

## THE ROLE AND APPLICATION OF ACCOUNTING IN METAVERSE: EXPLORING AN EMERGING CONCEPT

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### **Abstract**

*Technological developments are progressing very rapidly in today's business world and reflections are also observed in the accounting science. The Covid-19 era changed individuals' habits and did lead to new technological improvements. This era even encouraged or forced some individuals who are not really knowledgeable of technology to dwell into recent technological developments. During the Covid-19 era, technology was actually the only factor that brought people closer. The concept of the metaverse, the foundations of which were first laid in the science fiction novel named Snow Crash dated 1992, has started to be talked more frequently today especially after the Covid-19 pandemic and has made everyone to question whether a new virtual world is possible. In this virtual world, just like the physical world, stores can be opened, lands can be purchased and many financial activities can be carried out. Thus, metaverse is an emerging concept in accounting and it is actually linked to other new fields, which are cryptocurrencies, artificial intelligence (AI), virtual reality (VR), augmented reality (AR) and generally information technologies (IT). Definitely, the life cycle of accounting in the new field of metaverse is not completed, debates go and some issues are in the grey area. In this study, the concept of metaverse was first analyzed in the introduction section. Then, a literature review was run on the subject. The research includes journal entries as applications concerned with metaverse accounting in the following section. The study is finalized with conclusion and recommendations for future research.*

**Keywords:** Metaverse, Accounting, Technology, Covid-19, Virtual World.

## METAVERSE'DE MUHASEBENİN ROLÜ VE UYGULAMASI: YÜKSELEN BİR KAVRAMI KEŞFETMEK

### **Öz**

*Günümüz iş dünyasında teknolojik gelişmeler çok hızlı ilerlemekte ve yansımaları muhasebe biliminde de gözlemlenmektedir. Covid-19 dönemi bireylerin alışkanlıklarını değiştirmiştir ve yeni teknolojik gelişmelere yol açmıştır. Hatta bu dönem, teknoloji konusunda pek bilgi sahibi olmayan bazı bireyleri, güncel teknolojik*

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*gelişmelere yönelmeye teşvik etmiş veya zorlamıştır. Covid-19 döneminde insanları yakınlaştıran tek faktör aslında teknoloji olmuştur. İlk kez 1992 tarihli Snow Crash adlı bilim kurgu romanında temelleri atılan metaverse kavramı, özellikle Covid-19 salgını sonrasında günümüzde daha sık konuşulmaya başlanmış ve herkesin yeni bir sanal dünya olup olmadığını sorgulamasına neden olmuştur. Bu sanal dünyada tıpkı fiziksel dünyada olduğu gibi mağazalar açılabilir, arsalar satın alınabilir ve birçok finansal faaliyet gerçekleştirilebilir. Dolayısıyla metaverse, muhasebede yeni ortaya çıkan bir kavramdır ve aslında kripto paralar, yapay zeka (YZ), sanal gerçeklik (SG), artırılmış gerçeklik (AG) ve genel anlamda bilgi teknolojileri (BT) ile bağlantılıdır. Elbette yeni bir alan olan metaverse hususunda muhasebenin yaşam döngüsü henüz tamamlanmamıştır, tartışmalar sürmektedir ve bazı konular gri alanda yer almaktadır. Bu çalışmada metaverse kavramı ilk olarak giriş bölümünde incelenmiştir. Daha sonra komuyla ilgili literatür taraması yapılmıştır. Araştırmanın bir sonraki bölümünde ise metaverse muhasebesi ile ilgili uygulamalar kapsamında yevmiye kayıtlarına yer verilmiştir. Çalışma, sonuç ve gelecek araştırmalara yönelik öneriler bölümü ile noktalanmıştır.*

**Anahtar Kelimeler:** Metaverse, Muhasebe, Teknoloji, Covid-19, Sanal Dünya.

## Introduction

The position of technology in today's business world is undoubtedly very valuable for everyone. Tools such as mobile devices and the internet are often used by many people. Especially in the last few years, it can be observed that the investments made in the information technologies sector have increased significantly especially after the Covid-19 pandemic. The most important factor that brought people closer together in this process and helped them to remain social was technology. On the opposite side, this unfortunate period of Covid-19 pandemic showed people that education could be obtained without going to traditional schools and money could be earned without travelling physically to work. This experience made everyone to think whether the concept of metaverse as a virtual world, which is a frequently used term recently, is really applicable. The concept of metaverse first appeared in the science fiction novel Snow Crash by author Neal Stephenson in 1992. Although the new concept of metaverse seemed and was considered impossible when it was first heard on that date, it has been understood now that it is applicable (Stephenson, 1992).

