

# **Non-fungible tokens: implications for virtual property**

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## **Abstract and keywords**

This dissertation, being a literature study, has the aim of determining the implications for virtual property due to the extent in which the introduction of non-fungible tokens influence virtual worlds and virtual property.

At its core, the findings of this study concluded that the legal aspects relating to the interplay between virtual world and virtual property was too wide to give an accurate answer of the aim of this study. Due to the constraints of the study, it is not possible to explore all the implications non-fungible tokens have on virtual property. Nevertheless, the topics of discussion in this study concluded with certainty that non-fungible tokens are indeed influencing virtual worlds and virtual property resulting in implications for virtual property.

With non-fungible tokens only recently burgeoning in popularity, an effort is made in this study to explain not just what non-fungible tokens are, but also the technology surrounding it. With a better understanding of the latter, it is possible to understand the applicability of possible remedies and how Cyber Law finds applicability thereto.

Whether non-fungible tokens will in the future form part of our daily lives remains unanswered at this time, for now this study at the minimum provides a basis for others to expand upon and develop the law.

The keywords of this study are as follows: Non-fungible tokens; Virtual worlds; Virtual property; Blockchain technology; Cyber Law.

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## **Abbreviations**

BoE	Bank of England
BRICS LJ	Brazil, Russia, India, China, and South Africa Law Journal
CBDC	Central Bank Digital Currency
CEO	Chief Executive Officer
CGT	Capital Gains Tax
DAO	Decentralised Autonomous Organisation
dApps	Decentralised Applications
DeFi	Decentralised Finance
EULA	End User Licence Agreement
FBI	Federal Bureau of Investigation
IOHK	Input Output Hong Kong
IPFS	InterPlanetary File System
ISSN	International Standard Serial Number
LAWSA	The Law of South Africa
MMORPG	Massive Multiplayer Online Role Playing Game
NFT	Non-Fungible Token
PELJ	Potchefstroom Electronic Law Journal
RMT	Real Money Trade
SAJHR	South African Journal on Human Rights

SARB	South African Reserve Bank
SSRN	Social Science Research Network
ToS	Terms of Service
USD	United States Dollar
ZAR	South African Rand

## Chapter 1: Introduction

### ***1.1 Background and Problem Statement***

Virtual worlds are nothing new with the first being created in 1979,<sup>1</sup> but the first online virtual world is that of *Habitat* – a Massive Multiplayer Online Role Playing Game (MMORPG) developed by the famous *LucasFilm Games* in 1985.<sup>2</sup> As time progressed virtual worlds evolved and people started to acknowledge that there is more to virtual worlds than just using it to play games. A prime example of this is the virtual world of *Second Life*, which was developed by *Linden Research Inc* and launched in 2003,<sup>3</sup> in which a user creates an avatar to virtually do what people do in the real world (excluding some obvious exceptions, of course).<sup>4</sup>

What made *Second Life* even more appealing was the statement from Philip Rosedale (the Chief Executive Officer of *Linden Research Inc*) in which it was said that "what you have in Second Life is real and it is yours. It doesn't belong to us. You can make money."<sup>5</sup> In addition to this notion, even the homepage of *Second Life* stated that "SECOND LIFE IS AN ONLINE, 3D VIRTUAL WORLD, IMAGINED, CREATED AND OWNED BY ITS RESIDENTS."<sup>6</sup> After an individual dispute occurred in 2007 regarding virtual property being confiscated, *Linden Research Inc* quickly went on to change the latter to state that "SECOND LIFE IS AN ONLINE, 3D VIRTUAL WORLD, IMAGINED AND CREATED BY ITS RESIDENTS."<sup>7</sup> The removal of the word "owned" from the statement now implies that users do not have an ownership right

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<sup>1</sup> This was a text-based virtual world. See ALA TechSource 2009 <https://journals.ala.org/index.php/ltr/article/view/4254/4860#bib3>.

<sup>2</sup> Rossney 1996 <https://www.wired.com/1996/06/avatar-2/?pg=3>.

<sup>3</sup> Linden Lab 2021 <https://www.lindenlab.com/about>.

