

Accounting and Auditing in the Metaverse World from a Virtual Reality Perspective: A Future Research

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Abstract—The research aims to illuminate and raise questions about the future of accounting and auditing from the perspective of the most prominent technology, virtual reality technology, the Metaverse. A normative approach is considered an appropriate approach for future research. The research's contribution is that it is the first scientific study to identify a link between accounting, auditing, and the Metaverse, which no other research has done. As prominent results' of the research, the Metaverse represents a vertical rather than a horizontal development in accounting and auditing, where their objectives remain unchanged. Metaverse technologies will serve as auxiliary tools for them. Furthermore, Metaverse creates new digital assets that require accounting measurements to provide tools and disclosure methods that are accurate. In addition, the Metaverse has potential effects on planning the audit process and collecting evidence. Moreover, because it provides an interactive environment with enormous potential, the Metaverse can be used in education and accounting training.

Keywords— Accounting, Auditing, Augmented Reality, Metaverse, Virtual Reality.

I. INTRODUCTION

As a result of the innovations in information and communication technology, Today's business and financial world is developing at such a rapid pace that sometimes can be hard to keep up with and absorb. While, the world is still attempting to adapt the products produced by the third industrial revolution, at its peak and to absorb social media and the cultural, political, economic, and social changes that have resulted. The World Economic Forum announced several integrated technologies with enormous potential in Davos, Switzerland, in 2016, under the banner of the Fourth Industrial Revolution (4IR) (WEF). The World Economic Forum announced several integrated technologies with enormous potential in Davos, Switzerland, in 2016, under the banner of the Fourth Industrial Revolution (4IR) (WEF). These technologies have infiltrated almost every field, arousing the curiosity and enthusiasm of many organizations and individuals. Research and exploration continued at a moderate pace until 2020, when COVID-19 spread across the globe, quarantining everyone in their homes. These technologies got the attention to serve as medicine, to keep the world in general, and the business and finance world in particular, active and continuous, and reliance on technologies increased the performance of remote businesses. In the technology and communications fields, the pace of research and exploration accelerated.

As the world prepares to recover from the consequences of COVID-19, Mark Zuckerberg, founder, and CEO of Facebook announced the change of the company's name to Meta on October 28, 2021. The company will work under this new name to help build an Internet that consolidates social relationships and embodies experiences and makes the user an element within them, not just a viewer of them, and this is called the Metaverse, where anyone can meet another person they want within. This world may be a virtual embodiment of our physical world, the real world with all its features and characteristics, or a completely virtual world with new features and characteristics. Whatever the geography of the Metaverse is, everyone can do anything that they can imagine, such as meeting with friends and family, working, learning, playing, shopping, creating, and experiencing different new experiences that do not harmonize with the current way in which we interact with machines. The ultimate goal of the Metaverse world is for the user to feel his presence with another person. To move virtually instantaneously as an anthropomorphic to anywhere he wants without moving from his place in the physical world. These would create more opportunities for everyone, regardless of where they live. It will reduce congestion and the total harmful effects of emissions resulting from individuals, companies, or events, called the carbon footprint. The most prominent role of companies in the coming period will be to accelerate the development process to renew life and weave this world with the means of current social media to have a better social experience [1].

The Metaverse is a digital reality that combines aspects of social media, online games, Augmented Reality (AR), Virtual Reality (VR), Blockchain, and cryptocurrencies to allow users to interact virtually [2-3]. It is an umbrella term for a group of technologies. The Metaverse has begun to spread, and the news sites have filled with articles about it, its meaning, and its future possibilities. The focus has been on virtual reality (VR), while scientific research still lacks research in this aspect, whether dealing with the Metaverse or virtual reality, especially in accounting and auditing. The reason is likely to be the nature of the field, as the application of accounting precedes theorizing.

Earlier, Sunder's research indicated that humans have a significant talent that other living beings do not possess, namely: the imagination of a large percentage of human beings. They are aware that much of human civilization and its achievements, from the Seven Wonders of the World, and multiple inventions, are the results of the imagination of

human beings, none of which would have been possible if no one had dared to imagine them into existence. Sunder saw it as logical to imagine the alternative (virtual) that literature deals with, just as science explores alternative perceptions of the material world. Sunder saw that accounting is, in the limit itself, the result of human imagination, and is contemporary with mathematics, writing, and civilization itself, and added that if imagination is the source of the discipline of accounting and all human progress, it may be essential to explore the state of imagination in our profession today, and in the future [4]. Sunder poses a question: why not imagine alternative scenarios rather than just waiting for changes to happen or imposing them on us? [4] Referring to the importance of imagination in business and finance changeable environment, as well as innovation in practices and organizations, in addition to the above, this research comes to visualize what the future of accounting and auditing may be in the world of the Metaverse after introducing and adopting virtual reality technologies more broadly. That is limited to addressing the most prominent technologies that make up the Metaverse world. The rest of the techniques are left to be dealt with by other accounting research. Although this research may touch on some tangentially in some places, it is not the primary aim of this research.

As for the accounting literature that dealt with the subject of the Metaverse, the researcher failed to obtain any of them, and therefore it can be said that there is no previous literature in the field of accounting and auditing that dealt with the topic in the question, and what reinforces this is research entitled "Metaverse Shape of Your Life for a Future: a bibliometric snapshot" which attempted to provide a bibliometric assessment of the literature that dealt with the Metaverse for the period from 1990–2021 and concluded that there was little literature dealing with the Metaverse worldwide, and previous research focused in the technical field, the fields of education and digital marketing [5]. Another research entitled "A Content Analysis of the Metaverse Articles" aims at analyzing the content of articles containing the keyword "Metaverse" in all fields. They concluded that the Metaverse had been a subject of academic research in many areas over the past years, from literature to art, and from music to education, where they examined 40 scientific articles published in refereed journals, and none of these articles dealt with the field of accounting and auditing [6]. Accordingly, the research gap covered by this research is clear. Previous literature used to build a theoretical framework that clarifies the idea of the Metaverse and some related aspects and uses this general framework in anticipating the reality of accounting and auditing in the world of the Metaverse, proceeding from the point of view of Shotton, who stated that the ability to explore, integrate, and reuse scientific outputs from the previous literature is critical to innovative research [7].

II. METHODOLOGY

The research uses the normative approach because it is trying to determine what the future of accounting and auditing might be in the world of Metaverse after the introduction and adoption of virtual reality technology on a large scale, and not what it is today. It is research seeks to embody the traditions of utopian thinking as an attempt to draw a picture of a practical and desirable future. It also aims to create reliable maps to determine alternative future paths. If these maps cannot show the final destination, we need to find pathways that lead to the desired direction, which is often hard to see but

worth building. The normative approach is considered one of the approaches to building accounting theory. According to Matar and Al-Suwaiti, it depends mainly on deduction in deriving accounting rules and procedures, elicits standards of behavior, and provides model solutions for accounting procedures, and reducing it depends on assumed assumptions that may be difficult to measure objectively and to reach conclusive results that represent acceptable practical facts. Therefore, normative research remains just a set of ideal rules whose goal is to devise better practices, but it may contradict the current practical reality [8]. In this regard, Sunder argues that thinking about possible alternatives for the current accounting and auditing firms is essential if our world is changing, and thinking about the potential consequences of these alternatives is essential if such change is for the better [4]. Pietro & Cresci added that if we do not anticipate the complexity of the Metaverse, or if we fail to predict its potential effects, the losses incurred and the risks might be enormous and high [9].

III. WHAT IS METAVERSE?

The introduction of the research mentioned that the term "Metaverse" includes a group of technologies, and it clarified that this research deals with only one of these technologies, which is Virtual Reality (VR). Because of the importance of the chronology of events in the context of talking about historical roots, it is better to highlight virtual reality then move on to the term "Metaverse" in addition to the fact that the latter is recent compared to Virtual Reality.

A. *Virtual Reality (VR) as a core technology in Metaverse*

To avoid any confusion occurring because of the similarity of terminology. It is necessary to clarify the difference between virtual reality (VR) and augmented reality (AR). The idea of the Metaverse embodies virtual reality in the first place. Augmented reality represents a technology based on projecting virtual objects and data in the user's environment to provide additional information or serve as a guide for him, a technology that superimposes digital data and information over the current user's environment. Reality can enhance by adopting specific devices that allow users to control their presence in the real world [2]. It is a technology in which real-world data interacts with digital appearances to give an in-depth perspective to enable individuals to face real scenarios better [10]. Perhaps the most prominent example of augmented reality is Pokémon Go was launched in 2016 by Niantic Inc., an American company that publishes and develops video games. This game enables users to search for Pokémon in their environment, such as rooms of their houses, stores, and streets. This level of explanation of augmented reality technology will suffice.

