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Current trends in Accounting for digital/crypto-assets: An empirical analysis of accounting practices from UK, US, Canada and Europe

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Abstract:
Given the ongoing evolution, growth potential and diversity of crypto-assets as so as their unique and risky nature, there are intensive debates on the accounting treatment by holders and issuers of crypto-assets at the international level. The purpose of this research is to deepen and broaden knowledge about how crypto-assets are classified, measured, recognized and disclosed in UK, US, Canada and Europe. The first stage of the study is exploratory in nature. In the first step, we make a literature review of current regulatory frameworks of cryptocurrency by reviewing current accounting standards and practices. In the second stage, we collect the data from the annual reports of 15-20 publicly listed companies for the 2020, 2021 and 2022 periods. We manually extract the information related to classification, recognition, measurement and disclosure of cryptocurrencies. Our objective is to identify the best practices, but also gaps that exist and to come up with a list of recommendations that can be useful to policy makers, accounting standard setters and other market participants.

Key words: Crypto-assets, cryptocurrency, accounting recognition, measurement, disclosures
INTRODUCTION

Cryptocurrency has gained immense popularity over recent years as a new form of investment and asset class (Blandin et al., 2022, Bains et al. 2019). It has been increasingly adopted by retail, by institutional investors, and by companies in their respective business models (Prochazka, 2018). However, the lack of clear accounting regulations regarding their classification, measurement and disclosure has created a significant challenge for the businesses, investors and policymakers (Chou et al., 2022).

The increasing prevalence of crypto assets has also drawn the attention of various stakeholders such as regulators, standards setters, professionals and academics (EFRAG, 2020). IFRS\(^1\) provides and addresses some accounting considerations for holders of cryptocurrencies while US GAAP preparers (AICPA)\(^2\) provides non-authoritative interpretive guidance on accounting issues related to crypto-assets (also referred as digital assets) such as their asset classification and fair value measurement for crypto asset lending and crypto asset mining. While there has been some consensus regarding the classification of digital assets (considered indefinite-lived intangible assets under both IFRS Standards and US GAAP) based on general guidelines, yet there are many issues that have not yet been addressed. The various functions and differing economic characteristics of

\(^{1}\) IFRS IC Agenda Decision, Holdings of cryptocurrencies, IFRIC Update June 2019
\(^{2}\) AICPA Practice Aid January 2022, Accounting for and auditing of Digital Assets
crypto-assets make it challenging to develop specific classification criteria and a single measurement basis that would be applicable to all crypto-assets and circumstances (EFRAG, 2020).

In addition, we can reasonably expect that more companies will deal with various types of crypto-assets in the future. Thus, given the ongoing evolution, growth potential and diversity of crypto-assets as so as their unique and risky nature, there are intensive debates on the accounting treatment by holders and issuers of crypto-assets at the international level.

The first issue is the definition and the classification of digital assets that are important for their legal taxation and accounting treatments (Strader, 2011). In the context of accounting, are cryptocurrencies considered as assets in accounting? What type of assets are they? Are they considered as intangible assets? However, under IFRS Standards, companies that hold digital assets for sale in the ordinary course of business classify them as inventory (IAS2). This accounting model is not available under US GAAP because inventory generally only includes tangible items. It is still not clear how to apply accounting requirements to transactions related to cryptocurrencies and digital tokens (Fernandes et al. 2018).

A second issue associated with the accounting for digital assets is measurement and valuation (Govindarajan et al. 2018). If digital products are capitalized, their initial value and subsequent valuation basis should be determined. Given the risky nature of cryptocurrencies, the use of subsequent valuation models at cost or at fair value can have significant impacts on companies’ key financial ratios. Where digital products are capitalized, depending on the categorization of digital assets as an inventory or a long-lived intangible asset, amortization and depreciation issues arise. For the amortization of digital products, the useful life of the digital products should be determined. This can be an issue for cryptocurrency, as they life could be infinite (Dupuis et al. 2021). This property of cryptocurrencies raises significant challenges in determining how to measure and account them properly in accounting records.

Thirdly, disclosures of crypto-assets transactions and associated risks remain poorly addressed in disclosures to financial statements. Lack of clear guidelines related to crypto transactions puts businesses and investors at a higher risk of non-compliance with tax and accounting standards. This can result in penalties, fines, and reputational damage (Jackson and Luu, 2023). Further, cryptocurrency transactions are highly volatile and risky in nature; this requires more disclosures from investor’s point of view, to disclose them fully that value of their investments can fluctuate rapidly yielding to heavy losses (Jackson and Luu, 2023).
At the regulatory level, legislation relating to crypto-assets varies from one country to another. In a recent study, the Cambridge Center for Alternative Finance (Cambridge CAF 2019) reviews various regulations relating to crypto-assets in 108 jurisdictions. The analysis of regulatory requirements shows that there is heterogeneity, but also a lack of clarity on the regulatory framework applicable to crypto-assets in different countries. The publication issued by the International Monetary Fund (IMF) in January 2020 highlights that although 64% of regulators have identified a gap in the regulation of crypto-assets, only 30% have closed this gap. Indeed, the accounting of crypto-assets (classification, measurement and disclosure) depends on the company’s business model (e.g. investors, minors, traders, means of exchange) and of the characteristics of crypto-assets ((i.e. contractual terms, rights and obligations). We find considerable gap in existing literature related to these issues and more importantly there is lack of evidence how companies with different business models are accounting for crypto-assets across different countries and across different business models.

Taking into account the issues raised above, the objectives of this research are to carry out an exploratory study of regulatory frameworks applicable to crypto-assets in different countries (EU, UK, Canada and US). Given the potential growth and the diversity of crypto-assets as so as their unique and risky nature, we aim to oversee transactions related to crypto-assets both from accounting and taxation perspective. Prior literature has documented the diversity in practice in the application of the current accounting standards but our approach is different. Chou et al. (2022) provided recommendations based on the perceptions of stakeholders they have interviewed. Jackson and Luu (2023) analysed current accounting standards and treatment of crypto assets in US to assess the most appropriate treatment. Luo and Yu (2022) studied the accounting treat.

Consequently, in the first step of the research, we carry out a comparative study on existing rules of accounting and taxation for crypto-assets that are applicable in different countries (EU, UK, and US) with the help of our detailed review of literature (academic papers and regulator setters for example like Internal Revenue Service (IRS) for US).

In the second step, we carry out an exploratory study of current accounting practices on a sample of 50 publically listed companies who hold and issue crypto-assets in the EU, UK, and US for the most recent reporting periods (2020, 2021 and 2022). Based on exploratory data methodology, we review their annual reports in detail and extract most crucial information related to crypto-assets. We accumulate information related to nearly 80 variables (size of company, information on key
balance sheet variables, income statement variables, how crypto-assets are classified, terms used, how crypto-assets measured and initiating recognized, critical audit matters and disclosures). Further, we also collect information related to the name of auditing firm, and accounting standard followed. To the best of our knowledge, by far, this is the most unique and comprehensive dataset related to crypto-assets companies that we have manually built taking 15 companies across five countries: US, UK, Canada, France and Germany.

