



## Bachelor's Thesis

Name  
Tobias Holz



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Supervisor: Prof. Dr. Michael Gille

Secondary Examiner: Prof. Dr. Christian Decker

Faculty of Business and Social Sciences

Department of Business

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**Abstract**

In recent years, the importance of the internet has drastically increased. We live in times of industry 4.0, artificial intelligence, global online markets, and access to worldwide content. In the course of these developments, a universal, digital currency was the next logical step in order for people to easily pay their invoices without having problematic encounters with exchange rates or fees for foreign purchases. Nowadays, we refer to this currency as cryptocurrency, with its best-known provider being Bitcoin. But the creation of this currency has raised questions in the field of accounting. How do accountants recognize this item and how do they measure it? These issues are not fully resolved as of today and may be subject to change in the future. Therefore, this paper aims to draw a picture about the components of cryptocurrency and its safety precautions and attempts to take it into the perspective of IFRS, thereby attempting to illustrate what this currency is and how accountants can deal with this innovation.

Key Words: Cryptocurrency, Bitcoin, Blockchain, IFRS, Fair Value

JEL classification: F32, F65, G12, M41, O33

## I Outline

I Outline .....	III
II List of figures and tables .....	V
III List of abbreviations .....	VI
<b>1. Introduction .....</b>	<b>- 1 -</b>
1.1 Research problem .....	- 1 -
1.2 Research method .....	- 1 -
1.3 Course of investigation .....	- 2 -
<b>2. Cryptocurrencies.....</b>	<b>- 2 -</b>
2.1 Introduction .....	- 2 -
2.2 Safety precautions .....	- 3 -
2.2.1 Blockchain.....	- 3 -
2.2.2 Security measures .....	- 6 -
2.3. Proof of work vs. proof of stake .....	- 7 -
2.4. Pricing of Bitcoin.....	- 9 -
<b>3. IFRS .....</b>	<b>- 11 -</b>
<b>3.1 Recognition and types of assets .....</b>	<b>- 11 -</b>
3.1.1 Recognition criteria for assets .....	- 11 -
3.1.2 Types of assets .....	- 15 -
3.1.2.1 IFRS 9 Financial Instruments .....	- 15 -
3.1.2.2 IAS 2 Inventories .....	- 16 -
3.1.2.3 IAS 38 Intangible Assets.....	- 16 -
<b>3.2 Measurement of assets.....</b>	<b>- 16 -</b>
3.2.1 IFRS 13 Fair Value .....	- 16 -
3.2.2 Types of measurements.....	- 19 -
3.2.2.1 Measurement of IFRS 9 Financial Instruments .....	- 19 -
3.2.2.2 Measurement of IAS 2 Inventories .....	- 20 -
3.2.2.3 Measurement of IAS 38 Intangible Assets .....	- 21 -
<b>4. Recognition and measurement of cryptocurrencies .....</b>	<b>- 22 -</b>
<b>4.1 Recognition of cryptocurrencies .....</b>	<b>- 22 -</b>
4.1.1 General recognition of cryptocurrencies .....	- 22 -
4.1.2 Recognition pursuant to IFRS 9 Financial Instruments.....	- 25 -
4.1.3 Recognition pursuant to IAS 2 Inventories.....	- 27 -
4.1.4 Recognition pursuant to IAS 38 Intangible Assets .....	- 28 -
<b>4.2 Measurement of cryptocurrencies.....</b>	<b>- 30 -</b>
4.2.1 Measurement pursuant to IAS 2 Inventories.....	- 30 -
4.2.2 Measurement pursuant to IAS 38 Intangible Assets .....	- 32 -
<b>5. Conclusion .....</b>	<b>- 33 -</b>
5.1 Summary .....	- 33 -
5.2 Critical acclaim .....	- 34 -
5.3 Outlook.....	- 35 -
IV List of references .....	VII
V Declarations .....	XV

**Declaration of originality ..... XV**  
**Declaration of publication ..... XVI**

**II List of figures and tables**

Figure 1 Process of a Bitcoin transaction.....	- 4 -
Figure 2 Top 10 Bitcoin trading countries .....	- 10 -
Figure 3 Recognition criteria of an asset.....	- 13 -
Figure 4 Volatility of Bitcoin in comparison to Gold, Euro and US-stock.....	- 24 -

**III List of abbreviations**

IFRS	International Financial Reporting Standard
IAS	International Accounting Standard
IFRIC	International Financial Reporting Interpretations Committee

## **1. Introduction**

### **1.1 Research problem**

The task of external accounting is to depict the financial relationships of a company with its external world and to provide the company's stakeholders with information that is useful for decision-making. Since large companies in particular, are increasingly operating internationally, it is becoming more and more important to provide this information in an internationally comparable manner. As the newly developed cryptocurrency firstly gained popularity in early 2013 and with even more attention in 2017 (Eberle, 2021), accountants around the world were forced to take a closer look at this topic and create regulations for it. As of 2020, the subject gained even more attention, as globally acting companies such as Tesla, Inc. made huge investments into cryptocurrency with the result, that the currency reached an all-time high. (finanzen.net, 2021) However, based on the fact, that cryptocurrency is not backed by the government like currency in general is (Ju, Lu, & Tu, 2016, p. 446) and poses no intrinsic value (Breuker, et al., 2013, p. 3) the underlying question this paper aims to further investigate is, how cryptocurrency can eventually be recognized and measured correctly in the financial statement.

### **1.2 Research method**

This paper addresses the systematic characterization of cryptocurrencies and how they are recognized as well as measured under IFRS. Possible recognition options and the associated measurement methods will be applied to cryptocurrency. With respect to the ambivalent nature of cryptocurrency it is still uncertain whether today's standards already offer a clear solution for this. This examination is conducted by applying a literature based theoretical approach. In order to get a better insight into the above-mentioned topic, a detailed definition of cryptocurrency is required. In addition, the IFRS is examined more closely with regard to assets and their measurement. The first step is to explain what constitutes an asset, what types of assets there are and how they are measured in order to provide the user of the balance sheet with a comprehensive picture. Finally, in order to conclude, the information gathered on cryptocurrency on the one hand, and IFRS on the other, are brought together and assessed to what extent cryptocurrency can be included in the balance sheet, how it is recognised and finally how it can be measured. Different findings of several authors

will be combined in order to provide a sophisticated understanding of the proceedings and coherences.

### **1.3 Course of investigation**

Based on the research question presented in chapter 1.1, chapter 2 will pursue to provide a clear understanding of the foundations of cryptocurrency. Why did the idea for cryptocurrency arise? What are the characteristics of cryptocurrency? What are security precautions and measures? What influences the price of cryptocurrency? Furthermore, a more in-depth approach will lie on security measures and the blockchain. Following the descriptions and findings in chapter 2, the subsequent chapter 3 is devoted to the legal basis of accounting. It focuses exclusively on the paragraphs of IFRS and refers to the recognition of assets in general and in detail. Furthermore, it also explains how assets are measured in the balance sheet, with a focus on fair value. Concluding the fundamental work derived from previously, chapter 4 now serves to analyse whether cryptocurrency may in principle be included in the balance sheet as an asset. It is analysed to what extent the existing IFRS rules are sufficient to depict and evaluate the overall picture of cryptocurrency and thus provide relevant information to the user of the balance sheet.

## **2. Cryptocurrencies**

### **2.1 Introduction**

The cryptocurrency market has been one of the most watched in recent years, partly due to its exorbitant pace of development, which has seen more than 5,000 different currencies with a market capitalization of 1.6 Trillion USD as of June 2021 (Fusion Media Limited, 2021) in just over ten years, but also due to its forward-looking focus in an increasingly interconnected world. (Farell, 2015, p. 3)

However, the idea behind Bitcoin and other cryptocurrencies dates to the 1980s and can be traced back to David Chaum, who developed the idea of introducing cryptography into online monetary transactions. (Chaum, 1983, p. 199 f.) To illustrate this and to promote it in an economic framework, consider two business parties who want to do a transaction, that should be done without the supervision of a third party. (ibid) The two parties meet to conduct their business, and the buyer creates a new unit of cryptocurrency and chooses a secret serial number, which is recorded on the currency. (Narayanan, Bonneau, Felten, Miller, & Goldfeder, 2016, p. XV) The buyer



signs the unit, still unaware of the serial number and eventually, the seller receives the issued cryptocurrency unit and is now enabled to make a purchase using the same principle. (ibid)

This verification idea of transactions arose from the problems that occur in money transactions with credit cards, where a third party, serving as an intermediary, is omnipresent, and it intended to bring the benefits of cash to the internet forming the basis of today's cryptocurrency. (Nakamoto, 2008, p. 1 f.) These risks of credit card transactions were firstly, that one party may not fulfill its obligation, i.e., default payment always accompanies any transaction, while concerning cash, this risk of defaulting does not exist, as the transaction is usually ad hoc and takes place on site. (Narayanan, Bonneau, Felten, Miller, & Goldfeder, 2016, p. 14)

Moreover, transactions with credit cards are exposed to an environment with less anonymity. (Chaum, 1983, p. 199 f) In order to use a credit card, relevant personal data must first be transmitted to the credit institution, which can also track every future purchase and further data is then disclosed, such as possible places of residence, information on lifestyle, or even personal problems. (ibid) This is not the case when using cash, since you do not have to disclose your personal data, nor can a third party such as the credit institution track any purchases. (Narayanan, Bonneau, Felten, Miller, & Goldfeder, 2016, p. 14)

Finally, it should also be mentioned here that credit card transactions are conducted via a central server operated by a third party and for this reason, both parties to the transaction must have a certain degree of trust in the credit institution. (ibid) This fact can also be circumvented in the case of cash transactions, as these only take place in person and there is a physical handover of the money. (ibid)

## **2.2 Safety precautions**

### **2.2.1 Blockchain**

The underlying ideas and conceptions of David Chaum were revisited in a white paper called "Bitcoin: A Peer-to-Peer Electronic Cash System" in 2008, which was published under the pseudonym "Satoshi Nakamoto". (Nakamoto, 2008, p. 1) The elaborated concept of how to exclude financial institutions from online transactions and at the same time settle transactions between two parties directly on a basis of trust is called blockchain. (Martini & Weinzierl, 2017, p. 1252) Nakamoto argues that this

intermediary limits the practicability of online transactions because, for example, microtransactions cannot be carried out since they are not profitable for the financial institution and in addition, the costs of transactions on the internet are rising, for example, if the payment is revocable. (Nakamoto, 2008, p. 1 f.) As a result, merchants have to obtain much more information about their customers than is actually necessary in order to protect themselves and receive their rightful money - in other words, they have to carry out conscientious due diligence. (ibid)