In metaverse, people create their own avatars or holograms and continue their virtual lives using various clothes as well as VR glasses. An extremely realistic virtual world with physical interactions are created. In this world, which is very similar to the daily lives of individuals, avatars can also make trading transactions. As an example, the purchased goods are stored in each avatar's own virtual wallets. These trading transactions are made with non-fungible token (NFT), i.e. digital asset certificates. In addition to all these, companies are also actively involved in this virtual universe now. However, it

is still not completely certain how the metaverse accounting should be carried out (Dwivedi et.al., 2022).

The metaverse is actually a virtual atmosphere where accounting can be practiced, with its encrypted and eye-catching reliable virtual features, and a processing technique where the abilities of VR, AR, blockchain, and AI are united to present high quality financial reports compared to the real physical atmosphere. There exist necessities for the accounting profession in case the economic exchange in the world continues, and the format in addition to functions of accounting information systems in metaverse can be influenced. On the other hand, the aims of accounting will continue to be identical. The changes will be observed concerning applications, not concerning theories (Al-Gnbri, 2022).

The metaverse is more than a two-dimensional virtual world. Here, the user has the opportunity to experience the content as well as viewing it. In metaverse, the user can personally enter the virtual world with his/her avatar and communicate with other users. Thus, metaverse is also considered as the 3D (three dimension) type of internet. Definitely, this issue also leads to several marketing initiatives and opportunities, attracting famous global brands to this new world. The global brands perceive metaverse as the next and future communication platform among individuals (Hollensen et al., 2023).

It is possible to carry out many activities on metaverse platforms, such as playing games, organizing or participating in art events, promoting goods or services, buying and selling crypto assets, and providing consultancy services. Definitely, technologies such as VR and AR did also contribute to the development of metaverse. Plus, developments in the fields of AI and crypto currencies also affect the improvements in metaverse. However, some researchers argue that disadvantages of metaverse can also arise in addition to the advantages when metaverse is not closely monitored (Johri, et.al., 2024).

It is possible to carry out many social, artistic and commercial activities in the metaverse, such as playing games, visiting museums, organizing or going to a concert, promoting goods or services, and providing consultancy. Today, as businesses operating in different sectors attempt to carry out their activities on metaverse platforms and the metaverse is used for commercial purposes, the issue of accounting for income or loss arising from transactions carried out on metaverse platforms becomes important. In addition, it is stated that the transactions carried out on metaverse platforms will affect the way professional accountants work (Yüksel, 2023).

There are many platforms in the metaverse such as Decentraland, the Sandbox, VRChat, Roblox and virtual currencies such as Mana, Sand, VRChat Credits and Robux belonging to these platforms. Some metaverse platforms allow transactions with cryptocurrencies such as Bitcoin on the platform. However, some platforms may redirect payment processing to traditional e-commerce payment methods. Platforms such as Decentraland,

the Sandbox, Secondlife and Roblox have created a real world economic ecosystem (Ioannidis and Kontis, 2023).

While there are businesses that organize various meetings using metaverse platforms, there are also businesses that create their own metaverse platforms and try to carry out commercial activities there. For example, a clothing company exhibits its products on the metaverse platform, and users can log in to the specified platform and experience these clothes on the avatars they create. Users can design new clothes with motifs of their own choosing instead of existing clothes designs. On this platform, which still operates with a limited number of users, users can play games and shop by discovering various discount coupons. Due to the lack of legal regulations in the purchasing process, shopping can be completed within the framework of e-commerce opportunities instead of cryptocurrencies for now. Overall, metaverse is also reshaping the fashion technology in the world (FashionUnited, 2021).

Accounting of companies that trade in the metaverse is an extremely important issue. With the keeping of accounting records, fraud and forgery situations can be prevented. In addition, a company called Second Life, which is an extension of the metaverse, announced that sales tax will be collected from users starting from March 2022. It is thought that more companies will implement taxation in the coming periods. Therefore, accounting records are extremely important for determining the profit or loss situation of enterprises in the metaverse (Orkunoğlu Şahin and Çiftçi, 2022).

