology. Using examples from previous studies, we arrived at five general attributes of blockchain technology that explain different attributes from those derived from the aspect of finance. By citing examples from previous studies, we show that the developed model has validity and made a new contribution to the study. One thing about the previous studies on blockchain technology is that there is hardly a clear attribute of blockchain technology in the aspect of finance. Thus, this study is the first to use case study evidence to discover the attributes of blockchain technology adoption in finance.

THE RESEARCH METHODOLOGY

In the context of this study, the qualitative research method was the most appropriate to address the primary goal which was to understand the attributes of adopting blockchain technology. The understanding of blockchain technology will not be well portrayed by quantitative research methods. In light of the fact that blockchain technology is a recently investigated subject, it is thus very appropriate to utilise a qualitative research approach to aid in the researcher's understanding of the situation (Andoni et al., 2019). The analysis of earlier works on blockchain technology indicated that academics are becoming increasingly interested in this field of study.

This study attempted to use an explanatory case study. An exploratory case study can be defined as the initial study of a hypothetical or theoretical idea. It is normally used to obtain knowledge when conducting a deep study and address the question of “what”. This type of case study has been used in this study as it would include the analysis and interpretation of the documentation, serving as evidence or acting as supplements to the interviews (Woodside and Wilson, 2003). This method also allowed the researcher to collect detailed information using a variety of data collection procedures over a stipulated period. In this study, the researchers had focused on answering the questions “what” and “how” regarding blockchain technology.

An organisation from Malaysia that has implemented blockchain technology was approached, which we will refer to here as Case A. Case A’s business area of technology employed blockchain technology. Data were collected through face-to-face interviews with 10 interviewees over a period of 5 months using purposive sampling. The respondents were from the management, finance, and information technology divisions and were users of blockchain technology. The number of interviewees in this study was sufficient because it reached data saturation (Guest et al., 2020). Plus, there is no magic number that is considered appropriate for sample sizes in qualitative research (Morse, 2015). They were also participating to successfully provide financial services through the adoption of blockchain to their clients. The number of interviewees was determined by the availability of the employees and time constraints. Such selection was deliberately made to ensure the interviewees have adequate knowledge and awareness of the adoption of blockchain technology in the areas of accounting and finance. The data collection period was from March 15, 2021 to August 15, 2021. Each interview lasted between 1 and 1 1/2 hours. The interview questions were open-ended in nature, with additional questions expanding based on emerging themes. The Table 3 below provides a summary of the interviewees’ profiles.

Table 3: Summary of Interviewee Profile

Interviewees' Job Titles	Interviewees' Code	Department	Job Scope	Location
Chief Executive Officer	C1	Management	Head of the company, strategy planning, business development and subject matter expert.	Case A Office, Kuala Lumpur
Chief Technology Officer	C2	Management	Head of IT Department, oversee the development of IT apps, subject matter expert.	Case A Office, Kuala Lumpur
Senior Account Executive	E1	Accounts and Admin	Oversee the finance and admin works	Case A Office, Kuala Lumpur
Account and Admin Executive	E2	Accounts and Admin	Assist Senior Account Executive in all related finance and admin works	Case A Office, Kuala Lumpur
IT Expertise	IT1	IT	Develop mobile apps	Case A Office, Kuala Lumpur
IT Expertise	IT2	IT	Provide business analysis, Develop website	Case A Office, Kuala Lumpur
IT Expertise	IT3	IT	Develop backed/blockchain apps	Case A Office, Kuala Lumpur
IT Expertise	IT4	IT	Develop mobile app, backed/ blockchain apps	Case A Office, Kuala Lumpur
External User	U1	Company A	Use blockchain application by Case A	External User Office, Kuala Lumpur
External User	U2	Company B	Use blockchain application by Case A	External User Office, Kuala Lumpur

Data analysis was performed using the thematic approach (Braun and Clarke, 2006). We started with transcribing the interviews. Since the interviews were conducted in mixed languages (English and Bahasa Malaysia), the data was translated into English. This process was carried out to facilitate the analysis process as well as provide consistency in data transcription. In order to ensure its validity, a third party was asked to verify the translation of all interviewees from Bahasa Malaysia to English. This third-party reviewer was the professor in graduate studies and had vast knowledge in the research area. Then, thematic coding was used to analyse the data, as suggested by Braun and Clarke (2006). Finding justificatory statements and creating conceptual categories from them is the process of data coding. By using thematic coding, categories along with their properties and dimensions were extracted from the raw data. The process of thematic coding is a frequentative process where we detect the expressive statements

in raw data and form the relationship between them. Furthermore, it is also necessary to revise some of the coding categories during the analysis stage, which requires us to revisit the data that has already been coded.