Based on Bitcoin, the largest and best-known cryptocurrency in terms of market capitalisation, (Imöhl & Ivanov, 2021) Nakamoto's conception is now presented below. First of all, every participant who wants to work with cryptocurrency, in this case Bitcoin, must have access to special software, which are widely called "wallets" and allow the user to access "Bitcoin" software. (Rosenberg, 2019, p. 142 f.) This software used to manage all cryptocurrencies in its possession and can also be used to carry out transactions with cryptocurrencies. (Zapf, 2020, p. 156)

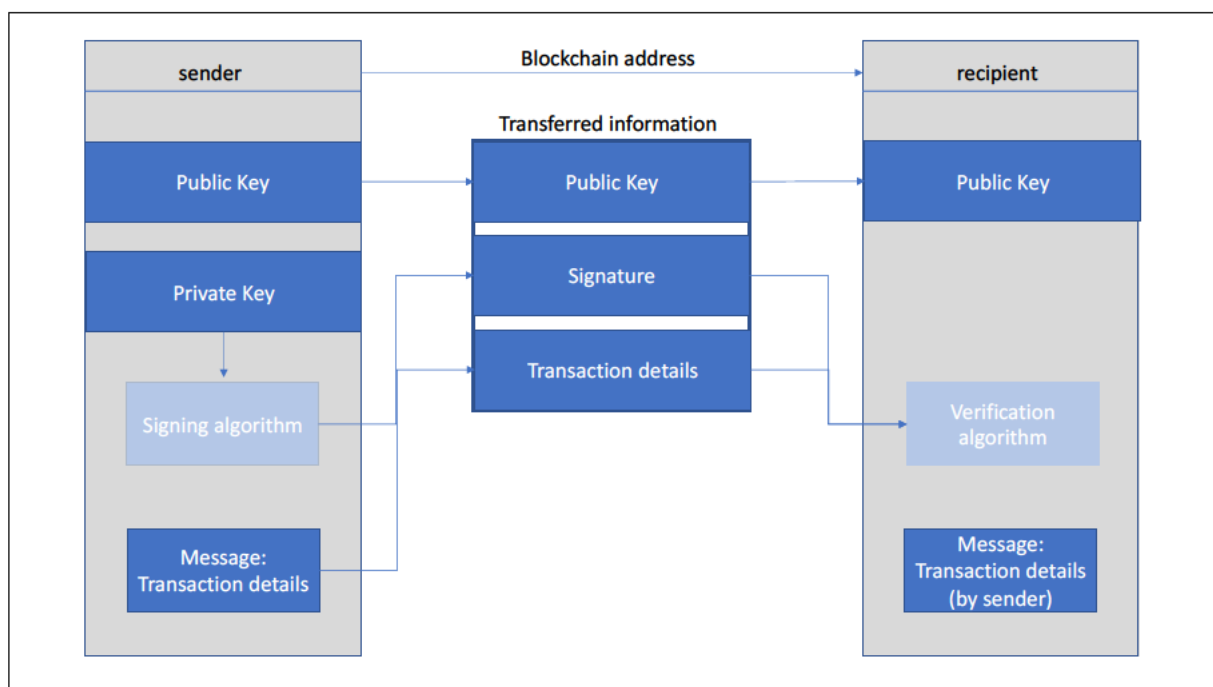


Figure 1 Process of a Bitcoin transaction (Author's own rendering based on (Brühl, 2017, p. 136))

According to Brühl, a Bitcoin-based transaction can initially be carried out in three steps, which are illustrated by figure 1. (Brühl, 2017, p. 136) In the beginning, the sender generates two different keys, one of which is called a "public key" and the second a "private key". (Martini & Weinzierl, 2017, p. 1251) The private key is used by the sender to generate an encrypted signature, while the public key is used by the recipient and the entire blockchain network to verify this signature and thus establish the sender's

authenticity. (Brühl, 2017, p. 136) In order to carry out this transaction, the sender needs the Bitcoin address of the recipient, which is created using cryptographic techniques and, for security reasons, is also only valid for this one transaction. (ibid)

Subsequently, a transaction is initiated by the sender which, in addition to the generated recipient address, also contains the amount of the action as well as the references to all previous Bitcoin transactions in order to legitimize the sender as the legal owner of the Bitcoin. (Nakamoto, 2008, p. 2) At the end of the second step, the private key generates a signature of the underlying data with the help of a signing algorithm, which in turn is encrypted and transmitted to the recipient together with the public key. (Brühl, 2017, p. 136)

To finalize the transaction with the third step, the recipient can now use the sender's public key to check whether the sender really transferred the Bitcoin and conversely, the recipient must now be the rightful owner of the Bitcoin if the process is carried out correctly, since the sender's signature mentioned above can only have been created with the unique combination of public key and private key. (ibid)

The blockchain, in turn, can now be seen as a decentralized "diary" of all Bitcoin transactions ever executed. (Weinzierl & Martini, 2017, p. 1251) A transaction is therefore referred to as a "block" and the length of the blockchain is constantly growing, as the so-called miners are constantly adding new blocks to record the latest transaction. (Swan, 2015, p. X) The miners pursue monetary compensation for their services and the incentive for these people is incorporated into the Bitcoin protocol. (Farell, 2015, p. 5) Two approaches of payment exist, one being traditional transaction fees, whereas the second one are newly minted Bitcoins. (Hubermann, Leschno, & Moallemi, 2021, p. 5) So, eventually every block that will get verified under the Bitcoin protocol, provides new coins to the market, which will be rewarded to the miners as the compensation for their effort. (Farell, 2015, p. 5)

The blocks are added to the blockchain in a linear, chronological order. (Swan, 2015, p. X) In addition to the transactions, each individual block of the chain also contains a timestamp, the so-called "hash value" of the previous block, and furthermore a nonce, which is a random number to verify the hash value. (Martini & Weinzierl, 2017, p. 1252) This approach ensures the integrity of the entire blockchain including the very first block, the "Genesis" block. (Nofer, Gomber, Hinz, & Schiereck, 2017, p. 184) Due to the fact that hash values are unique, fraud can be effectively eliminated or at least

strongly prevented, as changes to a block in the chain would result in a change of the respective hash value. (ibid)

As soon as the majority of nodes, also called miners, in the network approve the validity of the transaction and the block itself via a consensus mechanism, this block is irrevocably added to the blockchain. (Nofer, Gomber, Hinz, & Schiereck, 2017, p. 184)

To conclude the explanations of the blockchain, it can be stated that the process described for Bitcoin and the underlying blockchain are based on peer-to-peer technology. (Simmchen, 2017, p. 162) This means that there is no central point of contact (server) of a third party, the intermediary, which must be trusted in advance by both negotiating persons. (Martini & Weinzierl, 2017, p. 1252) From now on, they must trust solely in the technology at hand. The logical consequence of excluding the intermediary is that the aforementioned collection of personal data is no longer necessary, hence all this makes the existence of a third party obsolete in this type of transaction and increases the trust of the persons involved. (Swan, 2015, p. 2)

### **2.2.2 Security measures**

The blockchain presented in the previous chapter clearly shows many strengths, and it is not without reason that more and more institutions, authorities and governments are considering implementing this technology for their purposes. (Swan, 2015, p. XIII) The most obvious risk, which was also mentioned by Nakamoto in his white paper for Bitcoin, is the double spending problem, in which case, a traded bitcoin would be transferred multiple times from a single sender to different recipients, i.e. different transactions would be carried out with the same coin. (Karame, Androulakie, & Capkun, 2012, p. 908 f.) A solution involving a mint that is obligated to reassure the payee, that the coin is not double spent, would be reasonable but, all transactions would have to go through this central authority and, in addition, after each transaction, the coin would have to be sent back to the intermediary, which in turn would or could only then issue a new one. (Nakamoto, 2008, p. 2) However, this would contradict all the intentions, ideas and benefits, which Nakamoto had in mind.

Consequently, Bitcoin in combination with the blockchain technology intrinsically solves this problem, since it remains a strictly peer-to-peer endeavor, so the parties involved can be quickly identified. (Swan, 2015, p. 2) Moreover, as mentioned in the previous chapter, it uses a cryptographic process with a set of two keys, one private and one public, and this endeavor is then recorded in the "blocks" and verified by the

various miners. (Swan, 2015, p. 2) The verification by the miners could be, in principle, considered questionable, since they represent only a third party and their judgement may not fully correspond to the truth. (Lin & Liao, 2017, S. 653) However, as also mentioned in chapter 2.2.1, incentives in the form of transaction fees and rewarded Bitcoins are used to encourage miners to make their work sustainable and correct. (Hubermann, Leschno, & Moallemi, 2021, p. 5) Nevertheless, a miner, assuming he has enough computing power to take over at least 51% of the nodes at the same time (Lin & Liao, 2017, S. 653) and has actual criminal or at least not benevolent tendencies, could possibly change the transaction data and thereby enable double spending, could stop the verifying process of the whole block and interrupt the blockchain or stop other miner from mining any available block. (Lin & Liao, 2017, S. 656) The blockchain technology, in turn, should then work in such a way that this person decides that it is more profitable for him to generate more coins and thus maintain the integrity of the entire blockchain. (Nakamoto, 2008, p. 4) This means that the incentives offered do not provide a breeding ground for criminal activity, as they are not economically profitable. (ibid)

### **2.3. Proof of work vs. proof of stake**

As mentioned before, the blockchain technology and thus also the Bitcoin is dependent on the miners, who verify every transaction via the "proof of work" procedure. (Hubermann, Leschno, & Moallemi, 2021, p. 5) This is intended to curb the "double spending" problem on the one hand (Karame, Androulaki, & Capkun, 2012, p. 908) and to keep the cryptocurrency scarce on the other, since computing power must first be expended and a transaction must be verified in order to be subsequently rewarded with new Bitcoin. (Prinz, Rose, Osterland, & Putschli, 2018, p. 315) Besides the previous described possible problem of one entity having the computing power to control more than 50% of the blockchain and thereby potentially interfere with the integrity of it, the resulting problem in the proof of work approach by the Bitcoin is the possible negative impact on the environment. (Yang, Chen, & Chen, 2019, p. 261 f.) Especially the CO2 emissions could be considered in the case of Bitcoin, since high computing power requires large amounts of electricity, which are generated during the mining process of new Bitcoins. (Artner, 2014, pp. 24-27)

In order to generate new Bitcoins, miners have to solve a mathematical problem in the verification process, namely to find a "nonce", i.e. a "number used only once", which,

with the help of the block that is to be attached to the blockchain, forms a hash value that corresponds to the algorithm. (Prinz, Rose, Osterland, & Putschli, 2018, p. 314 f.) In this context, the computing power of the individual miners is the decisive factor and a competition arises to see who can solve the mathematical problem faster and thus also be rewarded with the newly generated Bitcoin. (ibid) To ensure that this process does not take place too quickly, it was implemented in the Bitcoin that a new block can only be generated every ten minutes and if the computing power used falls below these ten minutes, the difficulty of the mathematical problem is increased. (Prinz, Rose, Osterland, & Putschli, 2018, p. 315) Thus, this inevitably leads to high power consumption and besides the mining itself, high computing power is also crucial in terms of prevention of manipulation attacks, since possible attackers need to possess more power than the upright part of the blockchain. (Becker, et al., 2012, p. 40) For example, the Westphalian Wilhelms University in Münster analyzed the question of what impact a decentralized currency backed by computing power could have on the environment. (Becker, et al., 2012, p. 44 ff.) So, according to their estimates, analyses and calculations, hedging against these attacks would quickly reach CO2 emissions on par with global commercial aviation. As a result, it would be conceivable that social resistance to this technology would arise. (ibid)

However, this problem should be reduced with the help of the "proof of stake" approach, which is used by a major competitor of Bitcoin, Ethereum. (Sedlmeir, Buhl, Fridgen, & Keller, 2020, p. 401 f.)

