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Blockchain technology, cryptocurrencies and transforming accounting fees

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Abstract: This study investigated the accounting treatment of Bitcoin, considering whether it should be classified as an asset or a currency. The study also explored the role of blockchain technology in promoting transparency and the potential separation of blockchain from Bitcoin. The study found that cryptocurrencies are significantly impacted by political, economic, and regulatory factors. The study also found that it is challenging to control cryptocurrencies and cross-border transactions in the absence of accounting standards. The study recommends that regulators and accounting standards setters should establish new regulations and accounting standards for cryptocurrencies. Finally, this study identifies the vast majority of the existing literature as lacking adequate, well-rounded knowledge about cryptocurrencies or access to adequate resources, despite their clearly understanding the fundamental concepts of cryptocurrency. Further, the theoretical part of this paper is there to establish some type of accounting approach for Bitcoin.

Keywords: cryptocurrency; Bitcoin; blockchain technology; accounting innovation; accounting approach.

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1 Introduction

In 2008, Nakamoto created Bitcoin, a software protocol and virtual currency and one of the most important innovations in the currency industry. In founding Bitcoin, Nakamoto was trying to find "an electronic payment system based on cryptographic proof instead of trust, allowing any two willing parties to transact directly with each other without the need for a trusted third party" (p.1). The basic idea of cryptocurrencies was formulated in 1990 (Levy, 1994), but was not officially put into use until the introduction of Bitcoin.

Segendorf (2014) defined virtual currency as "a means of payment; that is, units of the virtual currency represent a value" and Bitcoin as "a virtual currency that has been devised for anonymous payments made entirely independently of governments and banks" (p.72). Thus, Bitcoin can be transferred between parties as payment for products and services, and can be stored in traditional banks, without the need for a government to physically generate the currency. Notably, these virtual currencies are projected to grow into conventional currencies and put more pressure on the need for a generally accepted accounting principle. However, people still mainly prefer fiat money over Bitcoin, as fiat money is more widely accepted, commonly used, and familiar. Interestingly, the emergence of blockchain technology has sparked a debate about whether or not to separate it from Bitcoin to enable companies to exploit the technology in full.

Accordingly, this study will form part of a series of research projects to address the need for more in-depth research on Bitcoin and virtual currency, specifically with regards costs from an accounting perspective. This paper focuses on developing a hypothesis about whether this technology can, indeed, reduce manufacturing costs – and, to that end, this paper seeks to determine whether Bitcoin should be considered an asset or a currency, provides an overview of the importance of blockchain technology in promoting transparency, and examines blockchain technology's possible separation from Bitcoin.

This study has established answers to several questions, such as: what is blockchain technology and how does it work? What are cryptocurrencies and how do they relate to blockchain technology? How can blockchain technology and cryptocurrencies transform accounting fees? What are the advantages and disadvantages of using blockchain technology and cryptocurrencies in accounting? And what are the challenges and limitations of implementing blockchain technology and cryptocurrencies in accounting?

The emergence of blockchain technology and cryptocurrencies has the potential to significantly impact the accounting profession. By offering a transparent, secure, and efficient method of record-keeping and transaction processing, blockchain technology can reduce costs, increase accuracy, and improve auditability. Furthermore, cryptocurrencies provide a new way to store and transfer value, which can have implications for financial reporting and taxation. Understanding the potential benefits and limitations of these technologies is critical for accounting professionals to stay current and relevant in the ever-changing digital landscape. Furthermore, acquiring an understanding of blockchain technology's place and potential on a per-country basis allows government officials, investors, accountants, and market regulators to create future business, governing, and investment rules and regulations that are appropriate for that country.

This study contributes to the broader understanding of how technology is changing the accounting profession. By exploring the potential impacts of these technologies, researchers can identify new opportunities for efficiency and accuracy in accounting processes. Furthermore, the study of these technologies can inform accounting standards and regulations, as well as shape the development of new accounting tools and software. Ultimately, this research has the potential to shape the future of accounting and financial reporting. Furthermore, this study yielded in-depth information regarding the reform efforts that should be sought by certain countries by combining the markets, legislative, legitimate, and institutional factors comprising cryptocurrencies – something that could not otherwise be done when conducting the study within more across a number of countries. Finally, our context includes developed, transitioning, and developing countries, which enriches the existing literature in and of itself, considering the existing literature tends to focus exclusively on one specific market. Finally, we have yielded very strong findings due to the fact that we applied coding and quoting analysis to the study.

The rest of this study is structured as follows: Section 2 outlines and assesses the current literature in the field, concluding with a relevant hypothesis; Section 3 presents the study method used; Section 4 details the study's findings; and Section 5 offers a conclusion.

2 Literature review and hypothesis development

2.1 Why Bitcoin?

Bitcoin is used as a measure because it is the most well-known type of cryptocurrency in the world.

Back in 1947, there were only 76 countries, but today, there are approximately 193 nations worldwide (Alberto and Barro, 2002) – and, in all those countries, Bitcoin is far more significant than any previous digital currencies. It was the most prominent cryptocurrency by market capitalisation as of June 2022, with a value of US$393.52

billion and a daily trade volume of over US$516 million (Bitcoin, 2022). In contrast, according to BrokerNotes (n.d.), about US$5.3 trillion was traded daily in 2017 – and now, in 2022, this number has only increased. According to CoinMarketCap, the total amount traded in June 2022 was about US$20 billion. Barber et al. (2015) noted that 7 million Bitcoins were in circulation in 2015, and transactions worth US$2–$5 million were completed during that time. Meanwhile, research from Statista (2022) reports that the number of Bitcoins in circulation in 2022 is a little over 19 million.

In 2015, there were 18 cryptocurrency exchanges buying real currencies, such as the Australian dollar, the euro, the British Pound, the Swiss franc, and the US dollar (Barber et al., 2015). Further, new research indicates that more than six hundred cryptocurrency exchanges worldwide trade cryptocurrency and other digital assets (Tepper, 2022), while other studies indicate that Bitcoin expands with other currencies worldwide, meaning Bitcoin is exchanged with gold and even stocks (Hazlett and Luther, 2020).

However, there are concerns regarding whether or not Bitcoin and other virtual currencies are an asset with potential value, or simply a medium of exchange. Indeed, Bitcoin is used for a multitude of different purposes, including as money and as a store of value – similar to a commodity.

2.2 Asset vs. fiat currency

Bitcoin is a type of digital currency that has become popular due to advances in cryptography and blockchain technology (Cecily and Marcos, 2015; Segendorf, 2014). Tan and Low (2017) define fiat currency as having three main functions: a medium of exchange, a store of value, and a unit of account. Anything that performs these three functions is considered money. They state that, for a token to be used as money, it should be widely accepted as a means of payment and be divisible, durable, portable, and standardised. According to them, the value of fiat money is based on the state's guarantee and the reserve banking system's capability to multiply its effect. The supply of money and the banking system are both regulated to guarantee financial stability.

Durability means currency can be saved for later use, and is therefore a store of value. Inflation and depreciation of currency notably does not contribute to perishability, since central banks use monetary policies to ensure the stability of their country's respective currencies against inflation and the movement of a foreign currency. Finally, a unit of account is when the value of products is determined with reference to the unit rather than to other goods.