In this paper, we provide valuable insights into the accounting treatment of cryptocurrencies in financial statements. First, understanding how firms handle these crypto-assets is crucial for investors to make informed decisions. By examining how these assets are recognized, measured and disclosed, the investors can gain a clearer understanding of the financial performance of companies that hold crypto assets. Overall, this research contributes to the practical knowledge in the field of accounting treatment of cryptocurrencies. Second, with this study, we highlight that there is no uniformity or definitive answers currently related to accounting treatment for crypto-assets. In absence of this, the companies are obliged to use their own limited knowledge, which can later lead to huge reconciliations that may affect their profitability and investors return. Lastly, companies located in the countries where there is no specific disclosure guidance did not provide complementary information about the volume of cryptocurrencies hold. We end the paper, providing suggestions and recommendations. We identify the inconsistencies that exist and come up with a list of recommendations that can be useful to policy makers, accounting standard setters and other market participants. To the best of our knowledge, this research will be the first cross-country comparative study expanding to US, UK, Canada and EU supported with detailed empirical analysis and evidence.

The rest of the paper is organized in following sections. Section 2 summarizes cryptocurrencies and related financial reporting guidance under IFRS and GAAP frameworks. Section 3 we provide the data collection methodology. Section 3 presents the detailed review of literature related to crypto-assets classification, measurement and disclosures. Section 5 presents the sample firms’ financial statements and analyses current financial reporting practices for each category of cryptocurrency exposure. In Section 6, we discuss the inconsistency and distortions resulting from the current accounting practices around cryptocurrencies, and provide recommendations. Section 7 concludes the paper.
2. OVERVIEW OF CRYPTOCURRENCY ECOSYSTEM

2.1. Bitcoin, Blockchain and Cryptocurrencies

Bitcoin is the first cryptocurrency that was developed in 2009 and that was coined (Albrecht et al. 2019). The term ‘cryptocurrency’ is used because all transactions and issuance of new units will use the cryptography system that is developed using the blockchain technology (Raiborn and Sivitanides, 2015). A blockchain is a decentralized, digital ledger that records transactions across a network of computers (Corbet et al. 2019; Abramova & Bohme, 2016). It is used to store and record data in a way that is secure, transparent and tamper-proof. A blockchain is made up of a series of blocks, each of which contains a number of transactions (Trivedi et al. 2021). These blocks are linked together in a chronological chain that is called blockchain.

The most well known blockchain is the one underlying the Bitcoin cryptocurrency, but there are also other blockchain networks such as Ethereum, Ripple, Litecoin, and many others. Also, Blockchain is the cryptocurrency’s backbone technology, which may be thought of as an append-only register where transactions are recorded (Zhong et al. 2019; Trivedi et al. 2021). The intended function of the Bitcoin was to be a universal medium of payment that replaces the currency of a certain country (DeVries 2016).

Cryptocurrency is also known as virtual currency or digital currency (Adam 2017). While most of the cryptocurrencies are largely based on the bitcoin principles, they still have distinct features, functions and utility (Albrecht et al. 2019). Some crypto assets can be used as means of payment to facilitate transactions (like bitcoin, litecoin, dogecoin etc.) while others can be used as utility tokens, service tokens, finance tokens, etc. This makes them very heterogeneous and difficult to classify as their functions and applications continue to rise, thus making it challenging to be monitored by supervisory authorities (DeVries 2016; Sungit and Ahmad 2017; Adam 2017).

The EFRAG defined a crypto asset as ‘a digital representation of value or contractual rights created, transferred and stored on some type of distributed ledger technology (DLT) network (e.g. blockchain) and authenticated through cryptography’ (IFRS, 2019). While cryptocurrencies represent a significant portion of the overall crypto asset by market capitalisation (Jackson and Luu, 2023), there are actually two broad categories of crypto-assets: crypto tokens and cryptocurrencies, or coins (Chou et al., 2022, Jackson and Luu, 2023). In the cryptocurrency industry, the terms "coin" and "token" are often used interchangeably, but they can have slightly different meanings. A "coin" generally refers to a cryptocurrency that operates on its own
blockchain (Singh and St John, 2019; Jackson and Luu, 2023). Bitcoin, Litecoin, and Bitcoin Cash are examples of coins. A "token" is a digital asset that is built on top of an existing blockchain (Chou et al., 2022; Jackson and Luu, 2023). There are four main types of crypto available: asset-backed, security, utility tokens and Non-fungible tokens (or NFT). Tokens can represent an asset or utility, such as a digital asset that represents ownership in a company (Chou et al. 2022), or can be used to access a specific service or application (Gandal et al. 2021). Tokens are often issued through an Initial Coin Offering (ICO) or a Security Token Offering (STO) and can immediately be traded on secondary markets (Ante and Meyer, 2021; Amsden and Schweizer, 2018). Thus, the main difference is that coins have their own blockchain and tokens don’t. Tokens are issued through smart contracts built on blockchain technology, and entrepreneurs commit to only accept tokens as payment for future products or services (utility token) or to share profits with investors (security token, issue through a Security Token Offering: STO) (Amsden and Schweizer 2018, Kher et al. 2021, Howel et al.2019). At the time of ICO, tokens often have no financial value or real-world usages (Russo and Kharif 2017, Kher et al. 2021). Like security tokens, asset backed tokens are tied to underlying tangible assets, companies’ earnings and entitlement to dividend/interest payment. The economic function of security tokens and asset-backed tokens is analogous to equities, bonds or derivatives (Chou et al., 2022). The inherent value of utility tokens would be the demand for the issuer’s product or service (Di Angelo and Salzer, 2020).

Crypto-currencies have no tangible existence; rather they are electronic signals and records that keep track of transactions mediated with the currency (Smith and Kumar, 2018). They operate independently of a central bank or government. Coins live on their own blockchains. They can be used to purchase goods and services, or traded for other currencies, both digital and fiat (Gandal et al. 2021). Digital cryptocurrencies refer to a form of exchange that only exist digitally and is not linked to any physical currency (Venter, 2016).