Instead of using computing power, which involves the exorbitant energy consumption mentioned above, the miners who verify the integrity of the blockchain are selected in the "proof of stake" according to their personal contribution to the blockchain. (Kiayias, Russell, David, & Oliynykov, 2017, p. 358)

Particularly in the "proof of stake" consensus mechanism, the individual's contribution is the number of tokens, or coins of cryptocurrency, they hold. (Nguyen, et al., 2019, p. 85731) Consequently, this approach reduces energy consumption by not consuming computing power in the process of searching for the next leader of the blockchain, but simply selecting him according to his previous contribution to continue the mining process and add the next block to the chain. (ibid)

Hence, it can be seen that cryptocurrencies already show differences in their underlying technology. The two methods shown, "proof of work" and "proof of stake" in

connection with the blockchain, are currently used by the two largest cryptocurrencies, Bitcoin and Ethereum. (t3n, 2021)

## **2.4. Pricing of Bitcoin**

Despite the differences in the technology used, the pricing of cryptocurrency is similar among all existing currencies and is illustrated below using Bitcoin as an exemplary case. According to das Neves, the price of Bitcoin is determined by three factors, of which the first being , the macroeconomic and financial aspects, such as the stock market index and the current value of the US dollar, the second being, the popularity of the cryptocurrency itself, which includes rising interest rates over the years due to increasing appreciation over time and as a final aspect, the interaction of supply and demand is also shown, which also influences the price. (das Neves, 2020, p. 2) Regarding the first aspect, Zhu's study indicates that the U.S. dollar price and the Bitcoin price are related. Thus, based on this analysis, it can be observed that both prices behave contrary to each other, i.e. if the US Dollar appreciates, the Bitcoin depreciates and vice versa. (Zhu, Dickinson, & Li, 2017, p. 10) Zhu explains this behavior by saying that with a stronger dollar exchange rate, investors are more likely to invest their money in this currency instead of in alternatives such as cryptocurrency, hence, conversely, if the dollar is devalued, an investment in cryptocurrency becomes more attractive, as it promises potentially higher interest rates and profits. (ibid) An additional point was made by Ciaian, that there is also a connection between the Dow Jones Index and the Bitcoin. (Ciaian, Rajcaniova, & Kancs, 2016, p. 901) Van Wijk makes the assumption that the Dow Jones is an indicator of the economic performance of the U.S. and therefore derives in the long term in his analysis that a well-functioning American economy also has a positive impact on the price of Bitcoin, which is in contrast to the previously mentioned exchange rate of the US dollar. (van Wijk, 2013, p. 13 f.) According to van Wijk, this is the case because the Dow Jones is one of the most analyzed and watched indicators of the American economy, and assuming that any changes in the Dow Jones value occur within a few days, this is often a sign that a major event in the economy is imminent, which in turn will also influence the demand for Bitcoin, and consequently, according to van Wijk, it is reasonable to say that the Dow Jones influences the price of Bitcoin. (ibid) All of the indicators mentioned so far refer to the U.S. American region, since, as Figure 2 shows, this is where Bitcoin is traded most frequently by a large margin. (Statista, 2021)

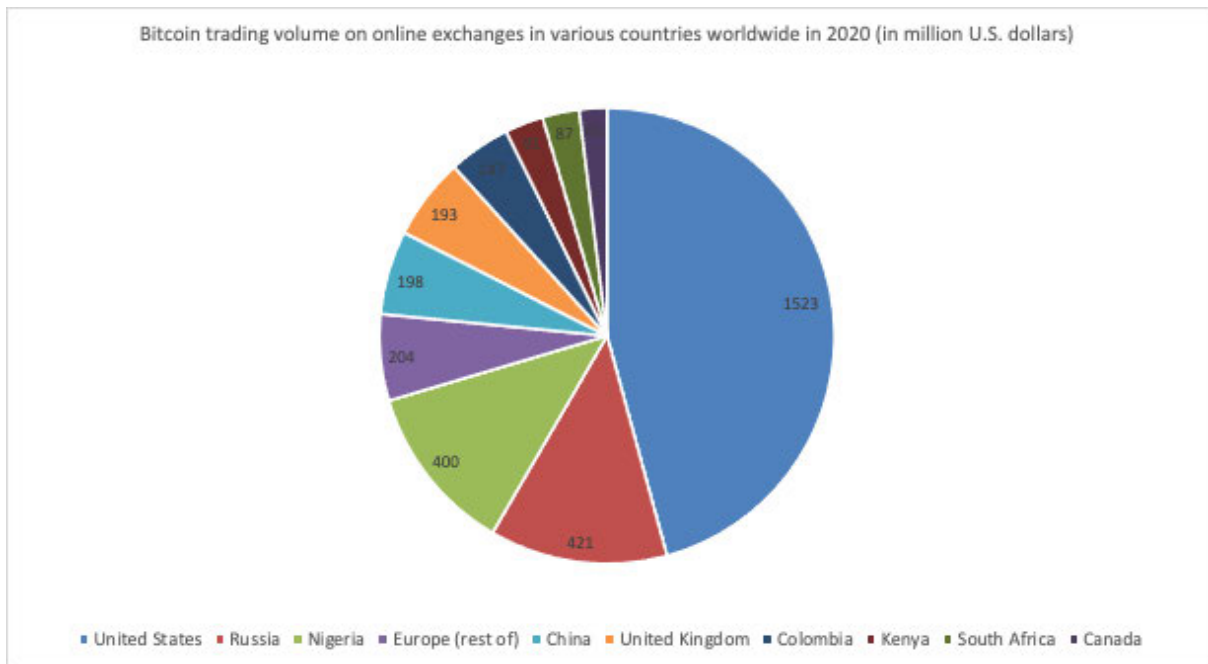


Figure 2 Top 10 Bitcoin trading countries (Authors own rendering based on (Statista, 2021))

It follows that any influences on the American stock exchange or currency have a much stronger impact on the price of Bitcoin than in other parts of the world. (van Wijk, 2013, p. 13)

Subsequently, aspect two is the general popularity of the cryptocurrency, and concerning this, Polasik conducted an analysis, which showed that articles about the Bitcoin have a direct influence on the price. (Polasik, Piotrowska, Wisniewski, Kotkowski, & Lightfoot, 2015, pp. 20-24) If the number of articles about cryptocurrency and the Bitcoin increases, the price for the Bitcoin also increases exponentially, which can also be applied to Google searches, i.e. if cryptocurrency is suggested more often and more actively, the price of the cryptocurrency also increases. (Polasik, Piotrowska, Wisniewski, Kotkowski, & Lightfoot, 2015, pp. 20-24)

The third and last factor to be mentioned here that influences the price of Bitcoin is the interplay of demand and supply on the public cryptocurrency market. (Ciaian, Rajcaniova, & Kancs, 2016, p. 896 f.) Supply is represented by the total number of Bitcoins distributed on the market. Demand, in comparison, is determined by the number of transactions involving cryptocurrency and in addition, the velocity, i.e. the frequency with which a Bitcoin is used to purchase goods or services, also influences demand. (Ciaian, Rajcaniova, & Kancs, 2016, p. 896 f.)

The price of Bitcoin falls when the velocity and the number of available coins fall, but rises when the number of Bitcoin transactions increases. (Breuker, et al., 2013, p. 3)



The demand is determined by the value as an exchange item and unlike commodities such as gold or oil, cryptocurrency has no intrinsic value and derives its price solely from the future exchange value in transactions. (ibid)

The supply of Bitcoins is determined by the total number of units made available on the market, and this number was purposely artificially pre-determined for the Bitcoin (Böhme, Christin, Edelmann, & Moore, 2015, p. 218) Bitcoin, or the developers behind it, are trying to imitate commodities like gold with this approach, which are also only available in a limited number. (Farell, 2015, p. 7)

Even though Bitcoin has this scarcity of commodities, such as gold and oil, there is a difference. This is that the supply of Bitcoin is exogenous, i.e. it is independent and cannot be directly influenced, whereas the supply of gold can be influenced by improved production and extraction measures. (Ciaian, Rajcaniova, & Kancs, 2016, p. 897)

Therefore, it is more accurate to say that the first indicator and main determinant of the Bitcoin price is the demand for it, and changes in the expectation for the future use of the Bitcoin could quickly reflect changes in the price, which in turn is also confirmed by an analysis by Ciaian. (Ciaian, Rajcaniova, & Kancs, 2016, p. 909)

### **3. IFRS**

#### **3.1 Recognition and types of assets**

##### **3.1.1 Recognition criteria for assets**

Fundamental information regarding the items of a balance sheet, such as assets, liabilities and equity, and additional information on income and expenses is provided by the conceptual framework. (IFRS Conceptual Framework, §F4.2)

However, in order for an item to be recognised at all, it must first be checked whether this possible item meets the requirements of the IFRS Conceptual Framework to be considered an asset on an abstract level. (Deloitte GmbH, 2021) This conceptual framework carries out a check in two steps. (IFRS Conceptual Framework, §F4.3-4.4 & F5.7) First of all, it must be verified whether the conditions for an asset are met and If this first step has been fulfilled, step two requires relevant and reliable information from that specific asset in question for the user of the financial statement. (IFRS Conceptual Framework, §F4.3-4.4 & F5.7) To further illustrate that, figure 3 displays a rough idea of the proceedings of an asset recognition. In order to carry out the first

step of the audit, a precise definition of an asset is needed. This can be found in the Conceptual Framework under "Definition of an asset", where it is stated that an asset is an economic resource that the company can control and that originates from a past event. Additionally, an economic resource is a right that has the potential to produce economic benefits. (IFRS Conceptual Framework, §F4.3-4.4)