Yermack (2015) does not consider Bitcoin to be a true currency, as it did not display the characteristics outlined above (i.e., serving as a unit of account, a medium of exchange, and a store of value). Rather, Bitcoin was found to be similar to speculative investment, and is often used by merchants participating in online markets as a kind of payment. Nevertheless, a small number of individuals use it widely as a medium of exchange. The currency has no innate value, and its worth is determined by its usefulness in the consumer market. To compound this, there is no real evidence for the use of Bitcoin in daily trading, as the information available is subjective. Only newspaper articles have reported that individuals are living off Bitcoin alone or estimated the number of companies ready to accept the currency, such as Overstock.com.

Yermack (2015) states that computer and software companies that sold goods available on Bitcoin applications mainly accepted the currency. In addition, considering websites provide data regarding their use of Bitcoin, we can see that 70,000 transactions

involving Bitcoin are closed per day, and most of these are transfers between speculative investors (Yermack, 2015).

According to Bitcoin Transactions per Day (2022), there are approximately 258,883 Bitcoin transactions carried out every single day, as of June 2022. However, only a small number of these involve the buying of goods and services. Fred Ersham, one of the founders of Coinbase, argues that 80% of transactions on the Coinbase website are related to speculation (as cited in Yermack, 2015). Indeed, the number of Bitcoin transactions per day involving the purchasing of goods and services was around 400,000 in early January 2021. This means Bitcoin lacks any sizeable market presence, given the world's population.

Indeed, leading from this, different factors have made it difficult for individuals to use Bitcoin as a medium of exchange. For one, consumers can only get the currency online or from dealers and store it in a secure manner, and goods and services cannot be bought with Bitcoin using PayPal or credit cards. Instead, users are required to make bank transfers and connect to a current account to complete the transaction. Indeed, current Bitcoin exchanges have low liquidity, custody, and execution risks (Raiborn and Sivitanides, 2014). In addition, customers cannot bypass the requirement of having to have owned Bitcoin prior to buying goods and services. However, they can buy products and services without cash, as they use third-party credit cards, and the trader can finance the credit. Thus, Bitcoin is important for online transactions, but certainly will not replace fiat money, as it is easier for individuals to transact using fiat money compared to electronic wallets (Tan and Low, 2017). It is for this reason that fiat money is more widely used than Bitcoin.

Tan and Low (2017) discuss how other barriers affect consumer confidence in Bitcoin as a medium of exchange. Here, they note that Bitcoin is transparent at the wallet level and anonymous at the personal level, making it more convenient when paying for illegal products, funding terrorism, and laundering money. For instance, in 2013, the Silk Road black market accepted Bitcoin for the purchasing and selling of illicit products, such as arms and drugs. Indeed, this lack of stringent regulation of digital currencies minimises consumer confidence in them.

To help address this issue, the US and UK implemented regulations to govern digital currency in 2011 and 2015, respectively, with specific focus on money laundering. Furthermore, many exchanges allow online wallets for clients, who are exposed to risks and losses if the exchanges are closed. This was evidenced in one case where a person became bankrupt after losing US$850,000.

Another issue Tan and Low mentioned is that Bitcoin requires traders to quote the retail price of products as far as four or five decimal places, with a leading zero. This creates confusion amongst traders and customers, as such a practice is not prevalent in the consumer market during the purchasing and selling of consumer goods.

Another issue is that Bitcoin is highly volatile in the sense that its value changes across diverse exchanges without arbitrage. For example, it plunged from US$1,100 in 2013 to US$350 in 2014 (Tan and Low, 2017).

According to new research, the price of Bitcoin increases from year to year. For example, in 2013, it was US$95, while in 2021, it was approximately US$34,434, and in June 2022 US$20,433 (Bitcoin Price Today, BTC to USD Live, MarketCap and Chart, 2022). According to Tan and Low (2017), this volatility is associated with the changing

demand for regulatory announcements and situations and is expected to calm down and become more consistent after the regulatory framework becomes stable.

In the meantime, this volatility will adversely affect Bitcoin speculators and individuals more so than companies, as the currency is not an investment-grade asset. To address this issue, Bitcoin derivatives were expected to be launched in 2015 to assist consumers in managing volatility risks.

Notably, the cost of a single Bitcoin is high compared to many goods and services, which also prevents its widespread use. Furthermore, computational data allows the division of Bitcoins into eight decimal places, in turn enabling people to have adequate units (Yermack, 2015) while at once undermining the currency's worth as a unit of account.

Table 1 outlines Bitcoin's highest and lowest prices each year from November 2014 until June 2021, while Table 2 demonstrates the fact that the highest price in 2021 was US$63,346.79, whereas the lowest in 2014 was US$306.46. Here, one can easily see the volatility and inconsistency of Bitcoin's value.

Table 1 Bitcoin's highest and lowest prices each year from November 2014 until September 2021

Year	*Bitcoin closing prices*	
	Highest closing price	*Lowest closing price*
2014	$442.11	$306.46
2015	$467.83	$193.35
2016	$971.65	$369.13
2017	$19,166.98	$772.66
2018	$16,735.11	$3,194.96
2019	$12,575.90	$3,360.53
2020	$29,111.52	$4,944.70
2021	$63,346.79	$29,608.60

Notes: Table 1 highlights the extreme volatility and price fluctuations that Bitcoin has experienced over the years, demonstrating the importance of careful consideration and risk management for individuals and businesses interested in investing in cryptocurrencies.

Bitcoin fails to serve as a store of value because of the widespread security concerns related to hacking and theft associated with it (Levy, 1994). Bitcoin's exchange also has no correlation with the exchange rates of important currencies, such as the British pound, US dollar, or euro. As a result, Bitcoin's value is not tethered to the value of other currencies, so cannot be used as a risk-management tool, as it is inherently risky and impractical to use for business (Yermack, 2015). Barber et al. (2015) believe that the irreversibility of Bitcoin transactions makes it safer to use, however, particularly for those worried about credit card fraud and chargebacks. Even still, individuals find it challenging to transact with Bitcoin in countries with insecurities.

The private keys enabling individuals to spend their Bitcoins are another potential risk, as users can lose their Bitcoin if the key is stolen, forged, or lost (Barber et al., 2015). Malware attacks in particular have led to the theft of private keys. For example, myBitcoin.com lost US$1.3 million in users' Bitcoin due to a malware attack. Barber et al. (2015) believe this problem could be addressed by dividing private keys into

random shares with the threshold cryptography method and distributed to different locations, such as users' desktop, smartphone, and online service providers. In this way, a user could only use their Bitcoin when the threshold number in the devices works simultaneously. Barber et al. (2015) also suggest that people use a super wallet divided across multiple devices. Here, pre-approved transactions would allow users to transfer funds from the super wallet into the sub wallet in small amounts. Then, they could use their smartphones to spend the money in their wallet and could only lose what is already in the wallet.