CASE STUDY

Case Description Background

The following Table 4 outlines the summary of the case profile (Table D).

Table 4: Summary of Case Profile

Descriptor	Item
General Background	
Industry Sector	Technology
Business Segments	Mobile Applications
Incorporation	2012
Number of Employees	110
Core Products	<ul style="list-style-type: none"> ● Business Analysis, ● UI/UX Design, ● Mobile/Web Application Development
Additional Products	Backed/Blockchain
IT and Blockchain Technology	
Number of employees in the IT department	86
Current Situation of Blockchain	Mobile/Web Application Development mainly used Utilization of Blockchain technology is at early stage – Monitoring ph

Source: Interview Sources and Website for Case A

Attributes of Blockchain Technology in Finance Aspect

As the business expanded, the company faced operational issues. Existing business processes required a new system to fulfil the requirements of the new environment. Within the challenging business environment, the company should always be up to date with the latest technology in executing its business functions without jeopardizing its information. Over time, the business may change or modify its accounting system to adopt a more sophisticated system, such as blockchain technology.

To understand the attributes of blockchain, data analysis was carried out through thematic coding of all interview transcriptions. Analysis of the 10 of Case A's officers along with the users of the system led to the identification of features of blockchain in Case A. We found that the blockchain technology system was mainly used and utilized in the Accounts and Administration Departments. Table 5 illustrates a summary of the selected interview logs as exemplary of the attributes of blockchain technology in Case A.

Table 5: Summary of Selected Interview Logs

Category	Dimension/ Definition	Sample Interview Logs	No. of Similar Quotes
Distributed Ledger Technology	Distributed software system that can be seen as a protocol stack (based on Serena et al., 2021)	<i>Blockchain technology is an open innovation. Why I said that is, it is an innovation of process based on purposely managed information flows across organization, a fast approach of recording and sharing data.</i>	7
Integrity of Data	Core security issue of information (based on Husna et al., 2021)	We want to protect our data. Especially financial information. That is why we are using blockchain technology. Blockchain can prevent any changes of information. I meant we can detect it and trail the information. It is good for audit later.	5
Data Reconciliation	Process of comparing figures from two or more records to check on correctness and in agreement (based on Jeffrey et al., 2014)	For the companies that have branches, the blockchain system is helpful. We have a history of unreconciled balance between branches which was delayed in the closing process. But now not anymore.	6
Transparency	Quality of tasks being done without secrets.	We are in the same company. So, we want to have the same information. Additionally, we want to know who the person approved of any transaction or decision. Everything is disclosed when using Blockchain.	5
Data Synchronization	The operation of two or more things to show the same time, state, or rate.	Blockchain is ideal for business. We can directly capture the information across states. Even if we are miles apart or from the other branches, at the HQ we are able to gather the information from other branches just in seconds as it is displayed through the system.	5

Description for each of attributes as per below.

Distributed ledger technology

This study showed that the use of blockchain technology has significantly changed accounting and finance functions. The basics of blockchain are that it is known for its distributed ledger technology, which is the simplest definition of what blockchain is. In conventional accounting or normal accounting tasks, records are stored in centralized locations, either in collection with the use of spreadsheet files or in the database of an accounting software application, or in both combinations. The accountants enter each record and perform whatever actions are necessary to serve the client's needs. When the financial information from the records is needed by regulators, tax agents, auditors, top management, or clients, the accountants must retrieve whatever data is needed and provide it to the requesting party. Generally, these financial records can only be accessed by those in the accounting department. It was supported by Officer B (C2), who stated:

If we want to have some accounting data for decision-making, we need to ask the Accounting Department. We, the top management, don't have access to the system. Even if we wanted to know about the sale record, we still asked the Accounting Department. The record from the Sales Department might not be the same as the record of sales from the Accounting Department. This is how the record is obtained for the decision-making process prior to using blockchain technology.