2.2 Cryptocurrency regulation

Central banks and other regulators believe that cryptocurrencies do not pose an immediate threat to financial systems, in part because traditional financial systems continue to predominate (Smith and Kumar, 2018). However, crypto-asset products and services are becoming increasingly sophisticated and their growing links to regulated financial services could pose a risk to financial stability, particularly in the absence of regulation (Bains et al. 2022). Regarding cryptoassets, regulators need to find a balance between the benefits of innovation and imperatives such as
financial stability and integrity as well as consumer protection and investors (Blandin et al. 2019). Originally, cryptocurrencies and then crypto-assets were designed to eliminate intermediation in financial services. However, this has not prevented the emergence of new centralized entities, such as exchanges and wallet providers. These offer key functions to users requiring them to trust centralized entities again, but which are largely unregulated unlike traditional financial intermediaries. In some cases, a single entity can even offer several key services, such as exchange, storage and clearing (Bains et al. 2022). Cryptocurrencies thus pose a challenge to all regulators, as the decentralized ledger system means there is no central authority to regulate (Smith and Kumar, 2018). To address these concerns, some authorities have provided high-level recommendations on the regulatory treatment of crypto assets, while a few have developed bespoke regulatory frameworks (Bains et al. 2022). The result is that regulatory responses in the cryptoasset landscape are far from consistent across jurisdictions (Blandin et al. 2019). Indeed, countries are currently taking different approaches to taxing and regulating cryptocurrencies (Smith and Kumar, 2018). The differences are reflected on several levels: the authorities playing an active role in the regulation of crypto-assets, the terminology used, the definitions given to crypto-assets and the regulatory responses adopted. Additionally, the regulatory landscape is evolving rapidly and in a non-linear manner, making it impossible to take a snapshot of the international regulatory regime from a comparative perspective (Martino, 2023).

At the regulatory perimeter level, several authorities have taken up the issue of crypto assets and their regulation at the supranational and/or intergovernmental level as well as at the national level. This wide range of authorities may have overlapping mandates on crypto-asset activities within the same jurisdiction (Blandin et al., 2019). While the cross-border nature of crypto assets can make regulation, supervision and enforcement particularly difficult (Bains et al. 2022), supranational or intergovernmental authorities can promote regulatory harmonization, to fill the gap of some national regulators to fill the knowledge gap on crypto technology and to build on the best practices of other regulators (Blandin et al., 2019).

At national levels, Blandin et al. (2019) found that on average, three separate national bodies per jurisdiction have issued official statements on cryptoassets. The authors explain the presence of this multitude of stakeholders by the fact that activities linked to crypto-assets can fall within the regulatory scope of several regulators (example: Australia).
In such cases, regulators often choose to cooperate with each other formally through working groups or consultations or informally. The expected benefits of coordination include information sharing, learning and pooling of resources, in addition to potentially providing a higher degree of legal certainty for industry and consumers and avoiding confusion among industry and consumers (Blandin et al. 2019).

Regarding the terminology used, regulators use various terms to designate crypto-assets. Blandin et al. (2019) identified the use of at least ten different terms between 2013 and 2019. It should be noted that the terms cryptocurrency, virtual currency and digital currency have often been used interchangeably. The increasing diversity of terminology could be interpreted as regulators gaining a better understanding of the nuances and differences between different types of tokens.

Regarding the definitions of cryptassets, many regulators share a common set of elements and characteristics such as the form of the asset (“digital representation of value”/“electronically”), its associated properties (“transferable”/“negotiable”/“storable”), and its primary functions (“means of payment”) /“store of value”/“unit of account”) (Blandin et al. 2019). Generally speaking, regulatory definitions agree that crypto-assets are not recognized as money in the strict sense.

In general, existing frameworks tend to divide cryptoassets into three main categories: Payment Tokens, Utility Tokens, and Security Tokens. Some frameworks present a fourth category of hybrid tokens, which designate crypto-assets sharing the characteristics of two or more categories and for which it is unclear whether the legal obligations associated with each category are cumulative or hierarchical.

Today there are four forms of possible regulatory responses (EFRAG, 2020):

- Existing regulations: This concerns the application of existing laws or regulations to cryptoasset activities. (Example: Australia's factsheet (INFO 225) on ICOs and cryptocurrencies).
- Modernized regulation: existing laws are amended to explicitly include activities related to cryptoassets (e.g. Australia-AML regulation, EU-AML regulation, Canada; Japanese Payment Services Act; Estonia's amendment of the Money Laundering Act and the Prevention of Terrorism Financing Act).
- Bespoke regulation or regulatory regime: Tailored regulation where a new law or regulation is promulgated to regulate crypto-asset activities (e.g. French AMF allows optional visa application for ICOs, Malta- Virtual Financial Services Act, the Mexican law aimed at regulating financial technology institutions).
• Outright ban (ban on ICOs by China and South Korea)

Current regulatory responses typically display a combination of these types. Analyzing cryptoasset activity levels based on regulatory response reveals an interesting observation: jurisdictions with the most advanced regulatory framework (i.e. a tailored regulatory regime or specific new regulation) are often smaller countries with a low level of cryptoasset activity. And conversely the modernized regulatory approach prevailed in countries with a higher level of activity on crypto-assets. This approach offers a relatively quick solution to providing regulatory clarity compared to the lengthy development of a bespoke regulatory framework.

2.2. Business models around cryptocurrency

Cryptocurrencies are developed and held for several purposes, as a medium of exchange, similar to cash, but also for speculative purposes (short-term investment) and investment-like purposes (long-term appreciation value) (Venter, 2016). The cryptocurrency models in finance and economics can be broadly categorized into following: investing/purchasing, trading/exchange platforms and initial coin offerings (ICO’s), mining and means of payments for products or services (Luo and Yu, 2022). Investing and purchasing business model can be observed for big public companies that are increasingly purchasing cryptocurrencies (mainly Bitcoins) for investing purposes (Hobbs 2021).

Cryptocurrency investment is a business in which an entity pools funds from various investors and then invests them into different cryptocurrency assets, making money through capital appreciation and/or dividends. Trading and exchange platform is the most dominant business model for cryptocurrencies (Ante and Meyer, 2021). Cryptocurrency exchanges have become an integral part of the cryptocurrency landscape, with many exchanges providing a wide range of services to their users such as buying, selling, staking and trading for other currencies (Ante and Meyer, 2021). They make money through transaction fees and sometimes by charging for additional services such as margin trading or staking. Some examples are like Binance and Coinbase. These platforms can also serve as crypto lending and borrowing platforms enable users to lend and borrow cryptocurrencies and make money through interest charges.

Mining is the process by which new cryptocurrencies are created and transactions are verified and recorded on a blockchain. It is an essential part of the cryptocurrency ecosystem and is essential
for the upkeep and maintenance of the blockchain. Companies that run mining operations can make money through the sale of the cryptocurrency they mine, as well as through the sale of the equipment and infrastructure used for mining. Lastly, payment-processing companies can provide services for merchants who want to accept cryptocurrency as payment and make money by charging fees for their services.