The Conceptual Framework also defines three further terms that were used in the definition of an asset. Starting with "Right", which is thoroughly described in paragraphs F4.6-4.13 of the conceptual framework, can take many forms. F4.6 distinguishes between two categories, the former being based on obligations of a second party. The holder of the asset has the right to receive money, goods or services. (IFRS Conceptual Framework, § F4.6.a) The latter being not based on obligations of a third party but rather being allowed to use the physical object for one's operations or use intellectual property. (IFRS Conceptual Framework, §F4.6.b) However, having an asset at one's control does not necessarily mean having ownership of it. (IFRS Conceptual Framework, §F4.12) According to F4.12, it is not decisive whether an asset is owned or not. Here, the procedure is purely economic and the current owner of an object can balance it without actually having to be the owner. This circumstance may well be the case for deliveries with retention of title or leased goods. (Ballwieser, 2013, p. 52) This more precise definition is now continued with the "potential to produce economic benefits". (IFRS Conceptual Framework, §F4.4) The Conceptual Framework states that this potential only has to exist. It is neither necessary that it is certain nor even probable. It is only decisive that the previously described right to this potential already exists and that in at least one case it authorises the owner to obtain his benefit. (IFRS Conceptual Framework, §F4.14) However, a very low probability can have an impact on the measurement method or even on the fact, that this asset may not deliver relevant information for the user. (IFRS Conceptual Framework, §F4.15) This economic benefit can consist of contractual cash flows or the exchange of economic resources. In addition, this benefit could also be classically used for production or the creation of services and thereby create its own cash inflows or prevent its own cash outflows. It could also be the case that the economic resource is to be used as a sales object or leasing object, thereby generating money that is equivalent to the benefit. (IFRS Conceptual Framework, §F4.16) The final definition provided by the Conceptual Framework is that of "control". This firstly states or indicates that an economic resource

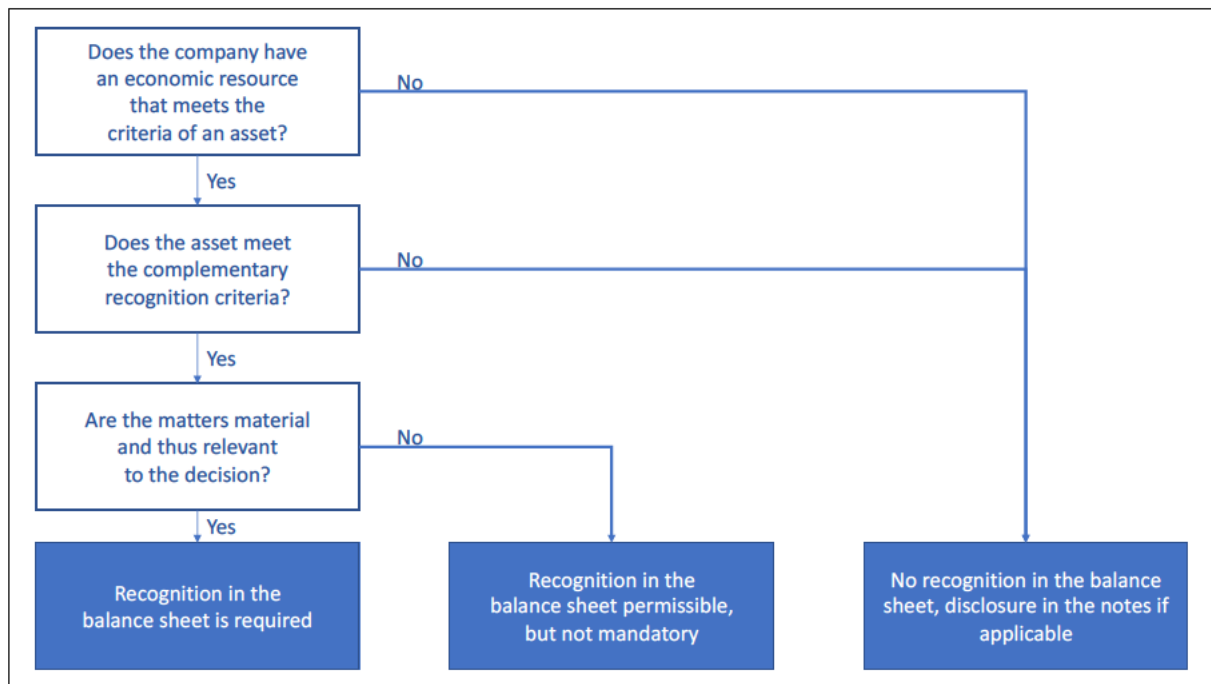


Figure 3 Recognition criteria of an asset (Author's own rendering based on (Petersen, Bansbach, & Dornbach, 2017, p. 49))

belongs to a company. It is important to note here that only parts of a resource can be considered a control, but only this percentage can be included. As an example, it is mentioned here that a company could own parts of a building or land, but does not have access to the entire rights arising from ownership of the thing. (IFRS Conceptual Framework, §F4.19) Furthermore, it is shown in the following paragraphs that control over an item means that one can control the use of it and thus the economic benefits. Simultaneously, it also means that one can legally prevent another party from enriching himself with that thing or can enable a third party to deploy this economic resource. (IFRS Conceptual Framework, §F4.20-21) It may also happen that a company hires a sales representative to sell products on behalf of the company. However, if this is the case, the economic resources remain under the control of the company. Similarly, if the sales representative has an obligation to sell the economic resource, this obligation does not revert to the sales representative as a liability if the sales representative is unsuccessful, as the sales representative never had control over the resource and it is only attributable to the entity. (IFRS Conceptual Framework, §F4.25)

So if an item meets these criteria it can be considered an asset and qualifies for step two of the assessment, i.e. the actual recognition in the balance sheet and can be found under "Recognition Criteria" in the conceptual framework.

This paragraph also states that assets contain a certain amount of information that is important to readers of the financial statements. This would be information about the

"Relevance", which is also defined in more detail in the conceptual framework, and a "Faithful Representation" of the asset, which is again defined in more detail later. (IFRS Conceptual Framework, §F5.7)

Furthermore, it is stated that the economic benefit for the readers of the financial statement must cover the costs of recognition in the balance sheet. In some respects, the information gained by including the asset may outweigh the costs incurred, in which case the asset is not included in the balance sheet. (IFRS Conceptual Framework, §F5.8) "Relevance" is described with the help of two aspects. The first is "existence uncertainty". This states that it is possible that certain circumstances prevail and the existence of the asset can at least be doubted. As already mentioned, this can occur in the case of disputes over the rights to an asset between two parties, where it can only be determined in court who is entitled to dispose of the asset. In this case, the existence of the asset is "pending". (IFRS Conceptual Framework, §F5.14) This "Relevance" is additionally described by the "low probability of an inflow or outflow of economic benefits". An asset can be included in the balance sheet even if the possibility of an inflow or outflow of economic benefits is low. The exact level of probability is not stated and is open to interpretation. So if the possibility is considered low, information about the asset would still be included, but off balance sheet in the notes. This information mainly includes aspects about the extent of inflows and outflows, the timing and possible factors that indicate the occurrence of this case. (IFRS Conceptual Framework, §F5.15-5.16)

In addition to the "Relevance" described above, which the asset must provide, a "faithful representation" is also a prerequisite for recognition in the balance sheet and is affected by two aspects. The first aspect at this point would be the "measurement uncertainty", which arises from the uncertainty in the approach of measuring an assets, as these measurements often only represent estimates and are not completely accurate. The aim of these estimates is to provide useful information to the reader of the financial statements. (IFRS Conceptual Framework, §F5.19) The said uncertainties vary greatly in their level and therefore the assumption applies that in case of doubt, if the uncertainty is perceived to be too high, the asset no longer provides the required useful information. If this is the case, the measurement variant must be examined more closely and, if necessary, changed to achieve a lower uncertainty level. In the case of increased uncertainty and the associated change in the measurement method, an

exact description and explanation of the circumstances and available data is required. Only then the asset can be recognised. (IFRS Conceptual Framework, §F5.21) The recognition however, can also be denied if the uncertainty arising from the estimation is too high and cannot be positively manipulated. (IFRS Conceptual Framework, §F5.22) The second aspect besides the "measurement uncertainty" which influences and constitutes the "Faithful representation" are the "Other factors". These include information on the presentation and disclosure of information derived from the assets at hand. (IFRS Conceptual Framework, §F5.24) First of all, it is stated here that in the case of a purchase of an asset, the expenses incurred for this must appear in the profit and loss account in the same way as the correlating asset in the balance sheet. Only if both values are recognised can users of the financial statements also understand and rely on these values. Otherwise, the omission or non-recognition of a value would lead to the financial statement being potentially misleading. (IFRS Conceptual Framework, §F5.25a) The same applies to the accounting mismatch, which is also listed. In this case, all assets and liabilities that are directly related to the potential newly acquired and recognised asset must be or will be recognised in the balance sheet. (IFRS Conceptual Framework, §F5.25b) Finally, explanatory information, detailed facts, more precise definitions or other relevant aspects must also be listed here. (IFRS Conceptual Framework, §F5.25c) For all types of assets below, the definition of an asset according to the conceptual framework is considered to be fulfilled.