Officer A (C1) commented on the establishment of blockchain technology in accounting that was highlighted on the distributed shared ledger. It was said that when using blockchain technology, the records entered can be accessible to all concerned parties, up to a portion of their own records. The remark from Officer A (C1) of Case A emphasizes this feature as follows:

Using blockchain technology that has distributed ledger technology and is decentralized, the records are entered into and stored in a distributed or shared ledger that is generally accessible to all concerned parties. In this case, stakeholders would always possess an identical copy of the ledger. There is no issue in obtaining different information. Of course, each party

would have access only to the portion of the ledger that contains their own records. To segregate each party, public and private keys are used to authenticate users.

Further, Officer E (IT1) defined distributed ledger technology as an opening door for companies that wanted to be advanced in business. Such enthusiasm can contribute to distributed communication between parties in the same organization without any dispute or delay. The quotation from Officer E (IT1) is as follows:

It is a global trend to use blockchain technology in operating today's businesses. If the company wants to be advanced in business, blockchain technology is the solution, as it is a distributed ledger technology, hence requiring distributed communication. So, every decision can be communicated between parties in the same organization without taking time, without dispute, and without delay.

Integrity of data

The second reason is due to the ability to safeguard the integrity of data. Each record that enters the blockchain technology is encrypted, and each entry is automatically dated and timestamped. A collection of records or transactions form a block; that is the reason the name is called blockchain. It is the new transactions that are chained to the existing transactions. It is supported by a statement from Officer D (E2) that states the data in the blockchain system is properly recorded with the identification of the changer with date and time.

I would say that the data integrity issue is related to the audit issue. So, when the data is changed, you know who changed it and when. And everything is properly recorded. So, this is the reason they want to use the blockchain.

One of the reasons blockchain technology is used is due to its complex ability for users to alter the information that has already been entered or chained in the system. This complex ability is good for the company, as the alteration is nearly impossible to do. The remark from Officer F (IT2) of Case A emphasizes this feature as follows:

When a transaction is chained in the blockchain system, it is impossible for it to be altered. For example, when someone wants to make any changes, he needs to adjust not only the specific transaction that he wants to adjust but also the existing transactions that are already chained with that particular transaction. To think of it, who has the possibility of doing it? Since the system is decentralized. It is shared with others. So, the data entered has a high level of integrity. No one will question it once it is chained.

From the perspective of accounting and finance, the integrity of data is crucial for the company. The step-by-step records from trade details, time, date, or other financial data need to be known up to their source or originality. This is used to verify and track many types of transactions with sequential records of the history of an audit trail. This was supported by Officer C (E1) as follows:

Accounting and financial information are important for the company. Especially when it involves money or figures. The features of blockchain have saved us a lot in many ways, especially in terms of audit trails. We could not trail the records as the previous system was not able to do so. But with blockchain technology, we can track the source of records, destination, figures, time, person who entered the transactions, and many more.

The same officer further added:

Once an employee resigned, and we needed to check back on the originality of the transactions, and it was so difficult. We could not trail the records as the previous system was not able to do so. But with blockchain technology, we can track the source of records, the destination, the figures, the time, the person who entered the transactions, and many more.

Data reconciliation

Other than that, blockchain technology is also crucial for multinational companies that have multiple branches. The parent company always

has a problem making sure transactions between branches are properly reconciled. The most problematic time was when group accountants needed to reconcile all intercompany transactions during the peak period prior to closing monthly or yearly. There must be a situation where branch A is not considering the transaction and is not recording it in a timely manner, which branch B already takes into account. For instance, Officer C (E1) pointed out the data reconciliation challenges prior to the use of blockchain technology as follows:

When using the current accounting software, we as accountants always need to ask for reconciliation of the records between branches. This is a problem when branches are not timely, considering the transaction occurred. That is why the process of reporting the financial report at the end of the month will be delayed. and top management will have difficulties making any decision due to the fact that the data is not timely delivered. But this is not the case when using blockchain technology. Everything is distributed. Everything is automatically reconciled. And everyone in the accounting department is happy with this.