Table 2 Interviewees

Interviewee	*Position*	*Academic qualification*	*Professional qualification*	*Years of firm experience*
1	FM	BA accounting	CPA	16
2	GM	BA business	–	10
3	APA	PhD finance	–	20
4	FM	BA accounting	CPA	17
5	GM	BA finance	CPA	14
6	GM	BA accounting	CPA	12
7	APA	MSc accounting	–	5
8	FM	BA accounting	CPA	10
9	APA	BA economics	CPA	9
10	APA	PhD accounting	CPA	13
11	GM	BA accounting	CPA	10
12	APA	PhD accounting	CPA	15
13	GM	MSc business	–	17
14	FM	BA accounting	CMA	30

Notes: FM – financial manager, GM – general manager, and APA – academic professors in accounting. Table 2 provides information on the interviewees who participated in a study related to the adoption of cryptocurrencies in accounting and finance. The table provides details on their positions, academic qualifications, professional qualifications, and years of firm experience. Overall, Table 2 provides useful insights into the profile of the interviewees, indicating that they were well-qualified and experienced professionals in accounting and finance. This suggests that their perspectives and opinions on the use of cryptocurrencies in accounting and finance would be valuable for understanding the potential benefits and challenges of adopting these technologies in practice.

Even still, Bitcoin can be lost accidentally. For instance, Butomat lost close to US$200,000 in Bitcoin as a result of human error, as the developer hosted the wallet on a cloud storage that did not exist. With this in mind, Barber et al. (2015) argue that adhering to backup procedures is critical to protecting Bitcoin. In this way, their 'wallet file' idea serves as a private cryptographic asset. All private keys should be generated pseudo-randomly from the major secret utilising the standard PRG to avoid backing them up constantly.

Meiklejohn et al. (2013) states that Bitcoin combined the characteristics of online payment techniques and cash. Like money, Bitcoin transactions do not explicitly indicate the payer or payee, as they are cryptographically signed. In addition, as previously

mentioned, the transaction cannot be reversed. However, Bitcoin differs from money in the fact that transactions require mediation by a third party. In this case, a peer-to-peer network validates and certifies the transaction. Thus, the network participants are supposed to maintain the system's transaction history. The identifiers are pseudo-anonymous and transparent, as they are not connected to a person or company in the real world. The scalability, irreversibility, and anonymous nature of payments thus makes Bitcoin attractive for criminals engaging in fraud and money laundering.

Weber and Beer (2015) compare Bitcoin to gold, as Bitcoin is an asset unrelated to the processes of creating credit and does not have a specific issuer or represent any individual's liability – and, indeed, it shares these characteristics with gold, though gold is used for different products and has a commodity value, while Bitcoin does not have a set value (as it only serves a function in the Bitcoin system). Instead, its value is established by the subjective valuation of those using it, and thus has great volatility, as discussed. As a result, the quantity cannot be modified based on changes in demand. In addition, no one promises to convert Bitcoin into official currency at a specific rate.

On top of this, Bitcoin fails to satisfy other qualities associated with currency in today's economy, as outlined by Yermack (2015). First, it cannot be deposited into banks, but is stored in a digital wallet system that is expensive to maintain and prone to threats (as explored above). As a result, users of Bitcoin do not have any kind of protective insurance, unlike those using traditional banks. Second, lenders do not utilise Bitcoin as a unit of account for customer finance credit, mortgages, or auto loans. There are also no debit or credit cards for Bitcoin, and sellers or customers cannot sell it. Finally, financial derivatives used with other currencies, including swaps and forward contract, are not available for Bitcoin.

Tan and Low (2017) recognise Bitcoin as not operating like money, as the Bitcoin program determines its monetary base/value. The increase in the demand for Bitcoin as a medium of exchange and the increase in product prices lead to deflation of the currency – which, in turn, decreases the incentive for people to invest and use goods and services. Further, the low prices give lenders the opportunity to hoard cash as they wait for a higher purchasing power, which decreases capital stock in the long term and aggregate demand temporarily. Thus, to summarise, continuous deflation hurts the market.

Another stumbling block is that countries only recognise fiat money as legal tender, which makes it difficult for Bitcoin to be used as a replacement for physical money. To add to this, only four countries (Australia, Singapore, the UK, and the USA) have developed tax guidelines for Bitcoin, and while these nations consider Bitcoin an asset, they do not view it as a legal currency (Antonopoulus, 2015). In Australia, people pay goods and services tax if they use Bitcoin as a medium of exchange (Tan and Low, 2017), but are not required to pay taxes immediately after spending the currency; instead, they should monitor the historical exchange rates when the payment was received and create an inventory policy to establish capital gains and losses.

2.3 Blockchain technology and transparency

Blockchain technology is critical for addressing the issues associated with by virtual currencies, such as Bitcoin, and ensuring transparency in transactions. A distributed ledger notably guarantees transaction integrity, since the public can access it without permission from users – critical, as this ensures trust between the people participating in a

decentralised network that does not require a third party (Omran et al., 2017; Swan, 2015).

According to Omran et al. (2017), blockchain technology is based on four pillars. The first is the peer-to-peer network that acts as a database structure for the distributed ledger; the second includes the digital signature and cryptography used to secure transactions between anonymous accounts; the third is the immutability of data (as the ledgers comprise consecutive data blocks that are independently secured and sealed using cryptography. The data blocks are also connected to past data within the chain); and the fourth is the consensus instrument, through which an algorithm allows users to agree on a single true systemic state of the network for synchronising the shared ledger through a global election.

The blockchain is stored on a computer's hard drive when users employ Bitcoin software, while the ledger stores the history of all transactions sent and confirmed on the Bitcoin network, as well as transaction details. More information is added via the proof-of-work mining process (Houy, 2014). Nakamoto (2008) believes proof-of-work implies one vote for every CPU. Meanwhile, Omran et al. (2017) describe how those using a variation of Bitcoin software must expend considerable computing power to add a block to the chain: to generate a Bitcoin block, a computer must solve a complicated mathematical problem, and every time one computer finishes, a new computer takes over, continuing the process until the problem is solved. Naturally, this may involve many computers.

Solving a problem generates 25 Bitcoins, and each computer earns a share based on how much each has contributed to the process. Further, a person who wishes to change the previous block has to recreate the proof-of-work of the block and others after it, and hence catch up with it or go past nodes that are considered honest. According to Omran et al. (2017), the reward of 25 Bitcoins provides an incentive to engage in honest mining, and the expenditure of computing power increases the integrity of the blockchain. The miners verify the validity of every transaction included in the block via public and private key cryptography, and the transaction is incorporated into the block if it is validated and cleared by a miner.

Bitcoin in itself is anonymous, but the resulting blockchain keeps a transparent record of the transactions between users in the Bitcoin network (Crosby et al., 2016). Users on the network are identified based on digital addresses, which act as pseudonyms on the blockchain.

In a blockchain, people using the network and statistical analysis establish the identity of those using voluntary identification and digital addresses, as well as in cases of unintentional identification.

2.4 Separating blockchain technology from Bitcoin

Van der Vliet et al. (2013) believe that supply chain financing offers a chance to improve supply chain competencies by preventing disruptions to the supply chain. To this end, improving software and coming up with technology solutions that permit businesses to partner with each other and speed up the flow of funds, is key. Companies such as Maersk Line, Dianrong, FnConn, and IB are interested in blockchain technology considering it could ensure the efficient and secure sharing of data (Hofmann et al., 2018). However, the separation of blockchain technology from Bitcoin is a divisive issue.

Financial institutions are advocating for this separation to take advantage of the distributed ledger system, having invested heavily in blockchain technology, but are doubtful about Bitcoin (Alharby and Van Moorsel, 2019). In contrast, supporters of Bitcoin believe blockchain technology cannot be separated from Bitcoin.

