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# **Virtual Property in the Metaverse**

**The upcoming challenges of *res digitalis***

Masters of Transnational Law

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## **Acronyms, Abbreviations and Terminology**

**AR** Augmented Reality

**EULA** End-User License Agreement

**GAFAM** Google, Apple, Facebook, Amazon, Microsoft

**NFT** Non-fungible token

**PCC** Portuguese Civil Code

**ToS** Terms of Service

**VR** Virtual Reality

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## 1. Introduction

We are further and further away from the days where the internet simply served to find new recipes and send emails. Currently, we live in a digital era, where new forms of working, entertaining and essentially living are being shifted from the physical world to cyberspace. With people spending most of their time in front of their smartphones and computers, not only for work related reasons, but also for social reasons, to connect with friends, to purchase things, to play games and so on, virtual worlds and communities started to emerge.

The first virtual world to ever exist was named Habitat and dates back to 1988. Since then, different cybercommunities have appeared through various platforms that, despite having dissimilarities, essentially provide the same service: a shared space for avatars to interact with each other, where there is a graphical user interface by which the world is visually shown; an immediacy of interactions, interactivity of the content and a persistency of existence.<sup>1</sup> Currently, most videogames have all these characteristics and can, therefore, be called virtual worlds.

Moreover, some digital companies like Meta<sup>2</sup> are taking this concept to a new level by planning to create the Metaverse: a single virtual world that joins all the existing cyberspaces where users can socialize, work, invest, buy and sell virtual items, among other things. Nowadays, there is a lot of frenzy around the concept of the Metaverse: what it will look and feel like, what people will do there, what will users buy and sell, etc. Supposedly, the future Metaverse will incorporate all of our living aspects: we will be able to own a digital house, have a job, attend a concert, start a business and so on<sup>3</sup>. However, it is important to understand that in its essence, the Metaverse will still be a cyberspace that allows people to socialize through avatars, have a digital identity and, in

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<sup>1</sup> Simon Gottschalk, *"The Presentation of Avatars in Second Life: Self and Interaction in Social Virtual Spaces"*, (2010). P. 503.

<sup>2</sup> Meta is the new name of the Facebook company. Two years ago, Facebook's CEO Mark Zuckerberg announced Facebook's rebrand, which was a step towards his new goal: to build a Metaverse. Salvador Rodriguez, *"Facebook changes company name to Meta"*, (CNBC, 28 October 2021). Available at: <https://www.cnbc.com/2021/10/28/facebook-changes-company-name-to-meta.html> Accessed 19 September 2022.

<sup>3</sup> Meta, *"What is the Metaverse?"*. Available at: [https://about.meta.com/what-is-the-metaverse/?utm\\_source=about.facebook.com&utm\\_medium=redirect](https://about.meta.com/what-is-the-metaverse/?utm_source=about.facebook.com&utm_medium=redirect). Accessed 19 September 2022.

a way, live a digital life. In that sense, it is not completely different from the existing virtual worlds. In fact, it is fair to say that the Metaverse will most likely look like a videogame on steroids.

Videogames, among other virtual worlds, have enabled the creation of virtual economies, where virtual to virtual commerce started to emerge<sup>4</sup>. Initially, there was no real virtual economy, consumers would buy a CD of the videogame and play it every time they wanted to. In this initial period, although in-game items already existed, these could only be earned through “labour”, which implied a time investment in the game but not a monetary one. However, because the most valuable items were often the most difficult ones to acquire, the inevitable happened: a real-world market emerged, where players started to sell virtual items and game accounts to each other. In this context, sometime after the first virtual worlds were created but still decades before Metaverse was even a term, the responsible platforms for these proto- metaverses saw a business opportunity and began selling in-game virtual items to users.

These assets have a crucial role in these virtual worlds, one that will continue in the Metaverse, as everything susceptible of being owned or consumed: from land to houses, to the avatar’s accessories, can only exist through virtual items. Today, consumers, on average, spend at least 219 dollars annually on virtual items, of which more than 30 percent is on metaverse-related assets such as in-game purchases, virtual enhancements, digital real estate, and NFTs<sup>5</sup>. Moreover, recently, based on a survey of 35 000 active online users from 25 to 44 years of age in some of the largest virtual items markets (UK, USA, India and Singapore), McKenzie found that 20% of respondents own digital items; two-thirds of those 20% had already made payments using digital assets and just over half had purchased digital items represented by NFTs and performed play-to-earn activities with digital assets.<sup>6</sup>

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<sup>4</sup> Vili Lehdonvirta and Edward Castronova.: “*Virtual Economies, Design and Analysis*” (Information Policy, 2014).

<sup>5</sup>McKinsey, “*Prohibiting reality and myth in the metaverse*” (June 13, 2022). Available at: <https://www.mckinsey.com/industries/retail/our-insights/probing-reality-and-myth-in-the-metaverse>. Accessed 27 September 2022.

<sup>6</sup>McKinsey, “*Web3 beyond the hype*” (September 26, 2022). Available at: <https://www.mckinsey.com/industries/financial-services/our-insights/web3-beyond-the-hype>. Accessed 27 September 2022.

For at least a decade, these virtual items have been traded, landed, rented and given or exchanged for others, thus they have been treated as property due to their inherent characteristics, their usefulness and their patrimonial value. However, a particularly important question remains: Do users have property rights over their virtual items?<sup>7</sup> According to some experts, the answer to this question needs to be yes, as for e-commerce to scale on the Metaverse, digital assets have to be recognized as a class of property among jurisdictions<sup>8</sup> and users must have property rights over them.

In this context, with Meta planning to build the Metaverse in the next few years, and McKenzie estimating that commerce in this virtual world will be a 5 trillion-dollar industry by 2030<sup>9</sup> (the size of Japan's economy), addressing this topic is becoming increasingly more urgent, thus we can't nor need to wait for the Metaverse to happen in order to start doing it. As the EU blockchain observatory and forum has suggested, exploring existent virtual worlds and their public perception can provide valuable insight for a more generalized, impactful metaverse as *it provides us with a roadmap of how today's business environment will evolve to address consumer needs, and an idea of the size of this transition and the areas likely to be influenced by the metaverse first.*<sup>10</sup>

As we have clarified, a Metaverse, as a concept, is both already here and still far away. Therefore, by analyzing users' property rights in cyberspaces like videogames, one will more easily grasp what property in the Metaverse will look like. Hence, in this thesis,

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<sup>7</sup> The first authors that tried to answer this question were Greg Lastowka and Dan Hunter in their article "The Laws of the Virtual Worlds" (California Law Review, vol.92, 2004) as well as Joshua Fairfield in "Virtual Property" (Boston University Law Review, vol.85, 2005), both considered revolutionary in the digital property debate.

<sup>8</sup> EU Blockchain Observatory and Forum, "Providing a foundation for understanding its potential and a vision for an Open Metaverse" (October 14, 2022). Available at: [https://www.eublockchainforum.eu/sites/default/files/reports/Metaverse\\_Report\\_Final\\_1.pdf](https://www.eublockchainforum.eu/sites/default/files/reports/Metaverse_Report_Final_1.pdf) Accessed 27 September, 2022.

<sup>9</sup> Mckinsey & Company, "Value creation in the Metaverse" (June 2022). Available at: <https://www.mckinsey.com/~media/mckinsey/business%20functions/marketing%20and%20sales/our%20insights/value%20creation%20in%20the%20metaverse/Value-creation-in-the-metaverse.pdf>. Accessed 30 September 2022.

<sup>10</sup> EU Blockchain Observatory and Forum, "Providing a foundation for understanding its potential and a vision for an Open Metaverse", (October 14, 2022). Available at: [https://www.eublockchainforum.eu/sites/default/files/reports/Metaverse\\_Report\\_Final\\_1.pdf](https://www.eublockchainforum.eu/sites/default/files/reports/Metaverse_Report_Final_1.pdf). Page 9. Accessed 27 September 2022.

we aim to clarify what rights users actually have over their virtual items and assess whether, in today's conjuncture, there is any possibility for ownership of virtual property. The latter will be done through the analysis of the evolution of ownership on early proto-metaverse implementations, including the implementation of NFTs and Blockchain technology and their contribution to the virtual property debate.

## 2. The Concept of Virtual Items

On the existing virtual worlds and proto-metaverses, the commerce looks pretty much the same as what it looks like on the physical world. Because users virtually live through their avatars, the items they consume will indeed be consumed by the avatar, thus everything from clothes to digital land can be purchased and sold. These objects are inherently digital and for the purpose of this thesis will be designated as “virtual items”, “digital items”, “digital assets” or “in-game items”.

It is important to define what kind of digital assets we are referring to, as one of the main obstacles to the study of this topic is that there is no unanimity in the literature on what virtual property is.<sup>11</sup> In this thesis we are not addressing IP rights, domain names or files in the cloud. When we mention digital assets, we mean virtual objects, i.e, the digital entities that users possess within their accounts in virtual worlds that are characterized by having a secondary mode of existence as they are not materially autonomous and thus depend on a particular platform to exist<sup>12</sup>. In a material or technical sense, virtual items are a custom graphical appearance preset package achieved by the use of graphical user interface that can be applied to specific computer software;<sup>13</sup> In a more practical sense, they are digital things that appear in virtual worlds, which can, but do not necessarily have to, mimic physical objects.<sup>14</sup>

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<sup>11</sup> Przemyslaw Palka, “*Virtual Property: towards a general theory*” (European University Institute, 2017) P.105.

<sup>12</sup> Virtual items only exist as products of private digital companies that create cyberspaces, they do not and cannot exist outside of them, thus they do not have the same autonomy of physical property. *Idem, ibidem*. P.16.

<sup>13</sup> “*Skin (computing)*”. Available at: [https://en.wikipedia.org/wiki/Skin\\_\(computing\)](https://en.wikipedia.org/wiki/Skin_(computing)) . Accessed: 10 September 2022.

<sup>14</sup> Philip Brey, *The Social Ontology of Virtual Environments* (American Journal of Economics and Sociology, 2003). P.269.

Depending on the specifics of the videogame/virtual world, the purpose or benefits of purchasing virtual items changes. In some cases, players acquire functional virtual items to speed up the avatar's progress in the game or to make the avatar more powerful and therefore enhance their chances of winning the game. In other cases, virtual items are purchased for a simply aesthetic reason: users enjoy buying nice items for their avatars because they tend to perceive their *digital personas* as an extension of themselves, therefore, people who spend money on the physical world to buy items for purely aesthetic reasons will tend to do the same in the virtual world.<sup>15</sup> In this sense, we can differentiate virtual items between those that serve a purpose in the virtual world, such as the powers the avatar can acquire, the resources it has to improve its performance or any other that has a concrete function within the game and those that simply have an aesthetic function and are not related to the functionality of the game or the performance of the avatar, which could be digital designer bags or digital clothing and accessories. Moreover, beyond functional and aesthetical, virtual items can also be consumable or non-consumable, exchangeable and non-exchangeable, etc.<sup>16</sup> Thus, the nature of the virtual items existing in virtual worlds and in the future Metaverse is as diverse or even more diverse than the ones existing in the physical world.

## 2.1. Minted and non-minted virtual items and on-chain vs off-chain videogames

Now that we have explained what a virtual item is, we need to make a distinction between what we have designated as minted virtual items and non-minted virtual items.

Minted virtual items are virtual items that have been tokenized, meaning that they have been through a tokenization process and are now represented by a token on a blockchain. There are different types of tokens, created to represent different types of assets; in the case of virtual items, once they are tokenized, they are represented by NFTs (non-fungible tokens).

It is important to highlight that the essence of the virtual item remains the same, what changes is that they start to be represented by a non-fungible token that is inserted

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<sup>15</sup> Amelia Henderson, "Consumer spending in the metaverse: why might people spend more?" (Gwi Marketing, July 7, 2022). Available at: <https://blog.gwi.com/marketing/metaverse-consumer-spending/34>. Accessed: 10 September 2022.

<sup>16</sup> Przemyslaw Palka, "Virtual Property: towards a general theory" (European University Institute, 2017) P. 189.

on a blockchain.<sup>17</sup> When a virtual item is represented by an NFT, the non-fungible token will function as a certificate that proves that that specific virtual item is original and possessed by a specific person. Thus, in a way, the NFT will act as a deed. These minted virtual items can be found on on-chain videogames, also known as blockchain games or meta games, which are videogames that have integrated blockchain technology in their platforms.

On the other hand, non-minted virtual items are typical in-game items, just a set of code that is stored on a videogame or virtual world platform and represents some sort of object. We refer to them as non-minted because they have not been tokenized, i.e., they have not been through the process of being represented by a token on a blockchain. Non-minted virtual items are usually found on off-chain videogames, which are videogames that do not incorporate blockchain technology.