Reconciling the data is not only beneficial to branches of the same company, but it also provides benefits to third parties outside of the company. Blockchain technology is said to be able to link with parties outside the company, especially the supplier or creditor, by using triple-entry bookkeeping. The transactions are automatically reconciled and linked to creditors' accounts once the payment is made. This shows that confirmation can be made in an instant. In the words of Officer G (IT3):

We, as an IT expert, noticed that our Accounts Department is having problems balancing the debt or collecting the debt between debtors and creditors. So, by using triple-entry bookkeeping in blockchain technology, we are able to minimize the problem. They directly know the outstanding amounts, and third parties also acknowledge the amounts. There is no sudden extra charge or undercharge between companies, as once the transaction is entered, our side (the Accounts Department) needs to confirm it, then third parties also need to give their confirmation on the transactions, and then the transactions are

chained, or basically sealed. But of course, the third parties are only able to see up to their transaction.

As a user of the blockchain system, I indicated that reconciling using the blockchain system also enhances and gives confirmation to the auditor that the data stated and provided can be trusted. This made the audit process less hectic. Officer J (U2) stated that:

Usually, when it comes to an audit, we need to send confirmation letters to creditors and debtors to confirm the amount or figure. But since we are using a blockchain system, we are no longer required to send the confirmation letter to them, as auditors also acknowledge the data that we show them as the blockchain system uses triple-entry bookkeeping. A lot of things can be saved. Save time. Save energy. Save paper.

Transparency

Furthermore, blockchain technology also provides ‘transparency,’ which is crucial to the accounting profession. It is of tremendous benefit to the integrity of an accounting department that their records be easily accessible to authorized parties. Of course, there must be rules governing even how authorized parties can access the financial records. Based on the comment from Officer C (E1):

You can’t just do whatever you want with the data. The types of transactions one can carry out are agreed upon in advance between participants and stored in the blockchain as “smart contracts,” which helps give confidence that everyone is playing by the rules.

Taken together, these financial characteristics give organizations a high degree of trust in the data and the business network. That level of trust makes blockchain important for the next generation of business applications.

Data synchronization

In another response, the interviewee’s participants also suggested that the blockchain system also enables data synchronization. For example, the following quotation from Officer H (IT4) suggested that data synchronisation using the blockchain system has provided a promising direction for efficient

privacy preservation of a company's information. He added that since information is owned by the company, the scope and scale of information that needs to be shared among departments are clear and serve the purpose. This is illustrated in the comment made by Officer H (IT4):

When data is synced using a blockchain system, it gives great significance to company development as it provides a promising direction of efficiency in terms of preserving the company's information. As long as it is from the same company, the scope and scale of information that needs to be shared among departments are clear.

Second, the blockchain system is synchronised and distributed across networks, which makes it ideal for multi-organisational businesses such as supply chains. This was supported by a statement by Officer J (U1):

As a user of the blockchain system, I can see that it is designed to be distributed and synchronised across networks. In other words, it is ideal for multi-organisational business networks. At the headquarters, we handled various kinds of business. So, it is so convenient for us that we have different types of operations to take care of, but in a proper way. It also encourages organisations to come out from behind their firewalls and share data. And of course, with this, information is properly synced at the HQ.

DISCUSSION

The coding and analysis of the interviews enabled identification of five attributes that can be used in the classification of blockchain technology systems. The five attributes were, "Distributed Ledger Technology", "Integrity of Data", "Data Reconciliation", "Transparency" and "Data Synchronizations". These attributes corresponded to the question of what attributes of blockchain technology adoption in the aspect of finance is. The following section discusses each of these attributes.