One issue that would come with separating blockchain from Bitcoin would be making the distributed system more susceptible to threats, unless companies pay large amounts of money to record-keepers (Alharby and Van Moorsel, 2019). On the other hand, Bitcoin ensures the system works effectively, since individuals have to use a lot of computer power to add a block and get rewarded. The miners are rewarded for keeping the records through the giving of Bitcoin blocks when they solve a problem, and the verification of the transaction guarantees security. The transaction between two users' wallets is indicated by the network, which is tasked with its confirmation or verification for it to become valid (Ram et al., 2016).

In addition, blockchain technology has to be replicated several times if Bitcoin is not used. Further, companies would find it difficult to use blockchain to challenge the current payment system when using fiat money as the token (Alharby and Van Moorsel, 2019), since fiat currencies depend on inflation and their supply can be increased infinitely, thus reducing their value. It is because of this that miners would likely not be interested in committing to the system, as the value would ultimately be reduced.

Lastly, separating blockchain technology from Bitcoin would force institutions to trust third parties to check transactions and keep records, which would negate the main advantages of the technology.

2.5 Cryptocurrencies and theoretical framework

Cryptocurrencies have been a topic of interest in various fields, including finance, economics, and accounting. The agency theory suggests that conflicts of interest arise between principals and agents, and incentives must be provided to align the agents' interests with those of the principal. In the context of cryptocurrencies, this theory can be applied to examine the behaviour of cryptocurrency exchanges and their users. For example, in their 2020 research, Kamps et al. apply the agency theory to investigate the effects of regulatory measures on cryptocurrency exchanges' behaviour.

The institutional theory posits that organisations operate within broader societal and cultural norms, and their actions and behaviour are shaped by these norms. In the context of cryptocurrencies, institutional theory can be used to examine the development and adoption of these currencies within different national and cultural contexts. For example, in their work, Pan et al. (2019) use institutional theory to explore how the adoption of cryptocurrencies in China is influenced by national policies and cultural factors.

Stakeholder theory posits that organisations must consider the interests of various stakeholders, including customers, employees, suppliers, and the community, in their decision-making processes. In the context of cryptocurrencies, stakeholder theory can be used to examine the impact of cryptocurrencies on different stakeholder groups. For example, in their research, Liao et al. (2019) use stakeholder theory to investigate how the adoption of cryptocurrencies affected the financial industry and its stakeholders. Overall, these theories provide a useful framework for understanding the complex phenomenon of cryptocurrencies and their impact on various stakeholders in the accounting and finance fields.

The theoretical aspects of reporting cryptocurrency in financial statements are still in the early stages of development. Previous literature suggests that the application of traditional accounting principles and concepts, such as recognition, measurement, and disclosure, may not be entirely appropriate for cryptocurrencies due to their unique characteristics. For example, cryptocurrencies have no physical existence, are highly volatile, and operate independently of centralised authorities. Current FASB and IASB rules do not specifically address the accounting treatment of cryptocurrencies, but they provide general guidance on the recognition, measurement, and disclosure of intangible assets and financial instruments. In response to the growing use of cryptocurrencies, the accounting standard-setting bodies are actively considering their accounting treatment. However, due to the complexity of the issues involved, a comprehensive and consistent approach to reporting crypto in financial statements is still under development (Ramassa and Leoni, 2022).

2.6 Hypothesis

Since Bitcoin was only introduced in 2009, more research is needed to better understand the technology and encourage others to trust it for everyday transactions. Regardless, the advantages of such technology include lowering manufacturing costs by cutting out third parties and enabling companies to deal more directly with clients and suppliers while minimising transaction fees. A major downside of Bitcoin, however, concerns the instability of its value, which fluctuates constantly: its value in 2012 was US$100 per Bitcoin, but rose to over US$1,000 in 2013. Then, in 2017, Japan legalised Bitcoin as a legal payment method, in turn catalysing a steady increase in the value of Bitcoin until late 2017, when its value was US$20,000. Since then, Bitcoin has fluctuated in value from US$20,000 to US$10,000.

Another shortcoming of Bitcoin lies in the fact that the total number one can have is limited to 21 million Bitcoin (Meiklejohn et al., 2013). Also, according to Gadgets 360 (2021), as of August 2021, 18.78 million Bitcoin had been mined so far.

Some researchers note a poor understanding of Bitcoin from a normative perspective within the scope of existing accounting principles (e.g., Ram et al., 2016), while others suggest no specific accounting regulations or principles should exist to address virtual currencies (e.g., Cecily and Marcos, 2015).

The present study thus seeks to address the need for more in-depth research on Bitcoin and virtual currency as a whole, specifically with regards costs from an accounting perspective. The researcher has developed a hypothesis to test if this holds true to reduce manufacturing costs, under the following assumptions:

- Any cryptocurrencies should be more stable with the price of a cryptocurrency close to US$1. In comparison, according to Daytrading.com (2018), “The high levels of volatility within the EUR/USD pair can result in winning positions swiftly turning into losing ones. Often, no amount of historical data and 20-year charts can prepare you for the speed at which prices can swing.” The above assumption will help reduce the difference between the cryptocurrency and the US dollar amount.
- To stabilise cryptocurrencies, there is a need to increase the total amount of cryptocurrency units so this total is similar to one of the leading fiat currencies. For example, according to the Board of Governors of the Federal Reserve System

(2018), "There was approximately US$1.63 trillion in circulation as of 21 March 2018, of which US$1.59 trillion was in Federal Reserve notes." Thus, increasing the number of Bitcoins to this quantity might stabilise Bitcoin as a currency.

3 Methods

This study uses qualitative analysis in the form of semi-structured interviews with general and financial managers and academic professors in accounting. We focus on several issues to measure the variables impacting the nature of the relationship between cross-border transaction fees and cryptocurrencies, such as politics and economic circumstances and cultural factors. We also focus on the information technology (IT) approaches used within company accounting systems.

As mentioned previously, Table 2 summarises the characteristics of the interviewees, including their education, qualifications, and experience in the firm. As shown, most of our interviews are with general managers (42.8%), followed by financial managers (35.7%) and Board chairpersons (21.5%). Of these, 64% hold bachelor's, masters, or doctoral degrees in accounting – 14.2% in business, 14.2% in finance, and 7.6% in economics. Furthermore, 71.4% of our interviewees held a CPA qualification.

In terms of experience, 85.7% of interviewees have long periods of work experience in their current firm (>10 years), while 14.3% have a mid-level of experience (five to nine years). Composed, these statistics propose that that our interviewees are adequately well-qualified and experienced to offer in-depth visions about the cross-border transaction fees and cryptocurrencies.

Our semi-structured approach involves the participant answering to managing in an open style, which naturally generates more precise and in-depth information directly related to the phenomena under investigation.

In this case, we follow the same form of interview schedule across all the interviews conducted in order to reduce any differences between interviews.

Table 3 provides the interview questions and schedule. Each interview contains two parts, as is standard, the first part comprising basic interviewee information (including the interviewee's experience, education, position, and role in the firm), and the second part comprising how/what/why questions concerning the interviewee's perceptions of the internal and external factors affecting cryptocurrencies and cross-border transaction fees.

The interviews last, on average, 60 minutes, with all interviewees notably declining having their interviews recorded, meaning all answers were documented via physical notes.