As we will address later on, minted virtual items can currently be bought, sold and traded on blockchain based marketplaces, while non-minted virtual items cannot. There is an assumption that one can have property rights over the former but not over the latter. Our question is very simple: Why?

One of the main goals of this dissertation is to analyze whether tokenizing virtual items can contribute to the possibility of users owning them. Thus, the distinction between minted and non-minted virtual items is a crucial part of this thesis. Nevertheless, it is not necessarily an intuitive one for someone who is not familiar with the technical terms. Thus, in the next chapters, we will try to further clarify these concepts, on a step by step analysis.

### 2.1.1. Understanding NFTs and smart contracts

We have clarified that the difference between minted and non-minted virtual items is whether or not they are represented by NFTs. Thus, the first step is to really understand what NFTs are.

On a technical standpoint, NFTs are the product of smart contracts. The latter were initially described by Nick Szabo as “*a set of promises specified in digital form*”<sup>18</sup> and

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<sup>17</sup> Andres Guadamuz: “*The treachery of images: non-fungible tokens and copyright.*” (Journal of Intellectual Property Law & Practice, 2021). P. 1372-1376.

<sup>18</sup> Nick Szabo, “*Smart Contracts: Building Blocks for Digital Markets*”, 1996.

can be defined as a computer code that automatically manifests or executes an agreement<sup>19</sup>, stored on a blockchain. In the case of NFTs, the agreement is the assignment or reassignment of possession over an underlying asset. The execution or manifestation of this agreement is the creation of the token.

In its turn, a token is always a representation of something. A non-fungible token, specifically, is a representation of possession over a real world or digital asset. In some blockchain articles/websites, there is this notion of an NFT as a representation of ownership. It is very common for people to say that NFTs represent ownership over digital assets. However, the term ownership is used in a non-legal way, simply to mean possession.

Furthermore, smart contracts have different characteristics or standards depending on their purpose. Because an NFT is an ERC-721 token<sup>20</sup>, the smart contract needs to include some mandatory elements like the tokenID, which is generated upon the creation of the token, and the contract address (a blockchain address), which are both unique. Optionally, the smart contract can also contain other information like the wallet address of the creator or the links to the NFT's metadata.<sup>21</sup>

It is important to understand that what is stored on the blockchain is the smart contract. By having access to the smart contract, one can access the token URI which identifies where the token metadata is stored. The metadata will, in its turn, point to a link where the possessor can access the digital asset<sup>22</sup> that his/her NFT represents. In this sense, the metadata and the image/digital asset are not part of the smart contract and are

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<sup>19</sup> The code can be a simple manifestation of the agreement or can execute certain things like transferring funds from A to B.

<sup>20</sup> The EU Blockchain Observatory and Forum paper on “Demystifying Non-Fungible Tokens” (November 2021.) P. 25, available at: [https://www.eublockchainforum.eu/sites/default/files/reports/DemystifyingNFTs\\_November%202021\\_2.pdf](https://www.eublockchainforum.eu/sites/default/files/reports/DemystifyingNFTs_November%202021_2.pdf). explains that ERC-721 tokens are the NFTs minted on the Ethereum blockchain, although they are the most popular ones, NFTs they can be minted on other blockchains.

<sup>21</sup> Andres Guadamuz, “*The treachery of images: non-fungible tokens and copyright.*” *Journal of Intellectual Property Law & Practice* (2021). P.1367-1371.

<sup>22</sup> What the token represents is arbitrary: it can be a videogame item, a permission slip, an image, a subscription, a video, a text message, etc. See, for example: Balazs Bodo; Alexandra Giannopoulou; Péter Mezei and João Pedro Quintais, “*The Rise Of NFTS: These aren't the droids you're looking for*” (University of Amsterdam, 2019). P.6.

not stored on blockchain. These details are important to understand the dynamics between the NFT and the underlying asset.

However, more important than comprehending the technical characteristics of NFTs and smart contracts is understanding what those characteristics mean in practice. On a first note, it is crucial that the reader recognizes that NFTs are not the object they represent (the digital item), they are an identifier of the asset and of its possession, they represent possession over digital items. Moreover, since not everything is stored on the blockchain, as this technology is a lot less efficient than one imagines and could not bear to store more than the essential details about each smart contract, there are different possibilities as to where the metadata and the virtual item may indeed be kept. They can be stored on a centralized platform like the virtual world's central server or on a decentralized platform like IPFS<sup>23</sup> or Arweave<sup>24</sup>. Furthermore, to add another degree of complexity, the metadata can be stored on a centralized platform while the virtual item is on a decentralized platform, and vice versa. As we will assess later on, these different hypotheses of storing locations will have practical implications on the NFT's possessor rights.

There are innumerable applications for the use of NFTs: they can be used in music, allowing artists to tokenize their songs and provide royalties to creators and producers<sup>25</sup>; in digital fashion<sup>26</sup>; to prove authenticity of luxury goods such as expensive wine and

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<sup>23</sup> IPFS (Interplanetary File System) is a distributed file storage protocol that allows computers all over the globe to store and serve files as part of a peer to peer network, however, it needs someone to host the data, it is not a blockchain. For a more detailed explanation, see: Dennis Trautwein; Will Scott; Ignacio Castro; Gareth Tyson; Aravindh Raman; Yannis Psaras and Moritz Schubotz, "*Design and Evaluation of IPFS: A Storage Layer for the Decentralized Web*", (Cornell University, August 2022).

<sup>24</sup> Lev Berman; Ivan UemlianinViktor; Diordiiev; India Raybould; Sam Williams, *Arweave: A Protocol for Economically Sustainable Information*. (2019), explain that Areweave is a blockchain that stores and pins files onto IPFS and keeps them available permanently.

<sup>25</sup> As an example, the American rapper Nas has minted two of his most well-known songs, granting all NFT buyers streaming royalty rights. Available at: <https://royal.io/editions/nas-ultrablack>. Accessed: 29 September 2022.

<sup>26</sup> On this topic, see: Maria Vittoria, "*Technological Evolution in the Luxury and Fashion Industry: Focus on the Metaverse and NFT*", (LUISS Business School, 2022).

designer clothes/bags<sup>27</sup>; in medicine, to represent medicine prescriptions<sup>28</sup>; in ticket sales, ending the resell of tickets on secondary markets and including a royalties system so the artists get paid back<sup>29</sup>; they can represent ownership of physical items, for example acting like deeds in real estate,<sup>30</sup> and the list goes on. However, in this dissertation, we will only address NFTs that represent virtual items in virtual worlds, in that way, we will focus on the Metaverse/Gaming application of non-fungible tokens.

### 2.1.2 The existing Contractual Framework of non-minted virtual items

As there is no legislation on the subject, the only existing regulation of virtual items are indeed the EULA (End User License Agreements) that users enter into when they access the virtual world. The legal nature of EULA is not at all obvious. In theory, these are a type of software licensing agreements, more specifically contracts between software developers and the purchasers of the software with specific terms of use (ToS). However, when it comes to virtual worlds, these agreements or contracts, if we can fit them in that category, look nothing like the agreements between software developers and licensees. Virtual world's users have an ongoing close relationship with the digital platforms that own that cyberspace, they are definitely not just users of a software, their interaction with the virtual world is much more complex than that.

On a practical level, EULA's just serve to stipulate rules and tell users what they are allowed and not allowed to do while they're in the virtual world. They do not look like contracts for service because they include no obligations on the side of the metaverse platforms, they just enunciate the rules of the cyberspace, plus, users have no rights to

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<sup>27</sup> Ian Allison, "Louis Vuitton Owner LVMH is Launching a Blockchain to Track Luxury Goods" (Coindesk, March 26, 2019). Available at: <https://www.coindesk.com/markets/2019/03/26/louis-vuitton-owner-lvmh-is-launching-a-blockchain-to-track-luxury-goods/> Accessed: 25 November, 2022.

<sup>28</sup> Danielle Alvarez, "Digital Frontiers: What NFTs Can Do For Pharma" (Pharma's Almanac, June 24, 2022). Available at: <https://www.pharmasalmanac.com/articles/digital-frontiers-what-nfts-can-do-for-pharma> Accessed: 25 November, 2022.

<sup>29</sup> André Schweizer; Nils Urbach; Ferdinand Regner, "NFTs in practice- Non-Fungible Tokens as Core Component of a Blockchain based Event Ticketing Application" (2019) P.4.

<sup>30</sup> Johan Haji, "Forbes Magazine, Guide to Using NFTs In Real Estate, Forbes Magazine, (August 4, 2022). Available at: <https://www.forbes.com/sites/forbesbusinesscouncil/2022/08/04/guide-to-using-nfts-in-real-estate/?sh=6115da315e8a> Accessed: 30 November, 2022.

claim any action based on these documents. Thus, there is a lot of confusion around the nature of these licenses which leads us to ask important questions such as: Are they a type of constitutional laws for cyberspaces? If the platforms change the terms of use, are they regulating a cyberspace or just changing the mechanisms of a “videogame?” What about when they change the code of the virtual world? Are they changing the contract, changing the service or regulating the digital space? <sup>31</sup> We do not have a clear response for these questions and answering them is not the purpose of this thesis, nevertheless, this is an important discussion that needs to happen in the near future.

What we do know is that currently, most off-chain videogame’s terms of use or EULA strictly stipulate that all in-game items are the game creators’ property, <sup>32</sup> and that the buyer only has a license to use the item. As an example, in the videogame Pokemon Go ToS it is established that *“The purchase of Virtual Money grants you only a limited, nontransferable, nonsublicensable, revocable license to use such Virtual Money to access and purchase Virtual Goods in conjunction with your personal, noncommercial use of the Services.”*<sup>33</sup> A similar provision can be read in the Supercell’s ToS, a well-known videogame developer,<sup>34</sup> where it is stated that *“Notwithstanding any provision to the contrary herein, you agree that you have no right or title in or to any content that appears in the Service, including without limitation the **virtual goods** or currency appearing or originating in any Supercell game, **whether earned in a game or purchased from Supercell, or any other attributes associated with an Account or stored on the Service.**”*<sup>35</sup>

In this sense, users enter into contracts with platforms whereby they agree that they have no ownership rights over the in-game items they purchase. However, most users are not aware of this and actually believe they own the items they acquire for their avatars. It is not at all obvious to the user that he/she only has a license to use and no property

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<sup>31</sup> Przemyslaw Palka; *Virtual Property: towards a general theory*,” (European University Institute, 2017). P.190-201.

<sup>32</sup>Steven J. Horowitz, “*Competing Lockean Claims to Virtual Property Note*”, (Harvard Journal of Law & Technology, 2006). P. 445

<sup>33</sup> Niantic ToS, Section 5.4: Virtual Money and Virtual Goods. Available at: <https://nianticlabs.com/terms/> Accessed: 23 November 2022.

<sup>34</sup> Supercell is a finish videogame developer company, responsible for famous videogames like Clash of Clans, Clash Royale, Hey Day, Boom Beach and Brawl Stars.

<sup>35</sup> Supercell’s ToS, Section 2.3: Virtual Content. Available at: <https://supercell.com/en/terms-of-service/> Accessed: 23 November 2022.

over his/her in-game items.<sup>36</sup> The relationship users have with their items looks, and most importantly feels a lot like a proprietary relationship, but in fact that is not the case. Although users can enjoy their items and feel a sense of control over them, they *de facto* and *de jure* don't have proprietary rights over their digital assets. As an example, they cannot dispose of them or control them, they can simply control the way in which they use them and possibly dispose of them inside the game dynamics if the code allows them to, but not as a sale or other real transfer of property, besides, they do not have a property title.<sup>37</sup>

Thus, unlike what occurs in property transmissions, EULA do not transfer the ownership of the good but rather grant an authorization so that a third party not in possession of the title can still enjoy the item. They are, in this sense, a way of restricting the scope of application of the typical power of exclusion that involves property assets, enabling legal transactions in which the title holder does not wish to remove it from its sphere of ownership.<sup>38</sup>

In this sense, under normal off chain videogames, users are not the owners of the in-game digital items they purchase. Thus, when they acquire virtual items, they are simply paying a license fee to use them in the game world, rather than actually buying them.<sup>39</sup>

This reality is not ideal for players that spend relevant amounts of money and time acquiring these items and end up with virtually no rights over them because of the videogame's terms of use, which is the reason why judicial disputes regarding EULA and property rights are becoming more common as the value of these items increases.<sup>40</sup>

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<sup>36</sup> Charles Blazer, "*The Five Indicia of Virtual Property*", (The University of New Hampshire Law Review, 2006). P. 137.

<sup>37</sup> Steven J. Horowitz, "*Competing Lockean Claims to Virtual Property Note*", (Harvard Journal of Law & Technology, 2006). P. 445.

<sup>38</sup> Joshua Farfield, "*Anti-Social Contracts: The Contractual Governance of Virtual Worlds*", (McGill Law Journal, Vol. 53, 2008). P. 437.