Distributed Ledger Technology (DLT)

The present study found that the records entered can be accessible to all concerned parties when using blockchain technology due to its distributed shared ledger. The basics of blockchain are that it is known for its distributed ledger technology, which is its simplest feature. In this study, the definition of DLT is based on Treleaven et al., (2019), where blockchain technology is also well-known for its distributed ledger technology. Sunyaev (2020), defines DLT for blockchain as one of the promising innovations in the field of information technologies with the potential to change organization and collaboration in the economy, society, and industry. This study uses the definition from Sunyaev (2020), to describe the attribute for Case A, where it is defined as a technology that enables the creation of a tamper-proof and distributed database of transactions without the need for a central authority or intermediary.

According to the interview findings by the Chief Technology Officer, the transaction is distributed to nodes owned by selected parties. Those parties can see the sequence of the transaction from one address to another, not just Accounting Departments. It is consistent with Husna et al., (2021), where every transaction is publicly (or privately) logged by authorized parties up to a portion of their own records. From the findings of Case A, DLT acted as a gatekeeper for uninterrupted and timely distributed communication among internal and external parties. This is also aligned with Sunyaev, A. (2020), Luo et al., (2020), Tapscott and Tapscott (2019), and Zheng et al., (2017), where distributed ledger technology has been seen as a potential technology that could unlock new opportunities and features for modern power systems and markets.

Integrity of Data

In Case A, the integrity of data attribute refers to its ability to be beneficial to the management in making business decisions without worrying about the issues that originally every organization needed to encounter, like improper information flow, a lack of trust between partners in the organization, fraud transactions, and a lot of other risk management problems. This finding is supported by Kumari and Bucker (2021), where integrity is one of the organizations' proposed security issues in big data.

Due to these issues, especially those that jeopardize the financial information of the organization, management organizations may consider adopting blockchain technology to minimize their problems.

Another interview finding in Case A also stated that due to blockchain's unique characteristics in their functionality and provision of mechanisms for inputting data, processing it, and extracting output, it was useful for reporting and analysis. Such a finding is consistent with Wang (2021), where it is claimed that authentication, authorization, audit, and data protection are the four key areas of focus in blockchain technology. Moreover, a past study by Makhdoom et al., (2020) in the healthcare industry revealed that this capability in blockchain technology is capable of enhancing patient empowerment.

Data Reconciliation

The findings from this case study are in line with previous research on reconciliation using blockchain technology. Nazir and Li (2021), Park and Kwon (2021) and Bajpai (2020) proposed that blockchain technology has been proposed as a solution to improve the efficiency, accuracy, and transparency of reconciliation processes. In a similar vein, Azaria et. al (2021) found that blockchain technology can improve the accuracy and transparency of healthcare reconciliation processes, particularly in the areas of medical claim processing and medication reconciliation. This finding is further supported by Bai et al., (2020), who highlighted a blockchain-based reconciliation system for supply chain management that can reduce the time and cost associated with reconciliation processes. The authors demonstrate that their proposed solution can improve the accuracy and efficiency of reconciliation processes and provide real-time visibility into the supply chain. This implies that the blockchain technology system can be associated with the current accounting system as a supplement. It is supported by Berhend (2019), where the positive feedback of adopting blockchain technology includes providing information and functionality that meets the needs of the individual departments within an organization, the capacity to foster creativity, perceived innovativeness, qualities, and the ability to bring stability and order.

Furthermore, according to the findings, data reconciliation also provides benefits to third parties outside of the company by using triple-entry bookkeeping. This is consistent with Kang et al., (2021), where reconciling may influence the judgements of nonprofessional investors with varying degrees of financial reporting knowledge. Triple-entry bookkeeping that uses blockchain technology is able to provide greater transparency and security for financial transactions. However, triple-entry bookkeeping is argued to be a relatively new concept and has not yet been widely adopted in practice, as stated by Joseph et al (2023), Seow and Lim (2021) and Tsai and Wang (2020).

Transparency

Apart from the above, findings from Case A reported on the attributes of blockchain technology in terms of transparency. In describing the usefulness of blockchain technology, it will look into how the system will benefit an organization in terms of checking and balancing, as the records will be easily accessible to authorized parties. Blockchain technology has the potential to increase transparency in financial services, as stated by Liao et al., (2020). The authors argue that blockchain can provide greater visibility and accountability in financial transactions and reduce the potential for fraud and money laundering.