This study debates the possibilities for the integration of the results of our qualitative approach's (i.e., coding and quoting) analyses in light of the applied substances resulting from the mixture of these two approaches. Quoting and coding methods are commonly used in accounting research to analyse and interpret data from various sources. Quoting involves directly reproducing text from a source into a research document, while coding involves categorising and organising information based on common themes or ideas. In accounting research, quoting is typically used to support and illustrate findings, and can be done either verbatim or through paraphrasing. Coding, on the other hand, allows researchers to analyse data in a systematic and structured manner, which can help to identify patterns, relationships, and insights. The process of coding involves breaking down information into meaningful and manageable categories or themes, which can then

be used to create charts, graphs, and other visual aids to help support and communicate research findings. Both quoting and coding are important techniques in accounting research, as they enable researchers to analyse and interpret complex data in a rigorous and objective manner.

Table 3 Interview questions

About you
• What is your position and role in this firm?
• What is your previous work experience?
• What are your academic qualifications?
• Do you have any professional qualifications?
About your firm
• How would you define and describe the cryptocurrencies in your firm and industrial?
• Do you believe the cryptocurrencies effects the development of cross-border transaction fees? Give an example and how you believe this role has changed over time.
• What factors do you think could possibly affect the relation between the following and cryptocurrencies: 1 COVID-19? 2 Custom fees? 3 Country export and export regulations? 4 Remittances limitations? 5 Retail payment?
• What cultural factors do you consider might affect cryptocurrencies (including education, experience, and religion)?
• Do you consider politics and economics affect the relation between cryptocurrencies and cross-border transaction fees? How?
• Do you consider manager incentives affect the cryptocurrencies in your firm? How?
• Do you believe that the adoption a new International Financial Reporting Standards (IFRS) could develop cryptocurrencies? How?
• Do you believe that financial crises affect the relation between cryptocurrencies and cross-border transaction fees? How?
• Which type of accounting system does your firm use? Give an example.
• Can you identify the IT department for your firm? How it deals with cryptocurrencies?
• What do you see as the main obstacles your firm faces in achieving high performance of adopting new accounting standards for cryptocurrencies?

Notes: Table 3 provides a comprehensive list of interview questions that cover various aspects related to the adoption of cryptocurrencies in accounting and finance. The questions are designed to collect data on the interviewees' perceptions and opinions, which could be useful for understanding the potential benefits and challenges of adopting cryptocurrencies in practice.

Normally, there are a number of advantages relating to this study's themes and their formation through coding analysis, and this is somewhat done manually, rather than using software (e.g., NVivo). Indeed, considering our notes were physical, using NVivo might

have mitigated the thematic analysis in our study – and, along the same lines, the use of this method has empowered us to create our new thematic outline and has maintained all our themes and sub-themes via the quoting of the suitable statements.

Basit (2003) states, "…when it comes to classifying, grouping and interpreting the composed information, coding is mostly recognised as being one of the most vital phases during analysis, seeing the detail that such data analysis is usually supposed to be the most significant and compound factor in qualitative studies." Indeed, due to the detail required to understand the answers collected from this study's interviews, the fact we need to analyse more datasets, and we need a diverse array of interview questions (see Table 4), thematic analysis is deemed to be the most appropriate for the research at hand.

Table 4 Sub-theme summary

Sub-theme	*High*		*Moderate*		*Low*		*Relatively highly ranked*
	No.	*Rank*	*No.*	*Rank*	*No.*	*Rank*	
Cryptocurrencies	65	1	10	7	10	2	High
Cross-border transaction fees	35	2	15	3	2	5	High
Cultural factors	33	3	9	7	10	7	High/low
Religion	5	8	0	0	0	0	High
Political issues	58	1	11	8	15	7	High/moderate
IFRS adoption	41	2	15	6	18	6	High/low
COVID-19	60	2	5	4	20	3	High
IRS	15	6	5	9	1	9	High
Financial crisis	56	3	15	4	20	4	High
Manager incentives	23	4	5	8	13	6	Low
Accounting systems	13	9	12	5	7	11	High
IT system	48	2	14	6	17	8	High
Remittances	19	4	7	9	0	0	High/low
Total references	471		123		133		

Notes: Table 4 provides a summary of the sub-themes discussed by the interviewees, along with the number of references and their ranking. The sub-themes are classified into high, moderate, and low categories based on their ranking.

Consequently, the initial phase of code creation concerns the transcribing of all the answers provided through the interviews. This allows for familiarisation with the information. All the collected data is then highlighted in terms of its significance to the study and classified according to whether it is stated under the code of 'themes' or 'sub-themes'. This analysis, as noted above, is completed manually rather than through the use of NVivo.

Tables 5–7 present all 16 sub-themes for each presentation group (high, moderate, and low), all of which rotate around the essential theme of cross-border transaction fees and cryptocurrencies (including cross-border transaction fees, cultural factors, religious and political issues, IFRS adoption, COVI-19, IRS, financial crisis, manager incentives, accounting systems, IT systems, remittances, custom fees, export and import regulations, and retail payments). Table 4 meanwhile outlines the number of situations ascribed to each sub-theme for each group classification. From here, we utilise the quoting method

for the initial code in each sub-theme to disclose positive and negative interviewee thoughts about the nature of the association between cross-border transaction fees and cryptocurrencies.

Table 5 Codes, references, and sub-themes (high performance)

Initial codes	*References*	*Sub-theme*
Bitcoins	41	Cryptocurrencies
Fiat currency	9	
Paper currency	10	
Coins currency	5	
Custom fees	10	Cross-border transaction fees
Export	8	
Import	7	
Retail payment	10	
Cultural factors	3	Cultural factors
International culture	6	
Language	8	
Experiences	9	
Education	7	
Religion impact	3	Religion
Religion and lifestyle	2	
Ukraine and Russian	18	Political issues
Weakness political	5	
Political dilemma	17	
Political connections	5	
Revolutions in Middle East	13	
Starting IFRS adoption in 2005	3	IFRS adoption
Cryptocurrencies and IFRS adopting	18	
Firms improvements after IFRS adoption	8	
IFRS adoption advantages for cryptocurrencies	12	
COVID-19 restrictions	25	COVID-19
Border closed	27	
COVID-19 and cryptocurrencies	8	
IRS regulations	10	IRS
IRS and cryptocurrencies	5	
Financial crisis 2008	9	Financial crisis
Fake currency	6	
Signing new agreements	3	

Notes: Table 5 provides an overview of the initial codes, references, and sub-themes related to high performance in the study. The table indicates that the most referenced sub-themes in the study were cryptocurrencies, followed by cross-border transaction fees, political issues, and COVID-19.

Table 5 Codes, references, and sub-themes (high performance) (continued)

Initial codes	*References*	*Sub-theme*
Restricting investment processes	7	Financial crisis
Developing firms	6	
Customers declining	10	
Lack income	15	
Manager motivations	6	Manager incentives
Taxation	3	
Bonuses and compensations	7	
Share splits	1	
Attracting investors	6	
Software of accounting system	9	Accounting systems
Developing accounting system	4	
Internet security	21	IT system
iCloud	13	
Viruses attach	5	
Currency IT system	9	
Remittances limitations	13	Remittances
Remittances regulations	6	

Notes: Table 5 provides an overview of the initial codes, references, and sub-themes related to high performance in the study. The table indicates that the most referenced sub-themes in the study were cryptocurrencies, followed by cross-border transaction fees, political issues, and COVID-19.