### **3.1.2 Types of assets**

#### **3.1.2.1 IFRS 9 Financial Instruments**

The most reasonable approach to recognise cryptocurrency in the balance sheet is "IFRS 9 Financial Instruments". A financial instrument is defined as a contract that simultaneously gives rise to a financial asset to one entity and a financial liability or equity instrument to a counterparty. (IFRS 9 Financial Instruments, §2.4-2.5) Equity instruments are contracts that represent a right for an entity to receive the assets of another entity after deducting all of its liabilities. (Hans Böckler Stiftung, 2014, p. 3) The financial assets mentioned above can be divided into three broad categories. These are firstly cash and cash equivalents, secondly an equity instrument held as an asset and thirdly a contractual right. (Deloitte GmbH, IFRS 9 Financial Instruments, 2021) The contractual right referred to includes three possible claims. (IFRS 9 Financial Instruments, §2.4 & 2.5) The first claim would be the right to receive cash or

another financial asset from another entity, which are considered customer receivables. The second claim would be the right to exchange financial assets or financial liabilities with another entity under conditions that are potentially favourable. Thirdly and finally, it would be the right to settle an existing contract in the entity's own equity instruments. (IFRS 9 Financial Instruments, §2.4 & 2.5)

### **3.1.2.2 IAS 2 Inventories**

IAS 2 prerequisites two specified tasks, of which an asset must fulfil one. (IAS 2 Inventories, §6) An asset held must either be available for and used in the ordinary course of business, or it must be used in the process of production in the form of supply, raw materials or work in progress. (IAS 2 Inventories, §6) The standard does not explicitly require the asset to be in a physical form. (IAS 2 Inventories, §6) At the same time, however, IAS 2 also excludes inventories that are to be allocated to another standard, namely financial instruments and biological assets related to agricultural activities and products. (IAS 2 Inventories, § 2)

### **3.1.2.3 IAS 38 Intangible Assets**

In addition to the aspects of "control" and "future economic benefits" already described, an intangible asset has a third aspect called "identifiability", which is described by two parameters. (IAS 38 Intangible Assets, §8 & 9) The first is separability, which means that this intangible asset can be separated and subsequently has the ability to be sold, transferred, rented or exchanged individually or as part of a group. (IAS 38 Intangible Assets, §12a) However, an asset is also identifiable if it is based on a contractual or legal basis, regardless of whether the right is transferable or separable from the entity or its other rights and obligations. (IAS 38 Intangible Assets, §12b) According to the definition of intangible assets provided by IAS 38, these originate from the acquisition, development or advancement of intangible resources. (IAS 38 Intangible Assets, §9) By way of illustration, it is further explained that these intangible resources can take the form of scientific or technical knowledge, new processes or systems, licences, intellectual property, market knowledge or trademarks. Implicitly excluded from this definition are monetary assets. (IAS 38 Intangible Assets, §9)

## **3.2 Measurement of assets**

### **3.2.1 IFRS 13 Fair Value**

IFRS generally defines the term "fair value" as the price that would be received to sell

an asset (or paid to transfer a liability) in a transaction between knowledgeable, willing parties in an arm's length transaction at the measurement date. (IFRS 13 Fair Value, §9 & 15) This paragraph is applied when fair value measurement is required or permitted by other IFRS paragraphs. In addition, it is also possible that other paragraphs include a measurement that incorporates fair value as a factor. (IFRS 13 Fair Value, §5) The valuation is always applied to a specific asset (e.g. a financial instrument or a non-financial asset or a group of asset meaning a business) and should include its characteristics in the measurement. According to IFRS, these characteristics are the condition and location of the asset. In addition, whether the asset has any restrictions on sale or use is also taken into account. (IFRS 13 Fair Value, §11 & 13) With the approach via a measurement hierarchy, the IFRS also wants to ensure that the present measurement of the fair value is consistent and comparable. This hierarchy is divided into three levels, with level one being the highest priority and level three the lowest. In the event that inputs from different levels of the hierarchy are used to measure the fair value of an asset, the prevailing prioritisation takes effect and the factor with the lowest level is decisive in the measurement. (IFRS 13 Fair Value, §72-73) In level one of the hierarchy, prices are those achieved for identical assets on active markets, i.e. markets with such a high frequency of transactions that information on prices is continuously available to which the company has access to. (IFRS 13 Fair Value, §76) According to IFRS, this quotation of the price on an active market constitutes reliable evidence of the fair value and can be used to measure it without further processing, insofar as this is possible. (IFRS 13 Fair Value, §77) The fair value measurement at level one represents the product of the quoted price and the quantity that the entity has in stock. This is also the case if the quantity held by the company exceeds the quantity sold on the market on the reporting date. (IFRS 13 Fair Value, §80) Compared to level one, level two cannot provide this accuracy of comparability below the products. Therefore, a different approach is taken and similar products or markets are used as comparators. (IFRS 13 Fair Value, §81) Price quotations for similar assets on an active market or price quotations for the same assets on inactive markets are listed here. Furthermore, it is stated that other factors can also be used apart from price quotations. These include interest rates or interest rate curves, implied volatility or credit spreads. Furthermore, it is stated that other factors can also be used apart from price quotations. These include interest rates or yield curves, implied

volatility or credit spreads (IFRS 13 Fair Value, §82) As can be assumed, these values, which are available here in level two, cannot be directly included in the measurement of the fair value and require a certain amount of preparatory work. This consists of an assessment of the condition and location of the asset, the degree of comparability of the assets used as a price reference or the actual activity of the market used. (IFRS 13 Fair Value, §83) Lastly, there is level three, in which the input factors that are not directly observable are located. (IFRS 13 Fair Value, §86) These are based on the fact that there are hardly any comparable assets, nor is there an active market. The indirect input factors mentioned replace the direct ones from level two (or 1, if applicable) to the extent that these are missing for measurement and only then. The company must take this into account by developing the direct factors itself to the best of its knowledge and using the available information, whereby internal data can also be used for this purpose. In addition, all reasonable and relevant information about other market participants that is available must be used to develop the input factors. (IFRS 13 Fair Value, §87-89)

In summary, it can be said that four things are needed to determine the fair value of an asset. Firstly, there is the determination of the asset to be measured, taking into account its condition, location and possible restrictions on its sale and use. (IFRS 13 Fair Value, §11) Secondly, there is the question of the valuation premise, which can be unified in terms of "highest and best use". The IFRS defines "highest and best use" in Appendix A as the maximisation of the value of a non-financial asset through the use of a market participant. (IFRS 13 Fair Value, §27) Thirdly, it is necessary to determine which market has priority or is the most advantageous for the asset in question. According to Appendix A, the priority market is described as the market with the largest volume of this asset and the highest frequency of related transactions, whereas the most advantageous market is described as the one in which the price to be obtained for the asset is the highest. In general, it is assumed that the asset takes place on an existing "priority market". Only under the premise that such a market does not exist is the "most favourable market" to be considered alternatively. (IFRS 13 Fair Value, §24) Fourthly, an entity uses valuation techniques that are appropriate in the circumstances that are given for the respective asset. Sufficient data must be available at the time of the fair value measurement in order to develop input factors for each of the valuation techniques. In addition, there is the measurement hierarchy described above, which is added to the individual input factors and shows their prioritisation. It is also relevant



that the use of observable input factors (i.e. those from level 1 or 2 of the valuation hierarchy) should be maximised and the use of non-observable factors should be minimised or avoided as far as possible. The objective of all these valuation techniques is to estimate the price at which, under current market conditions at the measurement date, an orderly transaction between market participants would occur in which the asset would be sold. (IFRS 13 Fair Value, §62)

Appendix B of IFRS 13 describes three different approaches to these assessment procedures. The first is the market approach, which uses prices and additional relevant data and information generated by market transactions. This approach creates a duplicate of the asset in the current market and thus allows conclusions to be drawn about the price. (IFRS 13 Fair Value, §B5-B7)

The second approach is the cost approach, which bases its price on replacing the service capacity of an asset. Here it is assumed that under normal circumstances a market participant will only pay as much for an asset as it costs him to acquire or construct a comparable substitute asset. (IFRS 13 Fair Value, §B8-B9)

The third and final approach is the income-based approach. It includes all future cash flows in its calculation and converts them into a single value by discounting. This discounted value then in turn reflects current market expectations with regard to future cash flows and thus obtains its fair value. (IFRS 13 Fair Value, §B10-B11)

### **3.2.2 Types of measurements**

#### **3.2.2.1 Measurement of IFRS 9 Financial Instruments**

In order to enable the initial valuation of a financial instrument, it must first be classified according to three different approaches, which are based on the subsequent measurement of the asset. For this purpose, the financial instruments are first classified into three groups based on the differences in the business model and the contractual cash flows of the assets in question. (IFRS 9 Financial Instruments, §4.1.1)

The first possible option would be a classification according to amortised cost. This assumes that the company holds the asset for a longer period of time in order to receive the contractually guaranteed cash flows. (IFRS 9 Financial Instruments, §4.1.2

(a)) In addition, it is also assumed that the contractual content specifies a precise date on which cash flows will arise from the fair value at initial recognition of the asset and interest from the current value of money, credit risk and a profit margin. (IFRS 9

Financial Instruments, §4.1.2 (b)) In order for a financial instrument to be subsequently measured at fair value through other comprehensive income, there must also be a reliable date for the incoming cash flows of the asset, as is already the case with amortised cost. However, the underlying business model differs here, whose goal does not necessarily have to be to keep the asset in the company and to maintain the contractual cash flows, but whose purpose can also be to be able to sell it over time. (IFRS 9 Financial Instruments, §4.1.2A) If neither amortised cost nor fair value through other comprehensive income is applicable, the last option, fair value through profit and loss, is used. (IFRS 9 Financial Instruments, §4.1.4) For the initial measurement of a financial instrument, all assets apart from customer receivables must be recognised at fair value plus or minus transaction costs if they are not allocated to the third option mentioned above, "fair value through profit and loss", in the subsequent measurement. (IFRS 9 Financial Instruments, §5.1.1) According to IFRS, the best indicator of fair value in this case is the transaction price. If there is an identifiable difference, positive or negative, between these values, it must be included as a gain or loss either in full or partially, as a factor that other market participants would consider when pricing the asset. (IFRS 9 Financial Instruments, §5.1.2A)

### **3.2.2.2 Measurement of IAS 2 Inventories**

Inventories should be valued at the lower of cost and net realisable value, i.e. the value expected by the company in the ordinary course of business. (IAS 2 Inventories, §9)

The costs include three value-driving factors. Firstly, there are the costs of purchasing. These include the purchase price and all costs directly associated with the asset, such as customs duties, taxes and transport costs, minus any discounts. The second factor is the cost of conversion. These include all fixed and variable manufacturing overheads. The third and final factor is the other costs incurred to bring the inventory to its present location and condition. (IAS 2 Inventories, §10-22)

In this context, the following costs of inventories are excluded from the measurement and may not be included in the measurement. These are unusual quantities of material waste, storage costs, administrative overheads not directly related to production, distribution costs, exchange rate differences resulting from the purchase of inventories and any interest expenses. (IAS 2 Inventories, §16-18)

Any write-downs to the net realisable value shall be recognised as an expense in the period in which they occur. Any reversal of an impairment loss shall be recognised in

the income statement in the period in which the reversal occurs. (IAS 2 Inventories, §34)

However, there are also assets that are excluded from the measurement as inventory. These would be any agricultural and forestry products, as well as minerals, if these are valued at net realisable value. If such inventories are measured at net realisable value, changes in value are recognised in the income statement in the reporting period in which the change occurs. (IAS 2 Inventories, §3(a)) The same also applies to commodity broker-trader who measure their inventories at fair value less costs to sell. If such inventories are measured at fair value value less costs to sell, the changes in value are recognised in the income statement in the reporting period of the change. (IAS 2 Inventories, §3(b))