It is important to mention crypto assets as it relates to the concept of metaverse. Crypto assets have emerged as an alternative digital asset due to insecurity and collapse in financial markets. Crypto asset transactions, which have started to increase in number, are secured and controlled with encryption in a virtual environment. Crypto assets are becoming more and more preferred for investors everyday (Sabuncu, 2022).

Cryptocurrencies are produced by people called miners. This production is realized by adding a new link to the existing chain on the internet, using computer technology, and in return, a certain amount of crypto money is earned. In this way, virtual mining is carried out and production is ensured. However, this production is not infinite and its amount is fixed. Bitcoin is the most known and recognized cryptocurrency. Its amount to be produced is 21 million units (Kızıl, 2019).

## **1. LITERATURE REVIEW**

The research titled Blockchain for the Metaverse: A Review, emphasized that the metaverse's dependence on blockchain is important for user integrity, privacy, and reputation of companies. In this study, it was also mentioned that important decisions that need to be made about companies are risky. Thus, it would be more error-free and secure to manage them with

blockchain-based DOA's (Decentralized Autonomous Organization) (Gadekallu et. al., 2023).

Regulation problems and taxation challenges of metaverse was discussed in a study from the perspective of accounting science. Research benefited from the literature as secondary data in terms of methodology. The paper defends that case based approach is a must since standard regulations do not exist for the accounting of metaverse (Pandey and Gilmour, 2023).

Metaverse's growth and potential are expressed in a research, which emphasizes that the critical year for Metaverse was 2001. The study adopted a qualitative method including semi structured interview and thematic analysis. Participants of the interview were playing interactive games or they were involved with NFT, cryptocurrencies and digital assets. From the viewpoint of interview participants, the accounting treatment and the valuation of digital assets were adjusted to the existing standards based on the intention or the aim of the holder or entity. The participants also believed that, development of metaverse was still limited and a more accurate solution is needed so that metaverse can meet the expectations of public (Millahibrahim et al., 2023).

Another study focused more on the role of accounting and auditing in metaverse. It was investigated to what extent audit is applicable in this virtual universe. In the research, it was stated that audit and accounting should run together and in harmony. The paper concluded that commercial activities in the metaverse would reduce costs and audit expenses would go down significantly (Er, 2023).

The effect of metaverse on accounting professionals was evaluated in a research. Also, the perception of accounting professionals about the advantages and disadvantages of digital technologies as well as metaverse was assessed. Moreover, factors making accounting professionals to do or avoid activities with digital technologies and metaverse were investigated. Study benefited from integrated theoretical framework uniting the Theory of Planned Behavior (TPB) and the Technology Acceptance Model 3 (TAM 3). Research was run on 597 accounting professionals and structural equation modeling with partial least squares (PLS-SEM) were used. Based on the findings of study, digital technology does not prevent accounting professionals to work in virtual world. However, accounting standards related to digital technologies have flaws, which lead to transparency and safety problems for accounting professionals (Burlea-Schiopoiu et al., 2023).

Attention was attracted to the increasing popularity and acceptance of metaverse in another paper. It was pointed out that, developments in blockchain and Web3 technologies accelerated the improvements in metaverse. However, illegal activities and financial crime were also observed in metaverse like scams, code exploit, wash trading, money laundering, and illegal services as well as shops. According to the study, illegal activities and financial crimes witnessed in metaverse should first be defined, listed and

categorized to ensure the sustainability of metaverse. The paper provides information about security threats in metaverse and provides solutions as well as recommendations for financial crime fighting (Wu, et. al., 2023).

After briefly introducing the metaverse and its basic components, a paper aimed to provide an idea about how a business carrying out commercial activities in this virtual world could record these activities according to current accounting rules. As a method in the study, sample events about certain business models were presented and it was shown how these events could be reflected to accounting recordings. As a result, the transactions in question were somehow recorded for with existing accounts, but it was stated that a more systematic framework could be achieved by making international regulations on the metaverse and defining unique accounts (Öncel, 2022).

One other article on this topic examined how the marketing of physical or virtual products sold in the metaverse environment can be done and to what extent this breakthrough in the virtual environment can reduce costs. In the last part of study, it was mentioned that a company should be established in the real world in parallel with a company in the metaverse. It was concluded that, selling the same products to both avatars and people would improve the company from a marketing point of view (Cesur et al., 2022).