Table 6 Codes, references, and sub-themes (moderate performance)

Initial codes	*References*	*Sub-theme*
Bitcoins	5	Cryptocurrencies
Fiat currency	1	
Paper currency	2	
Coins currency	2	
Custom fees	8	Cross-border transaction fees
Export	4	
Import	3	
Cultural factors	2	Cultural factors
International culture	3	
Experiences	3	
Education	1	

Notes: Table 6 shows the codes, references, and sub-themes with moderate performance. Compared to Table 5, the number of references is significantly lower, indicating that these sub-themes are less prominent in literature. The sub-theme with the most references is cross-border transaction Fees and cryptocurrencies.

Table 6 Codes, references, and sub-themes (moderate performance) (continued)

Initial codes	*References*	*Sub-theme*
Ukraine and Russian	3	Political issues
Political dilemma	7	
Political connections	1	
Cryptocurrencies and IFRS adopting	5	IFRS adoption
Firms improvements after IFRS adoption	9	
IFRS adoption advantages for cryptocurrencies	1	
COVID-19 restrictions	5	COVID-19
IRS regulations	3	IRS
IRS and cryptocurrencies	2	
Financial crisis 2008	1	Financial crisis
Restricting investment processes	7	
Customers declining	2	
Lack income	5	
Taxation	1	Manager incentives
Bonuses and compensations	3	
Attracting investors	1	
Developing accounting system	12	Accounting systems
Internet security	7	IT system
iCloud	1	
Viruses attach	1	
Currency IT system	5	
Remittances limitations	5	Remittances
Remittances regulations	2	

Notes: Table 6 shows the codes, references, and sub-themes with moderate performance. Compared to Table 5, the number of references is significantly lower, indicating that these sub-themes are less prominent in literature. The sub-theme with the most references is cross-border transaction Fees and cryptocurrencies.

Table 7 Codes, references, and sub-themes (low performance)

Initial codes	*References*	*Sub-theme*
Bitcoins	10	Cryptocurrencies
Custom fees	2	Cross-border transaction fees
Cultural factors	2	Cultural factors
Experiences	5	
Education	3	
Weakness political	18	Political issues
Political dilemma	17	
Political connections	5	

Notes: Table 7 presents the codes, references, and sub-themes for low performance. The most frequent codes are Bitcoins, custom fees and cultural factors, and political issues.

Table 7 Codes, references, and sub-themes (low performance) (continued)

Initial codes	*References*	*Sub-theme*
Cryptocurrencies and IFRS adopting	12	IFRS adoption
Firms improvements after IFRS adoption	6	
COVID-19 restrictions	13	COVID-19
Border closed	3	
COVID-19 and cryptocurrencies	4	
IRS regulations	1	IRS
Financial crisis 2008	3	Financial crisis
Developing firms	1	
Customers declining	9	
Lack income	7	
Manager motivations	4	Manager incentives
Taxation	2	
Bonuses and compensations	6	
Attracting investors	1	
Software of accounting system	3	Accounting systems
Developing accounting system	4	
Internet security	7	IT system
iCloud	2	
Viruses attach	3	
Currency IT system	5	

Notes: Table 7 presents the codes, references, and sub-themes for low performance. The most frequent codes are Bitcoins, custom fees and cultural factors, and political issues.

4 Results

4.1 Analysis of cryptocurrencies

As shown in Table 4, particularly in the first row, there are 85% more high-performing reference cryptocurrencies than moderate- and low-performing firms. Indeed, cryptocurrencies are ranked first for high-performing references but only eighth for moderate-performing and low-performing references.

More recently, cryptocurrency has undergone rapid growth and worldwide development, particularly following the IT revolution of the 1980s, in turn attracting more investors to deal with such technology. After 2009, the Bitcoin scheme used cryptography to maintain the reliability of the linkage system, instead of opting to use banks and financial institutions as third parties. Indeed, when it comes to opting for these

third parties, the currency in question must have significant development in market quality (Rose, 2015). In this regard, three participants comment:

> "Cryptocurrency is a new phenomenon that brings us significant advantages to reorganise our transactions worldwide … however, I found that cryptocurrency is also easier to deal with compared to traditional currency (i.e., paper and coins)." (FM, high, APA, moderate)

> "Indeed, cryptocurrency has started to be the new currency worldwide. However, many countries still do not understand how this currency is essential, saves more time and enhances the controlling monetary system … I believe that most firms worldwide should start learning about cryptocurrency." (GM, moderate)

Then again, cryptocurrency has some drawbacks, such as its appeal to the black market, which sells drugs, amongst other illicit items. Accordingly, one manager states:

> "I believe the cryptocurrency will increase … fraud and manipulation and support the black markets, as the users of this currency could hide their names by using unknown words." (GM, low)

Also, tax evasion is another example of the black market in cryptocurrency, since several transactions can be manipulated due to the lack of the accounting standards at play in cryptocurrencies (Marian, 2013). In this vein, two managers state:

> "In the absence of accounting standards related to cryptocurrencies, I found it easy for each one to manipulate the accounting transactions related to cryptocurrencies. … Therefore, I suggest that the accounting setters start to constitute a new accounting standard to organise cryptocurrencies." (GM, low)

> "Establishing a new accounting standard to organise cryptocurrencies could be the best solution to avoid tax evasion once we start using cryptocurrencies instead of traditional currency." (FM, moderate)

4.2 Cross-border transaction fees

A cross-border fee is defined as one of the fees that customers pay when they use their credit card for purchases or services. These are relevant to online shopping, which does not limit the purchasing of goods to local transactions. Before this period, however – particularly in 2005 – cross-border fees did not exist. In this regard, one manager states:

> "I believe that there were no cross-border transactions fees before 2005, as Internet services were not commonly used worldwide." (GM, moderate)

The use of cryptocurrencies for cross-border transactions is likely to continue to grow in the coming years, as more individuals and businesses become aware of the potential benefits and risks of this technology. As with any new and emerging technology, it is important for individuals and businesses to carefully consider the potential benefits and risks of cryptocurrencies for cross-border transactions and to take appropriate measures to manage any risks that may arise. Since 2005, many businesses worldwide have continued to contribute to the market with large annual cross-border payments (Qiu et al., 2019). In 2015, cryptocurrencies (e.g., Bitcoin) were announced as the new way to make cross-border payment. The most popular way of making cross-border payments worldwide for businesses, however, is SWIFT, which saves more time and money. One academic professor states:

> "After the internet revolution, businesses worldwide started extending their transactions over the world … Therefore, I believe that the SWIFT was commonly used in the first period for cross border transactions … After 2009, the idea for electronic currency such as Bitcoins are started." (APA, moderate)

Cryptocurrencies have the potential to significantly reduce the high fees and long processing times associated with cross-border transactions. The current payment infrastructure for cross-border transactions is slow, expensive, and heavily reliant on intermediaries, which can create significant barriers to international trade and commerce. According to our analysis, there are two ways to avoid paying cross-border transaction fees: first, get customers to buy their products or services through a local agency; and second, register your business in areas with more customers, particularly after e-business trade.