<sup>39</sup> That is the case simply because there is currently no regulation on the type of digital property we are addressing. If such transnational regulation indeed existed, digital platforms wouldn't be the lawmakers in this field and could not decide who can own what and why.

<sup>40</sup> John Sutter, "*Can people actually own virtual land?*" (CNN, May 10, 2010). Available at: <http://edition.cnn.com/2010/TECH/05/10/virtual.property.second.life/index.html>. Accessed: 30 November 2022.

### 2.1.3. The existing Contractual Framework of minted virtual items

On the other hand, the on-chain videogames' policies in regard to ownership are extremely different. From this moment on, we will focus our analysis on the ToS of two of the most well-known blockchain videogames: Sandbox and Decentraland. Both of them are famous proto-metaverses where users can purchase things like virtual land represented by NFTs to create and monetize experiences, the main difference between the two being that Sandbox essentially has a gaming nature, giving specific missions to players, while Decentraland is more general and focuses more on user-generated content and less on the gaming strand. On both platforms, users can purchase digital land, there is a limited number of parcels of land that are traced through blockchain and each platform declares exactly how many parcels there will be, so scarcity is controlled.<sup>41</sup>

Currently, most blockchain videogame/metaverse platforms state that users have total ownership over the minted virtual items they purchase in the platform. As an example, we can refer to the Sandbox's Terms of Use, where they indicate that "*Because each NFT is an NFT on the Ethereum Network, when you purchase a Premium NFT in accordance with these Terms you own the underlying NFT completely.*"<sup>42</sup> Or Decentraland's Terms of Use, where it is stated that "*All title, ownership over NFTs, including without limitation, Wearables, belong to the creator of the NFT. Transactions for the sale of NFT through the Marketplace will convey said title, ownership and Intellectual Property Rights to the purchaser*"<sup>43</sup>

## 2.2. Blockchain as the promise of ownership

As one can observe, there has been a policy shift from off chain videogames to on-chain videogames. In the former, users have been denied ownership rights whilst in the latter, property rights have been peacefully recognized. Naturally, we wonder what is the

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<sup>41</sup> Aron Fischer and Jaya Brekke, "*Digital Scarcity*", (Internet Policy Review, 2021). Available at: <https://policyreview.info/pdf/policyreview-2021-2-1548.pdf> Accessed: 6 December, 2022.

<sup>42</sup> Sandbox Terms of Use. Section 3: Ownership, License and Ownership Restrictions. Available at: <https://www.sandbox.game/en/terms-of-use/> Accessed: 6 December 2022.

<sup>43</sup> Decentraland's Terms of Use. 12.4 Ownership and management of LAND, Non-fungible tokens (NFTs) and Content created by users. Available at: <https://decentraland.org/terms/> Accessed: 6 December 2022.

reason behind this shift, why can users suddenly own virtual items, now that Blockchain is in the picture? Well, firstly, one needs to understand that when there is no regulation on the subject and consumers have no law to protect them, they are at the mercy of digital platforms and their own terms of use.<sup>44</sup> This being said, it is undisputed that the fact that ownership was not mentioned *ab initio* was always an issue for users of virtual worlds, however platforms were not incentivized to introduce property rights in their cyberspaces, as that would open the game economy to the real economy, which would draw the attention of regulators, thus creating more responsibilities for digital platforms.<sup>45</sup> However, with the general crypto enthusiasm that has flooded the digital space in the last couple of years, the mainstream excitement around Blockchain technology<sup>46</sup>- the underlying technology behind cryptocurrencies- and essentially the promise of a Metaverse, these platforms have made the business decision to be on the frontline of the Web3 revolution and make videogames more dynamic and interconnected by “granting” property rights to users, as that was strategically the most intelligent route to follow. We believe it was an “either evolve or stay behind” kind of dilemma, and thankfully videogames chose to evolve.

Nevertheless, to users, this change was not perceived as a decision but rather as a new technological possibility in the digital sphere, as if there was no possible way of this happening before Blockchain. In fact, and mostly because it was indeed advertised that way, there is a general belief that only NFTs can grant users real ownership rights over their digital items.<sup>47</sup>

In this scenario, the blockchain gaming industry grew 2000% in the past year and increased the NFT trade volume from 135 million dollars in 2020 to 64 billion dollars in 2022.<sup>48</sup> Thus, it is driving an entire new economy, one that is based on digital-first alternatives to the “real world” economy. Accordingly, one could say that gamers,

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<sup>44</sup> Joshua Fairfield, “*The God Paradox*”, (Boston University Law Review, 2009). P.1019-1021

<sup>45</sup> *Idem, ibidem*. P. 1018.

<sup>46</sup> Balazs Bodo; Alexandra Giannopoulou; Péter Mezei; João Pedro Quintais, “*The Rise Of NFTS: These aren’t the droids you’re looking for*”, (University of Amsterdam, 2019). P.1-10.

<sup>47</sup> Joshua Fairfield “*Tokenized: The Law of Non-Fungible Tokens*”, (Indiana Law Journal, 2022). P. 1278-1280.

<sup>48</sup> Brent Liang, “*Three Things You Need to Know About Blockchain Gaming*”, Forbes Magazine, (August 2, 2022). Available at: <https://www.forbes.com/sites/theyec/2022/08/02/3-things-you-need-to-know-about-blockchain-gaming/?sh=3905af934a85>. Accessed: 10 December 2022.

especially blockchain gamers, are the native population of the metaverse, as “*while large social platforms and other big technology firms try to define and understand the meaning of the term Metaverse, gamers have been playing, socializing, and purchasing goods in virtual worlds for years*”<sup>49</sup>. This is what makes them so useful for our study, they are the building blocks for a true Metaverse, the pioneers of the first on-chain “ownership system” in virtual worlds.<sup>50</sup>

This is, indeed, a lot of information to digest, but in a very succinct way, what we want the reader to take from this is that on on-chain videogames and proto-metaverses, users are essentially being promised a real ownership right over the virtual items they purchase. However, that is not exactly what they do materially or factually have when they purchase minted virtual items. The fact that virtual worlds recognize or grant property rights is in no way imperative for our normative analysis, nor is it relevant from a judicial perspective. Whether digital items can be owned depends on the legal characteristics of the assets in question and whether or not users can own them is a regulatory question not a contractual one. EULAs are not dispositive of whether property rights exist. Thus, the rights users have over digital items represented by NFTs are not as clear as they are being advertised, which necessarily implies that granting ownership in the Metaverse will also not be as automatic as one is being led to believe.

### 3. Debunking the Myth: NFTs are not virtual items

Even though we have already demystified the meaning of NFTs and smart contracts, in order for the reader to understand why associating blockchain with digital ownership is incredibly misleading, an even clearer explanation on the nature of these tokens is indeed necessary. In this context, we would like to start by saying that the very expression “ownership over NFTs”, used in most virtual world’s terms of use, is both technically and legally wrong. In practice, it is the same as saying ownership over

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<sup>49</sup> Anders Christofferson; Andre James; Amanda Obrien and Tom Rowland, “*Games are the Getway to the Metaverse*”, (Bain & Company, September 21, 2022). Available at: <https://www.bain.com/insights/games-are-the-gateway-to-the-metaverse-interactive/2022>. Accessed: 10 December 2022.

<sup>50</sup> Brent Liang, “*Three Things You Need to Know About Blockchain Gaming*”, Forbes Magazine, (August 2, 2022). Available at: <https://www.forbes.com/sites/theyec/2022/08/02/3-things-you-need-to-know-about-blockchain-gaming/?sh=3905af934a85>. Accessed: 10 December 2022.

representation of ownership, which would be the equivalent of saying one owns a deed. People don't own deeds; they have deeds which prove they own houses.

This is something that has been, in our opinion, intentionally unmentioned by digital platforms. A lot of these platforms state, in their terms of use that users own “the underlying NFT” completely, which is at the very least, incredibly deceptive because it seems to imply they own the underlying asset but semantically, actually means that users only have rights over the token- the unique numerical ID- and not over the digital asset.<sup>51</sup>

Once again, an NFT is not a physical or digital item, it is a representation of possession over a physical or digital item.<sup>52</sup> It is not even a representation of ownership, it does not represent ownership, rather it symbolizes possession. The token does not know law, it cannot distinguish a property right from a right of use or a rental right from a credit right, it only recognizes possession and allows the possessor to dispose the item<sup>53</sup>. Which means that, for example, if an NFT gets stolen via a phishing scam, the blockchain will treat the thief as the legitimate owner.

Thus, the rights that are transmitted via smart contract will indeed depend on the smart contract and on the details provided in the metadata, the token will be the same whether the right transmitted is a property right or any other right, therefore, the range of rights the NFT could represent are essentially unlimited. However, even on those instances where the smart contract transfers property rights, the question is not whether one owns the NFT, there's no point in owning the NFT as there is no use in owning a set of code. The real question is whether having an NFT means one owns the underlying digital item, that is what society in general wants to know. Thus, the question must be reframed from “Do users have property rights over NFTs? To “Can NFTs provide real property rights over the things they represent?”. Just like owning a deed without owning a house doesn't make any sense, owning an NFT without owning the underlying asset is useless.

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<sup>51</sup> João Marinotti, “*Tangibility as Technology*”, Georgia State University Law Review, (2021). P.731. Marinotti gives the example of CryptoKitties, where buyers are given ownership of the “underlying” NFT, which doesn't include the right to “trade,” “breed,” or even “visualize” the owned kitties, such that what is owned is not a CryptoKitty at all.

<sup>52</sup> Balazs Bodo, Alexandra Giannopoulou, Péter Mezei, João Pedro Quintais, “*The Rise of NFTs: These Aren't the Droids You're Looking For*”, University of Amsterdam (2019).

<sup>53</sup> Héctor Simón Moreno and Rosa Teruel, “*The Digital Tokenization of property rights. A comparative perspective*”, (Computer Law & Security Review, July 2021). P.5.

### 3.1 NFT ownership according to the Singapore High Court

In this context, we should refer to a recent judgment from the Singapore High Court<sup>54</sup>, regarding the possibility of a proprietary injunction in respect of an NFT. This was a very recent case, and one of the many that proved the importance of clarifying whether an NFT can grant any property rights over virtual items, as there cannot be an injunction if the plaintiff does not have a proprietary interest in the thing that is being disputed. The Court started by defining what an NFT is by rightly distinguishing between the token and the underlying asset, which on that case was digital art, as the NFT was Bored Ape #2162<sup>55</sup>. However, once the Judge started to examine whether there were any property rights, the focus of the analysis was on the token and not on the digital art the token represented.

In its decision, the Court applied the Ainsworth<sup>56</sup> criteria, thereby claiming that for a property right to exist, firstly the right must be definable which, in its understanding, means that the asset must hence be capable of being isolated from other assets whether of the same type or of other types and thereby identified. One would argue that the digital artwork is indeed definable, it can be distinguished from other digital artworks and other objects in general. However, the Court concluded that this criterion was fulfilled, not because of the latter but because *metadata is central to an NFT, and it is the metadata which distinguishes one NFT from another.*<sup>57</sup> With this being said, it becomes obvious that the asset the Court is assessing is the token itself, which is not an asset, it is a set of numbers that link to an asset.

Moreover, according to the Court, the second requirement is that “*the asset must have an owner capable of being recognized as such by third parties*”. On this requirement, the Court established that where NFTs are concerned, the presumptive owner would be whoever controls the wallet which is linked to the NFT and that similarly

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<sup>54</sup> Janesh s/o Rajkumar vs Unknown Person (“CHEFPIERRE”) (21 October 2022.); Process no SGHC 264, Available at: [https://www.elitigation.sg/gd/s/2022\\_SGHC\\_264](https://www.elitigation.sg/gd/s/2022_SGHC_264) Accessed: 17 December, 2022.

<sup>55</sup> The Bored Ape collection is an extremely well known NFT collection. This particular NFT is currently worth 19128,00 euros.

<sup>56</sup> These criteria originated in the common law case National Provincial Bank Ltd v Ainsworth (1965), an English land law case.

<sup>57</sup> Janesh s/o Rajkumar vs Unknown Person (“CHEFPIERRE”), (21 October 2022). Process no SGHC 264, Para. 69. Available at: [https://www.elitigation.sg/gd/s/2022\\_SGHC\\_264](https://www.elitigation.sg/gd/s/2022_SGHC_264) Accessed: 17 December, 2022.

to cryptocurrencies, “*excludability is achieved because one cannot deal with the NFT without the owner’s private key.*” It is indeed true that the owner has the control and excludability over the token but as we will analyze later on, he/she will only have those rights over the digital asset if it is on a decentralized platform, which ended up being the case *in casu*, as the image file of the Bored Ape NFT is indeed stored on IPFS. Therefore, there was excludability on this instance, but not for the reasons the Court raised.