Some scholars examined the possibility of using an auction environment to improve the trading capabilities in a virtual universe. The situation of creating an auction environment by building a virtual auction house for the development of commercial skills in the meta-universe environment was examined by using a set of scenarios. It was concluded that the experiment of buying virtual goods with virtual coins at this auction house would most likely be part of the virtual environment. The initial observation propose of creating a virtual trading platform would have advantages for trading virtual assets and investigating their consequences (Yılmaz et al., 2022).

## **2. APPLICATION (JOURNAL ENTRIES)**

There are still discussions on how to categorize crypto assets, and a consensus has not yet been reached on this subject. Various opinions have been put forward, expressing these assets as commodities, securities or currencies and some countries are using these concepts for their taxation purposes. At the same time, some countries have remained silent and did not apply any taxation (Kızıl, 2019). Recommendations in the literature also include reporting crypto assets within intangible fixed assets (Sabuncu, 2022) or within the group of current assets as account 108, "Other Current Assets" (Doğan et al., 2018). The accounting treatment for crypto assets depends on the intention and purpose of the user or entity to treat them (Millahibrahim et al., 2023).

The category in which crypto assets are included is an important matter in terms of accounting. Because the accounting processes of a crypto asset recognized as a money will be different from that of the same asset considered as a security. Various factors such as the account in which it will be recorded, the inclusion of acquisition costs in the cost of asset, the valuation of the asset at the end of the accounting period etc. will vary according to classification. This situation also will lead to various differences in terms of taxation. The accounting treatment of crypto assets should be evaluated not only in accordance with the International Financial Reporting Standards (IFRS) or Generally Accepted Accounting Principles (GAAP), but also within the legal frameworks of the countries or communities where the business operates. For example, in Turkey, according to one of the regulations published by the Central Bank of the Republic of Turkey, a crypto asset cannot be defined as fiat money, bank money, electronic money, payment instrument, security or other capital market instrument. In the same regulation, these instruments are defined as intangible assets (Resmi Gazete, 2021). The Capital Markets Board - CMB (Sermaye Piyasası Kurulu - SPK) has declared that crypto assets cannot be considered as securities. In this case, crypto assets may be considered as commodities (Yalçın, 2019).

Even though it may not be legally permitted by all countries, in practice, cryptocurrencies are frequently used as a means of payment. In accounting, following the substance over form principle, if cryptocurrencies are utilized as a payment instrument, the accounting entries should align with this usage. Legal regulations should eliminate uncertainties in this field by considering the essence of these transactions. As emphasized earlier in the study, due to the lack of established consensus on accounting practices for the metaverse, various assumptions are stated to create examples. The application section of this study includes journal entries of metaverse transactions that would be made under different recognitions assets. In other words, the journal entries for transactions conducted within the metaverse are illustrated using various examples in this section. Below, an example has been created related to the topic, and recommendations regarding accounting records have been provided.

On December 11, 2023, 1 Ethereum (ETH) cryptocurrency was purchased for 10,000 TL.

Journal entry in the case of defining crypto asset as 'Money':

11.12.2023			
102 BANKS		10.000	
102.10 Ethereum			
102 BANKS			10.000
Buying Ethereum			

Journal entry in the case of defining crypto asset as 'Security':

11.12.2023			
118 OTHER MARKETABLE SECURITIES	10.000		
118.10 Ethereum			
102 BANKS			10.000
Buying Ethereum			

Journal entry in the case of defining crypto asset as 'Inventory':

11.12.2023			
157 OTHER INVENTORIES	10.000		
157.10 Ethereum			
102 BANKS			10.000
Buying Ethereum			

Journal entry in the case of defining crypto asset as 'Intangible Asset':

11.12.2023			
267 OTHER INTANGIBLE FIXED ASSETS	10.000		
267.10 Ethereum			
102 BANKS			10.000
Buying Ethereum			

Another example related to Metaverse transactions has been created below, and recommendations regarding accounting records have been provided. In the following examples, it will be assumed that cryptocurrencies are recorded in banks account and treated as a payment instrument when they bought.

On December 15, 2023, a metaverse land was purchased for 1 ETH. (1 ETH = 10.000 TL) (Ethereum price was the same when it was purchased).