Thus, to summarize the main stakeholders in the cryptocurrency ecosystem include the issuers and the holders of cryptocurrencies, miners of the cryptocurrencies, exchange and trading platforms, and the merchants who accept cryptocurrency as a form of payment.
2.3. Risks associated with cryptocurrency

Crypto asset growth has been volatile, and associated financial stability risks in some emerging markets and developing economies are rising (IMF, 2022). One of the biggest challenges in the financial reporting standard setting process is to identify risks associated with cryptocurrency that constantly evolve in the ecosystem and to ensure that those risks are fully reflected in the accounting treatment and disclosures in the financial statements. In the next following paragraphs, we highlight the main risks associated with investing in cryptocurrency.

The first and the most important one is volatility risk. Volatility risk is a significant concern of cryptocurrency transactions, as cryptocurrencies are known for their high degree of price fluctuation. The total valuation of crypto assets reached almost $3 trillion in November 2021 before falling to less than $1 trillion in July 2022, demonstrating relatively high volatility (IMF, 2022). The volatility of cryptocurrencies represents a significant challenge to investors, traders, and other users of cryptocurrencies, as it can lead to significant losses or revenue gains in a short period. Understanding volatility risk in cryptocurrency transactions is crucial for any investor or user of cryptocurrencies.

The second risk is cybersecurity. A cryptocurrency cannot be counterfeited due to the unique way in which the algorithm works that verify each transaction (Venter, 2016). However, cryptocurrency exchanges and wallets can be hacked or stolen, resulting in the loss of funds. Additionally, phishing frauds and other forms of fraud are common in the crypto space. The third risk is associated with lack of regulation in cryptocurrency space. Cryptocurrency is not regulated by governments or financial institutions, making it more susceptible to fraud, hacking and other forms of financial crime.

The fourth risk is associated with foreign exchange risk; an entity may undergo that risk as soon as it wants to convert cryptocurrencies into legal currencies (Bolt and van Oordt, 2020).

The fifth risk is related to storage and transfer, if you lose access to your private key, you may permanently lose access to your cryptocurrency.

Lastly, cryptocurrency is a relatively new and complex technology, and many investors may not fully understand how it works or the risks involved.

As companies increasingly use cryptocurrency as a medium of exchange or as an investment, they should consider how to capture, store, process, and organize data about cryptocurrencies in their accounting system; they should also consider financial risk exposure and impact on their
performance (Vincent and Davenport 2022). In order to close gaps in the regulation of crypto-assets, the EU sets up the Regulation MiCA (*Markets in Crypto-Assets*) by creating a common regulatory framework for the issuance of, intermediating and dealing in crypto-assets. MiCA will introduce licensing and conduct of business requirements as well as a market abuse regime with respect to crypto-assets. Having given an overview of cryptocurrency ecosystem, in next section, we present our data collection and methodology.

3. DATA COLLECTION AND METHODOLOGY

The purpose of this study is to draw up an overview of current accounting practices relating to crypto-assets. Our research is deliberately exploratory (Cornelius et al., 2006; Busenitz et al., 2003; Aldrich and Baker, 1997) given the nascent nature of the topic. Exploratory data methodology involves the process of analysing data to identify patterns, trends, and relationships in the data without any preconceived notions or hypotheses and is considered appropriate for evolving topic. It is an iterative process that involves visualizing the data, summarizing it, and using descriptive statistics to identify features of the data that may be of interest. By exploring the data in a systematic and unbiased way, we can uncover hidden insights that can inform subsequent analyses and improve our understanding of the underlying data. Therefore, exploratory data methodology is a critical first step in our empirical analysis as it helps to answer our research questions and generate meaningful interpretations. To achieve this goal, we will study how crypto-assets are classified, measured, recognized and disclosed in Europe, US, Asia and Australia.

In the first step, we make a literature review of current regulatory frameworks of blockchain technology applications as well as of existing accounting rules and practices. In order to explore the regulatory frameworks across countries where crypto-assets are largely prevalent, we use information from cryptocurrency platforms and on internet sources to find the top public companies for crypto trading, investment, mining, staking and other related crypto business models. In the second step, we extract the information related to these companies in order to build up our data collection model. Then we collect the annual financial reports of these companies for the 2021 and 2022 periods from their website or where they make annual filing (for example for US companies from https://www.sec.gov/edgar/database).

Most of the data related to accounting and disclosures of crypto-assets comes from relevant sections such as balance sheets, profit and loss statements, cash flow statements, notes to the financial
statements, notes related to accounting policies and management discussion and analysis section. The data is then extracted from these sections and structured into a database for further analysis. To ensure the accuracy and timeliness of the data collected, we verified the data amongst ourselves and adopted systematic approach to data extraction, quality assurance, and validation. Overall, this methodology for collecting information from annual reports is critical for the understanding of how cryptocurrency is measured, recognized and disclosed in respective countries as per their respective business model. The empirical observation of current accounting practices used by companies in different regions and under different GAAP can help regulators, standard setters, investors and other stakeholders make informed decisions about the measurement, recognition and disclosure of crypto-assets.

4. REVIEW OF LITERATURE: CLASSIFICATION, MEASUREMENT AND DISCLOSURE

Cryptocurrencies and digital tokens challenge traditional financial reporting boundaries (Fernandes et al., 2018). The companies dealing with crypto-assets report that many aspects related to recognition, measurement and disclosures of such assets are not specifically addressed by current accounting guidance (GAAP and IFRS), failing which companies are obliged to use their own judgements. In addition, they fear if specific guidance are enacted in the future, this may result in modifications, which may further affect their profitability and financial position. Indeed, regulatory changes or actions may affect the operations of the companies in a manner that may also adversely affect the investors and Governments. Accounting of crypto-assets depends on multiple factors including fact patterns, intention of the holder, business model, contracts and arrangements behind the transaction, and nature of the transaction (Chou et al. 2022). According to Jackson and Luu (2023), it is not the nature of the token but the purpose of use that makes the accounting issues more complicated. In the following section, we conduct the relevant review of literature related to this debate of classification, measurement and disclosure.

4.1. ACCOUNTING CLASSIFICATION OF CRYPTO-ASSETS IN FINANCIAL STATEMENTS

While crypto-assets are being traded all over the World, there is ongoing debate on the classification/recognition of crypto-assets (Chou et al., 2022). Classification of crypto-assets is

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3 Refer to Annual report of Hive Blockchain based in Canada (annual report 2022).
important not only for their accounting recognition but also for their legal taxation (Strader, 2011) as it affects not only the businesses, but also the investors and the policymakers (Government). Recognition is the process of identifying an asset or liability and recording it in the financial statements, however this process of asset recognition becomes most problematic for something that is invisible (Canibano et.al, 2000, Egginton, 1990) such as the case of crypto-assets. As of now, there are no specific guidelines or specific mention of digital assets, crypto assets, or cryptocurrency in any generally accepted accounting principle (GAAP) laid out in the Financial Accounting Standards Board’s (FASB’s) Accounting Standards Codification (ASC). It was only very recently, in December 2021, the FASB added “Accounting for Exchange-Traded Digital Assets and Commodities” to its technical agenda, thus making a first move toward the development of specific authoritative guidance for digital assets, such as cryptocurrency.