Furthermore, a third requirement was invoked: “*That the right must be capable of assumption by third parties, which in turn involves two aspects: that third parties must respect the right of the owner in that asset and that the asset must be potentially desirable.*”<sup>58</sup>This is, in our view, an extremely confusing requirement. However, what the Court takes from its applicability to the *sub judice* case gives us some light on what the criteria actually means. The Singaporean Judge states that “*In the present case, I was of the view that these requirements would be met. Firstly, the nature of the blockchain technology gives the owner the exclusive ability to transfer the NFT to another party, which underscores the “right” of the owner. Secondly, such NFTs are clearly the subject of active trading in the markets.*”<sup>59</sup>In this sense, we believe that what the Court meant with this third requirement is that the “owner” of the thing needs to be perceived as such by third parties. In their view, the fact that the owner is capable of disposing of the item indicates to third parties that he indeed has rights or power over the thing, which we agree, the NFT owner can have the right of disposition over the NFT. Moreover, the other part of the right seems to indicate that the thing must have some value in general and not just to the owner, which, as the Court rightfully recognized, is also true in these cases, as the underlying item has a market value and it becomes more valuable if it is minted, as the minting process provides some sort of transparency and security to the buyer.

At last, the Court established a fourth and final requirement: that the right and in turn, the asset, must have “some degree of permanence or stability”, and concluded that this last requirement was fulfilled as “*The NFT concerned has as much permanence and stability as money in bank accounts which, nowadays, exist mainly in the form of ledger entries and not cold hard cash.*”<sup>60</sup>Once again, we believe the Court is right but wrong.

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<sup>58</sup> Janesh s/o Rajkumar vs Unknown Person (“CHEFPIERRE”), (21 October 2022). Process no SGHC 264, Para. 71. Available at: [https://www.elitigation.sg/gd/s/2022\\_SGHC\\_264](https://www.elitigation.sg/gd/s/2022_SGHC_264) Accessed: 17 December, 2022.

<sup>59</sup> *Idem, ibidem*

<sup>60</sup> *Idem, ibidem*

The token itself has permanence and stability, however the item the token represents does not necessarily have those attributes. Luckily, in this case this analysis applies, as the digital image's storing is decentralized. However, if that was not the case, there wouldn't be much stability or permanence as we will be able to observe in the next sections.

In this sense, the Singapore Court's decision is indeed unhelpful. Even though it has been praised by many for finally recognizing ownership over NFTs, the *ratio* behind what we believe is the right conclusion is likely to give rise to more confusion on the topic. The focus of the analysis is on the token, on the representation of the thing and not on the thing itself. Using the same analogy we have used in previous chapters, what the Court is analyzing is whether the plaintiff owns a deed, not whether he owns a house. As we will develop in the next chapters, a more valuable question might be whether, in the case of NFTs, having the "deed" is actually equivalent to owning the house.

### 3.2. Can NFTs provide property rights over virtual items?

Unfortunately, similarly to the Singapore High Court, gaming and metaverse companies have also been mistaking the detention of a title with a material property right over a virtual item. In that sense, we find it imperative to critically examine whether NFTs, as "certificates of ownership", can actually materially provide property rights over virtual items, so that this misunderstanding ends before the Metaverse is operable. For now, we can reveal that the latter will depend not only on the title and the blockchain technology but also, and more importantly, on the international regulation of digital property that, in turn, will affect the main obstacle to material digital property rights: digital platforms and their terms of use. In order to do that, we will start by analyzing the concept of property and property rights. Furthermore, for practical reasons, our initial analysis will be based on civil law concepts, more particularly on Portuguese civil law.

## **4. The concept of property under Portuguese Law**

### 4.1. Formal requirements

Similarly to other civil law jurisdictions<sup>61</sup>, under Portuguese law, only “*corporeal (movable or immovable) things may be the object of the right of property.*”<sup>62</sup> However, this is not the case in all private law systems. In the U.S.A for instance, American authors, well-known in the virtual property doctrine, have claimed that “*all property is actually immaterial – what matters in real property is not the land itself, but the immaterial right to the land (leasehold, for example)*”.<sup>63</sup> This eludes to the notion of proprietary interests and the idea that property is not about the thing but rather about the relationship to the thing, which simply does not exist in civil law. Property has a wider meaning in the common law private law traditions and because of this, it would not be difficult to include virtual property as part of Anglo-American property law.<sup>64</sup> However, under civil law, a relationship with the thing or the right to the thing is not the object of property, the object of property is the thing itself. Thus, property is usually narrowly interpreted and associated with tangible things. This being said, the first problem we face is that, as we have seen, “things” in the virtual world are either mere representations of real entities or even *ontological reproductions recognized as part of reality*<sup>65</sup>, which are intangible “objects” that only exist in the form of computer code. Therefore, *a priori*, virtual items do not fall under the scope of article 1302 of the Portuguese CC because they are not tangible things.

Nevertheless, before making any conclusions, it is important to understand what the *ratio* of the legislator was when he decided to limit ownership rights to corporeal things. As well-known legal academic Professor Menezes Cordeiro explains: “*Corporeal things can be delimited and dominated. As external realities perceptible by the senses, corporeal things suffer - or may suffer - direct human action, in the most immediate sense of physical action. Human beings can control them, with or without legal basis, excluding their fellows from doing otherwise.*”<sup>66</sup> What the author means is that tangible things are susceptible of being controlled and possessed. Possession, according to the author,

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<sup>61</sup> The German civil code (BGB) also explicitly restricts the objects of property rights to corporeal things.

<sup>62</sup> Article number 1302 of the Portuguese Civil Code.

<sup>63</sup> Greg Latowska and Dan Hunter, “*The laws of the Virtual Worlds*”, (*California Law Review*, vol. 92, 2004). P.52.

<sup>64</sup> *Idem*.

<sup>65</sup> Philip Brey, “*The Social Ontology of Virtual Environments*”, (*American Journal of Economics and Sociology*, 2003). P.234.

<sup>66</sup> António Menezes Cordeiro, *Tratado de Direito Civil*, vol. III, Coisas, 2020 P. 67

involves a physical exercise over a thing that is perceptible to the senses and visible to those who come into contact with the thing or the possessor. Property law is especially interested in possession because it draws several consequences from the publicity of it, namely that there is a right *in rem*. In this sense, property is defined, not in itself, or by its extra-legal characteristics, but by the possibility, recognized by Law, of performing the function of being appropriated.

Furthermore, for something to perform the function of being appropriated, it must be controllable, delimitable, measurable and quantifiable. Thus, it can be concluded that the purpose of limiting property rights to tangible things was to exclude intangible things as, *a priori*, those could not be possessed, controlled, delimited, measurable or quantifiable.<sup>67</sup> The latter might be true if what we have in mind when referring to intangible things are the same ones that the Romans did.

In the roman empire, Gaius, a jurist who would have lived at the end of the 2nd century a.C, established a fundamental distinction between corporeal things (*res*) and incorporeal things (*jura*).<sup>68</sup> According to his distinction, *res* was related to the corporeal, physical things, while *jura* represented the incorporeal things which, at that time, meant legal rights or the relationship between the things and man. Gaius explained it in the following terms: “*Some things are corporeal, some incorporeal. Corporeal are those that can be touched, such as a rustic building, a slave, clothing, gold, silver and many other innumerable things. Incorporeal are those which cannot be touched, such as the ones that constitute a right like an inheritance or an usufruct, or obligations contracted in any way*”.<sup>69</sup>

Currently, most scholars include three different realities in the concept of intangible things: intellectual goods, performances and juridical *quia*.<sup>70</sup> None of these legal concepts are things that can be possessed or appropriated, therefore none of them have any interest in being objects of property rights. One can easily conclude that intellectual goods are governed by copyright and therefore have no need in being ruled by real property rules; or that performances are human conducts which are governed by contract law and have no use in being owned; or that the legal *quia* (technical or social

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<sup>67</sup> This is the equivalent of the notion of thinghood, mentioned in: João Marinotti, “*Possessing intangibles*”, Noerthwestern University Law review, vol. 116, (June 2022).

<sup>68</sup> George Masourakis, *Roman Law and the Origins of the Civil Law Tradition*, Springer, (2015).

<sup>69</sup> António Menezes Cordeiro, *Tratado de Direito Civil*, vol. III, Coisas, 2020. P.20.

<sup>70</sup> *Idem, ibidem*, P.165

figurations<sup>71</sup> powers, faculties and expectations) for obvious reasons, have no interest in being regulated by article 1302 and property law.

However, that is not the case of virtual items. Virtual items are not like the incorporeal things that property law aimed to exclude, nor like the corporeal things property law initially had in mind. They are digital things, which are intangible in the sense that they cannot be touched but tangible in the way they can be possessed and appropriated. They are not like intellectual property, as Fairfield puts it “*This is a different type of code than the one the authors have in mind, this code is ‘designed to act more like land or chattel than ideas’*”<sup>72</sup>. In this sense, they do not fall under any of these categories, which is the reason why we believe they should form a third category of things: the virtual or digital *res*.

Just like corporeal things, virtual items are delimitable, as there is a clear distinction between the different items, each having its own characteristics and specification as well as its own ID. They are controllable as we will assess later on and quantifiable as there is a certain limited number of them existing, meaning that scarcity is regulated. At last, they are also measurable (virtual items such as all digitized information can be measured in bits). They are objects, digital objects, which can be rivalrous, and interconnected. Thus, we believe that it is necessary to surpass the tangibility debate, as the requirement of physicality for property is indeed anachronical and only represents an obstacle to economic growth. Furthermore, the latter is a prerequisite that has already been ignored in some other instances, namely in Germany regarding the insertion of software in the scope of intangible things, where both doctrine and case law have clarified that programming itself would always be an intangible thing, but that: “*However, it would be possible to apply to it, when the analogy of the situations justifies it and with the necessary adaptations, the regime of tangible things.*”<sup>73</sup>

Moreover, with the Metaverse and AR (Augmented Reality), there will be an increasing connection between the virtual world and the physical world which could lead to a legal convergence between virtual and physical objects: AR applications can be linked with physical objects and create a hybrid thing which is both physical and virtual.

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<sup>71</sup> António Menezes Cordeiro, *Tratado de Direito Civil*, vol. III, Coisas, 2020. P.168.

<sup>72</sup> Joshua Fairfield, “*Virtual Property*”, (Boston University Law Review, vol. 85, 2005.) P. 1047.

<sup>73</sup> António Menezes Cordeiro, *Tratado de Direito Civil*, vol. III, Coisas, 2020. P.172.

This implies that boundaries between tangible and intangible will indeed fade<sup>74</sup> and all of this will play a role in our legal concepts, as the notion of things is deemed to change with these new technologies. As Szilagyι puts it “*property ownership as we know it is under attack and fading fast in the digital world. The availability of true digital assets has the potential to destabilize our theoretical constructs of what constitutes property, and correspondingly, property law.*”<sup>75</sup>

In any case, from the analysis we have conducted, we can conclude that one thing is clear: both descriptively and normatively, virtual items attract property rights.

#### 4.1.1. Numerus clausus

If we do create a *res digitalis* category, we will face a formality problem. Because property rights are *rights in rem*, in some civil law countries such as Germany and Portugal they are *numerus clausus*, which implies that new types of in rem rights cannot be created.<sup>76</sup>

However, it may indeed be necessary to create a new *in rem* right as a property right over a digital item will have differences from a property right over a physical item. Additionally, when it comes to virtual items, different possible rights can now be applied to the same object: one can have an IP right, a property right and a license to use all applied to the same digital asset, which is a different reality from a typical property right over a physical thing.

In any case, even if the legislator doesn’t opt to create a new type of property-digital property- where the tangibility requirement is surpassed- just like it did in the intellectual property debate, then at least the existing Property Law should be applied, where it makes sense, and by analogy, to virtual items. Essentially, we don’t find it difficult to see beyond the tangibility requirement when considering the possibility of

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<sup>74</sup>Yogesh K. Dwivedi, “*Metaverse beyond the hype: Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy*”, (International Journal of Information Management, vol. 66, October 2022). P.12.

<sup>75</sup> Katie Szilagyι, “*A Bundle of Blockchains? Digitally Disrupting Property Law,*” (Cumberland Law Review, vol. 48, April 2018). P.10.

<sup>76</sup> The decision to make *in rem rights numerus clausus* was based on the fact that jurists considered that all types of rights over things already existed, which makes sense if one is not capable of anticipating the digital revolution we are currently experiencing and the changes it has brought typical property rights.

owning virtual items. Thus, in our view, one should focus on the specific idiosyncrasies of these items and the peculiar characteristics of ownership and understand whether or not NFTs followed by Blockchain technology can indeed create such property rights.

#### 4.2. Material requirements

Given what we have concluded *supra*, we believe that in order to understand whether there is anything resembling a user's property right over virtual items, we need to analyze the actual material faculties that typical property rights provide to owners.