### **3.2.2.3 Measurement of IAS 38 Intangible Assets**

There are basically two phases in the measurement of an asset. Firstly, there is the initial valuation and then the subsequent valuation. The initial valuation of an intangible asset is based on its cost. (IAS 38 Intangible Assets, §24) Concerning this matter, cost represents the amount of cash or cash equivalents used to produce or purchase the asset. In addition, cost can also represent the fair value at the time of purchase or production of the asset. (IAS 38 Intangible Assets, §8) After the initial valuation, the company can choose between two approaches as to how it wishes to value its asset in the future. There would be a choice between the cost model and the revaluation model, which can only be used if there is an active market for the asset. (IAS 38 Intangible Assets, §72) The former approach is based on the costs of the initial measurement, which in turn are reduced by depreciation and impairments losses. (IAS 38 Intangible Assets, §74) The latter approach follows the same scheme as the previous cost model, except that it now shows the underlying fair value at the time of revaluation less depreciation and impairment losses. (IAS 38 Intangible Assets, §75) The frequency of these revaluations depends on the volatility of the fair value of the asset in question. If the fair value deviates significantly from the current book value, the asset must be revalued as a result. (IAS 38 Intangible Assets, §79) If, at any time during the life of the asset, the active market on which the fair value is based is no longer available, the asset is valued from this time onwards using the cost model, which means that the costs are estimated and reduced by the depreciation incurred up to this time. (IAS 38 Intangible Assets, §81)

## **4. Recognition and measurement of cryptocurrencies**

### **4.1 Recognition of cryptocurrencies**

#### **4.1.1 General recognition of cryptocurrencies**

In order to be included in the balance sheet as a possible item, cryptocurrencies must fulfil the defined requirements of the conceptual framework. These prerequisites are represented by the two-stage approach model presented in chapter 3.1.1. If this model is met, the next step is to analyse what kind of assets the cryptocurrency represents on the balance sheet, as this requires further information such as the purpose and use. (PricewaterhouseCoopers GmbH, 2019, p. 6) In the first step of the model, the cryptocurrency is assessed for its abstract accounting ability, which means that it represents a resource received in the past that is under the control of the entity and from which an economic benefit will be received in the future. (IFRS Conceptual Framework, §F4.3-4.4)

With regard to cryptocurrency and its fulfilment of the individual points of abstract accountability, it can be stated that it can create a future economic benefit in two ways. Future economic benefit can firstly be generated, when the cryptocurrency is used to acquire assets directly, provided they are accepted as a means of payment by the counterparty, and to use them for one's own operational activities and secondly, it would also be possible to exchange the cryptocurrency on the stock exchange for conventional currency, such as the US dollar, and to use this in turn to carry out one's operational activities. (Kirsch & von Wieding, 2018, p. 116 f.) The cryptocurrency originally came into the possession of the corresponding company via one of these two actions, which in turn reflects a business case from the past, which is also named as a condition of the definition. (ibid)

As already shown in chapter two, the corresponding cryptocurrencies do not exist in a physical form, but represent a part of the blockchain and are therefore only available in digital form. (Brühl, 2017, p. 136) In order to be able to dispose of its cryptocurrency holdings, a company needs a digital account, also called a wallet. (Zapf, 2020, p. 156) However, this can only be done in combination with your own personal private key. (Brühl, 2017, p. 136) For this reason, the company can also use this private key to prove, from an economic point of view, that it has control over the cryptocurrency holdings from the wallet and that the economic benefit is exclusively attributable to the

holder of the private key. (Kirsch & von Wieding, 2018, p. 117) At this point, it should be mentioned that a mere intention to acquire cryptocurrency is not sufficient to be considered as control over it on the reporting date. (Zapf, 2020, p. 156)

Therefore, cryptocurrencies are to be considered assets according to IFRS.

However, as already described in chapter three and taken from the Conceptual Framework, the asset in question must still fulfil step two of the valuation model for final recognition in the balance sheet, i.e. it must be probable that the cryptocurrency to be included will provide a benefit to the company and it must also be possible to classify it at a value that can be reliably determined. (IFRS Conceptual Framework, §5.7) The level of probability is not precisely defined in the IFRS, but in the case of cryptocurrency it can be assumed that the benefit will be realised and is based on the fact that control over the cryptocurrency is only rejected if the private key was lost or stolen, hence, it is therefore in the company's own interest to install security measures to counteract and avoid this circumstance, as otherwise the entire stock of the currency would be useless for them. (Martini & Weinzierl, 2017, p. 1251 f.) Therefore, it can be assumed at this point that the likelihood of benefits being derived is reasonable.

Additionally, the decentralised basic idea of the blockchain also plays a positive role, as no third party or institution can access the cryptocurrency holdings, thus mitigating the risk of manipulation. (Nabilou, 2019, S. 266 f.) At this point, however, it should be noted that China, for example, has already banned cryptocurrencies such as Bitcoin in order to protect its own currency and has also banned services related to the creation of new coins. (Wurzel, 2021) Other countries may follow suit in the future, which in turn will have an impact on the likelihood of the benefits being delivered. (ibid)

In addition to the probability of use, the asset must also have an acquisition cost, production cost or similar value that can be reliably and safely determined and recognised at the balance sheet date. (IFRS Conceptual Framework, §5.18) A further description of faithful representation was depicted in chapter three.

The cryptocurrency has a certain value through its acquisition alone, since it can be acquired on an exchange and thus has a market value that the parties to this transaction have agreed on, or the Bitcoin is received in exchange for a good or a service, which in this case is also equivalent to a market value. (Kirsch & von Wieding, 2018, p. 117) Thus, the values presented can be considered objective and reflect a neutral value for the reader or user of the balance sheet. (ibid) Some argue at this

point that the faithful representation of the cryptocurrency, however, is opposed by its very high volatility and therefore cannot be guaranteed. (Thurow, 2014, p. 197) This assumption is also illustrated in the following Figure 4. It can be seen very clearly that extreme fluctuations occurred in some cases in the first years of the Bitcoin, but these have increasingly decreased in the last few years, even though investors and holders are still exposed to significant fluctuations today. (Fiedler, Gern, & Stolzenburg, 2018, p. 752 f.) However, the general consensus is that this volatility will not preclude the recognition of cryptocurrency in the balance sheet. (Kirsch & von Wieding, 2018, p. 117) It is argued here that the exchanges for cryptocurrencies do not yet operate as

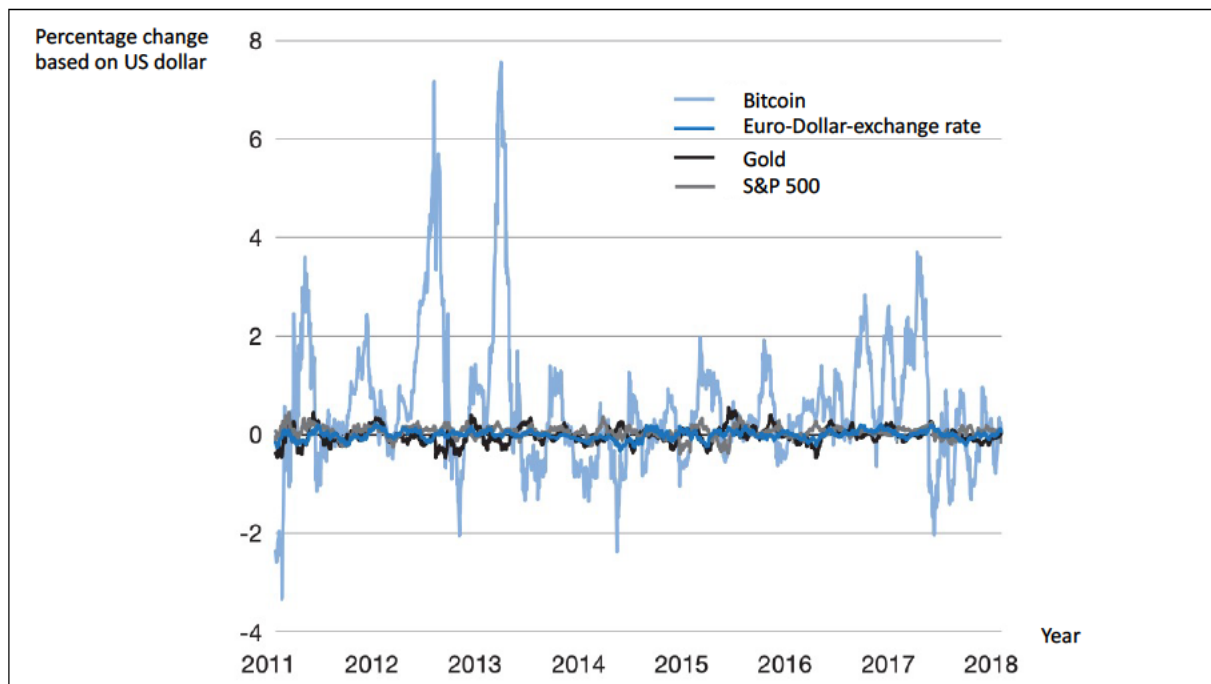


Figure 4 Volatility of Bitcoin in comparison to Gold, Euro and US-stock (Fiedler, Gern, & Stolzenburg, 2018, p. 753)

efficiently as the exchanges for traditional investments such as shares. (Schmidt, 2017, p. 47 f.)

However, the growing interest in these new assets through the increased trading volume and market capitalisation also shows an increasing number of market participants, which in turn will lead to this market also developing further in the future and approaching the efficiency of the exchanges of other assets. (Rauscher, 2021, p. 23) It can thus be stated at this point that the recognition of cryptocurrency in the balance sheet is essential according to the conceptual framework, also with regard to the users of the balance sheets. Financial instruments, intangible assets or inventories can be considered for a precise accounting of the assets that are now certainly available and eligible for recognition.

#### **4.1.2 Recognition pursuant to IFRS 9 Financial Instruments**

It is reasonable to assume that it can be recognised pursuant to IFRS 9 financial instruments, based on its primary idea of being a digital currency.