Regarding the classification of crypto-assets, contradictory points of view are observed but the debate between professional bodies, academics, standard setters and practitioners revolves around the following four categories: **Cash and Cash equivalent** (Kaustav, 2018; Flood, 2015; Hahn, 1998); **Financial instruments** (Raiborn & Sivitanides, 2015; FASB, 2018); **Intangibles assets** (PricewaterhouseCoopers, 2018) and **Inventories** (FASB, 2018).

According to Raiborn and Sivitanides (2015), to be considered cash, an item must be money and available for use in an exchange process. Thus, to the extent that most companies do not accept crypto-assets for exchange processes, their classification as cash or cash equivalent is not realistic (Fisher and Kaplinsky 2013; Goodwin Procter, 2014).

While the digital landscape is rapidly evolving, most accounting firms across most of countries are classifying cryptocurrencies like Bitcoin, as **Inventories or indefinite-lived intangible** assets under ASC 350, Intangibles—Goodwill and Other. Ajao & Theophius (2016) stated that for digital assets to be recognized as **intangible asset**, the businesses must show that meets the definition and recognition criteria (Intangible asset is defined according to IAS38). The “big 4” accounting firms that include Deloitte, PricewaterhouseCoopers, Ernst and Young, and KPMG recommend that cryptocurrency should be classified as an **intangible asset with an indefinite useful life** (Deloitte, EY, KPMG, & PwC, 2018). This sentiment is shared by the FASB (FASB, 2018).

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4 Refer to Classification thesis paper for full reference
5 Alternative accounting treatments for cryptocurrency may be appropriate in limited circumstances, such as when held for sale as part of an entity’s ordinary business operations when held as an investment by entities within the scope of ASC 946, Financial Services—Investment Companies. See Deloitte, “Classification of Cryptocurrency Holdings.”
However, Chou et al (2022) argue that holding for speculative purposes and issues in subsequent measurement (as **intangibles**), and the lack of value additive properties (as **inventories**) question the appropriateness of the accounting treatment Prochazka, 2018). According to Kang, (2018), digital assets like crypto-currencies are by no means equivalent to **intangible assets**, because, digital assets are not directly invested in production activities, cannot bring direct inflows of economic benefits. The main argument against applying IAS38 is that standard expect production od cash flows but does not address intangible assets being held for speculative or investment purpose, or with cash-like features used for the payments of goods and services (Ventner 2016, Jackon and Luu 2023).

While, Fernandes et al. (2018) argue that some digital assets, such as tokens or coins in an ICO, may convey specific utility of financial characteristics, such as rights to goods or services or a share of the profits of a project or business. In each case, issuers and holders of digital assets should carefully evaluate the specific characteristics of the asset to determine the appropriate accounting. Issuers would determine whether the token or coin should be accounted for in the financial statements as debt, equity, or a right to goods or services. The holders would determine whether it represents a financial asset, a right to goods or services or otherwise. For example, a token that confers specific rights to cash over time may meet the definition of a debt security or loan, whether or not ownership of the token is represented on a blockchain. According to Chou et al. (2022) utility tokens do not meet the definition of financial assets. Therefore, entities may have to account them as non-financial assets and develop their own accounting policy under IAS8 Accounting Policies, Changes in Accounting Estimates and Errors (Chou et al. 2022).

In addition, EFRAG (2020) raised a number of issues related to the classification and the recognition of crypto-assets. On the one side, crypto-assets are characterized by relatively immature and opaque contracting arrangements, and this can make it difficult to precisely identify the underlying rights and obligations for some crypto assets, which in turn presents accounting challenges. On the other side, it can be difficult, even subjective to ascertain the business purpose for holding some utility and hybrid tokens as they have both investment and network functionality value attributes, thus making it difficult to achieve a consistent classification among companies based on business purpose.

For United States, the American Institute of Certified Public Accountants issued in 2020 non-binding guidance that cryptocurrency like Bitcoin should be accounted for as intangible assets, in
accordance with ASC Topic 350 Intangibles – Goodwill and Other (AICPA 2020). Although cryptocurrency is recognized as an intangible asset for GAAP, the Internal Revenue System (IRS) may treat it differently for tax purposes. Currently, cryptocurrency is treated as property for tax purposes (Rosenberg, 2018).

In Canada, both the Canadian Accounting Standards Board (AcSB) and the Chartered Professional Accountants of Canada (CPA Canada) issued non-authoritative guidance stating that many cryptocurrencies are likely to meet the definition of intangible assets according to IAS 38 (AcSB 2019; CPA Canada 2018). Furthermore, cryptocurrencies that does not meet the definition of intangible assets and are held for sale in the normal course of business, should be accounted as inventory in accordance with IAS 2. For taxation purposes as per Canada Revenue Agency (CRA), they are considered as commodity meaning subject to capital gain tax for corporations.

In France, the national standard setter (Autorité des Normes Comptables: ANC) issued in December 2018 the Regulation ANC n° 2018-07 by laying down a structured accounting framework for holders and issuers of tokens. According to the ANC’s approach, the accounting treatment of tokens issued is determined according to the rights and obligations attached to the tokens and described in the information documents made available to subscribers and holders while the method of accounting for the tokens held is based on the analysis of the intention to use the services associated with these tokens (Dao-Le Flécher 2019). Later on July 24th 2020, the ANC issued the Regulation ANC n° 2020-05 that clarifies the accounting treatment for token lending and borrowing, and token derivatives, for digital asset service providers. Nevertheless, the ANC seems to restrict its analysis to cryptocurrencies by using a general term "tokens" and assimilates the cryptocurrencies to existing categories of assets by proposing the existing accounting rules applicable to those assets. For taxation purposes, cryptocurrency is viewed as a moveable asset by the General Directorate of Public Finances, or DGFiP as such are taxed as capital gains from the disposal of movable assets.

In Germany, crypto is not considered as legal tender and it is viewed as a private asset, not property or commodity. The German Federal Central Tax Office or Bundeszentralamt für Steuern (BZSt) has set out strict guidelines on how cryptocurrency buying, trading, and mining are taxed. Cryptocurrency are classified as Intangible assets in accordance with IAS38 while previously (before 2019) they were considered as financial instruments in accordance with IFRS9.
Consequently, there is still a lack of consensus as to how crypto-assets should be classified and Vincent and Davenport (2022) suggesting that researchers should thoroughly explore the classification that provides the most useful information to the users of financial statements, and the potential implications of misrepresenting cryptocurrency. Keeping this perspective in mind, we conduct a review of current trends in classification of cryptocurrency across different countries for the purpose of accounting and taxation (Table 1).