<sup>4</sup> Strickland and Pollette 2021 <https://computer.howstuffworks.com/internet/social-networking/networks/second-life.htm>.

<sup>5</sup> *Bragg v Linden Research Inc* 487 FSupp 2d 593 (ED PA 2007) (hereafter *Bragg v Linden Research Inc*).

<sup>6</sup> *Sic, Evans v Linden Research Inc* C-11-01078 DMR (ND CAL 2012) (hereafter *Evans v Linden Research Inc*).

<sup>7</sup> *Sic, Evans v Linden Research Inc*.

in the property they have in *Second Life*, leaving users with mere licences to use the virtual property in *Second Life*.<sup>8</sup>

For years the licensing of virtual property, by developers to users, has been the common way in which virtual worlds such as *League of Legends*,<sup>9</sup> *World of Warcraft*<sup>10</sup> and *PlayerUnknown's Battlegrounds*<sup>11</sup> monetise their virtual property.<sup>12</sup> Users never had the opportunity to actually own the virtual property itself (excluding those misled *Second Life* users of course). Finally, for the second time there was hope for users to own virtual property once again when *Decentraland* was open for early users in 2019.<sup>13</sup> At the time of writing, the phrase "Create, explore and trade in the first-ever virtual world owned by its users" can be seen on the homepage of *Decentraland*.<sup>14</sup> The virtual world of *Decentraland* is rather different from that of *Second Life* in one key way, that being the use of non-fungible tokens in the virtual world of *Decentraland*.<sup>15</sup> In *Second Life* a user would only have the option to buy a licence to use the virtual property inside *Second Life*,<sup>16</sup> but in *Decentraland* all the virtual property consists of non-fungible tokens, which means that users actually have ownership rights vested in the virtual property they purchased as non-fungible tokens.<sup>17</sup> So what exactly are these non-fungible tokens?

A non-fungible token is, in essence, simply a proof of ownership (usually over a unique digital asset).<sup>18</sup> It is for this reason that a non-fungible token is analogous to that of a deed, since both the deed and the non-fungible token are merely proof of

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<sup>8</sup> See heading 1 at Linden Lab 2021 <https://www.lindenlab.com/legal/second-life-terms-and-conditions>.

<sup>9</sup> See heading 3 at Riot Games 2021 <https://www.riotgames.com/en/terms-of-service>.

<sup>10</sup> See Blizzard 2021 <https://www.blizzard.com/en-gb/legal/fba4d00f-c7e4-4883-b8b9-1b4500a402ea/blizzard-end-user-license-agreement>.

<sup>11</sup> See heading 5 at Krafton 2021 <https://na.battlegrounds.pubg.com/tos-website/>.

<sup>12</sup> Feuerstein 2020 <https://fadel.com/licensing-ip-management-in-the-gaming-industry/>.

<sup>13</sup> Wilser 2020 <https://www.coindesk.com/markets/2020/06/25/the-people-of-decentraland-will-greet-you-now/>.

<sup>14</sup> Decentraland 2021 <https://decentraland.org/>.

<sup>15</sup> Wilser 2020 <https://www.coindesk.com/markets/2020/06/25/the-people-of-decentraland-will-greet-you-now/>.

<sup>16</sup> See heading 1 at Linden Lab 2021 <https://www.lindenlab.com/legal/second-life-terms-and-conditions>.

<sup>17</sup> See heading 6 under the Terms of Use tab at Decentraland 2021 <https://decentraland.org/terms/>.

<sup>18</sup> Ray date unknown <https://medium.com/lansaar/nfts-and-smart-contracts-6c4c5516d5a0>.

ownership and not the asset itself.<sup>19</sup> Expanding on this, a deed can be defined as "a written document which is executed with the necessary formality (that is, more than a simple signature), and by which an interest, right or property passes or is confirmed, or an obligation binding on some person is created or confirmed."<sup>20</sup> Non-fungible tokens and deeds are commonly associated with the conveyancing of the title to property, but neither is limited thereto and may include licences, patents and so forth.<sup>21</sup> This allows for the digital asset (virtual property) to be sold by members of the community to other members of the community, as opposed to the developers simply licensing the use of the virtual property. Therefore, virtual worlds that allow for the use of non-fungible tokens are the virtual worlds that allow for true ownership of virtual property. This does, however, not solve all virtual property-related problems.