On December 21, 2023, a metaverse land was sold for 2 ETH. (1 ETH = 8.000 TL)

Journal entry in the case of defining metaverse land as 'Inventory':

15.12.2023			
157 OTHER INVENTORIES	10.000		
157.15 Metaverse Land			



102 BANKS 102.10 Ethereum Buying Metaverse Land		10.000
21.12.2023		
102 BANKS 102.10 Ethereum 601 EXPORT SALES 601.15 Sales of Metaverse Land Selling Metaverse Land	16.000	16.000
31.12.2023		
623 COST OF OTHER SALES 623.15 Metaverse Land 157 OTHER INVENTORIES 157.15 Metaverse Land Cost of Selling Metaverse Land	10.000	10.000

If the company considers the purchased land as inventory, it must also conduct the inventory valuation accordingly at the end of the period. In the same example, let's assume that the company, instead of selling this metaverse land, decides to subject it to revaluation at the end of the period. In this case, accounting entry may vary depending on the accounting standard or legal regulations to be considered. For this example, let's assume the entry is recorded in accordance with International Accounting Standards (IAS). Also, net realizable value of metaverse land is 1 ETH. (1 ETH = 9.000 TL).

According to International Accounting Standards (IAS), it would be necessary to assess the land at either the lower of cost value or net realizable value. But commodity broker-traders, who primarily engage in the acquisition and sale of crypto-assets to get benefit from price fluctuations or broker-traders' margin, have the option to value their crypto-asset inventories at fair value less costs to sell (Ernst Young, 2021).

31.12.2023		
654 PROVISION EXPENSES 158 PROVISION FOR INVENTORIES 158.15 Metaverse Land Revaluation of Metaverse Land	1.000	1.000

The provision expense has been recorded in the existing account, 654 Provision Expenses. Instead of this, a new account can be opened in the accounting chart and recording can be performed in a more suitable account group.

At the end of following year, the net realizable value of the metaverse land remain as 1 ETH. (1 ETH = 12.000 TL).

31.12.2024			
158 PROVISION FOR INVENTORIES		1.000	
158.15 Metaverse Land			
644 PROVISION NO LONGER REQUIRED			1.000
Revaluation of Metaverse Land			

Another example related to Metaverse transactions has been created below, and recommendations regarding accounting records have been provided.

On December 15, 2023, a metaverse land was purchased for 1 ETH. (1 ETH = 10.000 TL) (Ethereum price was the same when it was purchased).

On December 21, 2023, a metaverse land was sold for 2 ETH. (1 ETH = 8.000 TL)

Journal entry in the case of defining metaverse land as as 'Intangible Asset':

15.12.2023			
267 OTHER INTANGIBLE FIXED ASSETS		10.000	
267.15 Metaverse Land			
102 BANKS			10.000
102.10 Ethereum			
Buying Metaverse Land			

21.12.2023			
102 BANKS		16.000	
102.10 Ethereum			
267 OTHER INTANGIBLE FIXED ASSETS			10.000
267.15 Metaverse Land			
649 OTHER INCOME AND PROFIT FROM OPERATIONS			6.000

## Selling Metaverse Land

### **Conclusion**

Metaverse is a platform that expands the boundaries of digital world and brings with it new possibilities related to virtual reality in the business world. Especially during the Covid-19 pandemic, there were many question marks about whether a life could be possible outside the home without socializing. Although it is not entirely possible to live a complete life in the metaverse in today's business world, that can change in the following years since metaverse is excelling rapidly. This study analyzed the indispensable role of accounting in metaverse via first providing information about the metaverse terminology and then discussing the relevant literature and presenting journal entries as the implementation of metaverse accounting.

Accounting plays a key role in making strategic decisions, strengthening investor relations and ensuring tax control, in addition to providing several advantages to a variety of stakeholders. Accounting is critical in accurately recording and managing the value of digital assets in an environment dominated by the purchase and sale of mentioned assets. This is significant beyond just the function of monitoring financial situation for enterprises and individuals involved with metaverse. In this direction, actually accounting of metaverse is not only an obligation, but also an opportunity. Definitely, the correct and transparent reflection of financial data also provides advantages in establishing healthy relationships with stakeholders.

As a result, this research shows that metaverse is an area subject for further improvement. Thus, metaverse accounting will develop accordingly and regulations as well as standards will become clearer in the coming years. Metaverse accounting is currently not universal and separate approaches exist. However, uncertainties will be observed less in the near future. Absolutely, progress in fields such as cryptocurrencies, AI, VR, AR, NFT and information technologies in general will also affect the journey of metaverse as well as structuring metaverse accounting.

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