Furthermore, the findings of this case study aligned with the findings of Azzi et al., (2021) and Baliga (2021) for blockchain in accounting. They suggested that blockchain can improve audit quality, increase transparency, and reduce the possibility of fraud. It is also supported by Yildiz et al., (2019), where blockchain technology is able to increase transparency in supply chain management by providing greater visibility and accountability in the supply chain and reducing the risk of counterfeiting and fraud.

Data Synchronization

Other than the above-mentioned attributes, Case A reported that data synchronization is essential for blockchain. This is especially true for multi-organizational business networks. The finding from Case A extends prior studies results, such as those by Zhang et al., (2020), Yao et al., (2020), and Kim et al., (2019). They highlighted the potential of blockchain technology

to improve synchronization in various industries and applications, from IoT and mobile cloud computing to supply chain management. In a different context, Chatterjee et al., (2019) explore the potential of blockchain technology to improve synchronization between distributed ledgers. The authors argued that blockchain can provide a secure and decentralized platform for different ledgers to synchronize data and communicate with each other.

The above discussion shows how blockchain technology benefits the organization in the financial aspect. These attributes are further illustrated in Figure 2.

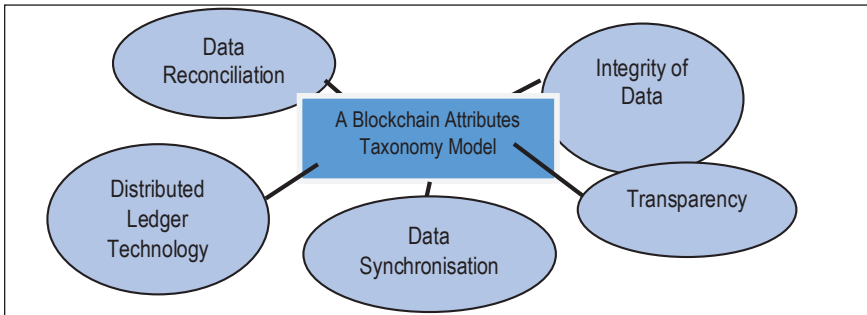


Figure 2: A Blockchain Attributes Taxonomy Model

Source: Authors Own Construct

CONCLUSION

Contribution

This study was set out to address the research question, “What are the attributes of blockchain technology adoption in finance applications?” For this question, the study showed that blockchain technology could benefit an organization by bringing distributed ledger technology, integrity of data, data reconciliation, transparency, and data synchronization. From a theoretical perspective, this paper contributes to blockchain technology and information system research by developing a comprehensive Blockchain Attributes Taxonomy Model using an example from Case A. Although previous studies have identified the “blockchain technology” concept, this study extends the conceptualization of blockchain technology to a wider

scope by classifying it in a more comprehensive way, especially looking into the aspect of finance.

From a practical point of view, this paper could facilitate organizations' recognition of the blockchain technology phenomenon that might influence the use of the current accounting system in the organization. For instance, blockchain technology can act as a supplement to the current accounting system, where it will provide a positive outcome in terms of providing information and functionality that meets the needs of the individual departments, especially the Accounts Department.

Limitation and Future Research

In this study, we discussed the attributes of blockchain technology in finance by providing a case study of a company that has already adopted blockchain technology in its business. Despite all the attributes that blockchain brings to business in the aspect of finance, there are still issues that need to be overcome.

We now present some main areas that future research could investigate. First, future research could focus on the potential adoption of smart contracts in business applications. This might facilitate the finance aspect through more efficient data exchange between different parties in every business transaction. Second, the level of blockchain technology adoption among Malaysian companies is still low and at an early stage. Since this paper provides a case of adoption that was not mature enough in using the blockchain technology, future research may consider cases that have already adopted the blockchain technology for more than 5 years. Since the research was conducted in an organization in Malaysia with a unique organizational culture, the result might not hold true in other organizations. A similar study should be conducted using broad and diverse samples from other countries to further extend and enhance these findings.

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