The most problematic areas can be seen to be that majority of people do not know what non-fungible tokens are, nor do they know what is actually being bought when purchasing non-fungible tokens. This gives rise to other problematic areas, such as: a common misunderstanding of the blockchain technology behind cryptocurrencies and non-fungible tokens; how the ownership, intellectual property rights and consumer protection relating to non-fungible tokens could be approached; the nature of virtual land (specifically the application of virtual zoning laws and fixtures), as well as the deprivation and expropriation thereof; and lastly, the cyber laws applicable to those involved with non-fungible tokens. Taking all of the above implications for virtual property into account, the problem can be summarised as there being uncertainty about the extent to which the introduction of non-fungible tokens is influencing virtual worlds and virtual property, resulting in the existence of a *lacuna* worthy of research in order to ensure the beneficial evolution of blockchain innovation alongside the trade and finance coupled with it.

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<sup>19</sup> Nightingale 2021 <https://www.makeuseof.com/what-do-you-actually-own-if-you-buy-an-nft/>.

<sup>20</sup> Thomson Reuters 2021 [https://uk.practicallaw.thomsonreuters.com/1-107-6055?transitionType=Default&contextData=\(sc.Default\)&firstPage=true](https://uk.practicallaw.thomsonreuters.com/1-107-6055?transitionType=Default&contextData=(sc.Default)&firstPage=true).

<sup>21</sup> Ethereum 2021 <https://ethereum.org/en/nft/>.

## **1.2 Research Question and Hypothesis**

The research question for this dissertation is "To what extent does the introduction of non-fungible tokens influence virtual worlds and virtual property?"

In order to answer the question it becomes necessary to examine the interplay that virtual worlds and non-fungible tokens have with the law, followed by the interplay with one another. Specific focus will then need to be given to virtual land and the cyber laws governing not only non-fungible tokens but also the people using them.

My hypothesis is that the introduction of non-fungible tokens influences virtual worlds and virtual property to a great extent, specifically the remedies available to the users of virtual worlds and virtual property. It is hypothesised that this is due to the fact that the law of property now also finds application when dealing with virtual worlds and virtual property (instead of just the law of contract and intellectual property rights that commonly regulated the above).

## **1.3 Methodology**

This dissertation will be a literature study composed of the following: the *Constitution of the Republic of South Africa, 1996*, legislation, case studies (including notes and comments thereof), academic journals, electronic sources and textbooks.

Some comparisons will be made in the course of the dissertation where appropriate, but they will not be fully fledged and their nature and quality will fall short of qualifying this as comparative research. Also, due to the nature of what is being researched, many of the sources referenced in this work will be internet sources. The value of these internet sources should, however, not be taken for granted as a wide array of these internet sources has been published by the original creators of certain blockchain technology and the innovations that sprouted from it. Also note that a large portion of work from my LLB mini-dissertation will be used since it can now be expanded upon in relation to non-fungible tokens. Due to the wide applicability of non-fungible tokens it seems logical to take national, international and foreign sources into account in the writing of this dissertation.

## ***1.4 Overview of Chapters***

Chapter Two aims at understanding the interplay between virtual worlds and the law. The different sources of law applicable to virtual worlds will be discussed, which discussion will be followed by an in-depth analysis of the five different stages a virtual world can be in, and how the sources of law discussed would be applied in each respective stage. As a start to answering the research question, this will provide a great indication of the influence non-fungible tokens have on virtual worlds.

Chapter Three, which is the largest and most important chapter, will focus on the interplay between non-fungible tokens and the law. With the interplay between virtual worlds and the law being discussed in Chapter Two, it is also necessary to discuss the interplay between non-fungible tokens and the law to determine the influence thereof on virtual property. Chapter Three will start by simplifying blockchain technology, cryptocurrencies and how the world is slowly transitioning (at least in part) from fiat currency to its evolving digital currency counterpart. This background is of extreme importance since a lack of understanding of the technology would result in a failure to apply the legal aspects relating thereto. A failure of this kind would not allow for the influence non-fungible tokens have on virtual property to be identified. With this technology (and the legal aspects relating to it) still evolving, there is much uncertainty as to how these legal aspects are to be applied. Chapter Three will thus serve the aim of indicating these legal aspects, as well as the application thereof, in virtual worlds that make use of non-fungible tokens as a way of determining the extent of the influence that non-fungible tokens have on virtual property.