There are all sorts of tests that Courts apply to "discover" if there are property rights involved in specific cases. One could apply the Ainsworth criteria, like the Singaporean Court, Blazer's 5 property indicia<sup>77</sup>, or any other test. Most tests focus on whether digital things can be property, and thus are more oriented to describing the object in itself (whether it is persistent, has market value, is tangible, etc) than in describing the meaning of ownership. In this chapter, we assume that virtual items can indeed be owned, as they have the necessary characteristics for that, thus, our aim is to solely analyze whether users have property rights over them. For that, we will not apply one single "test", but rather consider the main criteria that these tests have in common.

The truth is that there are certain features of ownership that are common in most jurisdictions. Under Portuguese law for example, "*the owner fully and exclusively enjoys the rights of use, enjoyment and disposition of the things that belong to him, within the limits of the law and in compliance with the restrictions imposed by it*"<sup>78</sup>. In this sense, in Portugal, a property right is a right to use, enjoy and dispose of a thing fully and exclusively. This is not an isolated example, as in most countries owners also have the above-mentioned rights, for the concept of property is extremely similar around the world, even if its legal formulation differs. Thus, in general, property rights can be perceived as a bundle of different rights that the owner has over a thing.

In this next section, and for the reasons we will explain further on, we will analyze whether there is a proprietary relationship between users and their minted virtual items, based on our chosen property theory: The tree theory.

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<sup>77</sup> Charles Blazer, "*The Five Indicia of Virtual Property*", (The University of New Hampshire Law Review, 2006).

<sup>78</sup> Article 1305 of the Portuguese Civil Code

## 5. The Tree Theory of Property

The tree theory of property is a mix between the common law bundle of sticks theory and the typical civil law ownership model.

One might wonder what use this theory would bring to a digital property debate, especially one that has so far been primarily based on civil law. Well, firstly, as the reader might have anticipated, digital property is, inherently, transnational. The cyberspace and, by excellence, the Metaverse, needs to be governed by transnational law in order to properly function. Therefore, we cannot simply look at this issue from one jurisdiction's or one legal system's perspective, we must truly understand each jurisdiction's legal concept of property so we can properly identify what it is that we have materially meant by property rights over the years. Only when we know that, will we be able to question whether our current understanding of ownership can be applied to this new type of property. We believe that the tree theory is the legal theory that best serves this purpose, not only because it is a true mix between the common law and civil law notions of property, but also because it is extremely efficient in isolating the inherent characteristics of property rights that both common and civil law agree to exist.

Why is that important? Well, more than important, it is useful, as Civil and Common Law systems are the most widespread legal systems in the world, with 60% of the world population only applying civil law, 35% only applying common law and 28% applying a mixed system between the two. Thus, if we can come up with an ownership concept that integrates both civil and common law, we will be able to base our analysis on an understanding of property rights that 99%<sup>79</sup> of the world population agrees with.

This being said, we should start by establishing the main differences between civil and common law's concept of property rights.

On the one hand, the civil law ownership model is by excellence a roman law theory that denotes the absolute, *ipso facto*, right that can be exercised over things such as land. Traditionally, it implies an absolute and exclusive control over a corporeal or tangible thing, which gives its owner different powers like the right to dispose of the thing or benefit from it. Thus, under civil law, property rights can be seen as a unit of powers or a monolithic aggregate of rights that derive from the absolute control over an object.

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<sup>79</sup> Juriglobe “Percentage of the world population, civil and common law systems”. Available at: <http://www.juriglobe.ca/eng/syst-demo/tableau-dcivil-claw.php>

On the other hand, the common law bundle of rights model was developed in the 20<sup>th</sup> century in the USA, at a time where wealth became increasingly dephysicalized, which created a need for a more flexible concept of property.<sup>80</sup> In that context, property ceased to describe any *res* or objects but instead merely became a bundle of legal relations-rights, powers, privileges and immunities: a set of analytically distinct entitlements “*an exhaustive enumeration of which is not possible*”<sup>81</sup>, rather than a full monolithic aggregate of rights, which, in our belief, better explains what ownership means in practice and what distinguishes it from other rights.

*A priori*, these two concepts seem completely antagonistic. However, as we will observe in the next chapters, the tree theory is somehow capable of joining them both, by using common law’s flexibility and fragmentation of rights, while still honoring civil law’s understanding of control, exclusion and thinghood. It perceives property as a bundle of different rights or entitlements that exist in relation to a specific thing, by analyzing the particular characteristics of the resources and adapting the concept of ownership to them, while still maintaining its structure.<sup>82</sup> Moreover, the trunk of the tree is used as a metaphor to represent the exclusive control that the owner has over the thing, so the idea of *dominium* of the ownership model is still present.<sup>83</sup>

In this sense, the fundamental sticks of the tree are: (i) the right of enjoyment; (ii) the right of disposition, and (iii) the right of benefit, while the trunk of the tree is always an exclusive control over a thing.

In this next section, we will apply this theory to the relationship users have with their minted virtual items, in order to understand whether there is any material proprietary link between the two.

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<sup>80</sup> Anna Di Robilant, “*Property: A Bundle of Sticks or a Tree?*”, (Boston University School of Law, Public Law Research Paper No 14-26, June 2014). P. 877-878.

<sup>81</sup> *Idem, ibidem*. P.903.

<sup>82</sup> The tree concept of property was about analyzing the specific characteristics of resources in a way that reduces the arbitrary nature of property law and thus prevents the potential erosion of property rights in the name of a generic interest of the Fascist Dictators.

<sup>83</sup> Anna Di Robilant, “*Property: A Bundle of Sticks or a Tree?*”, (Boston University School of Law, Public Law Research Paper No 14-26, June 2014).

## 5.1. Ownership of minted virtual items under the tree theory of property

### 5.1.1. The sticks of the tree

#### 1. Enjoyment

When it comes to the right of enjoyment, also known as *usus* in Roman law, the user can enjoy the digital asset by using it in the videogame or the metaverse. The right to use corresponds to the direct use of the thing, in its simplest configuration. This might be the only uncontroversial right that users have, they can effectively exclusively enjoy- in the sense of using it in the virtual world- their minted virtual items.

#### 2. Disposition

The right of disposition, or the *abusus* in Roman law, is very different in the context of minted virtual items when compared to non-minted virtual items and it is the most uncontroversial right that the NFT system can grant digital owners. Most metaverse platforms like Sandbox state that “*End users who purchase the Asset own that underlying, purchased NFT completely and have the right to sell, trade, donate, give away, transfer, or otherwise dispose of the NFT as they see fit.*”<sup>84</sup> Unlike what occurs in off chain videogame platforms, when it comes to minted virtual items, the owner can indeed dispose of it because it is recognized by the metaverse platform that he is the lawful owner. The ownership title can easily be transferred from one user to the other,<sup>85</sup> and material disposition comes with digital possession, which in its turn comes with the possession of the title.

In this sense, typically, NFT “owners” have the right to dispose of the NFT whereas normal users of non-minted virtual items do not have this entitlement, which is

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<sup>84</sup> Sandbox Terms of Use. Section 3: (a) Ownership of Premium NFT. Available at: <https://www.sandbox.game/en/terms-of-use/> Accessed 19 December 2022.

<sup>85</sup> Sandbox Terms of Use: Sales of Assets and Games; Payment. Available at: <https://www.sandbox.game/en/terms-of-use/> Accessed 19 December 2022. However, even on these cases some platforms limit the disposition of the NFTs, which is the case of Sandbox, that demands to have a say in the pricing of the minted item, by establishing that: “*You may make your Asset eligible to be sold in The Sandbox marketplace. You and TSB shall mutually agree on the price for the Asset in The Sandbox marketplace*”.

an important upgrade that Blockchain videogames add in comparison to off-chain videogames.

### 3. Benefit

The right to benefit is the equivalent of the right to *fructus* in Roman law, which means the right to profit from one's property, the right to derive income from the owned thing.

Minted virtual items' owners have the right to benefit from their virtual property. In the most recent metaverses, owners of the NFT represented items can lease them to other metaverse users and in that sense profit from them. That is the case of Decentraland, in which the game creators developed an on-chain NFT rental solution for the LAND parcels, where “ *Just like in the physical real estate business, Decentraland LAND owners can rent out their virtual lands to tenants who may use them to host events or develop them into malls, offices, entertainment hubs, and more.*”<sup>86</sup> NFT rentals are a good example of the possibility of NFT owners benefitting from their property, which is why they have created a powerful niche in the new metaverses.<sup>87</sup>

From this context we can conclude that the user's right to benefit only exists in the case of NFTs and not in regard to non-minted virtual items.

#### 5.1.2. The trunk of the tree: Exclusive control

The trunk of the property tree is the owner's right to exclusively control the resource, the thing.<sup>88</sup> This metaphor is extremely helpful as it distinguishes property rights from other rights, mainly from *in personam* rights. Exclusive control or dominium is the most significant component of any property right; thus, it is the most complex one

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<sup>86</sup> Frederico Miras, “*Community Highlights: a New Way to Rent LAND in Decentraland*”, (Decentraland, 18 July, 2022). Available at: <https://decentraland.org/blog/community-projects/community-highlights-a-new-way-to-rent-land-in-decentraland/> Accessed 19 December, 2022.

<sup>87</sup> Laura, L, “*NFT Rental Will Change Your Life- an Airbnb of the Metaverse*”, (BTCC Academy, July 2022). Available at: <https://www.btcc.com/en-US/academy/research-analysis/nft-rental-will-change-your-life-an-airbnb-of-the-metaverse> Accessed 19 December, 2022.

<sup>88</sup> Anna Di Robilant, “*Property: A Bundle of Sticks or a Tree?*” (Boston University School of Law, Public Law Research Paper No 14-26, June 2014). P. 872.

to analyze. The right of exclusion is the *erga omnes* part of ownership that enables owners to demand others not to interfere with their property; thus, it can be described as the right to prohibit one or more people from using a particular resource, either at all or in some ways.<sup>89</sup> This is a critical characteristic of ownership<sup>90</sup>, as without it, property would lose its value: If anyone could take one's property without any repercussions, there would not be any advantages in being an owner.

As we previously mentioned, the content of the NFT- the digital item itself or the metadata- can indeed be stored in one of the metaverse's platforms server and subject to its terms of use. That is currently what happens in most cases, especially when it comes to in-game items. If that is the case, some people would say that users have no control over their minted virtual items. I do not think this is true, in that case, users will have some control: they will be able to use the items, dispose of them, keep them, collect them, etc. In this sense, they can at least control the way in which they enjoy them and have a sort of *usufructus* right. However, it is indisputable that players will not have the exclusive control over their digital assets, nor will they have the ultimate control as that right is indeed reserved to the platform providers.

When the minted items are stored in the videogame and under its rules (as there is no other regulation on the subject besides the digital platform's terms), the videogame platforms ultimately control them in three different ways: contractually, technologically and through code.<sup>91</sup> The "owner" will still have control over the hardware in which he accesses the software and over his wallet, as well as indirect control over the software because the server allows it to. However, technologically speaking, the videogame platform actually has the same control and more: they can modify or delete the digital asset at any point. This technological interference, often described as "digital force", is something that platforms probably won't do constantly because it is not a good business practice, but they effectively could if they wanted to.

Moreover, on a contractual level, most virtual worlds draft their ToS and EULA in a way that grants them the right to modify or delete the virtual items as well as keep the users away from them by blocking or suspending their accounts. This contractual power was incredibly common in off-chain videogames, before NFTs were introduced in

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<sup>89</sup> Thomas Merrill, "*Property and the Right to Exclude*", (Columbia Law School, 2014). P.3.

<sup>90</sup> Nelson DaCunha, "*Virtual Property, Real Concerns*", (Akron Intellectual Property Journal, 2010). P. 41

<sup>91</sup> Joshua Fairfield, "*The God Paradox*," (Boston University Law Review, vol. 89, June 2009). P. 1021.

virtual worlds. As an example, in the ToS of the off chain videogame *Clash of Clans* it is established that: “*Supercell may manage, regulate, control, modify, or eliminate virtual items and/or merchandise at any time, with or without notice*” and also that “*Supercell shall have no liability to you or any third party in the event that Supercell exercises any such rights*”<sup>92</sup>. These provisions, although aggressive and even abusive, are not unexpected, as off-chain games only give users a license to use, therefore it is only natural that the real control and real ownership, the trunk of the tree, lies with the real owner: the videogame company. However, one would hope that the terms of use of blockchain games would be different from the off chain ones, as it would be a clear contradiction if the platform recognized users’ ownership over the minted virtual items, while still reserving to themselves the possibility of modifying and deleting them or keeping users away from them by expelling or suspending them from the game. Unfortunately, that is not the case: these platforms are extremely clear about the control they can still exercise over what they consider someone else’s property. That is the case of Sandbox metaverse’s Terms of Use, where they “*reserve the right to remove Assets and Games from the Services, in whole or in part, without prior notice, for any reason or for no reason at all*” and even more ironically state that: “*At any time and without notice, TSB reserves the right to modify or stop offering all or part of the Services. TSB may, in its sole discretion and at any time, refuse anyone who requests access to The Sandbox, (...) provided, however, that you will remain the owner of your Assets and Games in accordance with these Terms.*” (our emphasis). Although it seems incredibly odd, this is in fact the type of control digital platforms still have over virtual items, even if the latter are represented by NFTs and user’s property rights are contractually recognized.