In contrast to Augmented Reality technology, indicated by Ramadan, Virtual Reality (VR) is a technology-based on dropping realistic objects into a virtual environment to make them appear as if they were in the real world. It is an interactive three-dimensional environment designed by computer programs. The interactions between the virtual environment and the user's senses and responses will reflect on the fictitious world [11]. According to Folger, this technology enhances fictional facts in a completely virtual world, users access this world via special devices, and the system controls the users [2]. Besides, The Financial Reporting Council (FRC) stated that it is a technology that creates a complete simulation experience. The realistic

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situation or landscape but completely artificially is mirrored, and the user will be fully immersed in this reality to contribute to its formation and development [12]. Ray defined the virtual environment as a mathematical representation of things in three dimensions through simulation, creating an almost replica of realistic physical objects and their properties (e.g., size, weight, color, width, height, etc.) [13].

Virtual Reality technology is not new technology as it is an old technology that spanned several decades to develop, and there is no room to review the Virtual Reality journey that began at the beginning of the twentieth century but will stop at some stations for clarification only. In 1929, Edwin Link, an American inventor, and pilot built the first flight simulator under the name Pilot maker, and this device captured the interest of the US Army Air Force, which acquired six simulators in 1934 AD, and also used them to train pilots for World War II. In 1962, Morton Heilig introduced the Sensorama, a Virtual Reality machine that can view movies in three-dimensional (3D). It was a project for the future cinema at that time, it was not just about watching, but the viewer felt the wind, vibration, and smells. This machine was similar to the three-dimensional devices currently found in entertainment and game centers, and this device may have obtained a patent at the time. In 1968, a head-mounted display (HMD) Ivan Sutherland developed an American computer scientist. The devices related to Virtual Reality that improved at that time were used in military applications. From 1970 to 1990, the Virtual Reality industry flourished in various sectors, such as medicine and the automobile industry. The beginning of the twenty-first century represented a new era for the Virtual Reality industry [14-17].

In 2010, American engineer Palmer Luckey created the prototype of Virtual Reality glasses under the name Oculus Rift. He was seeking to provide a technically mature system at an affordable price. In 2014, Facebook bought Oculus VR, the developer, and manufacturer of glasses, for \$2 billion. The final version was on the market in 2016. These are not the only modern product, as many companies are working on innovating and launching their own Virtual Reality devices, for example, Sony, which released Playstation VR (PSVR), and HTC, which launched the HTC Vive by the end of 2010. Many other companies are developing software for these systems, which means that devices are under constant improvement and development due to the presence of many competitors [14]. It is worth noting that all previous VR devices rely on 360-degree video technology, as this technology uses a series of cameras to obtain simultaneous feed from multiple angles. The feed from each camera is combined to create a video clip that allows 360 movement degrees. This technique can be said to replicate a location or event in the real physical world [12].

Not all VR technologies have attracted attention, in both professional and consumer environments, until recent years [18]. The video game industry was the first driving force in the development process of VR devices. It can be considered, the driving force behind the increase in investments in this field since the beginning of the first decade of the twenty-first century [14].

By wearing these devices, the user enters Virtual Reality or a virtual environment. Earlier, this virtual environment could be accessed via a specific website via the Internet and navigating this environment or this Virtual Reality by

computer. The user sees this environment on the computer screen, and at the same time, the environment of the physical reality. Today, the matter is different, as these devices have worn to obscure the view of the environment of the physical reality, transport the user to a virtual environment, where he can use the complementary devices that he wears in his hands to move, immerse all his senses, body and mind in this Virtual Reality.

To further clarify the form of the virtual environment, it is necessary to briefly refer to one of the previous experiences that used a form of Virtual Reality, taking into account the level of technical development in that period, the Second Life. One of the Virtual Reality platforms was introduced in 2003 by a private company, Linden Research Inc (also known as Linden Lab), in San Francisco. Johnson & Middleton define it as a virtual three-dimensional educational, public relations, and economic impact on the Internet. They suggested that this platform merge online video game technology and social networking tools, such as Facebook and e-commerce capabilities. Notably, it's not a game, not even intended for kids. Johnson & Middleton found that BusinessWeek Magazine, The Wall Street Journal, CNN's blog featuring stories about Second Life (SL), and the Reuters news agency, which has an Office on this platform, are already on this platform to cover VR events. In addition, on the professional level, IBM, Toyota, Pontiac, H&R Block, and many groups of companies. Either on the academic level, many universities have set up a virtual campus on this platform, for example, Ohio University and Princeton University [19].

The number of people who flocked to this platform in 2007 reached nearly one million people. This period can be called the boom period of this platform. During this period, the founder of the platform, Philip Rosedale, met with Jeffrey Jorgensen, one of the financiers of this platform and the founder and CBD of Amazon. They thought deeply about the ability of the Internet to change the way of life. The meeting was about thinking about the future of the Second Life (SL) platform. After this boom period, the number of users of the platform stabilized then receded. Due to the lack of rapid development, slow Internet connections, and a new popular place for online gatherings. The social network Facebook has reached 2.9 billion users today, while the number of users of the Second Life (SL) platform today is about 600,000 users. As a result of these situations, Rosedale stepped down in 2008, and Jorgensen's focus quickly shifted to dominating the 2D mainstream internet. Amazon did not establish a formal presence in the Second Life (SL) platform [20].

The Second Life platform (SL) was not the only virtual world, as there are many other experiences, such as Active Worlds. A virtual world launched on the Internet in 1995. There is a platform launched in 2003 that represents a three-dimensional virtual world. In addition to CitySpace, which was active from 1993-to 1996 AD [6].

B. The concept and historical roots of the Metaverse

Despite the long development process spanned about a century for Virtual Reality technology. It faces limited usage and a shortage of spent on it. This technology was making its way quietly and cautiously towards an unknown future with modest technical and economic curiosity until 2021. Until the announcement of Mark Zuckerberg, the founder of Facebook, about the Metaverse, on October 28, 2021. Though, he has changed Facebook's name to Meta. Which created a sensation

as if he was returning to eliminate the remaining of the Second Life (SL) platform after sabotaging its career when he launched the Facebook application.

The main reason for the hype surrounding the announcement of Metaverse in Virtual Reality, According to Brown, is that Meta (formerly Facebook) has some things that help achieve the concept of Virtual Reality better than others have done in the past. Meta can invest huge money in a short period (two or three years), which exceeds the total dollars spent on the concept of Metaverse and Virtual Reality during the previous thirty years. In addition, the situations are now more favorable than before. Dealing with virtual communications and remote work has become more comfortable. Nevertheless, Zuckerberg aspires to access Virtual Reality through advanced modern devices previously referred not through computer screens or a TV connected to game consoles, such as Xbox or PlayStation [20].

The term "Metaverse" dates back to the 1992 science fiction novel "Snow Crash" by Neal Town Stephenson, where he coined the term "Metaverse" [21]. The researcher could not locate a definition of this term in the dictionaries. Whereas the online encyclopedia Wikipedia divided the term into two parts, the first one being "Meta" which means the sense beyond, and the second one being "Verse" which drafts from the universe, this means that the term is "beyond the universe" about the world of metaphysics. Wikipedia indicated that it is a term usually used to describe the concept of future versions of the Internet consisting of a static three-dimensional (3D) space linked to a perceived virtual universe. According to META's official website, the Metaverse represents the following development in social communication. Factually, the Metaverse represents a significant convergence between physical and digital life, achieved through developments in Internet connectivity, Augmented Reality (AR), Virtual Reality (VR), and Blockchain technology. It is just the culmination of all the attempts at science fiction contained in science fiction films. The movie Ready Player One, released in 2018, takes place in 2045, where most of humanity uses a Virtual Reality program to escape from the gloom of the real world. The idea of virtual simulation where people can interact was present in Already, appeared in the 1982 movie Tron. Likewise, the Metaverse creates a world that simulates the physical world with domains related to man and society [6]. Moreover, it is considered a virtual universe in which people are in a daydream-like state [22]. Some regard it as the third version of the Internet (WEB 3.0), the Spatial Web, or the three-dimensional Internet (3D Web), which is divided into [23]:

1. Physical layer: The world as we currently know and experience it through the five senses.
2. Digital information layer: Through sensorization and digital mapping of the physical world, we will eventually create a digital twin of every object in every place. Today, this type of digital information is primarily accessed via screens and dashboards. In the future, it will be retrieved primarily via the spatial interaction layer.
3. Spatial interaction layer: Through next-generation interfaces (e.g., smart glasses or voice), we will be able to interact with contextual, real-time information that has been called up by intuitive and sensory triggers such as geolocation, computer

vision, and voice, gesture, or biometric commands. In effect, this merges the digital and physical layers for the user.