With reference to chapter three, in which financial instruments have already been defined in detail, it should be briefly summarised here that they represent a contractual relationship between two or more parties, in which an asset is received on one side and on the other side it leads to a financial liability or an equity instrument. (IFRS 9 Financial Instruments, §2.4-2.5)

Looking at cryptocurrency holdings by a company against this background, the question arises as to whether a contract between two or more parties has come into existence at all. (Venter, 2016, p. 12) For this to be the case, performance obligations between two or more parties would have to have arisen through an agreement that cannot be evaded with impunity and it is not clear which obligations are associated with the holding of the cryptocurrency, nor who the obligating counterparty is. (ibid) In addition, the legal situation is unclear, according to which an algorithm can set up a contract and this shows, that there are discrepancies with cryptocurrency in the definition of a financial instrument and should probably not be chosen as an approach. (Simmchen, 2017, p. 164)

Examining receivables in that regard, the notion of the counterparty in question is confirmed. A declaration in the balance sheet as a receivable would require that there is a counterparty. However, as described, this does not exist and is not represented by any wallet operators or the Bitcoin network. (IFRS 9 Financial Instruments, §2.4-2.5)

But the idea of the cryptocurrency was also different, namely to be a platform for payments, with the coins enabling the transactions, i.e. representing a means of payment. (Nakamoto, 2008, p. 1)

Looking apart from IFRS, cash is understood as a "store value", "a common base for prices" and a "medium of exchange". (Thiele & Diehl, 2017, p. 3)

In order to maintain or preserve a value, cash must not be exposed to strong volatility. Even if we know that the volatility of cryptocurrency has at least improved in recent years, this is still not enough to maintain a value. (Fiedler, Gern, & Stolzenburg, 2018, p. 754) Cryptocurrency is also not yet sufficient as a basis for a price, even if some already accept this currency as payment, as there are hardly any, if any, offers of goods or services denominated in cryptocurrency. (Procházka, 2019, p. 221) This does not

correspond to broad acceptance thinking. (Fiedler, Gern, & Stolzenburg, 2018, p. 752) The last point cannot be fully proven either, as cryptocurrency is only accepted as an object of exchange in isolated cases, but not by everyone and therefore, it can be stated for the time being that cryptocurrency does not correspond to the common image or definition of cash. (Venter, 2016, p. 11)

However, this definition does not necessarily have to be followed by IFRS, which can also choose a different approach under accounting law. According to IAS 7 that see cash defined as liquid funds and demand deposits, which in turn are closer in nature to cryptocurrency, as they are also not based on a contractual relationship in the narrower sense. (IAS 7 Statement of Cash Flow, §7.6) Nevertheless, this approach is also rather questionable in the IFRS context, as cryptocurrencies cannot yet be deposited at banks or institutions with a similar background like other means of payment. (Venter, 2016, p. 10) In addition, cryptocurrencies also lack the physicality that cash has, nor are they a means of payment that has been legally legitimised. (Thiele & Diehl, 2017, p. 4) This lack of legal and social acceptance means that cryptocurrency cannot be included in the balance sheet as cash. (Fiedler, Gern, & Stolzenburg, 2018, p. 752 f.) The IFRIC also argues at this point that cryptocurrency is not cash, which is regarded as a medium of exchange. (IFRS Interpretations Committee - meeting, 2019, p. 5) According to the committee, cryptocurrency does not have this characteristic, as it is not yet widely accepted and is therefore neither universally exchangeable nor used as a monetary unit for the valuation of items in the balance sheet. (IFRS Interpretations Committee - meeting, 2019, p. 5)

However, the possibility of cash equivalents could also be considered. These are regarded as short-term financial investments that can be exchanged for fixed amounts of cash at any time. (IAS 7 Statement of Cash Flow, §7.6) Cash equivalents may only be subject to very minor fluctuations in value, i.e. their volatility may not be disproportionately high. (IAS 7 Statement of Cash Flow, §7.6) Repeatedly, an approach as a cash equivalent fails, since the limited acceptance does not guarantee that they can be exchanged at any time, nor is the current volatility level sufficient to be considered immaterial. (Thurow, 2014, p. 197) Therefore, it is currently not objectively justified to recognise cryptocurrencies neither as cash nor as a cash equivalent in the balance sheet. Cryptocurrency also misses the definition of the last financial instrument. A recognition as an equity instrument, such as shares or shares in partnerships, is also



not fulfilled, as there is no residual claim to the assets of a company after deduction of the debts, due to the fact that there is no underlying contract nor a counterparty. (Venter, 2016, p. 12) In conclusion, cryptocurrency cannot be included in the balance sheet as a financial instrument.

#### **4.1.3 Recognition pursuant to IAS 2 Inventories**

With regard to chapter three, it is shown that inventory does not need to exist in physical form, but rather in the form of assets that are sold in the normal course of business. (IAS 2 Inventories, §6) With regard to IAS 2.5, a recognition for a broker-trader comes into question. If a company actively trades in cryptocurrency and sells it with the intention of making a profit, whether through price fluctuations or margins, recognition in accordance with IAS 2 is possible would meet the criteria stated in. (PricewaterhouseCoopers GmbH, 2019, p. 10) Apart from the broker-trader mentioned, however, the cryptocurrency lacks the properties that are shown in the definition of inventories. Due to their purely digital nature, they are neither assets that are used in the production of goods for sale, nor are they to be regarded as raw materials or supplies for production. (Kirsch & von Wieding, 2018, p. 118 f.) Furthermore, they are not necessarily sold in the normal course of business, but are used for payment, which in turn contradicts the requirement of IAS 2.6. (Thurow, 2014, p. 198)

Kirsch argues at this point with a comparison to gold, since both, gold and cryptocurrencies, have a finite supply and a limit on the maximum number of units they can hold, but gold, unlike cryptocurrency, can be further processed and thus meets one of the three definitions of IAS 2.6. (Kirsch & von Wieding, 2018, p. 119) Therefore, a generally applicable recognition of cryptocurrencies in the balance sheet under IAS 2 as inventories can currently be ruled out and only broker-trader and companies that have anchored cryptocurrency trading in their normal business activity can recognise it as an inventory according to IAS 2.

According to the IFRIC, sales within the normal course of business cannot be categorically excluded, which in turn does not contradict an approach as inventory. (IFRS Interpretations Committee - meeting, 2019, p. 24) In addition, they also consider broker traders as an alternative, and thus an inventory approach would also be given. (ibid)

However, there are fundamental doubts on the part of experts about the eligibility for broker-traders, as IAS 2 does not provide a sufficient definition for this and companies

must prove that they acquire cryptocurrency and hold it for sale after the normal course of business in order to generate profit from the fluctuation of this currency. (IFRS Interpretations Committee - Letters, 2019, p. 8) However, this existing definition does not cover the activities of miners who do not acquire cryptocurrency but receive it as payment and, by analogy, this also applies to companies that receive cryptocurrency as payment but do not immediately sell it for speculative purposes. (IFRS Interpretations Committee - Letters, 2019, p. 9) This shows that in this case an approach as inventory is possible under given circumstances, but that this is critically questioned by experts and will at least be generally clarified in the future.

#### **4.1.4 Recognition pursuant to IAS 38 Intangible Assets**

If IAS 2 is not applicable, i.e. cryptocurrencies are not held for sale in the ordinary course of business, another approach are the requirements of IAS 38 for an intangible asset, in which four aspects must be fulfilled, that have already been examined and described in more detail in chapter three. These aspects are the identifiability, the non-monetary nature, the lack of a physical component and the definitional guidelines of the conceptual framework for the recognition of an asset. (IAS 38 Intangible Assets, §8 & 9)

The requirements of the conceptual framework for being recognized as an asset can be applied to cryptocurrencies and have already been described in chapter three. The aspect of the non-physical component is also undoubtedly present, since cryptocurrency, as clarified several times in chapter two, is created purely digitally and only exists in the blockchain and wallets. (Rosenberg, 2019, p. 142 f.) The identifiability of cryptocurrency can also be clearly demonstrated, as it can be easily separated from the company by selling, transferring or exchanging it. (Zapf, 2020, p. 159) However, opinions differ on the aspect of non-monetary nature and one side argues that it has already been shown that cryptocurrency is neither cash nor a cash equivalent and should therefore be considered a non-monetary asset. (Venter, 2016, p. 13) This is also supported by a study that shows that cryptocurrency misses the definition of money. (Kubat, 2015) In addition, the reference to chapter 4.1.2. also applies, where it was shown that cryptocurrency does not meet the general definition of money. (Thiele & Diehl, 2017, p. 3)

Nevertheless, there are also opponents who point out that this simple approach may not be adequate and is insufficient. (IFRS Interpretations Committee - Letters, 2019, p.

4 f.) They base their argumentation on the fact that IAS 38 defines the term monetary as "money held and assets to be received in fixed or determinable amounts of money" and thus implicitly indicates what a non-monetary asset is. (IAS 38 Intangible Assets, §8) This definition, however, only borrows from other definitions available in IFRS (cf. IAS 7 §6 and IAS 21 §16), but is not identical and therefore not fully sufficient. It can therefore be concluded at this point that monetary assets according to IAS 38 do not necessarily correspond to the present definition of cash or cash equivalents and therefore it cannot be said whether cryptocurrency is really a non-monetary asset according to IAS 38.8. (Kirsch & von Wieding, 2018, p. 119) Thus, cryptocurrency is in a grey area. Companies use it as a transaction medium, i.e. from an economic point of view like a monetary asset. (Zapf, 2020, p. 159) In addition, as already shown, cryptocurrency can be exchanged for conventional currency on an existing exchange, which in turn also corresponds to a monetary asset according to IAS 38.8. (Weich & Sandkühler, 2020, p. 410 f.) In this context, however, they do not fall under the definitions of cash and cash equivalents, but are used by companies accordingly. The inaccuracy in the term "non-monetary" may therefore have to be interpreted differently for cryptocurrencies in the future. (Kirsch & von Wieding, 2018, p. 119) Also, in a published set of letters responding to the current discussion on the recognition of cryptocurrency by various experts, the Canadian Securities Administrators comment, that cryptocurrency does not fully comply with IAS 38. (IFRS Interpretations Committee - Letters, 2019, p. 4 f.) Intangible assets are used by the company at a later date to support its operating activities, meaning they are used to generate an economic benefit. (IAS 38 Intangible Assets, p. 17) Cryptocurrency, in comparison, is acquired in order to sell it at a later date at a profit. (IFRS Interpretations Committee - Letters, 2019, p. 4 f.)

The IFRIC agrees with parts of the Canadian Securities Administrators' comments and confirms that cryptocurrencies were not taken into account when IAS 38 Intangible Assets was prepared, as they did not exist at the time. (IFRS Interpretations Committee - meeting, 2019, p. 18) However, it further argues that the standard was designed to account for all assets that meet the essential requirements of intangible assets, that are according to the committee the prerequisite of an asset, no physical substance and being identifiable, and do not fall under any other standard. (ibid)

## **4.2 Measurement of cryptocurrencies**

### **4.2.1 Measurement pursuant to IAS 2 Inventories**

Since recognition as a financial instrument can already be ruled out, it should be noted at this point that a depiction for the measurement of cryptocurrencies refers exclusively to that of inventories and intangible assets.