Typically, the fullest potential of a property right over virtual items would prevent the metaverse provider from exercising control in any possible way, which would represent a *non facere* obligation that *erga omnes* rights, like the property right, typically invoke.<sup>93</sup> However, the technological ability of a centralized platform to dictate the use and even existence of these digital assets means that a general duty not to interfere with a user’s

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<sup>92</sup> Supercell’s Terms of Use, Section 4.1: Purchases. Available at: <https://supercell.com/en/terms-of-service/> Accessed 10 October 2022.

<sup>93</sup> Luis A. Carvalho Fernandes, *Teoria Geral do Direito Civil*, 5th edition, Universidade Católica Editora, 2017. P. 582

assets does not exist. Although the user has the power to exclude other users<sup>94</sup> from using or interfering with the digital asset he has earned or purchased, the minted virtual item's owner has an extremely limited right to exclude when the digital thing is stored on the metaverse/videogame platform and under its rules.<sup>95</sup>

In this sense, we can conclude that under the current non-existent legal framework and having the present contractual framework as the only regulatory basis, in no virtual world can users have the so-called trunk of the tree over their minted virtual items, unless these are stored on a decentralized platform.

## 5.2. Applying the tree theory to minted virtual items that are stored on decentralized Platforms

From this exhaustive analysis, we can conclude that if the digital item the NFT represents is stored on a decentralized platform, the owner will have its exclusive control; the right of enjoyment; the right of disposition and the right of benefit. In this sense, if we conduct a strict interpretation of the property tree doctrine, under the existent contractual and legal framework, the only practical form of users having a real ownership of digital assets represented by NFTs would be if the whole process was decentralized from start to finish. This is part of the reason why most of the NFT community is already developing solutions for the storing centralization problem by creating decentralized NFT storage platforms.<sup>96</sup> The most well-known solution to this problem is probably NFT storage<sup>97</sup>, a long-term storage service made for off-chain NFT data and based on IPFS which guarantees that the URI that leads the owner to the piece of data is completely unique to that data and ensures that the NFT will always refer to the intended data and will only be accessible by the actual owner who has the right key.

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<sup>94</sup> We can call this horizontal excludability, which implies that the user has the power to exclude other users from using his virtual item.

<sup>95</sup> It is important to notice that this is not simply a factual power as Videogame platforms contractually foresee these rights for themselves in the Videogame's EULA.

<sup>96</sup> However, this is only a technical solution to the problem, which has been the predominant approach in the USA, a jurisdiction that is known for having a very tech oriented centric narrative by viewing technology as a solution to governmental problems.

<sup>97</sup> Available at: <https://nft.storage> Accessed 12 November 2022.

### 5.3. Applying the tree theory to minted virtual items that are stored on centralized Platforms

On the other hand, when it comes to NFTs in which the underlying digital asset or the metadata are stored on a centralized platform, the existence of a factual material proprietary relationship between the NFT owner and the virtual item is highly doubtful. In these cases, although users have the typical branches of the tree such as the right of enjoyment; the right of disposition and the right of benefit, they don't have the trunk of the tree which is the exclusive control over their virtual items. However, as we hope to clarify, in these cases, the real obstacle to material property is actually not the centralization itself but rather the centralized platform's terms of use, meaning the "contract" that grants property rights to users and governs their relationship with the digital items.

The legal framework surrounding NFTs does not currently offer the kind of ownership interests that purchasers have been promised.<sup>98</sup>In practice, the main problem is that in these contracts, platforms recognize that users are the real owners of the minted virtual items while still reserving to themselves the trunk of the tree. Furthermore, the issue is aggravated by the fact that these private entities can effectively have those rights *de facto* and *de juris* because they have the technical power over the digital items and because the only existent legal regulations on this type of virtual property are indeed the Terms of Use of each platform. There would be no problem if these platforms continued to have *de facto* control over the items for as long as they did not have the *de juris* possibility of deleting/ modifying them without properly compensating the real owners for damages.

Essentially, we believe it all comes down to the lack of legal recognition of digital property as a class of property and thus the impunity of these terms of use. If there was an international regulation of digital property, these contractual clauses would be clearly null, as they would contradict imperative norms and thus would not subsist in a Court of Law.

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<sup>98</sup> Joshua Fairfield, "Tokenized: The Law of Non-Fungible Tokens and Unique Digital Property.", (Indiana Law Journal, April 2021). P. 1300.

### 5.3.1. Centralization and the missing virtual items' crisis

Every time minted digital items are stored on videogame platforms and under their terms, the risk of NFT owners seeing their virtual items disappear is indeed incredibly high, either because they are expelled or suspended from the virtual world, the platform goes off business, or the videogame company simply makes the executive decision of deleting or modifying the items for some reason. What this means, in practice, is that in these cases, the owner will still have the token but the virtual item that the token refers to will either disappear (in case the platform stops offering the service) or the owner will no longer have access to the item (if the metaverse platform keeps them from accessing the videogame).

Because of the frequency by which the latter occurs in the NFT community, the phenomenon has already been named as a form of rug pulling. The name comes from the expression: “to pull the rug out from under someone”, meaning to withdraw support unexpectedly.<sup>99</sup> NFT rug pulling practices can mean different things,<sup>100</sup> the ones we are referring to occur when platforms award users ownership over digital items, while storing the items in their centralized servers, and then, for some reason, just shut down the centralized server, making all the virtual property disappear. This can be done with malicious intent or not, but in either case consumers are always the losing parties. Even though these issues are somewhat common in DeFi projects, they have recently spread to other areas, and, as we will observe, are highly probable of manifesting on on-chain Videogames and, consequently, in the Metaverse.

A recent example is the Vault by CNN case.<sup>101</sup> Last year, CNN launched its own NFT marketplace with NFTs from pieces of its most notable events, like the 1990 report of Nelson Mandela being released from prison, or war notes from people in Ukraine. This was a really popular project that led to a lot of people spending real money purchasing

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<sup>99</sup> As we have analyzed, different Metaverses like Sandbox and Decentraland sell NFTs and recognize user's complete ownership over the NFTs they purchase. However, in their terms of use, they clarify that they can lawfully pull the rug on the owners of the items and impede them from accessing their own property for a limited period of time or forever.

<sup>100</sup> Elliptic NFT Report 2022 edition, page 39. Available at: <https://www.elliptic.co/hubfs/NFT%20Report%202022%20-full.pdf> Accessed 18 December, 2022.

<sup>101</sup> Cam Thompson, “*CNN Shatters Vault NFT Marketplace, Prompting Rug Pull Accusations*”, (Coindesk, October 2022). Available at: <https://www.coindesk.com/web3/2022/10/11/cnn-shutters-vault-nft-marketplace-prompting-rug-pull-accusations/> Accessed 28 December, 2022.

these NFTs. The problem was that the videos/pictures were stored on a centralized platform- the CNN vault- which meant that when the TV station decided to end the NFT project and close the platform, all the NFT owners lost their items<sup>102</sup>. Well, they technically still own the minted version of the news reports, but in practice what that means is that they own a code that leads to an unavailable website. Luckily for the victims, CNN was indeed comprehensive and made efforts to compensate consumers by refunding them part of the money they lost. However, as we will see in this next section, compensation is not the *modus operandi* of most virtual worlds.

### 5.3.1.1. Rug pulling in Virtual Worlds

This problem is aggravated in the context of virtual worlds because the possibility of rug pulling is contractually foreseen. As we have seen, on-chain virtual worlds contractually recognize users' ownership over minted items and later proceed to state, on the same contracts that they have the right to stop providing their services, to block users from accessing the videogame and to delete the users' virtual items. In our opinion, on-chain videogames are the perfect case study to demonstrate that when this kind of platform centralization is in place, NFTs cannot grant property rights unless the blockchain technology is accompanied by a legal reform and a subsequent contractual regulation. In this sense, saying that users currently have ownership over their minted virtual items is wrong and claiming that they own those digital items **because of** NFTs is even more wrong. Ownership of digital property is a legal problem that requires a legal solution, thus, in practice, selling NFTs is, at the very best, selling some type of property title.<sup>103</sup> However, a property title is not enough if it is not legally recognized as such and thus accompanied by real proprietary powers.

To sustain our claim, we do have a specific videogame dispute that illustrates the issue and, interestingly enough, it dates back to a time where NFTs and Metaverses were not a topic. The case is regarding a judicial dispute related to a virtual world named Second Life, the first of its kind that, without any in-game implementation of Blockchain,

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<sup>102</sup>Ali Raza, "Did CNN Just do a Rug Pull After Dumping its Vault NFT Project?" (Business 2 Community, October 13, 2022). Available at: <https://www.business2community.com/crypto-news/did-cnn-just-do-a-rug-pull-after-dumping-its-vault-nft-project-02560323> Accessed 23 November 2022.

<sup>103</sup> João Marinotti, "Possessing Intangibles", (Northwestern University Law Review, 2021). P. 1276-1277.

transformed the gaming community when it announced that users had real ownership over their items. But did they?

#### 5.3.1.1.1. The Second Life Case<sup>104</sup>

Second Life is an off chain videogame, but it is a different kind of videogame, it is probably the first prototype of a Metaverse as the gaming strand does not exist, it looks more like a virtual world for players to interact with each other, create digital items and sell them to other players.<sup>105</sup> This virtual world was the first of its kind to award users property titles over their digital items, something that attracted a lot of users and incentivized them to make and spend large amounts of money in that cyberspace.

In the *sub judice* dispute,<sup>106</sup> the player was named Marc Bragg, an avid user of Second Life who, over the years, had built a lot of wealth in that virtual world by buying and reselling digital real estate. At one point, Marc found a way of purchasing digital land at a lower price by going to unlinked URLs and starting land auctions that would not be visible to players who did not know how to access the link, which allowed him not to face more competitive bids. This was indeed indirectly prohibited under the videogame's ToS, therefore, as soon as the platform was aware of this practice, they froze Marc's account, deleted his avatar and denied him access to his digital property. The platform was able to do this because Section 2.6 of Second Life's ToS stated that: "*Linden Labs may terminate or suspend your account at any time, without refund or obligation to you.*"<sup>107</sup> Marc had a lot of money invested in this virtual world, which incentivized him to sue Linden Labs in a Pennsylvania state court for violation of consumer protection statutes, fraud and breach of contract, as he was guaranteed by the terms of use that he owned the digital real estate and this contractual clause was not coherent with that ownership right. In essence, he was complaining about probably one of the first ever rug pull practices.

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<sup>104</sup> To understand the case, see: Stephen J. Horowitz, "Bragg v. Linden's Second Life: A Primer in Virtual World Justice", (Ohio Northern University Law Review, 2004).

<sup>105</sup> Andreas Kaplan and Michael Haenlein, "*The fairyland of Second Life: Virtual social worlds and how to use them*, (Business Horizons, 2009) P.565.

<sup>106</sup>"*Marc Bragg v Linden Research, Inc.*" Annotated Case available at: <https://h2o.law.harvard.edu/collages/14334> Accessed 12 December.

<sup>107</sup> Second Life's Terms of Service. Available at: <https://www.lindenlab.com/legal/second-life-terms-and-conditions> Accessed 12 December, 2022.

Fortunately for Marc but unfortunately for us, the parties at dispute ended up reaching a confidential settlement, which means that the Pennsylvania Court never had the chance to issue a substantive ruling on the matter. However, it was the first time that this discrepancy between the rights that users are granted under the ToS and the practical rights they have over their virtual property reached a Court.

Our point is that if Marc Bragg's case had occurred in 2022 instead of 2004, and his digital property was tokenized in the form of NFTs not much would have changed. Second Life would've still had the possibility of blocking him access to his items and he would have lost all of the money he invested, which goes to show that in the last decades we have been trying to solve a legal problem with technical solutions. The solution that was created for lack of property rights in virtual worlds was to introduce blockchain, as the technology could somehow award property to users. However, as we were able to observe, without legal intervention, the latter is not true unless the items are completely autonomous and independent from the platform. But in practice, complete decentralization doesn't exist in these virtual worlds, and when centralization is the general rule, there is no technical solution to fix this, only law can help.