Some have considered that the Metaverse is a collection of interconnected virtual worlds with some common characteristics that can change how they interact with the Internet [24]. Others added that a Metaverse is a location where people meet to socialize, attend work meetings remotely, and participate in concerts, conferences, or games where there are digital copies of everything that exists in the physical world. This location is not a separate entity, nor just an online community; it is an inclusive world in which all aspects of the community can be found, including game worlds; it is neither an online game nor simply a platform like Second Life (SL). It is not pure Virtual Reality, despite being accessed through virtual and augmented reality devices. It is more than just a collection of a series of innovations; it is an augmented interactive layer of our physical and online lives, containing applications, platforms, games, experiences, societies, and spaces in a seamless and woven way between the real and the digital [25]. It is best to think that the Metaverse is a convergence of technologies that faded for years (and even decades) and emerging technologies, shown in Fig. 1.

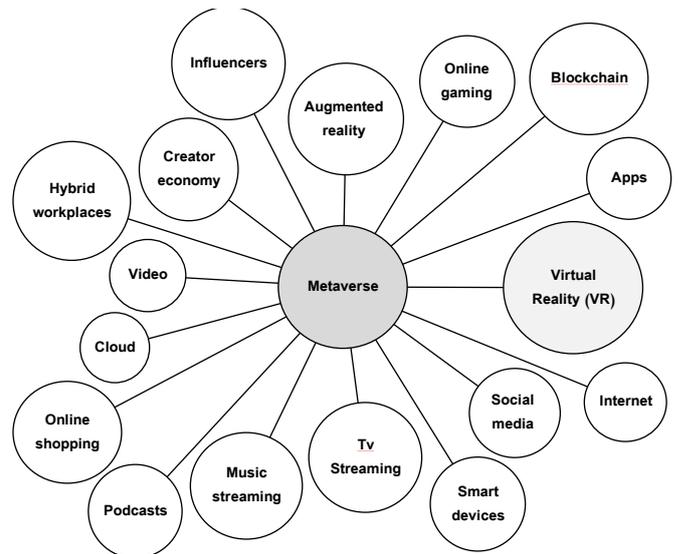


Fig. 1. Techniques covered by the term Metaverse
Source: Prepared by the researcher based on [25].

While discussing the Metaverse and Virtual Reality, another term confronted by readers in the relevant literature, Neuro Reality (NR), is a subset of Virtual Reality. This term, which has recently emerged, refers to technologies that directly interact with the human brain to create a more immersive sensory experience. Elon Musk, Canadian entrepreneur and founder of both Tesla and SpaceX, is a pioneer in research into the power of Neural Reality through his neurotech company Neuralink; Which he founded along with eight other businessmen in 2016, since Nervous Reality within Virtual Reality, Metaverse includes it as well.

Metaverse uses non-fungible tokens (NFTs), which are unique and non-fungible units of data stored in a digital ledger. They are unexchangeable new virtual assets type that fueled much of the growth in the Metaverse. NFTs may be images, videos, or items within a particular game. In accounting parlance, all NFTs consider assets regardless of their

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classification (which will be discussed later). The ownership of these NFTs recorded by Blockchain technology authorized to trade NFTs as an alternative to the digital assets they represent, which means that the Metaverse allows creating, owning, and monetizing a new type of decentralized digital asset. Notably, these assets will be bought and sold in the Metaverse by Cryptocurrencies [3; 26], which requires referring to Cryptocurrencies and Blockchain technology:

Cryptocurrencies: They are virtual currencies that can compare to current official currencies such as the dollar and the euro, but with several key differences, the most notable is that they are only traded online without a physical presence. Since there is no central bank issuing these currencies, it is an electronic cash system based on the principle of peer-to-peer (P2P) in financial transactions, a technical term that means direct dealing between one user and another without the presence of an intermediary [27].

Blockchain: It is one of the types of distributed ledgers based on connecting a group of blocks in a series. Each block is linked to its previous block by encryption mechanisms representing a record of financial transactions is only records transactions in this registry after approval by a network of Nodes. Nodes are computers registered in the chain, where each network node solves complex mathematical equations to accept their validation of the transactions in exchange for some rewards, such as Cryptocurrencies. This technology had characterized by decentralization, encryption, security, the possibility of moving the origin of ownership (and not copying), continuous updating, and immutability [28].

This clarification will suffice because Cryptocurrency and Blockchain are beyond the scope of this research.

Despite Facebook's announcement in September 2021 that it had invested \$50 million in global research and program partners to ensure the development of Metaverse technology, Metaverse has no single creator or identifier, implying that Facebook does not own or is responsible for developing it. Mark Zuckerberg believes that, like smartphones, Virtual Reality glasses will become more widely available in the future [2]. Contrast the Metaverse with the World Wide Web, which had built by many smaller entities anyone can access the Metaverse through their devices. Either no one (person, corporation, government, etc.) will be able to access the entire Metaverse. Furthermore, the Metaverse can not control by a single entity. It is accurate that each corporation will have its own [24].

As giant technology corporations (Apple, Google, Facebook, and Microsoft) are determined to embrace the Metaverse, some believe that the rise of the Metaverse star is inevitable [29]. By 2030, As giant technology corporations (Apple, Google, Facebook, and Microsoft) are determined to embrace the Metaverse, some believe that the rise of the Metaverse star is inevitable [29]. Microsoft Mesh is a platform for collaboration and communication created by Microsoft to unify 3D virtual cooperation across multiple devices, such as Virtual Reality glasses, laptops, or smartphones [30]. In the same context, BMW, a German multinational car manufacturer, partnered with Nvidia, one of the largest producers of graphics processors and video game systems, which is called a company without a factory and factoring equipment, to build a virtual factory that will be the digital

twin of the factory in the real world. So physical assets, systems, or processes can virtualize by a platform called Omniverse, powered by the Metaverse idea owned by Nvidia Corporation [29]. By 2030, Virtual and Augmented Reality has expected to be worth 1.5 trillion US dollars [31].

On November 3, 2021, Seoul, becoming the first government to enter the Metaverse universe, revealed its plan to provide governmental services and cultural events in the Metaverse in collaboration with a large body of about 500 firms, including Samsung, Hyundai Motors, and SK Telecom. This project will receive approximately 26 million dollars in funding in 2022 [32; 33].

On December 23, 2021, PricewaterhouseCoopers (PwC) acquired a virtual land in Sandbox, a 3D Metaverse game based on Blockchain technology owned by Animoca Brands. Thus, PwC became the first global company and the first member of the professional services network to enter the Metaverse universe. In this regard, PwC Hong Kong Partner William Gee commented that we utilize our experience to counsel clients who wish to adopt the Metaverse [34].

C. Possible capabilities and limitations of the Metaverse

Due to the term embrace potential, corporations are investing in the Metaverse. While the Metaverse reshapes society, restructures policies, and changes cultures, it can also open up new markets, providing innovative social networks, advanced tools, different consumer behavior patterns, and new patents. Either the Metaverse can impose its limitations to replace those of the realistic, moreover, help people interact, collaborate, and reduce duplication of assets and skills [29]. The most powerful and attractive feature of the Metaverse may be the feedback loop, where all content is freely available to individuals and corporations to be remixed and reused [24]. Moreover, major international accounting and auditing firms have agreed that VR helps improve processes, activities, and products and may transform entire industries [23; 31].

In the same vein, the Institute of Chartered Accountants in England and Wales (ICAEW) stated that in the Metaverse, the entire world becomes a user interface. It is not about re-creating the two-dimensional Internet (2D internet) or converting a 2D communication platform into a 3D platform, but rather about reimagining how we do business and think about things. Many corporations will benefit from the digital Metaverse's Next Generation, digital twinning, avatars, and user interfaces (UI) [35]. According to the Metaverse, rates of productivity and profit in the business world will determine by artificial intelligence and data science measures [29].