The valuation method prescribed by the standard, consisting of the lower of cost and net realisable value, poses challenges for users of the balance sheet, in case cryptocurrency is held for selling purposes in the ordinary course of business. (PricewaterhouseCoopers GmbH, 2019, p. 8)

For several reasons, this method does not provide the relevance required by the conceptual framework. First, IAS 2 is designed to apply to assets that are intended to be sold. (IAS 2 Inventories, §6) It does not aim to reflect the value of assets with investment or monetary characteristics that can be paid for. (Zapf, 2020, p. 161) In addition, the costs included here are a reflection of the past and hardly reflect the current value, (Venter, 2016, p. 16) especially against the background already described that the volatility of the cryptocurrency is still very high in some cases. (Thurow, 2014, p. 197) In addition, the method used always yields declining values, since a prudent valuation method that always uses the lower underlying value is not appropriate in the volatility context and may give a false picture to the users of the balance sheet. (Venter, 2016, p. 16) Furthermore, the value of the "net realisable value" is not intended to be applied to cryptocurrencies, which is an internal company value which, as already implied, does not reflect the current market in its entirety and could also give a false impression. (ibid) A measurement for assets like cryptocurrencies that generate their cash flow directly, as they are sold independently on an active market, so a market value is the best option for valuation. (IFRS 13 Fair Value, §9) Another aspect that speaks in favour of a market-based valuation approach and against a cost-based approach is the comparably high volatility (Thurow, 2014, p. 197) which is why costs once applied quickly lose their significance in the valuation and a market value according to fair value reflects this fluctuation in value much better. (IFRS 13 Fair Value, §9)

As already described, broker-traders are required to measure their inventories exactly at fair value (Weich & Sandkühler, 2020, p. 410), which in turn accurately reflects the

required market and current value, which is crucial to provide a relevant picture for the users of the balance sheet. (IAS 2 Inventories, §6)

As already defined in the chapter on fair value, a valuation according to this requires a classification within the hierarchy in order to determine a reliable price. In order to be valued according to Priority 1, there must be an active market and the price must be directly determinable. (IFRS 13 Fair Value, §76) This means that the available volume and the frequency with which the available asset is traded on this market must occur in such a quantity that a price is available at all times. (IFRS 13 Fair Value, Appendix A) As already described, the trading frequency of the cryptocurrency is still relatively low, but as of today there are several exchanges, providers and traders, which is why a valuation at fair value is objective and reliable. (Procházka, 2018, p. 174) One problem with cryptocurrency is that there are different markets and the largest market differs among countries. (coinmarketcap, 2021) This makes it difficult to determine a principal market and one must resort to the alternative, the most advantageous market. This is the market where the most favourable offer is received. (Chartered Professional Accountants of Canada, 2018, p. 17)

Therefore, the mere existence of a principal market is not sufficient, but must always be considered on a case-by-case basis, that it can be reached by the company, that the frequency and volume is sufficient to be considered a principal market and finally also to deliver a reliable price for a certain cryptocurrency. (Deloitte GmbH, 2018, p. 14)

Due to the different volatilities, acceptances, accessibility and prices for various cryptocurrencies, not all of them will be able to draw their price after prioritisation 1 and possibly initially only after prioritisation 2 or 3 with a reference value of a more stable cryptocurrency. (Deloitte GmbH, IFRS 13 Fair Value, 2021) However, this does not preclude an upgrade to a higher prioritisation in the future. (Chartered Professional Accountants of Canada, 2018, p. 17)

Yet experts conclude that fair value is best suited to measure cryptocurrency in view of the existing measurement methods and thus provide relevant information to the user of the balance sheet. (Venter, 2016, p. 18) Therefore, in addition, reporting the changes in fair value in the income statement would provide additional benefits and information to the user. (ibid)

#### **4.2.2 Measurement pursuant to IAS 38 Intangible Assets**

The intangible assets are also measured at the underlying costs when they are recognised. (IAS 38 Intangible Assets, §24) Production costs in the context of cryptocurrency can only be recognised under the condition that the coins in question were produced themselves, i.e. mined. (Zapf, 2020, p. 159) Acquisition costs are easier to apply here, as the total amount paid to acquire the cryptocurrency minus possible bonuses or discounts is recognised. (IAS 38 Intangible Assets, §27) In the case of cryptocurrency, the costs already mentioned for the verification of the blockchain are also incurred, which are paid to the miners. (Farell, 2015, p. 5) In addition, transaction, legal and consulting costs may be incurred in order to restore the intangible assets to their current condition and location, as described in IAS 2. (Zapf, 2020, p. 159) However, there could also be a case in which the cryptocurrency is not purchased but received in exchange for other goods or services. (Hanl & Michaelis, 2017, p. 364) In this case, the fair value of the cryptocurrency is recognised or, if this cannot be reliably determined, the carrying amount of the exchanged asset is recognised without effect on income. (Zapf, 2020, p. 159)

According to IAS 38, the company then has a choice for its subsequent measurement. One is the cost model and the other is the revaluation model. (IAS 38 Intangible Assets, §72)

Since measurement at cost is problematic, as already pointed out in the previous chapter, in the sense of a past-oriented approach and the resulting lack of current and reliable values, it is also not yet possible to say with certainty whether cryptocurrency must be depreciated and over how long a period. (Wollmert & Oser, 2019) In his comments on the accounting of cryptocurrency, Wollmert shows that there is no depreciation here due to the unlimited useful life of the currency. (Wollmert & Oser, 2019) Zapf, on the other hand, shows in her work that there are also opposing voices that describe that the use of cryptocurrencies will be realised at a point in the future and therefore this point in time must be attempted to be estimated and depreciated over this period. (Zapf, 2020, p. 160) For these two reasons, a measurement basis from the cost model should not be recommended, at least not at present.

The second approach is the revaluation model, which in turn entails a measurement according to fair value. (Deloitte GmbH, IFRS 13 Fair Value, 2021) The fact that the required fair value exists because there is an active market which delivers a reliable

price reference, at least for the most popular cryptocurrencies, was also shown in detail in chapter 4.2.1 and can be considered fulfilled.

However, not every change in the revaluation model is recorded in the profit and loss statement and thus initially provide an incomplete picture of the performance of this asset. (Venter, 2016, p. 17) Therefore, as already requested, an additional inclusion of the changes in fair value through the revaluation model within the profit and loss statement would create a more comprehensive picture for the user of the balance sheet. (IFRS Interpretations Committee - Letters, 2019, p. 5) This is also the conclusion reached by the participants of the IFRS® Interpretations Committee meetings, they state that cryptocurrency should be measured at fair value through profit and loss.

## **5. Conclusion**

### **5.1 Summary**

In the context of this bachelor thesis, an attempt was made to critically examine a possible recognition and measurement of cryptocurrency and to present it within the balance sheet. For this purpose, it was first necessary to illustrate the components of cryptocurrency and to present the legal basis within IFRS. To conclude on the whole topic, it can be quickly stated that the former idea of David Chaum and the final implementation of Nakamoto approximately 25 years later, is indeed a challenge for today's accountants. The unique concept of a purely digital currency, which currently has both monetary and non-monetary characteristics, is therefore difficult to fit into the existing paragraphs of IFRS. In principle, it could be included in financial instruments, inventories or intangible assets, but there are always definitional inaccuracies and leeway for interpretation within the standard, thus preventing a generally valid consensus. The still existing volatility of the cryptocurrency is also problematic in some respects at this time. For example, a valuation based on costs does not provide any reliable and relevant information for the user of the balance sheet, as costs are a measure based on history and do not correspond to the character of the cryptocurrency. Therefore, after the conclusion of a conference on the topic of "Holdings of cryptocurrencies" by the IFRIC and representatives of large institutions in the field of accounting, inventories and intangible assets and their corresponding valuation methods are considered as an appropriate recognition in the balance sheet, but following this conference there were off-target comments on the part of the institution,

including Deloitte, which considered such an accounting variant to be insufficient. This paper also agrees with this position. It concludes that the standards available today do not reflect the entirety of cryptocurrency and do not reflect the unique nature of cryptocurrency in its elementary components. The trader-broker exception cannot be applied to all companies and cannot be applied across the board. The same applies to holding cryptocurrency for sale in the ordinary course of business. There is also room for improvement in the valuation of intangible assets, as the performance of the asset is not fully reflected in the profit and loss account. Therefore, further scientific discussions on this topic will follow in the future.

## **5.2 Critical acclaim**

With regard to cryptocurrency and its development in the coming years, there are still some unanswered questions and unforeseeable changes.

It is difficult to predict whether there will be an increase in acceptance within society with regard to the rising consumption of electricity due to the ever-increasing effort in mining cryptocurrency based on the "proof of work" approach and the associated negative impact on the environment. (Yang, Chen, & Chen, 2019, p. 261 f.)

However, if acceptance were to increase as a result of, for example, technological progress, this would open up further questions. At the moment, cryptocurrency does not have the characteristics of a conventional currency such as the euro or the dollar, but this could change as volatility falls and acceptance increases. (Thurow, 2014, p. 197) In that case, the options that have been defined so far for recognition in the balance sheet would be complemented by others, such as cash.

The question raised by Deloitte about the long-term investment of cryptocurrency could also become more important in the future, according to which a further approach in accordance with IFRS 5 would be possible. (Deloitte GmbH, 2021)

The recognition of cryptocurrency as an intangible asset was also initially only accepted for the time being, as there were a number of votes that were clearly against it. (IFRS Interpretations Committee - Letters, 2019) It was argued that the definition of an intangible asset corresponds more to an asset that contributes to economic activity, and not to what cryptocurrency represents in most cases today, namely an asset that will generate a cash flow through its sale in the future. (Zapf, 2020, p. 159) It is also argued that cryptocurrencies are held in the short term as a speculative asset that can also be used to exchange for other goods and services. (Ciaian, Rajcaniova, & Kancs,



2016, p. 896 f.) These characteristics are unique and do not necessarily coincide with the intention of IAS 38. Therefore, further questions will have to be answered in this field. In addition, the lack of government control will also play a role in the future. China has already initiated measures against Bitcoin to protect its own currency from a decline, and other countries could follow this example in the future. (Wurzel, 2021)

### **5.3 Outlook**

Nevertheless, it remains difficult to say how the entire cryptocurrency world will develop. Should cryptocurrency become accepted or at least further established as a payment in the medium to long term, more precise definitions will have to be created within the IFRS in order to reflect every aspect and unique feature of the currency and thus provide users of financial statements with an all-encompassing picture. This whole issue is connected to the acceptance and incorporation of this currency into the business activities of companies. If cryptocurrency does become established as a reliable alternative to traditional currency, the creation of a dedicated standard will inevitably follow. However, if cryptocurrency were to develop in the opposite direction, this entire topic could be given far less attention in the future and the recognition and measurement principles defined by the IFRIC today would be regarded as set, despite a few dissenting voices.

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**V Declarations**

**Declaration of originality**

I hereby declare that this term paper and the work reported herein was composed by and originated entirely by me. Information derived from published and unpublished work of others has been acknowledged in the text and references are given in the list of references.

Place, Date

Signature

**Declaration of publication**

I hereby declare that a copy of my Bachelor's thesis will be included in the library of the department of business. This does not violate the rights of third parties.

Place, Date

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