**Table 1: Current trends of classification of crypto-assets from accounting and tax perspective**

<table>
<thead>
<tr>
<th>Country</th>
<th>Classification</th>
<th>Classification for Taxation</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Assets</td>
<td></td>
<td>Cryptocurrency is viewed as a commodity by the Canada Revenue Agency (CRA). This means it's either subject to Income Tax or Capital Gains Tax.</td>
</tr>
<tr>
<td></td>
<td>IAS 2 Inventories</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. France</td>
<td>Intangible fixed</td>
<td>Movable asset</td>
<td>France’s accounting standard setter (ANC) was published in 2018. Cryptocurrency is viewed as a moveable asset by the General Directorate of Public Finances, or DGFIP. Capital gains from the disposal of movable assets (e.g. securities, bonds) are taxed as ordinary income.</td>
</tr>
<tr>
<td></td>
<td>assets Tokens held</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>as investments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kingdom</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. US</td>
<td>IAS38 Intangible</td>
<td>Property</td>
<td>IFRS 2019 Holdings of cryptocurrencies: Principle: IAS38 Intangible assets Exception: IAS2 Inventories =&gt; if the cryptocurrencies are held for sale in the ordinary course of business</td>
</tr>
<tr>
<td></td>
<td>Assets IAS2 Inventories</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Germany</td>
<td>IAS38 Intangible</td>
<td>Private Asset</td>
<td>The German Federal Central Tax Office or Bundeszentralamt für Steuern (BZSt) has set out strict guidelines on how cryptocurrency buying, trading, and mining are taxed. It is taxed at individual tax rate as considered as private asset and not at capital gains tax rate as not considered property. The tax rate can go up to 45% plus potentially the 5.5% Solidarity tax.</td>
</tr>
<tr>
<td></td>
<td>Assets</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Authors compilation

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We summarize our review of current classification trends in table 1, there is still a little consensus as cryptocurrency treated as an intangible asset, however tax departments may still treat it differently for tax purposes, cryptocurrency is treated as property for tax purposes (Rosenberg, 2018) in US and UK. This would imply that gains on the sale of crypo-assets would be taxed in the same manner like capital gains (Holan, 2008) on sale of property in some countries (US, UK) while it can continued to be differently taxed in other countries (Canada, France, Germany).

4.2. ACCOUNTING MEASUREMENT OF CRYPTO-ASSETS

In this part of review, we will discuss why it is difficult to measure cryptocurrency in accounting due to inherent problems related to measurement process (Ronen, 2008; Milburn, 2008) of intangibles. One of the main accounting challenges in measuring cryptocurrency is the difficulty in valuing it (Strader 2011). In general, there are two bases for measuring elements of financial statements: Historical cost and fair value (Chou et al, 2022). An appropriate basis is the one that provides relevant information that faithfully represents the underlying substance of a transaction/event (IFRS, 2018). Failure to value cryptocurrency may result in inaccurate financial statements (Aladwan 2018), which can have negative consequences for stakeholders such as investors, creditors, and regulators (Ronen, 2008; Milburn, 2008) as there is greater risk of cooking the books.

Unlike traditional assets such as stocks, bonds, or real estate, cryptocurrencies are not backed by any physical assets or government guarantees. Therefore, their value is entirely determined by market demand and supply (Indera et al. 2017; McNally 2016). The value of a cryptocurrency can fluctuate wildly in a short period due to changes in demand and supply, regulatory changes, or other external factors. This volatility makes it difficult to determine the fair value of cryptocurrencies (Saad et al. 2019).

If a corporation decides to classify its cryptocurrency as an investment like a security, the firm would need to perform fair value adjustments that pass through net income (Flood, 2015). According to the Accounting Standards Codification (ASC) 320-10-25, if the firm classified its cryptocurrency as a trading security then gains and losses would flow through into the company’s

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7 Toward Characterizing Blockchain-Based Cryptocurrencies for Highly Accurate Predictions by Muhammad Saad, Jinchun Choi, Dae Hun Nyang, Joong heonKim and AzizMohaisen, SeniorMember, IEEE
net income statement (FASB, 2018). If the company classified its cryptocurrency as available-for-sale, then gains or losses would appear in the company’s accumulated other comprehensive income statement (FASB, 2018).

If a corporation decides to classify its cryptocurrency as an inventory, companies would need to bear in mind to adjust the entries that would impact their cryptocurrency account. According to ASC section 330-10-30, inventory is recorded at the lower of net realizable value and cost (FASB, 2018). As a result, if the cryptocurrency’s sale price falls below the original purchase price, a value mark-down would be created to decrease the inventory’s carrying value (Mullins 2005).

If a corporation decides to classify its cryptocurrency as an intangible asset, it must be an asset that can be identified as carrying a value, it cannot be cash or a non-monetary asset, and it cannot have physical substance (PricewaterhouseCoopers, 2018). Within the intangible asset classification, it could either be classified as an indefinite life asset that is periodically impaired or it could be classified as a definite life asset that receives annual amortization. This valuation can be problematic as it appears difficult to assign a definite life to cryptocurrencies as they have no legal limit unlike patents (World Trade Organization, 2009). Without the definite-lived classification, the indefinite-lived classification is all that remains for valuation purposes. According to ASC 335-30-35, accounting for an indefinite-lived asset involves recording it at its fair market value and then periodically impairing it with adjusting entries (FASB, 2018).

Another accounting challenge is determining the fair value of cryptocurrency as it is subject to fluctuations because it is a highly volatile asset (Tucker 2019). Therefore, the value of the cryptocurrency holdings may need to be revalued periodically to reflect changes in market conditions such as changes in exchange rates, changes in demand and supply, and regulatory developments. Revaluation of cryptocurrency is necessary to ensure that the value of the asset is reported accurately in the financial statements (FASB, 2018). The frequency of revaluation of cryptocurrency depends on the level of volatility of the currency and the accounting standards applicable to the entity. Some entities may revalue their cryptocurrency holdings daily, while others may do it monthly or quarterly. The revaluation can be done using publicly available market data or by engaging a third-party valuation expert.
Table 2: Measurement of Crypto-Assets