Despite all the above capabilities, some researchers have highlighted the potential limitations of using the Metaverse (specifically VR) on a large scale. The most prominent determinants are the length of time it takes to learn to operate these technologies and the increasing technological requirements necessary for these systems and platforms [36]. On the other hand, one of the most prominent determinants is the speed and energy of the currently available devices, like VR, such as the Metaverse, which requires very high computing power and a powerful component for the operation, which are not present in the devices available today. VR devices consume high power. Therefore, they require high-power batteries for long-term operations. Additionally, these devices, which are supposed to be collaboratively connected, require a high-speed frequency band and the fifth-

generation network (5G) unavailable in some countries. The security concerns related to data connection and devices using the Internet as a vein for data and information transmission, collection, and use raise a set of privacy, protection, and identity issues [37; 6].

The Digital Catapult report included education as a determination. Because few people understand VR (including the Metaverse), the user experience is the main factor. Many users, particularly the elderly, find it difficult to set up, operate, and experiment with advanced VR devices [38]. In addition to corporations' perceptions of these technologies, many are still hesitant to incorporate VR into their businesses because they see it as merely a gaming and entertainment medium [15]. One of the determinants of use is the relatively high cost of creating full content in the virtual form [37-38] [15]. Other limitations identified by the Financial Reporting Council (FRC) include a lack of a user base, with a small number of users compared to social networks or the Internet in general [12].

Jeremy Bailenson, director and founder of Stanford's Virtual Human Interaction Lab, stated the "30-minute rule," which indicates that the maximum amount of time someone should spend in VR per day is 30 minutes. After 30 minutes, they must remove the devices, drink water, touch the wall, and converse with a person. They must do whatever it takes to reconnect with reality. That begs the question: is half an hour sufficient for the Metaverse universe? [20].

However, the FRC has argued that such barriers, which have been real issues for decades, can be demolished in the Metaverse today. Rapid changes in technology access are shifting dynamics in favor of VR. Statista.com, Statista.com, for example, estimated that 5.5 million VR devices are sold in 2020 alone, implying that there is a large audience of potential users. Reports presented as traditional videos attract users more than texts that provide an opportunity for VR versus videos due to a lack of interest. Finally, with the new generation of cloud-based Reality as a Service (RaS) platforms, costs and complexity will reduce [12]. All of these determinants, according to the researcher, will vanish with the increase in technological developments and the innovation of new technologies, particularly in the scope of increased investment in the Metaverse; this is consistent with the perception that increased engagement and investment in the Metaverse would accelerate the development and invention of related technologies [39].

Finally, some recommended the need to pay attention to stakeholders in the VR industry and not focus on VR corporations only. It has also recommended communicating with government agencies to keep abreast of the latest legislation, with customers to receive comments and feedback from them, and with academic researchers to provide input and access to the latest research in this aspect in preparation for adopting VR technology and living in the Metaverse universe [38].

IV. ACCOUNTING AND AUDITING IN THE METAVERSE

Metaverse is almost the latest in technology. The term may still be in the stage of formation, exploration, and controversy. But expectations indicate that it will replace social networks and reshape how people interact and perform work. Therefore, the Metaverse will garner more attention than social networks or the Internet. Since the Metaverse includes many integrated

modern technologies, it is better to refer to the coming era as the Metaverse world. This section of the research aims to elicit some professional and academic ramifications or echoes for the Metaverse in accounting and auditing, but only from the perspective of one technology, Virtual Reality technology.

A. Accounting in Metaverse

Firstly, a question may arise, "Why do we need accounting in the Metaverse, which is a virtual world?". To answer this question, historically, the need for accounting was born out of the existence of economic exchange and barter between people, which still exists in the Metaverse as well, where a user can buy or sell digital assets to another user. Since there is an economic exchange, the accounting will need to protect scarce and limited resources and ensure optimal use. In this regard, some see that the Metaverse has its virtual economy, based on the same scarcity idea as the economy in the real world, which means the Metaverse needs the accounting profession. Others convey that the structure of the virtual world makes them unsuitable for economies based on scarcity and that the repetition of the economy in the real world is not the best way forward in the Metaverse [24]. Notably, accounting information systems (and accounting in general) will not change their goals in the Metaverse world but will change how they achieve them, which will reflect in the functions of these systems: measurement and accounting disclosure. There will be two accounting units, one in the Metaverse universe and one in the real world.

The Metaverse has its own economy, known as the Token economy. It is primarily based on the previously mentioned non-fungible tokens (NFTs). In this economy, new forms of trust are available in proving and recording the ownership of assets through tokens. Every digital asset is given a unique digital code (as are smart contracts), and every physical asset is given a digital code that represents it, and this is known as a token. NFTs are a type of digital asset in their own right, that has value and can be managed, traded, and owned.

The world today seeks to exploit cyberspace, known as the Fifth Domain. Digital or virtual space has become the fifth field (after the land, sea, air, and outer space) that humanity seeks to exploit to emerge into a new society, considering the Internet as its backbone [40]. Corporations will expect to establish branches in the Metaverse's virtual world. Offering various digital products to Internet users via branches through activities, operations, and programs had been designed to work with the Metaverse. If corporations succeed in opening virtual branches, they should consider accounting issues as challenges. Digital products and non-fungible tokens (NFTs), for example, are considered digital assets [29; 3; 26].

This raises a question, namely, how can these assets be measured in accounting? What is the appropriate accounting classification for it? And how will it be disclosed?, meaning there will be considerations related to measurement and accounting disclosure that were not raised previously, but what was written about digital currencies as digital assets that will be dealt with in the Metaverse can be guided, although the controversy has not yet been resolved in this direction as well, as companies Currently analyzing some of the international accounting standards and guidelines to determine the most appropriate classification; Due to the lack of clear accounting guidance for digital assets in general, and Cryptocurrencies in particular, some see their inclusion within cash and quasi-cash, others see them as financial tools, and others see them as

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intangible assets, while some went to consider them as stock items [41; 42].

For issuers or developers of non-fungible tokens (NFTs), the accounting at their companies may be similar to that of a traditional game company (sales of certain virtual consumables or durables), or to hardware manufacturers (sales of virtual reality glasses). However, some have argued that NFTs pose unique accounting challenges, particularly in terms of realizing revenue from the sale of NFTs, as well as challenges in determining the appropriate accounting treatment for NFTs development costs (which may be capitalized, deferred, or considered an expense when paid). Companies will need to understand the underlying intellectual property being developed, the rights that will be transferred to the buyer, and the nature of the costs being paid; Because NFTs usually transfer digital rights in the Metaverse rather than transferring tangible property in the physical world. For the investor or buyer of these tokens, he is also required to determine the nature of the rights transferred by the NFTs to determine the appropriate accounting treatment [43].

This accounting controversy must be resolved and viewed by the international bodies that have taken upon themselves the responsibility of regulating the accounting profession and framing its practices. For the virtual branches of physical companies to be able to process digital assets by international accounting guidelines and standards, and based on the argument that the application in accounting preceded the theorizing, it is expected that in the short and medium-term these assets will be measured in multiple ways, which may not suit their nature and may sometimes violate some accounting principles Until the most appropriate method is known, then attention will be paid to these methods and work on framing them theoretically and perhaps revising them if necessary.

The opening of virtual branches of the company raises the question: Will these branches be independent (with an independent legal personality) from the real physical branches or non-independent branches? in other words, will these virtual branches enjoy a large degree of financial independence? and will you maintain a complete hypothetical accounting ledger suite? Will it have its accounting system, with its inputs, processing, and outputs?. Looking at the most important reasons why the company grants its branches independence, it is noted that they are either due to market conditions (such as competition), or because of the geographical location, as in the case of branches that operate outside the borders of the country in which the head office operates, or because of the distance between the head office and its branches within one country. Thus, the researcher can say that the virtual branches are closer to the independent branches; For their work outside the borders of the state first (and even outside the borders of the material world), and secondly, for the nature of their activities and privacy.

The existence of a fully virtual company or a virtual branch of a real physical company, necessarily means that there are information systems within these virtual entities, and among these systems are accounting information systems, as there will certainly be virtual information users who need virtual financial reports to make rational decisions in the world of Metaverse.

Metaverse includes a set of technologies as previously mentioned, foremost of which is virtual reality, and these technologies are highly integrated and harmonious, which

means the possibility of designing accounting information systems that fit the virtual environment and the world of Metaverse, and these systems will be able to provide confidence in financial data and reduce the chances of falling into Errors and preventing opportunities for fraud and fraudulent practices, thanks to the Blockchain technology, which has been confirmed by many types of research on its ability to reduce fraudulent practices, for example [44-46].