In this regard, a financial manager states:

> "I think that cross-border transaction fees could be avoided by dealing with many agencies to sell their products and services worldwide … The business can also avoid these fees by registering their business in areas with more customers, especially after the e-commerce revolution." (FM, high)

4.3 Cultural factors and religion

A practical argument is informed by worldwide human legislation and personality variances. Nonetheless, leading companies in the cryptocurrency system are based in countries with strong economies. The result of this argument in the cryptocurrencies community is also influenced by cultural factors between countries (Ben Saad et al., 2022; Almasarwah, 2019).

Our semi-structured interview analysis uncovers an aspect of nepotism, and finds that language and employee mentality are the most critical factors affecting the relationship between cryptocurrencies and cross-border transaction fees. In this regard, several statements are relevant:

> "Our culture plays a significant role in all business aspects around the world. For example, networking most likely in a business with more relatives and friends on their Board of directors may lead to weakness in any online transactions … Therefore, adopting a solid corporate governance code will mitigate the nepotism (networking) issue and reduce the countries' cryptocurrencies risk." (FM, moderate)

> "The difference in the employees' language and their ways of thinking across the countries could be a potential reason that will lead to more difficulty in understanding cryptocurrencies, particularly with multinational firms." (APA, low)

> "I can confirm from my experience that the language led to many problems in our cross-border transactions." (GM, low)

> "In my opinion, nepotism is considered the main reason for earnings manipulation in the firms, which is a cryptocurrency is one of the tools to manipulate firms' income." (GM, high)

Based on the above discussion from our analysis, this study finds that establishing new regulations and accounting standards successfully organised cryptocurrencies and limited potential risk that could arise from cultural factors. A financial manager stated:

> "Setting new regulations and accounting standards will mitigate most of the problems that the cryptocurrencies transactions are suffered from in the absence of these regulations and standards." (FM, high)

Notably, religions from all over the world have different perspectives about cryptocurrency. For example, Muslims and Christians see that cryptocurrencies have several vague points that conflict with their religious standards (Asif, 2018; Sgantzos, 2017). Therefore, our analysis shows that the account-setters should consider taking on religious businesspeople so they can enhance the cryptocurrencies around the world. One academic professor and general manager stated in this regard:

> "From my long experiences, I can confirm that religion could affect the business directly or indirectly. According to the cryptocurrencies, I was in many discussions with several students who asked about how the accounting standards could deal with such kinds of these currencies as our religion prohibits them. These students provided me with evidence that denies dealing with cryptocurrencies. Therefore, my suggestion for the accounting setters is to establish flexible accounting standards that allow religious people to accept and adopt cryptocurrencies." (APA, high)

> "My recommendation for the accounting standards setters is to establish new regulations to allow the religious people to accept and deal with cryptocurrencies … But before that, they have to develop new accounting standards to organise cryptocurrencies transaction worldwide." (GM, high)

Overall, the impact of cultural and religious factors on cryptocurrencies is complex and multifaceted, and it will likely continue to evolve as the technology matures and becomes more widely adopted.

4.4 Political issues

Political issues are another factor highlighted in this study to investigate their impact on cryptocurrencies. However, the existing literature on cryptocurrency focuses exclusively on Bitcoin's instability and returns via quantitative methods, which fail to account for the nuances characteristic of political issues. Colon et al. (2021) documents geopolitical and economic policies as affecting cryptocurrency transactions using 980 cryptocurrency-month observations. Moreover, Aziz (2019) finds that the political issues negatively affected cryptocurrencies by stating that these could bring many challenges and disadvantages, such as, high financial instability, money laundering, fraud, and scams. One academic professor stated:

> "The political factor is an important issue that could affect any life aspect directly compared to other factors that could indirectly affect. Any political conflict between to economy leading countries could lead to more problems in the cryptocurrencies (i.e., closing the borders; increasing or decreasing currencies values). Therefore, focusing on the political issues and solving them will increase the trustfulness in cross border transactions worldwide by using cryptocurrencies." (APA, moderate)

Yatie (2022) indicates that the fear, vagueness, and market instability that is prevalent today began with the Ukraine-Russia war, which highly impacted cryptocurrencies (e.g., Bitcoin and Ethereum). The 2022 analysis of Yatie shows that the use of cryptocurrencies is not advisable during this crisis, and further goes on to report negative and significant impacts on cryptocurrencies in several countries (caused by war stress). Kumaran (2022)

similarly documents the Middle East revolutions as having an impact on cryptocurrencies, particularly portfolio diversification. Accordingly, our analysis provides several statements in this regard:

> "In my opinion, the Ukraine-Russia war is the main factor that affected all business aspects worldwide. Cryptocurrencies are not isolated from business aspects … whereas the negative impacts of cryptocurrencies on cross border transactions are clear nowadays, where many countries have started not trusting others." (GM, low)

> "I believe that the wars (Ukraine-Russia war and Middle East revolutions) negatively affected cryptocurrencies and all business transactions worldwide." (FM, moderate)

> "The Ukraine-Russia war badly increased the prices, decreased cross border transactions, and increased fraud by using cryptocurrencies." (FM, low)

Therefore, political issues can have a significant impact on the adoption, use, and regulation of cryptocurrencies. It is important for governments to carefully consider the potential benefits and risks of cryptocurrencies before enacting policies that could impact their development.

4.5 IFRS adoption

The virtual world offers several benefits for business by reducing normal obstacles (e.g., shipping restrictions) (Caliskan, 2022), and the same seen to be true for cryptocurrency. However, since cryptocurrencies are a new phenomenon, the IFRS is currently sub-par at organising cryptocurrency transactions. Prior literature also provides evidence of insufficiencies in the IFRS when it comes to cryptocurrency accounting, particularly in the current IFRS framework (Shehada and Shehada, 2020; Procházka, 2018; Yatsyk, 2018) – and, indeed, governments have only served to elevate fears concerning cryptocurrencies. Therefore, accounting standard setters and regulators have a chance to proactively to establish initial regulations to organise cryptocurrencies under IFRS (Yatsyk, 2018). In this regard, our analysis (which is notably consistent with those of prior studies) can be seen to be summed up by the following two statements:

> "There are no clear accounting standards so far to deal with cryptocurrencies … Where I believe that the absence of accounting standards to organise cryptocurrencies could lead to more fraud, misleading, wrong decisions and more disadvantages in our financial statements." (FM, high)

> "The existence of virtual currencies world will reduce the cross-border transactions fees in addition to any other fees related to the traditional currencies … But the regulators should establish accounting standards to organise virtual currencies such as Bitcoins. Whereas, several problems are facing the cryptocurrencies, such as fraud." (FM, moderate)

In conclusion, our findings and most of the prior literature document a recommendation for the establishment of a solid accounting standard to overcome most of the problems that cryptocurrencies currently face. In addition, the adoption of IFRS can impact the accounting treatment of cryptocurrencies for companies that have adopted these standards. Accordingly, firms that hold cryptocurrencies as part of their operations should carefully consider the implications of IFRS when accounting for these assets.

4.6 Financial crisis

A cross-border transaction is considered another option for businesses to pay – and, generally speaking, the financial crisis has led to reduced cross-border transactions, particularly after 2008, which, in turn, has also resulted in more fees via the use of the traditional method of paying debit (Terajima et al., 2010). Financial crises can have both positive and negative impacts on cryptocurrencies. On the one hand, cryptocurrencies may be seen as a potential hedge against traditional financial assets during times of economic uncertainty, and increased demand for cryptocurrencies can lead to higher prices. On the other hand, cryptocurrencies can also experience increased volatility, decreased liquidity, and loss of trust during financial crises. Moreover, the regulatory response to financial crises can impact the adoption and use of cryptocurrencies, and companies that hold cryptocurrencies may need to carefully consider the accounting treatment of these assets under International Financial Reporting Standards.