The background provided at the start of Chapter Three will then be followed by the sources of law applicable to non-fungible tokens. The first source of law would be computer program code with the main area of focus being smart contracts, since these contracts regulate the non-fungible tokens and their interaction with virtual worlds and the users thereof. The law of contract will thus automatically find application with an in-depth discussion on whether or not these smart contracts actually qualify as contracts in the ordinary sense, followed by how the legal aspects

in terms of the law of contract would influence non-fungible tokens. The second source of law will be real-world regulations with the main focus on the legal aspects relating to non-fungible tokens concerning the ownership, intellectual property and consumer protection thereof.

Non-fungible tokens and the ownership thereof will be treated in terms of the *nemo dat quod non habet* rule, which allows for the assumption to be made that the owner of the wallet, which can contain cryptocurrencies and non-fungible tokens, will be the owner of everything therein. This assumption does, however, fail to take into account the possibility of human error, thus it becomes necessary to discuss applicable remedies (such as the *rei vindication*, a delictual claim and unjust enrichment) in the event of such mistakes or infringement of property rights. This section will be followed by the intellectual property rights associated with the virtual property represented by a non-fungible token. During my research I have found that there is a mass misunderstanding of whether or not intellectual property rights, such as copyright, are also bought when purchasing a non-fungible token. With this being a reoccurring problem area during my research, it is only logical to deduce that the legal aspects of intellectual property relating to non-fungible tokens need to be researched and discussed in depth in order to clear the confusion surrounding the intellectual property rights associated with non-fungible tokens. The last area of focus to be discussed in Chapter Three will be the applicability of consumer protection for South African citizens that make use of virtual worlds and non-fungible tokens. Due to the electronic nature of non-fungible tokens, the *Electronic Communications and Transactions Act 25 of 2002* (hereafter the *Electronic Communications and Transactions Act*) read alongside the *Consumer Protection Act 68 of 2008* (hereafter the *Consumer Protection Act*) will be examined to indicate how electronic transactions of non-fungible tokens are to be regulated and protected. This section will conclude with the discussion of what is deemed to be a contract of sale, followed by proposed formalities to better ensure that consumers are protected from developers and one another when trading non-fungible tokens.

Chapter Four deals with virtual land and starts off by examining what gives land in the real world value, followed by a self-proposed third determiner of value when considering virtual land. In respect of trade and finance, the determination of the value of virtual land is of particular importance when it is necessary to decide on whether or not to purchase virtual land in various virtual worlds. Knowing how the value of virtual land is determined, the next area to be discussed will be that of virtual zoning laws applicable to virtual worlds and the virtual land therein, since this will influence the inherent value of the virtual land. The application of fixtures will be discussed next, since this also influences the inherent value of virtual land. A background will be provided as to how fixtures are dealt with in South Africa, followed by the application thereof in different virtual worlds.

This chapter will proceed to discuss the constitutional protection of virtual property in South Africa, with the main focus being on the deprivation and expropriation of virtual land (assuming that virtual land does indeed qualify as property in terms of the *Constitution of the Republic of South Africa, 1996*). This section of Chapter Four will thus primarily be focussed on section 25 of the *Constitution of the Republic of South Africa, 1996* (hereafter the Constitution), which is necessary to determine the constitutionality of property infringements by both the state and the developers of virtual worlds. This will then be followed by remedies for any unlawful property infringements in virtual worlds. To conclude Chapter Four, virtual land court cases will be discussed as examples indicating how such situations have been dealt with previously. Despite these court cases falling outside the jurisdiction of South Africa and not containing any non-fungible tokens, they provide an opportunity to research how the legal aspects relating to virtual worlds and the property contained therein have been approached and interpreted. This will in turn help to answer how the legal aspects relating to the interplay between virtual worlds and virtual property is being influenced by the introduction of non-fungible tokens.