It is noted from the above, that the Metaverse is in itself a virtual environment in which accounting can be practiced, with its encrypted and highly reliable virtual inputs, and a processing method in which the capabilities of virtual reality, augmented reality, Blockchain, and artificial intelligence are combined; To produce high quality hypothetical financial reports compared to the real physical environment.

It is not required that companies open virtual branches for them in the world of the Metaverse, it can only use the Metaverse or a kind of virtual reality as a means of communication that allows it to display its data, information, and reports that were produced in the real physical reality in a better and more attractive way, this perception was based on what was mentioned by one of the researchers that virtual reality and its capabilities can serve as a promising ground for accountants to improve financial reporting [47], and on what was stated in a report issued by the Financial Reporting Council (FRC) which indicated that The possibility for companies to display their reports that contain a set of scheduled events, and express their annual events and results using virtual reality capabilities (such as 3D video), instead of texts. The report indicated that some companies around the world have recently experimented with innovatively presenting their annual reports. And conducted its annual meetings with shareholders using virtual reality technology, however, the FRC saw that the current use of virtual reality in corporate reports is still limited and in the experimental stage, but it is expected that these technologies will have a place in corporate reports (albeit in the long term), and it should be noted. Here, what is meant by video in the world of the Metaverse is not simply displaying data in the form of a visual recording that lists events and is presented on social networks or the official website of the company, such Two-dimensional formats limit the level of interaction that they can provide, but the point is that virtual reality goes beyond mere viewing to experience, and puts the viewer within the narration, not the viewer of this narration. The French group specializing in luxury clothing [12], LVMH Moët Hennessy Louis Vuitton, is one of the parties that used a completely virtual report.

In the same context, it can be noted some of the considerations that must be taken into account when companies adopt virtual reality technology to produce financial reports in the Metaverse world, which may pose challenges to the accounting profession shortly, as follows [15; 12]:

1. The nature of the content of financial reports: The nature of the annual financial report includes different types of detailed financial statements and descriptive paragraphs about the business model and company strategy, and this combination of the content may be difficult to translate into an effective virtual reality experience.
2. The risk of ignoring: the focus of a range of groups benefiting from the data contained in the financial

reports, specifically analysts and investors, is on detailed analysis across a large number of companies, and therefore companies that use different technologies such as virtual reality may be at risk of being ignored in comparison; Due to the different nature of its reports, the lack of significant content due to the adoption of VR technology by relatively few companies remains the main challenge and obstacle to the widespread use of this technology.

3. Delayed issuance of financial reports: Virtual reality isn't a quick build-and-test process (yet). Experimental annual reports issued in virtual reality are often released publicly weeks or months after the official annual report issued in paper or PDF format, and this Limits its usefulness and value to its users.

It follows from the above, that the adoption of virtual reality technology and seeking to benefit from the capabilities of the Metaverse world by companies located in the real physical reality, may reduce - in the early stages of adoption - some of the reinforcing characteristics of the accounting information contained in financial reports, while it may improve some the other, as follows:

1. The company's adoption of virtual reality technology before the rest of the companies adopt these technologies, making its accounting information disclosed in the financial reports of a different nature that is difficult to compare with companies that did not adopt the mentioned technology, and this, may reduce the feature of comparability between the company and similar companies in the field, Users will therefore not be able to identify and understand similarities and differences between the items in these reports.
2. The potential delay in the issuance of financial reports due to the low speed of virtual reality technology in creation and testing may reduce the appropriate timing feature that requires the availability of information to decision-makers at the time making it useful for their decisions, and this is considered a challenge for companies seeking to adopt the technology, especially in light of A world of business and finance in which information loses its value whenever it comes late.
3. Virtual reality technology can increase the feature of comprehension, as it is a technique that helps in visualizing data by displaying it differently with the visual and auditory immersion of the user in the world of the Metaverse, and these elements are required for accounting information to be understandable.

But in general, accounting information is likely to be better understood, interpreted, and visualized by users and stakeholders in the Metaverse world, and the previous analysis was only from the perspective of virtual reality as the most prominent technology in the Metaverse, but what if the analysis was to take all the potentially integrated technologies In the future?, and even if the analysis is limited to virtual reality, it is noted that it allows providing consistent experiences to a wide audience, and these experiences can be cost-competitive compared to providing a real physical experience, and it also allows users to interact with an object that does not yet exist in reality In addition, it highlights data

individually or in a sequence in a way that enhances understanding beyond what can be achieved through a simple text, and virtual reality can be used to reach different stakeholders and more international audiences [12].

Through virtual reality technology - and other techniques - the accountant can simulate the situation that occurs in the Metaverse world, with many possible outcomes, and it is also possible to move between these results, study and visualize them better as if the Metaverse world is implementing a form of time travel. , where the user can move backward through past events [24], this means that using the Metaverse, it is possible to help greatly in the comparison between alternatives and the selection of the most appropriate and optimal alternative, and thus help the administration in performing its functions, which comes in the forefront of the decision-making function, and this is similar - to some extent - with what some referred, where they saw that virtual reality allows the generation of experience-driven decisions and the acquisition of experience from an artificial world close to reality [48]. For example, in the context of financial markets, when immersed in a virtual environment, the user acquires the feeling that he is interacting with a real financial trading market, interacting with virtual agents, improving his actions there using trial and error procedures, defining strategies, taking action and realizing the consequences of his decisions with a high degree of visualization, which enhances his awareness of the complexity and unexpected events that can occur in the real financial market.

In the same regard, Some praised the capabilities of virtual reality in displaying financial figures in 3D graphs instead of 2D, and this would provide a different perspective for the accountant [15], as it enables him to perform financial simulations in real-time while increasing the perception of accountants of the numbers and the consequences of changes in them, meaning how can changing one variable change the company's expectations? Imagine harnessing the capabilities of the Metaverse to perform a Monte Carlo simulation or what-if analysis.

It follows from the above, that the function of Accounting disclosure of companies based in the physical World may perform better through the possibility of the Metaverse, and therefore it can be said that the level of accounting disclosure may improve significantly, which increases the value of accounting information for decision-makers, and improves the media aspect of accounting As a whole, virtual reality can provide a new package of accounting disclosure methods and tools, and this package should cover all the needs and expectations of users of accounting information that will increase shortly, as the level of demand for disclosure is expected to rise and may include other things more than just numbers, and the annual financial reports in Metaverse may be reports that tell stories about the entire history of the company and not just one year, through the union of the capabilities of virtual reality and augmented reality. That is, the beneficiary denominations of financial reports will be at the end of the year with a three-dimensional accounting journey. This, in turn, raises the question: What is the appropriate amount of skills and experience that a user of financial reports must possess to understand the disclosed data? What skills and experience should a Financial report preparer have to present it well? It makes sense to rethink the skills required of accountants shortly to provide users of accounting information with a closer view of the economic

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reality of the company; To live in the Metaverse, these skills are expected to be fundamentally different from current skills.

Accountants are guided in performing the accounting measurement and disclosure functions by a set of guidelines, including but not limited to: Generally accepted accounting principles (GAAP) and International Financial Reporting Standards (IFRS), depending on the accountants' geographic location, these principles and standards are supposed to be in harmony with the shape and state of the financial and business environment, and therefore it is logical to ask a question here about the extent to which the nature of these standards is consistent with the expected technological developments in the Metaverse world. By searching in the previous accounting literature, a proposition was found that might be worth reconsidering with today's developments, which was reported by Sunder, who saw that international accounting standards are not in harmony with the digital or virtual world in which companies aspire to do their business, and thought that it is better to think about a wise mixture consisting of the social standards of the business and accounting community that derives its strength from social networks on the one hand, and the accounting rules and standards imposed by international professional accounting bodies that regulate the profession on the other hand, while not abandoning the penalty, in order to achieve a better balance in this new world, meaning a world is imagined in which written accounting rules, regulations and standards, no matter how elaborate, studied and judged they are, are only applied with the help of social rules and norms and within the framework of vaguely defined social sanctions that are understood by almost everyone, that is, Sunder prefers the existence of accounting norms applied by accountants according to their professional judgments and within the framework of social norms, rather than written rules applied by accountants for legal purposes and regardless of social norms. This means that the smaller the role of professional judgment, the lower the fees [4].

It is this proposition that Sunder considers necessary to preserve the profession and its prestige. It seems logical to think of this argument in light of the global trend toward the Metaverse, in which the lines between physical and digital are blurring to a large extent, as policies, cultures and even social norms will differ. Projecting what Sunder puts into the material world in which we live today, a lot of logic can be found. Humans adhere to customs and traditions (social norms), while they do not adhere to legislation and rules and are always looking for maps that show them the appropriate ways to escape. This is in the physical (real) world, so what about the Metaverse world?