In this sense, introducing digital property rights is not, or is not only, about introducing NFTs in cyberspace. NFTs, just by themselves, cannot create property rights over virtual items. These proprietary faculties only exist when we legally recognize digital property as a new *res* category, and thereby prohibit platforms that have *de facto* control over the virtual assets from exercising that control by abstaining from deleting/modifying other people's property or digitally keeping them from accessing their items. The reality of platform centralization and abusive terms of use is a very real, complex, problem that the digital and crypto communities are going through, which represents a true obstacle to the ultimate goal of granting users property rights over their virtual items.

Technology alone will not pave the way for true ownership of digital assets in the metaverse, legal reform alongside technological innovation is needed before the metaverse can mature into what it aims to become.

## 6. *Res digitalis* or new EULA?

Throughout this thesis, we have been claiming for digital property rights, however, that is not the only possible solution. Some authors argue that the problems we mentioned throughout this thesis would be solved if everything was completely decentralized, while others argue that it could be fixed if users, who are the weaker parties in End User License Agreements, had a bigger protection and more contractual freedom. According to the latter, a solution does not need to involve regulating digital property and granting users property rights,<sup>108</sup> rather, it simply requires a contractual regulation of EULA. To these authors, the problem can be solved by eliminating any mention to property rights in EULA and simply granting users a license to use the virtual item in a particular cyberspace, while simultaneously addressing the inequality between the parties and remaining existing abusive clauses through the implementation of a type of cyberspace user protection law, like a consumer protection law, instead of resorting to property law.<sup>109</sup> This approach is justified with the claim that the property goals one aims to achieve with property rights (such as preventing that users' items are taken away from them or modified for no reason and making sure users are compensated in case the platform does a rug pull) could be achieved by the above- mentioned means, which are simultaneously easier and cheaper to integrate when compared to the process of creating a *digital res* category.

We do not agree with either approach for several reasons. When it comes to complete decentralization, we do not believe that the Metaverse will be fully decentralized, at least not right away as that would come at an enormous economic and organizational cost for the main Metaverse gatekeepers<sup>110</sup>. And with centralization, one needs regulation. Moreover, regarding the second approach, our opinion is that although solving the contractual strain might help soothe the tensions between users and digital platforms, it will not prepare the field for the new digital era we are entering into. As we hope to have demonstrated, digital property does not only affect virtual relationships

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<sup>108</sup> Christopher Cifrino, “*Virtual Property, Virtual Rights: Why Contract Law, Not Property Law, Must Be the Governing Paradigm in the Law of Virtual Worlds*”, (Boston College Law Review, 2014). P.24-29.

<sup>109</sup> Przemyslaw Palka, “*Virtual Property: towards a general theory*” (European University Institute, 2017) P. 215- 222.

<sup>110</sup> Congressional Research Service; “*Web3: A Proposed Blockchain-Based, Decentralized Web*”, (April 1, 2022).

between users and service providers, it also creates and impacts horizontal relationships between consumers. In the Singaporean case, we were able to observe that virtual items are already making their way into the legal sphere. These assets are being used as collaterals, given as guarantees and sold at a large scale in the physical world in real-world contracts; in that sense, they are now objects of private relationships and thus subject to different types of complicated legal dynamics. In this context, continuing to treat them as a type of software service, as *in personam* rights instead of objects of autonomous *in rem* rights, will only deprive them of the *erga omnes* effects they need in order to circulate in this new digital economy.

Furthermore, to users, the advantages of property rights when compared to a simple license to use are innumerable: Only with ownership can users have the exclusive control, disposal and benefit rights over their digital items, and only if their rights are absolute rather than relative are they able to use them against everyone, as that type of *erga omnes* effect does not exist in pure credit rights, since the latter can only be opposed to the debtor and no one else.<sup>111</sup>

It is, in our opinion, obvious that EULA, even if revised and regulated, are inherently inadequate to govern the virtual items' economy, which becomes apparent as the former grow in popularity and economic impact.<sup>112</sup> It is now evident that in the future, the Metaverse will not be well suited with the existing legal and contractual framework. EULA do not protect the users' interests, do not ensure enforcement of rules and cannot create a safe and just environment for users to invest their time and resources in. The prevalence of property disputes and the failure to address them will harm the economic and social potential of the Metaverse, and Blockchain alone will not solve the issue. If users cannot expect any sort of certainty, permanence, control or stability in their property, or rely on Law to force digital platforms to abstain from destroying or modifying their digital assets without any consequences, it is very unlikely that this cyberspace will be able to grow as a place for economic and social activity.

Thus, our proposal on this thesis is that the legislator creates a new class of property: digital property, to regulate virtual items. With that, it will indirectly intervene

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<sup>111</sup> Luis A. Carvalho Fernandes, *Teoria Geral do Direito Civil*, 5th edition, Universidade Católica Editora, (2017). P.582-585.

<sup>112</sup> Justin Ackerman, "An Online Gamer's Manifesto: Recognizing Virtual Property Rights by Replacing End User Licensing Agreements in Virtual Worlds", (Phoenix Law Review, vol.6, Issue 1, 2012). P.182.

in the ToS of the future Metaverse, thereby forcing this virtual world to adopt *non facere* obligations in regard to virtual items. Additionally, this could be complimented on a technological level by creating more decentralized platforms and digital storages, as well as on a contractual level by establishing that if the item is owned by a user, the Metaverse could expel him/her only in special contexts and that, every time their item is destroyed or modified, their user account is blocked or the platform does anything to prevent the users from accessing their property, they at the very least must be compensated for the damage, as property is indeed an absolute right.

### 6.1. The Need for Transnational Law

It is important to emphasize the needed transnational nature of the future legislation. As we have experienced with other digital platforms like Facebook or Google, it is often cheaper and more effective for digital giants to stop providing services in a jurisdiction with stricter rules than to respect and adapt to those rules.<sup>113</sup> In this sense, if a Metaverse like what Meta envisions does come true, for digital ownership to function, action might need to be taken at the EU level or even on a more international level. There would be no point in recognizing property over virtual items in Portugal alone, as it would simply mean that Portuguese users might not be accepted in that cyberspace. Acting at the European level would be meaningful not only because of the overall power of the EU market but also because *in a globalized world powered by trade agreements, third countries tend to adjust their legal systems to the levels of protection offered by the more influential countries*<sup>114</sup>, hence it would possibly guide the rest of the world's legislation.

So far, we have dedicated our analysis to specific virtual worlds, focusing on the particular case study of videogames. However, it must be clear that digital property is not a videogame problem, at least not exclusively. As we have previously mentioned, some extremely influential digital giants already have concrete plans to move our daily lives to a digital universe where concepts like ownership will most certainly apply. Thus, in order to bring awareness to this regulatory necessity, in the next section, we will give the reader

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<sup>113</sup> Hans Mcklitz and Marise Cremona, *Private Law in the External Relations of the EU*, Oxford University Press, (2016). P.135- 167.

<sup>114</sup> One can think of the example of data protection law or copyright law.

a glimpse of what the Metaverse can be and how these problems may manifest in that cyberspace.

## 7. The Metaverse

The word Metaverse is the product of a combination between the prefix “meta” with the word “universe”. Meta implies transcendence and universe means a “*hypothetical synthetic environment linked to the physical world.*”<sup>115</sup> Therefore Metaverse is something that transcends the universe. Coined by Neal Stephenson in the fiction book “Snow Crash”,<sup>116</sup> the concept has become increasingly more popular since Facebook changed its name to Meta and announced it was going to create a Metaverse.<sup>117</sup> But what exactly is a Metaverse? A Metaverse essentially means a digital space that allows users to interact through avatars and engage in social and economic relationships (with real life currency, creating a virtual economy), within the software, and not simply through it. This digital space will be enabled by powerful Internet connections, cloud computing, processing and storage capacity, blockchain technology, extended reality technologies (such as augmented and virtual reality) and AI technology<sup>118</sup> where the physical and digital meet and blend.

In this context, the first note we need to make is that the Metaverse as a virtual replica of the real world, inhabited by 3D avatars does not exist yet, and we are not sure whether it ever will. Some argue that for it to be created, three main processes need to occur: (i) a digital copy of the physical reality; (ii) native content creation; and (iii) co-existence and

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<sup>115</sup> Lik-Hang Lee; Tristan Braud; Pengyuan Zhou; Lin Wang; Daniel Xu; Zijun Lin; Abhishek Kumar; Carlos Bermejo and Pan Hui, “*All One Needs to Know about Metaverse: A Complete Survey on Technological Singularity, Virtual Ecosystem and Research Agenda*”, Cornell University, (September 2021). P. 1.

<sup>116</sup> Judy Joshua, “*Information Bodies: Computational Anxiety in Neal Stephenson’s Snow Crash*”, Penn State University Press, vol. 19, (2017). ) P.23-27.

<sup>117</sup> Dan Milmo, “*Enter the Metaverse: the digital future Mark Zuckerberg is steering us toward*”, The Guardian; (October 21, 2021). Available at: <https://www.theguardian.com/technology/2021/oct/28/facebook-mark-zuckerberg-meta-metaverse> Accessed 27 December, 2022.

<sup>118</sup> Lik-Hang Lee; Tristan Braud; Pengyuan Zhou; Lin Wang; Daniel Xu; Zijun Lin; Abhishek Kumar; Carlos Bermejo and Pan Hui, “*All One Needs to Know about Metaverse: A Complete Survey on Technological Singularity, Virtual Ecosystem and Research Agenda*”, Cornell University, (September 2021) P. 2.

inter-operation with the physical world.<sup>119</sup> While others say that the metaverse is not about the 3D or 2D, and it is not even necessarily graphical, “*it is about the inexorable dematerialization of physical space, distance, and objects*”<sup>120</sup> which is pretty much already existent in the current virtual worlds.

In any case, the general expectation is that the future Metaverse will cover a lot more fronts than the current virtual worlds do. According to some, this cyberspace will be “*a gaming platform, a virtual retail destination, a training tool, an advertising channel, a digital classroom, a new gateway to digital experiences, (...) and essentially “whatever people’s imaginations dream it to be.”*”<sup>121</sup>

As currently the biggest market of the three core technologies of the Metaverse: VR, AR and Blockchain is indeed the gaming industry, it is true that the main or more established use case for the Metaverse is the one we covered in this thesis: gaming and socialization. Most industry experts foresee that gaming will account for the majority of investments in Virtual Reality<sup>122</sup>, as tech giants like Microsoft are heavily investing in that strand.<sup>123</sup> However, gaming will likely be blurred with other uses such as work or education. Gold farming is a good example of this, as it connects gaming with labor, where players play MMO games (Massive Multi-player online games) to acquire in-game currency and then sell it for real money, thereby taking advantage of the fact that players need to spend a lot of time playing to acquire in-game currency. It has inclusively become a conventional job for a lot of people in developing countries.<sup>124</sup>

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<sup>119</sup> *Idem, Ibitem.*

<sup>120</sup> EU Blockchain Observatory and Forum, “*Providing a foundation for understanding its potential and a vision for an Open Metaverse*” (October 14, 2022). P. 5. Available at: [https://www.eublockchainforum.eu/sites/default/files/reports/Metaverse\\_Report\\_Final\\_1.pdf](https://www.eublockchainforum.eu/sites/default/files/reports/Metaverse_Report_Final_1.pdf) Accessed on 26 October 2022.

<sup>121</sup> *Idem, Ibitem.*

<sup>122</sup> James Howell, “*Everything You Need to Know about the Roblox Metaverse.*” Available at: <https://101blockchains.com/roblox-metaverse/> Accessed 3 December 2022.

<sup>123</sup> A recent example of such trend is evident in the acquisition of Activision Blizzard by Microsoft. Microsoft News Center, “*Microsoft to acquire Activision Blizzard to bring the joy and community of gaming to everyone, across every device*” (January 18, 2022). Available at: <https://news.microsoft.com/2022/01/18/microsoft-to-acquire-activision-blizzard-to-bring-the-joy-and-community-of-gaming-to-everyone-across-every-device/> Accessed on 8 December 2022.

<sup>124</sup> Richard Heeks, “*Understanding “Gold Farming” and Real-Money Trading as the Intersection of Real and Virtual Economies*”, Journal for Virtual Worlds Research, ( 2009).