<table>
<thead>
<tr>
<th>Classification</th>
<th>Initially Measured</th>
<th>Subsequent Valuation</th>
<th>Income Statement</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investment (security)</td>
<td>Cost</td>
<td>Fair Market Value</td>
<td>Gains or Losses</td>
<td>(Flood, 2015), (FASB, 2018)</td>
</tr>
<tr>
<td>Intangible asset</td>
<td>Cost</td>
<td>Fair Market Value</td>
<td>Amortization/Impairment</td>
<td></td>
</tr>
<tr>
<td>Inventory</td>
<td>The lower of cost or net realizable value</td>
<td>Sale Price</td>
<td>Gains or Losses</td>
<td>(FASB, 2018)</td>
</tr>
</tbody>
</table>

To summarize, academic researchers (Luo and Yu, 2022), have raised concerns regarding the inconsistency in accounting practices under GAAP and IFRS for the measurement of crypto-assets. First, problem arises in ascertaining their asset class and second problem arises due to lack of accounting standards in their measurement and reporting. This can mislead the users in wrong assessment of values, affecting their liquidity and profitability. For example: some firms receiving cryptocurrencies in revenue-generating activities account for cryptocurrencies as intangibles using different measurement bases and classify the associated cash inflows differently. Some firms classify cryptocurrencies as long-term intangibles, while others consider them as liquid, short-term intangible assets.

4.3. ACCOUNTING DISCLOSURE OF CRYPTO-ASSETS

Disclosure is critical in accounting (IAS 1.15, IAS 1.17, IAS 1.19), as it enables stakeholders to make informed decisions, enhances transparency and accountability, and promotes market efficiency. Therefore, disclosures are integral part to provide a true and fair view of state of affairs of a reporting company. Disclosures are essential for crypto-assets as they can exist in many different types and forms, a detailed description of type, numbers, recognition and measurement methods applied would enhance the understanding of reader and give a true and fair picture of the company financial reporting. However, in case, of crypto-assets, disclosing cryptocurrency in annual reports is challenging due to the regulatory uncertainty surrounding cryptocurrencies. There is lack of literature related to accounting disclosure of crypto-assets. The regulations governing cryptocurrencies vary by jurisdiction, and this inconsistency creates uncertainty for companies when disclosing their cryptocurrency holdings. Companies may be hesitant to disclose their
cryptocurrency holdings due to uncertainty around the regulatory environment and potential legal repercussions.

Irrespective of this fact, according to the disclosure requirements (e.g., ASC 820’s fair value measurement disclosure requirements for both interim and annual reporting periods), crypto-assets should be properly disclosed in the accounting report. No matter how the company decides to classify the cryptocurrency (as an investment, intangible or inventory), disclosure notes should be provided in notes to financial statements. The disclosures through these notes must detail the justification for the classification of crypto-assets (Deloitte, 2018). It should disclose the method used to determine its cost basis for computing gains and losses (for example, first-in first-out; specific identification; or other method used) (FASB 2023). It should precise the method of amortization/impairment employed to ascertain the loss in value. Further, it should disclose the name of the crypto-assets, number of units held and any other matter related to the significant risks associated with crypto-assets in the financial report (Vincent and Davenport 2022; Kang 2018). There are strong arguments to consider that crypto-assets should be properly disclosed in the financial report in accordance with the principle of materiality (EFRAG 2022).

5. PRESENTATION OF COMPANIES DATA COLLECTED

We analyse the data based on the information collected from the companies listed in the Table 3. We present the name of the company, country, whether they are listed or no and their business model related to cryptocurrency. We pre-select the companies based on the fact whether they are listed or unlisted companies. This is crucial fact for our sampling, as for only public companies, we are able to find information through the annual reports. We share the information related to cryptocurrency measurement, recognition, and disclosure obtained from financial reports. We also provide information related to auditors, accounting standard followed and type of cryptocurrency issued or held. We compare also country-wise to observe if there are some inconsistencies in reporting standards.

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8 FASB Proposed Accounting Standards Update (ASU), *Intangibles — Goodwill and Other — Crypto Assets (Subtopic 350-60): Accounting for and Disclosure of Crypto Assets.*
### Table 3: Companies from North America (US and Canada), Europe (France and Germany and United Kingdom)

<table>
<thead>
<tr>
<th>Name</th>
<th>Country</th>
<th>Listed in Stock exchange</th>
<th>Business Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>MicroStrategy</td>
<td>US</td>
<td>Yes</td>
<td>Investment</td>
</tr>
<tr>
<td>Galaxy Digital Holdings</td>
<td>US</td>
<td>Yes</td>
<td>Trading</td>
</tr>
<tr>
<td>Tesla, Inc</td>
<td>US</td>
<td>Yes</td>
<td>Investment</td>
</tr>
<tr>
<td>Coinbase Global, Inc.</td>
<td>US</td>
<td>Yes</td>
<td>Exchange/Trading Platform</td>
</tr>
<tr>
<td>Marathon Digital Holdings Inc.</td>
<td>US</td>
<td>Yes</td>
<td>Mining</td>
</tr>
<tr>
<td>Hut &amp; Mining Corp</td>
<td>Canada</td>
<td>Yes</td>
<td>Trading</td>
</tr>
<tr>
<td>Hive Blockchain</td>
<td>Canada</td>
<td>Yes</td>
<td>Trading</td>
</tr>
<tr>
<td>BIGG Digital Assets Inc.</td>
<td>Canada</td>
<td>Yes</td>
<td>Trading</td>
</tr>
<tr>
<td>DMG Blockchain Solutions Inc.</td>
<td>Canada</td>
<td>Yes</td>
<td>Mining/Trading</td>
</tr>
<tr>
<td>Voyager Digital LTD</td>
<td>Canada</td>
<td>Yes</td>
<td>Trading</td>
</tr>
<tr>
<td>Akela</td>
<td>France</td>
<td>Yes</td>
<td>Investment</td>
</tr>
<tr>
<td>Ubisoft</td>
<td>France</td>
<td>Yes</td>
<td>Investment</td>
</tr>
<tr>
<td>Bitpanda issuance GmbH</td>
<td>Germany</td>
<td>N/A</td>
<td>Trading</td>
</tr>
<tr>
<td>Bitcoin Group SE</td>
<td>United Kingdom</td>
<td>Yes</td>
<td>Mining</td>
</tr>
<tr>
<td>Argo Blockchain</td>
<td>United Kingdom</td>
<td>Yes</td>
<td>Mining</td>
</tr>
<tr>
<td>Ninele Blockchain</td>
<td>United Kingdom</td>
<td>Yes</td>
<td>Solutions for Cryptocurrency/Blockchain</td>
</tr>
</tbody>
</table>

### 6. Analysis of the Data

#### 6.1 Recognition, Measurement and Disclosures in Financial Statements

The table 3 summarises the comparison of existing accounting rules for crypto-assets at the international level. Studying the annual reports and based on the extensive literature review, we report some findings. First, there is no specific international financial reporting standard dedicated to crypto transactions. Second, there is no formal accounting guidance for crypto-assets at the country level. Current GAAP and IFRS guidance fails to specifically address various types and
aspects of crypto-assets that constantly evolve. In effect, there is no consensus on how to account for crypto-assets at company and country levels. Finally, there is no consensus on whether an accounting standard setter should propose a specific financial reporting framework dedicated to crypto transactions.