B. Accounting education and training in Metaverse

Fortunately for accounting and auditing in the Metaverse, the virtual reality technology that constitutes the idea of this world may contribute to accountants and auditors acquiring the necessary skills that are in harmony with the needs of the Metaverse world, where virtual reality can be used in training, education and Continuing Professional Development (CPD). This has been pointed out by many reports, articles and literature, some have concluded that the use of virtual reality technologies can help in refining the skills of accountants and auditors, especially critical thinking skills, professional judgment, teamwork, project management skills, effective documentation and interviewing [49], and others added that virtual reality can be used to test different patterns of behavior,

and to represent the roles that accountants will play in real life; Because virtual reality simulates real-life situations and thus helps develop communication, leadership, and teamwork skills of accountants and auditors, in virtual reality making bad decisions has the consequences of little to no embarrassment behind the screen [18]. This was also confirmed by research and articles that linked virtual reality and education in various sciences, where they all agreed that virtual reality has positive repercussions on education and training, and through it, students can understand the many scenarios related to ethical dilemmas that occur in business practices, observing potential consequences and making decisions to solve concrete situations, i.e. virtual reality allows students to simulate situations virtually and develop their long-term experiences [50-51], which is critical in light of the increased likelihood that society will live shortly in a mixed or mixed world Both virtual and physical space.

Looking at the previous experiences of virtual education in the fields of accounting and auditing, it is noted that there are some promising indicators in the process of adopting the Metaverse world. In 2009, a group of professors at North Carolina State University (NC State) created a virtual repository for students in the Second Life (SL) platform. , which was referred to earlier, and this was part of the audit course teaching program, which seeks to teach how to conduct inventory audits. Students had to go to the virtual store, pull data and documents from a virtual administrative office, and set appointments to meet the store supervisor (who was one of the professors), the students were assessed on whether they could follow instructions, and whether they showed a degree of professional skepticism, and this initiative came because most students do not know what it is like to enter a large warehouse with huge amounts of stock, but When this digital store was created they could immerse themselves in it, and the training program became more realistic. It should be noted here, that the North Carolina State University Department of Accountancy's exploration of the benefits of using the Second Life (SL) platform as a tool to enhance the educational experiences of accounting students was supported by Ernst & Young (EY) in 2008 [36]. In evaluating such educational initiatives, one research concluded that teaching in a Second Life (SL) platform increased student performance, however, there may be negative psychological reactions when students wear virtual reality glasses, such as dizziness and nausea, and their research showed that about 15% of students experienced one or more of these symptoms, and this percentage is expected to increase with the development of techniques that are used for movement and navigation in virtual reality [52].

In an article published on the ICAEW website, it was noted that VR learners are 40% more confident than learners in traditional classrooms, and 35% more confident than learners using electronic tools, in their ability to act on What they have learned [18], a recent report by PricewaterhouseCoopers (PWC) showed that VR training was up to 40% more effective for trainee confidence, and up to 50% less expensive than classroom training, for large audiences [12], others concluded that the Second Life (SL) platform is a low-cost entry into the field of accounting education [53], as well as a creative mean of communication capable of attracting the new generation of young people to the accounting profession, this generation that has grown up with high internet connectivity Speed, instant messaging, and online multiplayer [19].

All the previous compliments on virtual reality technology in the field of accounting and auditing education were based on the experience of the Second Life (SL) platform and similar platforms, and even though this platform continued until the date of preparing this research, which means that previous educational experiences can be repeated through it. However, it is expected that the possibilities of the Metaverse world will be more comprehensive and useful than all previous experiences; because it is not only virtual reality, but also includes a range of technologies such as augmented reality, Blockchain technology, artificial intelligence, and others.

Speaking about the Second Life (SL) platform, it is necessary to shed light on an important part, which is that there is a private island for Certified Public Accountants (CPA) Island, and this island is considered a center for the accounting profession in this platform, and on this island there is a virtual association under the name The Second Life Association of CPAs (SLACPA), which includes accountants, educators and students in the field of accounting from all over the world, explores the potential of virtual worlds, as a prelude to carrying out accounting applications used in the real world there, and this island is still in a state of development in terms of Infrastructure and depends on modern architecture in construction, and it may be found empty of avatars if it is visited sometimes, and many avatars may be found in the event of an accounting event there, such as: a conference, seminar or accounting workshop [19], and it should be noted here that the joining of the accounting profession to the Second Life (SL) platform was thanks to the pioneering efforts of the Maryland Association of Certified Public Accountants The Maryland Association of Certified Public Accountants (MACPA), a statewide professional association in the USA, and Katz, Abosch, Windesheim, Gershman & Freedman (KAWG&F), a leading public accounting, tax, and advisory firm founded in 1969.

By searching the Internet for a tested virtual environment designed specifically for accounting and auditing, whether professional or educational, it became clear to the researcher that there is no virtual environment specialized in these two areas, and therefore there is a need to design these environments for accounting and auditing to harmonize with the world of Metaverse, and given the Previous modest accounting initiatives, and with the increase in technological development and the widespread interest in technologies, it is envisaged that major international accounting and auditing firms and regulators of the accounting profession will take serious steps to support an accounting environment in harmony with the world of the Metaverse, in partnership with specialists in the field of information and communication technology. As you did previously with the Second Life (SL) platform.

C. Auditing in Metaverse

Any changes and updates in accounting must extend to the audit since the second depends on the outputs of the first and its operations begin from where the first ended. At the outset, it must be noted the necessity of the audit profession in the Metaverse; Because there may be stand-alone companies in Metaverse, and their financial reports will be issued to virtual users, and it is not excluded that there will be a virtual money market and an integrated business and financial environment there, and therefore there is still a need for the impartial technical opinion of the auditor. But fundamental changes are

expected in the audit process thanks to the integration of virtual reality technology and Blockchain technology in Metaverse. With that, technical development is not expected to eliminate the need for external audit.

The first stage of the audit is planning the audit process itself, by developing a comprehensive plan for the scope of the examination and translating it into a program that includes a set of steps and procedures. In preparation for the development of the audit strategy, which is later translated into a more detailed plan, leading to the design of the audit program within the framework of the strategy and plan. Looking at the previous series of steps from the angle of the Metaverse, it can be said that planning the audit process for companies that operate in this world or that operate in the physical world but use virtual reality technology in performing some tasks and activities, will require the auditors to have sufficient knowledge of the nature of the Metaverse, from a technical point of view And to identify the nature of the financial and business environment and the types of risks there, so that they can develop a comprehensive audit strategy, plan, and program.

In this regard, some have indicated that health and safety risks are reduced in the world of Metaverse [15]. While others have pointed out that despite the low health and safety risks when conducting the audit process in the world of the Metaverse, cyber security risks The risks of data privacy and identity will be high and may reach deeper levels [29]. This requires auditors to carry out additional tasks in the planning phase of the audit process and the implementation phase of the audit process by ensuring that the risk management assesses these risks, and checks the controls that will be established Information technology management about the use of this technology.

Also, in the planning of the audit process, it is important that the auditors understand the accounting information system and the internal control system of the contracted company. If the company is based primarily in the Metaverse, this requires the auditors to identify the characteristics of all the technologies that make up this world and relate them to their concepts and requirements of auditing, To judge those systems that form the cornerstone of developing an audit strategy and plan.

After completing the planning stage of the audit process, implementation and gathering of Evidence of proof begin, to be relied upon in expressing an impartial technical opinion on the fairness of financial reports (Financial Statements), and this is what the third standard stipulates. Also from the fieldwork criteria, the external auditor is required to obtain sufficient and convincing evidence to form an adequate basis for expressing an opinion. A clear, audited, and visible record that cannot be altered or falsified. Also, the registration process in this registry is only after the approval of all the parties and members of the network [54], so there will be less need for authentication in the Metaverse. That is, the combination of the characteristics and capabilities of the technologies that make up the Metaverse will have a positive effect on the supporting evidence that the auditor needs.

In addition to the above, the Metaverse can be used as an audit tool, as it enables the auditors to make tours of the company's locations located in remote geographic areas in the physical world, rather than moving to those areas physically and incurring travel and accommodation costs, where they just

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go to the virtual location that simulates the physical location and its characteristics, and a 360-degree view of the Metaverse, thus achieving savings in costs and time, which can be used to carry out new activities that add value to the company. That is, the Metaverse can make the audit process safer and less wasteful of economic resources in some situations. In this regard, some have indicated that people can interact with virtual reality in a way that appears to them as real or physical, using the previously mentioned virtual reality devices. These devices make them immerse themselves in virtual reality [44]. Here, the expected that this technology will facilitate Auditors' work largely in the Metaverse. They can perform a document audit and discuss management through these technologies, so that the auditor and members of the management wear them and move to a virtual reality in which they meet and discuss what they have, regardless of space barriers. In the Metaverse, data may be available and additional information compared to the real physical environment, due to the harmonious integration of a range of technologies within this world.