In any case, many believe that when the concept becomes more mainstream and people are more familiarized with it, the Metaverse could indeed be used for virtually every component of our lives, not just to play videogames. It could be a great environment for education, by providing immersive experiences for students to really engage with the themes they are studying; a good space for employers to train their new employees; a great platform for brands to promote themselves, and so on. Take a moment to imagine that a medical student could actually learn how to perform a difficult surgery on an avatar, with no health risks involved, but all the components of the human anatomy and possible complications digitally present<sup>125</sup>; or that an artist could perform a concert for thousands of people without traveling and suffering tour exhaustion. Imagine an employer could digitally train his employees, thereby saving time and resources. Some of these use cases are already existent. For example, the car company Hyundai Mobis has added a metaverse experience to their employee training schedule, designed for new employees to get to know each other and the rest of their colleagues at a time where everyone was working from home due to the Covid pandemic.<sup>126</sup> Moreover, recently, Snoop Dog and Eminem, two of the world's most famous singers, have performed in the Yuba Lab's Otherside virtual world in the 2022 MTV VMA music awards.<sup>127</sup> At the same time, advertising, marketing and sales companies are also investing in the Metaverse. A lot of fashion brands have recently started to engage with these virtual worlds as product experimentation in a digital environment is said to be much cheaper and safer for brands.<sup>128</sup> Some examples of this are Balenciaga's partnership with the popular

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<sup>125</sup> As an example, see: Kala Baskar; "Revolutionizing Medical Education with Metaverse", International Journal of Scientific Research in Computer Science Engineering and Information Technology, (July 2022). P.18-22.

<sup>126</sup> HMG Journal Operation Team, "New Employees, Come to Metaverse", June 12, 2022). Available at: <https://www.hyundaimotorgroup.com/story/CONT0000000000001842> Accessed 8 December 2022.

<sup>127</sup> Full performance available at: <https://www.youtube.com/watch?v=0GW3TWBIQgE>

<sup>128</sup> BCG Digital Ventures, "Gaming Trends in the Metaverse: What They Mean for Your Business", (July 19, 2022). Available at: <https://medium.com/bcg-digital-ventures/experimentation-in-the-modern-digital-firm-f157d1d53431>. Accessed 10 December 2022.

videogame Fortnite<sup>129</sup>; Gucci's partnership with metaverse Roblox<sup>130</sup> or the recent NFT collaboration between Adidas and the famous Bored Ape Yacht Club NFT collection, which in total profited more than 100 million dollars<sup>131</sup>. Inclusively, there already exist Metaverse native luxury fashion brands, such as Auroboros<sup>132</sup>, that create items for both physical and digital markets.

Because the Metaverse is a digital replica of our world, almost everything we do on earth will potentially be replicated, thus the use cases of the Metaverse are, in a way, illimited. However, for the purpose of this thesis, the Metaverse component we are more interested in is the commercial one, as that is where the virtual property debate becomes relevant.

### 7.1. The Metaverse Commerce

With Metaverse commerce, we refer to the trading activity taking place in the virtual world, including but not limited to user-to-user and business-to-user trade, which will consist on virtual-to-physical (purchasing a virtual item that allows for a physical benefit or experience), physical-to-virtual (purchasing a physical item that unlocks a virtual item or experience) and virtual-to-virtual commerce (simply purchasing virtual items in the Metaverse).

As we have observed, virtual to virtual commerce has been taking place in videogames for decades and has generated a lot of wealth. According to Statista, in-game purchases alone have generated 61 million dollars in 2021<sup>133</sup> and the virtual items' market

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<sup>129</sup> Steff Yotka, "Balenciaga and Fortnite Team Up for a Digital-to-Physical Partnership, Vogue Magazine, (September 20, 2021). Available at: <https://www.vogue.com/article/balenciaga-fortnite-partnership> Accessed on December 12 2022.

<sup>130</sup> Maya Ernest, "Gucci partners with Roblox to launch "Gucci Town" metaverse world", Input, (May 31, 2022). Available at: <https://www.inverse.com/input/style/gucci-roblox-metaverse-world-gucci-town> Accessed on December 12 2022.

<sup>131</sup> Mathew Denis, "Adidas and Bored Ape Yacht Club NFT Project Partnership", The Manual, (January 13, 2022). Available at: <https://www.themanual.com/culture/adidas-and-bored-ape-yacht-club-nft/> Accessed on December 12 2022.

<sup>132</sup> Auroboros official website. Available at: <https://www.auroboros.co.uk/> Accessed on December 12 2022.

<sup>133</sup> Adroit Market Research, "Global Virtual Goods Market Size by Gender, by Age, by Region and Forecast 2018 to 2025" (March 2019). Available at: <https://www.adroitmarketresearch.com/industry-reports/virtual-goods-market> . Accessed 5 October 2022.

is expected to reach 200 billion dollars by 2025. This reality will bring new business models focused on providing digital objects to avatars, such as the D2A (Directly to Avatar)<sup>134</sup> model in which the target customer is actually the in-game *persona* and not the physical person behind the avatar. One of the main differences between in-game commerce and Metaverse commerce is that in the latter interoperability is present which, as we will observe in this next section, plays a crucial role in our plea for property rights in the Metaverse.

As we argue *infra*, blockchain will play a pivotal part in the Metaverse commerce. The role of NFTs, more specifically, is vital for this virtual economy to scale and interact with the real economy, instead of just existing in the digital world like it has been happening so far.<sup>135</sup>

#### 7.1.1. The Role of Blockchain on the Metaverse Commerce

Blockchain, as one of the key technologies in the Metaverse, will have a significant role in securing the value and integrity of assets created on that infrastructure. Moreover, as representations of in *rem* rights, NFTs can bring important aspects to this digital universe, the main one being interoperability.<sup>136</sup> Supposedly, in the Metaverse, users will be able to carry their possessions across different virtual worlds. The system of this cyberspace is not about creating one virtual world but many and to enable users to “travel” around numerous cyberspaces to gain as different immersive experiences as they desire. In this context, just like people can bring their possessions when they visit another country for vacation, users will be able to carry their digital property with them when they visit different cyberspaces. Since separate virtual worlds are often built in the absence of a common framework and even technologically the platforms can be different from one another, currently it is difficult for virtual worlds to interconnect. However, in the Metaverse, organizations like the Open Metaverse Interoperability Group have sought

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<sup>134</sup> Cathy Hackl, “How Brands Can Thrive In The Direct To Avatar Economy”, Forbes Magazine, (January 29, 2021). Available at: <https://www.forbes.com/sites/cathyhackl/2021/01/29/how-brands-can-thrive-in-the-direct-to-avatar-economy/?sh=55fb8a1b417c>. Accessed 17 December 2022.

<sup>135</sup> Guillaume Guinard, “Avatar capitalism: Policy implications of the metaverse as the future of platforms, Science Po, (April 2022). P. 32-36.

<sup>136</sup> Thippa Gadekallu; Weizheng Wang; Gokul Yenduri, Pasika Ranaweera; Daniel Benevides da Costa and Madhusanka Liyanage, “Blockchain for the Metaverse: A Review”, IEEE, (March 2022). P.8.

to bond individual virtual spaces with a common protocol and common terms of use, so that it is a coherent, fluent cyberspace and not an agglomerate of different virtual worlds with different policies. This feature not only brings an even stronger feeling of property to consumers, but it also creates a need for uniformity in regulations, as all platforms connected to the Metaverse must grant the same rights in regard to the same digital object. Blockchain is helpful in this area, as it provides a decentralized record of possession that can be accessed in all the metaverse platforms.<sup>137</sup>

Another important aspect that NFTs bring to the table is programmability, *NFTs can be programmed in any form that programmable software can*, in that way allowing for the creation of characteristics like moral rights, royalties and conditions on smart contracts.<sup>138</sup> Moreover, NFTs can also bring immutability, transparency (which is crucial for the creation of a real digital community), and a more regulated digital scarcity.

Thus, NFTs and Blockchain will most definitely be of use in the Metaverse, however, one should not commit the same mistake of assuming that simply implementing them in that cyberspace will solve all of the core issues around ownership and centralization.

## 8. Conclusion

William Blackstone once wrote that *“There is nothing which so generally strikes the imagination, and engages the affections of mankind, as the right of property; or that sole and despotic dominion which one man claims and exercises over the external things of the world, in total exclusion of the right of any other individual in the universe.”*<sup>139</sup>

Created essentially to deal with the harsh reality of scarcity of resources, private property has been an elementary institution from the dawn of history. Scarcity does not naturally exist in the digital sphere, as everything could potentially be easily reproduced,

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<sup>137</sup> John Dionisio, William Burns; and Richard Gilbert, *“3D Virtual Worlds and the Metaverse: Current Status and Future Possibilities”*, Loyola Law School, (2013). P.26.

<sup>138</sup> EU Blockchain Observatory and Forum, *“Demystifying Non-Fungible Tokens”*, (November 2021) available at: [https://www.eublockchainforum.eu/sites/default/files/reports/DemystifyingNFTs\\_November%202021\\_2.pdf](https://www.eublockchainforum.eu/sites/default/files/reports/DemystifyingNFTs_November%202021_2.pdf) . Accessed 24 November 2022.

<sup>139</sup> William Blackstone, *Commentaries on the Laws of England*, The Online Library of Liberty (first publication 1753). P.2.

however it is something that we have artificially introduced in these virtual worlds,<sup>140</sup> in order to approximate them to our physical universe. History tells us that whenever there is scarcity, ownership is deemed to exist, thus, creating an ownership structure for the Metaverse is, in a way, inevitable.

Throughout this thesis, we have taken a closer look at videogame platforms and their terms of use in regard to users' property rights over in-game items. We have conducted a separate analysis of users' rights under the EULA of non-minted virtual items and compared them to the rights users are granted by on-chain videogames or proto-metaverses. From that analysis, we were able to better comprehend what characteristics NFTs brought to digital property and their importance for ownership in the Metaverse. In that context, we have concluded that unlike blockchain technology, the terms of use of the Metaverse will be centralized and under control of one or a bundle of companies, which, as we have seen, can be problematic for legal ownership.

The main conclusion we can take from this research is that the problems that existed *ab initio* regarding property on off-chain videogames have continued and scaled in relevance on on-chain videogames, hence, if they are not addressed now, then, in the Metaverse, when there is no longer a distinction between a physical and a digital economy, these issues will complicate even further, for the problem will only become more pronounced as the technology and levels of immersion in virtual worlds increase.

For years, people have been investing money in digital assets without being able to own them. More recently they have been fooled into acquiring these assets in return for a property title with no property rights. For too long this problem has been ignored, mainly because most disputes arose in the context of videogames, the general argument being that these social environments are not real and therefore don't need regulation. Many believed that regulating virtual worlds could potentially cloud fiction with reality, which was not desirable. However, it has become apparent that property interests in virtual worlds have effects in the real world, and assets accumulated in the virtual world have value in ours. Plus, with new technologies and the Web 3, the world is moving to a place where the difference between reality and fiction is no longer desired or even needed, which has become clear with the popularity of social media, videogames and virtual worlds in the last decade.

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<sup>140</sup>Jaya Clara Brekke and Aron Fischer, "Digital Scarcity", (Internet Policy Review, 2021). Available at: <https://policyreview.info/glossary/digital-scarcity>. Consulted on 3 December 2022.

Currently, the Metaverse technology and its use cases are somewhat rudimentary<sup>141</sup>, but they are certainly evolving. Just like in the 1980's it would've been impossible to guess the impact of social media platforms on people's lives, the possibility of booking someone's house for holiday on a different country or even 1% of the apps we have today, it is impossible to define what role the Metaverse will have on our lives 10 or 20 years from now. However, we can for sure know that people, real people, will be spending money, real money, purchasing digital items through NFTs with the belief that they are the owners of the digital property and have *in rem* rights over them, because that is already happening on a large enough scale. In a matter of years, the question will no longer be whether players should have ownership rights over their magic dragons. It will look more like whether Ferrari can sell the fastest virtual car in the market for 500 000 euros on Metaverse and then just erase it for no reason without compensating the buyers; or whether some Metaverse platform can turn a private virtual hotel that annually generates 400 million in profit into a virtual public gym or park. At the rate that virtual items are growing in value, we would not be surprised if a few years from now, someone's metaverse real estate was listed as an asset on divorce or inheritance proceedings.

At the moment, in these worlds, in terms of law sophistication, we are somewhere in the 16th century. However, it is only natural that as these cyberspaces become more sophisticated, our approach also becomes more refined. For now, it is imperative that we recognize the value of these digital assets, understand their importance in the near future and protect consumers by granting them actual ownership rights over their property. As, in the words of Fairfield *“getting virtual property rights is not important solely because of efficiency concerns. This kind of property is also very important to develop for the social, medical, commercial, and cultural changes it can allow. Virtual worlds are fully contextualized social software with the ability to communicate information to humans far faster than the world wide web. We began this change when the telephone was replaced by the Internet. We will finish it when we protect the building blocks of virtual worlds.”*<sup>142</sup>

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<sup>141</sup> Brian Chen, “*What’s All the Hype about the Metaverse*”, New York Times Magazine, (January 18, 2022). Available at: <https://www.nytimes.com/2022/01/18/technology/personaltech/metaverse-gaming-definition.html> Accessed 4 December.

<sup>142</sup> Joshua Fairfield, “*Virtual Property*”, Boston University Law Review, (2005).

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