The commencement of cryptocurrencies in 2009 led to the improvement of business payment via the use of these e-currencies instead of traditional currencies (i.e., paper and coin) (Jeribi et al., 2021). In this regard, two managers state:

> "The financial crisis is the main reason for accelerating the use of cryptocurrencies in this world … However, using this currency reduced the impact of the financial crisis on the process of paying the cross border worldwide." (GM, low)

> "The relationship between financial crisis and cryptocurrencies is limited by using Bitcoins more widely." (FM, moderate)

4.7 Manager incentives

In the particular context of cryptocurrencies, there is relatively little literature on cryptocurrencies and manager incentives. Giles (2020) documents that the tax incentives for both cryptocurrency-related businesses and risking entities are essential, and could be one of the management incentives to reduce their taxes. In a similar vein, little is known about the possibility of cryptocurrency using or leveraging within the firms. Modifications of the tax regulations and codes may happen in the future, significantly affecting businesses' and individuals' success. However, our semi-structured interviews show more information about managers' incentives than the existing literature. In this regard, several statements are important:

> "Management could use cryptocurrencies as cover to gain more bonuses from the shareholders by reducing their taxes." (GM, high)

> "I think that cryptocurrencies are free from the tax code, which will help the management reduce their taxable income … I suggest establishing a new tax code for this purpose." (GM, moderate)

> "Starting with cryptocurrencies is essential to attract more new investors, particularly in developed countries with high tax rates." (FM, high)

Accordingly, new studies should focus on this issue so as to explore the nature of the relationship between managers' incentives and cryptocurrencies. Therefore, manager incentives can play a significant role in the adoption and use of cryptocurrencies by companies. Managers may be incentivised to invest in or use cryptocurrencies for a variety of reasons, including the potential for high returns, the desire to stay ahead of

competitors, or personal interests in the technology. However, managers must also carefully consider the potential risks and challenges associated with cryptocurrencies, including volatility, regulatory uncertainty, and cybersecurity risks. They must also consider the impact of cryptocurrency adoption on the company's financial statements and tax obligations, particularly if the company has adopted International Financial Reporting Standards.

4.8 Accounting and IT systems

During the study interview analysis, our interviewees make mention to two types of accounting systems to record cryptocurrencies and cross-border transactions. In this regard, the financial manager states:

> "Each company has its system to deal with cryptocurrencies; the first is the new accounting system (modern system by using iCloud). The second one is the traditional accounting system (using the regular accounting system such as QuickBooks or ERP)." (FM, moderate)

As documented in our analysis, each system has advantages and disadvantages. In this regard, one of the general managers states:

> "I believe that the new accounting system is much better compared to the traditional system, but there are many IT attacks that could destroy this system within a few minutes. I suggest the IT specialists increase their efforts to strengthen the blockchain system. Whereas the traditional accounting system has more security to keep all the companies' information secure." (GM, low)

Cryptocurrency is an innovative online payment system, and common cryptocurrency is certainly a network system requiring more anti-viruses and security systems (Shalini and Santhi, 2019). Accordingly, cryptocurrency requires a protected e-payment system within firms to ensure these payments are regulated. In this regard, an academic professor stated:

> "Cryptocurrencies seem to me like any software program attached by viruses and hackers … I heard that the blockchain system is very secure and protected, but in my opinion, I believe nothing in this world would be protected; therefore, we need constantly improve any software system." (APA, high)

4.9 Remittances

Remittances are money without restrictions transferred from one place to another, whether locally or overseas. Remittance was initially limited to people (i.e., friends and family), but later started growing – largely when businesses started using remittances to pay their debit (Joo et al., 2019).

Cryptocurrencies and blockchain are established to assess and facilitate money transfer for costs, fees, and expenses. Therefore, the stability of cryptocurrencies could directly lead to more stability of payments as a whole and ensure cost-effectivity and the guaranteed, timely transfer of money from debtors to creditors. However, remittances are considered the main reason for people starting to use cryptocurrencies. In this regard, two managers are stated:

> "It seems that remittance is considered the cornerstone of starting cryptocurrencies worldwide … But I cannot say that they both need the same processes and procedures." (GM, low)

> "Remittances have rules, and accounting standards and regulations organise their processes, but unfortunately, this is not the case for cryptocurrencies, as no regulations and accounting standards still control them. Therefore, I suggest establishing new accounting standards for cryptocurrencies." (FM, moderate)

There are significant challenges and risks associated with the use of cryptocurrencies for remittances. These include issues related to volatility, regulatory uncertainty, and the potential for fraud and cybersecurity risks. In addition, there may be concerns around the anonymity of cryptocurrency transactions, which could also raise issues related to money laundering and other financial crimes. Despite these challenges, the use of cryptocurrencies for remittances is likely to continue to grow in the coming years, as more individuals and businesses become aware of the potential benefits and risks of this technology. As with any new and emerging technology, it is important for individuals and businesses to carefully consider the potential benefits and risks of cryptocurrencies for remittances and to take appropriate measures to manage any risks that may arise (Joo et al., 2019).

5 Conclusions

Bitcoin is more of an asset (like gold) than a true currency, as it does not have all the major characteristics of currency, including serving as a store of value, unit of account, and medium of exchange. As a result, people prefer fiat money, which is also notably widely recognised by governments.

Blockchain technology is critical to preventing the loss or theft of Bitcoin, as it ensures verification by miners, who must work hard to resolve problems. The blockchain cannot be separated from Bitcoin, however, as they help each other function effectively through the mining process and rewards.

Currently, there are no accounting standards to measure virtual currencies. Thus, the purpose of this paper is to determine a theoretical accounting approach for Bitcoin.

Our detailed semi-structured interviews reveal that various cultural factors impact the relationship between cross-border transaction fees and cryptocurrencies. These interviews also bring to light several motivations for managers to achieve their desirable incentives (that is, engaging in earnings management). This information can benefit accountants, auditors, and regulators who are interested in understanding and trying to constrain manipulations in financial statements.

The results of this study also show that cryptocurrencies have the potential to be hacked, as they are based on an IT system. Therefore, updating and developing the blockchain system is required so as to avoid any potential risks in the future. Furthermore, the absence of accounting standards and regulations for cryptocurrencies is another issue discussed in this study, as shown in our detailed analysis. Setting new rules and accounting standards will alleviate this problem.

Finally, there are several areas that have not been covered by the current study, but which merit further consideration in future studies. Our study focuses on exploring the relationship between cross-border transactions fees and cryptocurrencies by using the qualitative method – meaning further research should focus utilise the advance quantitative method (i.e., discriminant analysis, protecting simulation, etc.).

This study implication is show that the adoption of blockchain technology and cryptocurrencies is likely to have a significant impact on the accounting profession and the fees charged for accounting services. As such, it is important for accounting professionals to stay up to date with the latest developments in these technologies and understand their implications for accounting practices. Moreover, replication of this study methodology in each country separately is likely to provide in-depth information that allows these countries to explore the strengths of their weakness for cryptocurrencies and developing the blockchain system, which will also allow countries to address their weaknesses, and to accordingly reduce potential risks in their firms.

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