It should be noted here, that some of the previous advantages or opportunities are also referred to when talking about remote auditing, and here we must alert a very important point, which is that the term remote audit refers to the traditional audit processes implemented by electronic devices and social networks traditional, and not by virtual reality devices or in the Metaverse world, meaning that the auditor under the term remote audit roams in the real physical environment by cameras and software, and not in a fully virtual environment as in the Metaverse world.

In the same context, the Financial Reporting Council (FRC) has reviewed a legislative issue that will need to be resolved shortly, as, by current legal requirements, no audit work will be conducted on the default version of financial reports or any enhanced layer of data (financial and non-financial) that is not visible in the paper document, there is no obligation for the auditor to do so; Because the financial report is considered - so far - in terms of concept and from the point of view of the law, a paper document only that is signed from within the company, and the references give it confidence by sealing it and signing it from outside the company [12]. However, the auditor should not wait for legislation, and can optionally provide confirmation, and provide new services to its clients, thus constituting a competitive value for it, until the legislator has his say and forces the audit to expand its services. Companies may look at this issue from another angle, where their point of view may be that the user of financial reports trusts the contents of the audited reports, and since the audit has not yet been obligated to audit the financial reports issued in virtual reality, this is likely to affect The value and level of trust given to this type of financial reporting by its users, and therefore there is no need to use these technologies, and therefore they may view the matter as a limiting factor for the use of full virtual reality [12], and therefore the company does not step into the world of the Metaverse.

D. Accountants and Auditors at Metaverse

Although the world of the Metaverse provides accountants and auditors with an immersion in virtual scenes with their minds and bodies, which positively reflects on their perception of the real and virtual financial and business environment together, and although this development releases the curiosity,

enthusiasm, and intelligence of accountants and auditors to explore the state of the scene before them. The researcher does not hide his fear that both accounting and auditing will become more miserable in the world of the Metaverse, through the disappearance of direct interaction between accountants, auditors, stakeholders, and other relevant parties, and that accountants and auditors move from one virtual work environment to another in a way similar to their transition from page to page on the Internet today, Thus, the feeling of the other decreases, and feelings become dulled. The researcher finds that no matter how technology reaches its advanced levels, it will not match the real physical reality that is full of emotions.

The discussion takes another turn when talking about what one of the researchers touched on, which is the issue of the informational corpse. Personal information in the Metaverse world can live virtually long after the death of a person in the physical world. To clarify the idea, a reference was made to the Musical Hologram Tour for Whitney Houston after her death [35], she passed away in 2012, and she revived concerts in the material world in 2020. Although the previous example refers to augmented reality technology and not virtual reality technology, meaning that the Houston concert was held in the physical world by augmented reality technology, that is, a virtual thing was called into the physical world, but what if the opposite happened? That is, what if the media corpse is seen as the one that will remain in the Metaverse world after the death of its owner in the physical world? And if this issue is linked to accountants and auditors in the Metaverse world, this means that the accountant or auditor is expected to die in the physical world and remain alive in the Metaverse. Here, some questions need to be answered, for example, how the virtual version will be dealt with Who are the accountants and auditors? and will this copy stop working as soon as its owner dies in the physical world by linking it to certain databases that are continuously updated (such as the Blockchain)?

Some may see that what this corpse will do is a mere repetition of previous actions and that it will not bring anything new. For example, in the case of the Houston concert, no new moves were introduced, and all the moves were previous moves that were replayed. But what about the possibilities that artificial intelligence (AI) that takes advantage of the accumulation of knowledge and attitudes in this aspect might offer? Where he may be able to make the virtual character of the accountant and auditor complete the journey for a certain period alone as a hypothetical corpse, although the researcher believes that it is difficult (and almost impossible) to repeat all actions in accounting and auditing in order not to repeat the same economic events.

V. CONCLUSION

Metaverse is the latest technology that seeks to fundamentally change the way we do business and interact with those around us, including the business and financial environment, and therefore accounting and auditing will likely have some impact, This research has tried to raise some future questions about accounting and auditing in Metaverse, leaving some of these questions open unanswered, and in some details, it tried to imagine some scenarios, but all of them remain just a forecast for an unknown future, but it is important to visualize the extent and size of the potential impact.

The research tried to start by identifying the extent of the need for accounting in the world of Metaverse and concluded that there is a need for the accounting profession as long as there is an economic exchange in that world, and the nature and functions of accounting information systems in Metaverse may be affected, but the goals of accounting will remain the same, the changes It will be in applications and not in theories, in addition to the fact that Metaverse provides new assets that need an accounting measurement, and it also provides new disclosure tools, all of which are in the interest of the characteristics of accounting information in the long run. On an academic level, Metaverse can provide a different interactive learning and training environment for accountants and auditors, which may improve their abilities and skills to fit in with the digital world. In addition to the above, accounting cannot be isolated from auditing, so we can expect to hear Metaverse echoes in auditing as well, especially in terms of audit planning, evidence gathering, and risk assessment.

Finally, whatever the level of capabilities of Metaverse, this research sees that Metaverse represents a vertical development and not a horizontal development in the fields of accounting and auditing, where the objectives of accounting and auditing are still the same and have not changed, and Metaverse technologies will be auxiliary tools for accounting and auditing.