Table 4: Comparison of existing accounting rules for crypto-assets

<table>
<thead>
<tr>
<th>Elements of comparison</th>
<th>IASB</th>
<th>USA</th>
<th>Canada</th>
<th>France</th>
<th>UK</th>
<th>Japan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Issuance of specific GAAP</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Issuance of non-authoritative guidance</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Definition of crypto-assets</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>-</td>
<td>No</td>
</tr>
<tr>
<td>Accounting classification</td>
<td>Intangible assets or inventories</td>
<td>Intangible assets</td>
<td>Intangible assets or inventories</td>
<td>Intangible assets or inventories</td>
<td>-</td>
<td>No</td>
</tr>
<tr>
<td>Accounting recognition</td>
<td>In accordance with IAS 38 or IAS 2</td>
<td>In accordance with ASC Topic 350</td>
<td>In accordance with IAS 38 or IAS 2</td>
<td>In accordance with French GAAP</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Specific presentation and disclosure requirements</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Lack of guidance for</td>
<td>- Holders of crypto-assets other than cryptocurrencies</td>
<td></td>
<td>Crypto miners</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Crypto issuers, miners and exchange platforms</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The results of our empirical observation of accounting practices on a sample of 15 listed companies highlight the lack of their reference to a legal or generally accepted definition of crypto-assets. Different terms have been used to refer to crypto-assets, namely “cryptographic assets”, “digital assets”, “cryptocurrencies” or “virtual currencies”. There is no consensus by companies on whether cryptocurrencies should be considered as a sub-category of crypto-assets. They consider cryptocurrencies rather as synonymous with crypto-assets.

We also observe an absence of consensus by companies on how to classify crypto-assets. They classify crypto-assets differently in the balance sheet either as non-current intangible assets, indefinite-lived digital assets presented separately from other intangibles, or as inventories or other current assets.

Different valuation models and methods were used by companies to recognise their crypto-assets. In fact, they recognised crypto-assets variably as intangibles valued at cost less impairment, intangibles valued at fair value, inventories valued at cost or at fair value. When the cost valuation model was used, impairment losses recognised could not be recovered for any subsequent increase in fair value. Furthermore, there is no consensus by companies on the classification of impairment expenses related to crypto-assets. When the fair value was used, the methodology adopted for determining the fair value was different across companies.
Cash flows related to crypto-asset transactions were also variously classified by companies in cash flows arising from investing or operating activities without further explanation in the notes to their financial statements. Consequently, the lack of consensus on the classification of crypto-assets and cash flows relating to crypto-assets could impact corporate performance measurement indicators.

Companies located in the countries where there is no specific disclosure guidance did not provide complementary information about the volume of cryptocurrencies hold, types of coins/tokens hold, associated risks, classification of cash flows, segment reporting, etc. Nevertheless, some companies provided specific note(s) dedicated to crypto-assets. Specific disclosures about crypto-assets were found in different notes to the financial statements, such as summary of significant accounting policies, notes related to intangible assets, digital assets, other assets, and fair value measurements. We do not observe a mention of crypto-asset valuation in critical accounting estimates and judgments by companies for which crypto transactions are significant.

We also study the auditors’ reports on consolidated financial statements. For exchange and trading platforms, the verification of existence and measurement of stocks of cryptocurrencies is considered as key (critical) audit matters (KAM or CAM) by their auditors. Interestingly, we observe a high level of audit fees for companies in our sample that deal with crypto transactions. Their auditors come essentially from Big Four audit firms.

These results corroborate with previous empirical studies which highlight a positive relationship between the level of audit fees and the complexity of the organisation, the company-specific risk (Simunic, 1980; Hay et al., 2006) and the level of audit quality requirements (Broye, 2009). The high level of audit fees can in fact be explained by the presence of particularly complex situations within the company, major organisational changes, which require more audit efforts. These results also highlight the risk of concentration of the crypto-asset audit market in favour of large audit firms which have the specialised resources and skills to support companies on blockchain and crypto-assets subjects.

6.2. Critical Analysis: An international evidence

This critical analysis of existing accountings rules also leads us to raise the question of why there is an absence of accounting standardization for crypto-assets at the international and national levels. While the international standard setters (IASB and FASB) as well as national accounting standard
setters are active in monitoring the topic, they seem to adopt a standby position for the following reasons. First, the creation of a new accounting standard dedicated to crypto-assets risks to fail to reflect the economic substance of crypto transactions in an evolving ecosystem and to anticipate future developments in this area. Crypto-assets are the first but not the only one case of blockchain technology. Setting up accounting principles that encompass different characteristics and nature of crypto-assets represents a real accounting challenge for the international standard setters. Second, neither the IASB nor the FASB consider that cryptocurrency is a pervasive issue and that crypto transactions are material for listed companies. Third, given the evolving nature of crypto-assets and absence of materiality for listed companies, the international standard setters conclude that existing accounting standards are sufficient for companies to represent faithfully crypto transactions and to disclose them in the financial statements. Finally, they prefer to elaborate a prudent strategy combining an active monitoring of the subject for knowledge building and being ready to set up a new accounting standard when the issue becomes pervasive for public listed companies.

7. Conclusion

In this research, we carry out a comparative study of accounting rules and practices relating to crypto-assets in Europe, US and Asia.

The main contributions of this research lie in the results from the comparative analysis of existing accounting rules and observations of accounting practices adopted by companies that deal with crypto-assets. These results highlight gaps in the current normative framework for reflecting the economic substance of crypto-asset transactions. They emphasise the need for convergence of accounting practices and therefore international accounting standardisation regarding crypto-assets in order to improve transparency, comparability and quality of financial information. Our remarks and recommendations may be useful to accounting standard setters, regulators, policy makers, users and preparers of financial information. Our empirical results have several implications for future research work that would shed light on the building of a common set of accounting rules and principles related to crypto-assets. Through proper financial reporting of crypto-assets, corporations can communicate to investors with risks associated with such volatile assets, market participants can assess their valuation implications, and government agencies can ascertain capital market consequences and tax effects. To our knowledge, this research is the first international
comparative study extended to the United States, the United Kingdom, the European Union and Asian countries.

However, this research has several limitations. The main methodological difficulty lies in the constitution of the sample and the validation of its representativeness, due to the absence of databases making it possible to identify the companies which hold and issue crypto-assets. We were unable to study the case of unlisted companies, due to the unavailability of their annual financial reports because of the absence of publication obligations for these companies (for example, Binance).
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