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REFERENCES

- [1] Zuckerberg, M. (2021). Founder's Letter. [03.11.2021] Available from: <https://www.facebook.com/zuck/posts/10114026953010521>
- [2] Folger, J. (2022). Metaverse Definition. [17.02.2022] Available from: <https://www.investopedia.com/metaverse-definition-5206578>
- [3] Roh, J. (2021). Factbox: What is the 'metaverse' and how does it work?. [25.12.2021] Available from: <https://www.reuters.com/technology/what-is-metaverse-how-does-it-work-2021-09-08/>
- [4] Sunder, S. (2011). Imagined worlds of accounting. *Accounting, Economics, and Law*, 1(1), 1-12.
- [5] Damar, M. (2021). Metaverse Shape of Your Life for Future: A bibliometric snapshot, *Journal of Metaverse*, 1(1), 1-8.
- [6] Narin, N. G. (2021). A Content Analysis of the Metaverse Articles, *Journal of Metaverse*, 1(1), 17-24.
- [7] Shotton, D., Portwin, K., Klyne, G. & Alistair, M. (2009). Adventures in Semantic Publishing: Exemplar Semantic Enhancements of a Research Article, *PLoS Computational Biology*, 5(4), e1000361. Doi: 10.1371/journal.pcbi.1000361
- [8] Matar, M. & Al-Suwaiti, M. (2012). Theoretical rooting of professional accounting practices in the field of measurement, presentation, and disclosure. Third Edition, Dar Wael for Publishing and Distribution, Amman, Jordan.
- [9] Pietro, R. D. & Cresci, S. (2021). Metaverse: Security and Privacy Issues. The Third IEEE International Conference on Trust, Privacy and Security in Intelligent Systems, and Applications (IEEE TPS'21). Doi: 10.1109/TPSISA52974.2021.00032
- [10] Rathore, D. (2022). The metaverse: phase of virtual realities. [20.02.2022] Available from: <https://www.dunebook.com/the-metaverse-phase-of-virtual-realities/>
- [11] Ramadan, M. A. M. (2018). Interior design and technology of visible virtual reality, *Journal of Applied Art and Science*, 5(3), 1-14.
- [12] Financial Reporting Council. (2021). Virtual and Augmented Reality in corporate reporting. [05.11.2021] Available from: <https://library.croneri.co.uk/miscvarc0221>
- [13] Ray, J. (2020). VR-not a reality but neither a hallucination nor dreaming imaginings. *CSI Communications: Knowledge Digest for IT Community*. 44(4), 10-13.
- [14] Greiner, P., Bogatsch, T., Jahn, N., Martins, L., Linß, G. & Notni, G. (2019). Remote-Audit and VR Support in Precision and Mechanical Engineering. Proc. SPIE 11144, *Photonics and Education in Measurement Science*. Doi: 10.1117/12.2533016.
- [15] Anastacio, S.B. (2019). Use of virtual reality in auditing. Annual national convention, Association of government internal auditors (AGIA).
- [16] K, S. & Sen, S. (2020). Virtual Reality: The New Reality. *CSI Communications: Knowledge Digest for IT Community*, 44(4), 14-16.
- [17] Mittal, H. (2020). Virtual Reality: An Overview. *CSI Communications: Knowledge Digest for IT Community*, 44(4), 9.
- [18] Vogel, S. (2021). How virtual reality can help accountants with CPD. Institute of Chartered Accountants in England and Wales. [10.11.2021] Available from: <https://www.icaew.com/insights/viewpoints-on-the-news/2020/aug-2020/how-virtual-reality-can-help-accountants-with-cpd>
- [19] Johnson, R. A. & Middleton, J. M. (2008). Accounting for Second Life. *Journal of Accountancy*, Association of International Certified Professional Accountants. [06.11.2021] Available from: <https://www.journalofaccountancy.com/issues/2008/jun/accountingforsecondlife.html>
- [20] Brown, A. (2021). What Is The Metaverse—And Why Does Mark Zuckerberg Care So Much About It?. [21.12.2021] Available from: <https://www.forbes.com/sites/abrambrown/2021/11/03/zuckerberg-facebook-metaverse-meta-virtual-reality-oculus/?sh=fef92ce6b69f>
- [21] Joshua, J. (2017). Information Bodies: Computational Anxiety in Neal Stephenson's Snow Crash. *Interdisciplinary Literary Studies*, 19(1), 17-47. Doi: 10.5325/intelitestud.19.1.0017
- [22] Ağralı, Ö. & Aydın, Ö. (2021). Tweet Classification and Sentiment Analysis on Metaverse Related Messages, *Journal of Metaverse*, 1(1), 25-30.
- [23] Cook, A. V., Bechtel, M., Andersonm, S., Novak, D. R., Nodi, N. & Parekh, J. (2020). The Spatial Web and Web 3.0: What business leaders should know about the next era of computing, Deloitte Insights.
- [24] Murray, D. (2021). An Inquiry into Designing Metaverses. Master Thesis, School of Simulation and Visualisation, The Glasgow School of Art. Doi: 10.13140/RG.2.2.23227.54560
- [25] Gibbs, A. (2021). 101: What on earth is the metaverse?. [10.11.2021] Available from: <https://www.pwc.com.au/digitalpulse/101-metaverse.html>
- [26] Jeon, H., Youn, H., Ko, S. & Kim, T. (2021). Blockchain and AI Meet in the Metaverse, *Intechopen*. Doi: 10.5772/intechopen.99114
- [27] Isam El-Din, A. M. (2014). Currency Bitcoin, *The Banker Magazine*, (73), 50-53.
- [28] Al-Gnbri, M. K. A. (2020). Blockchain technology and its implications for the internal audit profession, *Internal Audit Journal*. (11), 25-29.
- [29] Vyas, K. (2021). What is the Metaverse and How Do Enterprises Stand to Benefit?. [30.11.2021] Available from: <https://www.itbusinessedge.com/networking/metaverse-enterprises-benefits/>
- [30] Microsoft. (2021). Microsoft Mesh. [01.12.2021] Available from: <https://www.microsoft.com/en-us/mesh>
- [31] Dalton, J. & Gillham, J. (2019). How virtual reality and augmented reality are transforming business and the economy, Seeing is believing, PricewaterhouseCoopers. [07.11.2021] Available from: <https://www.pwc.com/seeingisbelieving>
- [32] Squires, C. (2021). Seoul will be the first city government to join the Metaverse. [25.12.2021] Available from: <https://qz.com/2086353/seoul-is-developing-a-metaverse-government-platform/>
- [33] Kim, S. (2021). South Korea's Approach to the Metaverse. [25.12.2021] Available from: <https://thediplomat.com/2021/11/south-koreas-approach-to-the-metaverse/>
- [34] Animoca Brands. (2021). The Sandbox welcomes PwC Hong Kong to the Metaverse. [25.12.2021] Available from: <https://www.animocabrands.com/the-sandbox-welcomes-pwc-hong-kong-to-the-metaverse> 25.12.2021.

Al-Gnbri M.K.A.

- [35] ICAEW. (2021). Doing business in the digital Metaverse. [18.11.2021] Available from: <https://www.icaew.com/insights/viewpoints-on-the-news/2021/sep-2021/doing-business-in-the-digital-metaverse>
- [36] Buckless, F. (2012). Accounting Education in the Second Life World: Opportunities for Students, Faculty, and Businesses. *Development and Learning in Organizations*, 82(3), 9-14. Doi: 10.1108/dlo.2012.08126daa.004
- [37] Bansode, R. (2016). Augmented Reality & Virtual Reality: Understanding the new digital interface and potential for financial services, Synchrotron.
- [38] Digital Catapult. (2018). Growing VR/AR companies in the UK, A business and legal handbook, PricewaterhouseCoopers.
- [39] Duan, H., Li, J., Fan, S., Lin, Z., Wu, X. & Wei, C. (2021). Metaverse for Social Good: A University Campus Prototype. *29th ACM International Conference on Multimedia (MM'21)*. Doi: 10.1145/3474085.3479238
- [40] Khalifa, E. (2019). The Post-Information Society: The Impact of the Fourth Industrial Revolution on National Security, First Edition, Emirates, Future Center for Research and Advanced Studies.
- [41] Chamber of Digital Commerce. (2017). Agenda Request – Determining the Appropriate Recognition, Measurement, Presentation, and Disclosure for Digital Currencies and Related Transactions.
- [42] Prestigiacomo, L. (2017) What is the "GAAP" in regard to digital currency?. Mazars USA Ledger.
- [43] Kim, S., Crowley, M., Park, A. & Karnick, M. (2022). The Metaverse: Accounting Considerations Related to Nonfungible Tokens. Accounting Spotlight, Deloitte.
- [44] Faccia, A. & Mosteanu, N. R. (2019). Accounting and blockchain technology: from double-entry to triple-entry, *The Business and Management Review*, 10 (2), 108-116.
- [45] Rahmawati, M. I., Sukoharsono, E., Ganis, R., Aulia, F. & Prihatiningtias, Y. W. (2021). From Blockchain to Accounting Profession: Evidence from Indonesia, *Journal of Hunan University (Natural Sciences)*, 48(2), 10-16.
- [46] Zheng, R. (2021). Applications Research of Blockchain Technology in Accounting System. International Symposium on Big Data and Applied Statistics, *Journal of Physics: Conference Series*. Doi: 10.1088/1742-6596/1955/1/012068
- [47] Imene, F. & Imhanzenobe, J. (2020). Information technology and the accountant today: What has really changed?. *Journal of Accounting and Taxation*. 12(1), 48-60.
- [48] Maad, S., Garbaya, S., McCarthy, J. B., Beynon, M., Bouakaz, S. & Nagarajan, R. (2010). Virtual and Augmented Reality in Finance: State Visibility of Events and Risk. *InTech*, 205-220.
- [49] Buckless, F. A., Krawczyk, K. & Showalter, S. (2014). Using Virtual Worlds to Simulate Real-World Audit Procedures, *Issues in Accounting Education*, 29(3), 389-417. Doi: 10.2308/iace-50785
- [50] Jeyaprakash, T. & Ranjana, P. (2020). Interactive Virtual Reality (VR) Applications for Education and Training, *CSI Communications: Knowledge Digest for IT Community*, 44(4), 17-18.
- [51] Sari, R. C., Warsono, S., Ratmono, D., Zuhrohtun, Z. & Hermawan, H. D. (2021). The effectiveness of teaching virtual reality-based business ethics: is it really suitable for all learning styles?. *Interactive Technology and Smart Education*, ahead-of-print(ahead-of-print). Doi: 10.1108/ITSE-05-2021-0084
- [52] Hornik, S. & Thornburg, S. (2010). Engaging Accounting: Second Life™ as a Learning Platform. *Issues in Accounting Education*, 25(3), 361-378. Doi: 10.2308/iace.2010.25.3.361
- [53] Khanna, S. (2016). Research Spotlight: Virtual reality makes auditing come to life. American Institute of Certified Public Accountants. [03.11.2021] Available from: <https://us.aicpa.org/interestareas/accountingeducation/newsandpublications/virtual-reality-in-accounting-education>
- [54] Appelbaum, D. & Nehmer, R.A. (2020). Auditing Cloud-Based Blockchain Accounting Systems, *Journal of information systems*, 34(2), 5-21.