Chapter Five pertains to the cyber laws applicable to South Africans and others in terms of the *Cybercrimes Act 19 of 2020* (hereafter the *Cybercrimes Act*). This chapter will start by examining the private protection of virtual property in South

Africa, followed by the discussion of foreign law cases in an attempt to research how, in the private law sphere, cases relating to virtual worlds and virtual property have previously been dealt with. The research of these court cases will serve the aim of being a possible indicator as to how South African courts might interpret and resolve virtual property disputes. The second part of this chapter will focus on cybercrimes, malicious communications and jurisdiction (as interpreted in terms of the *Cybercrimes Act*). These three subsections will have the aim of providing the reader with a better understanding as to the extent of the influence that non-fungible tokens have on virtual worlds and virtual property in terms of the *Cybercrimes Act*.

Chapter Six will contain an overview based on the conclusions of the aforementioned chapters. This overview will then be analysed and followed by an overall conclusion, in which the research question will be answered, which then serves as the end of this dissertation.

## **Chapter 2: The Interplay between Virtual Worlds and the Law**

### ***2.1 Background***

There is a distinction in South Africa between substantive law and procedural law.<sup>22</sup> Due to the unique nature of virtual worlds, these real-world sources of law are not always applicable, and therefore the sources of law which regulate virtual worlds will be discussed in this chapter to indicate the interplay between virtual worlds and the law. Following the discussion of the sources of law, the different stages which a virtual world can be in will be discussed, since the different stages influence the sources of law applicable to the virtual world and the virtual property within.

### ***2.2 Sources of Law***

Law in South Africa can be derived from various sources, which include the Constitution, common law, judicial precedent, customary law and legislation.<sup>23</sup> In virtual worlds, however, the sources of law are much more restricted.<sup>24</sup> Erlank proposes three main sources of law that regulate the virtual world. These are computer program code, customary user-created law, and real-world regulations (specifically contracts).<sup>25</sup>

#### ***2.2.1 Computer program code***

A virtual world is created by a developer by way of computer program code and is in essence constructed out of commands such as IF, AND, THEN, DO, BUT and OR.<sup>26</sup> Because a virtual world is developed out of the latter commands there is no room for interpretation. For example, IF a player's avatar reaches zero health points THEN all items in the player's inventory will be lost, BUT items that are non-fungible tokens AND are owned by the player will remain in the possession of the player.<sup>27</sup> Following the latter example, it is clear that anything not programmed by the developer is not

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<sup>22</sup> Van Loggerenberg 2016 *BRICS LJ* 126-127.

<sup>23</sup> Erlank "Property and Sovereignty in Virtual Worlds" 100.

<sup>24</sup> Erlank "Property and Sovereignty in Virtual Worlds" 100.

<sup>25</sup> Erlank "Property and Sovereignty in Virtual Worlds" 100.

<sup>26</sup> Erlank *Property in Virtual Worlds* 65.

<sup>27</sup> Erlank "Property and Sovereignty in Virtual Worlds" 102.

possible, which allows for the developer to decide the laws of nature for the virtual world by way of code.<sup>28</sup> To support this, Erlank explains that the code is similar to the laws of nature, due to the code being unchangeable by the avatar, inevitable for the avatar, and not open for interpretation or negotiation by the players.<sup>29</sup> The above also allows for the developer to afford property rights and protection to players, since the code enforcing this would be absolute (to the extent that it was programmed to be).<sup>30</sup>

### 2.2.2 Customary user-created law

In order to define customary law one must take into account the context in which the definition is to be used. For example, customary law in the international context would differ from the indigenous context.<sup>31</sup> For the context of virtual worlds, "customary law" can be defined to be:

Law consisting of customs that are accepted as legal requirements or obligatory rules of conduct; practices and beliefs that are so vital and intrinsic a part of a social and economic system that they are treated as if they were laws.<sup>32</sup>

In virtual worlds, just as in the real world, society has a set of moral values that is changeable. Any deviation from these moral values is seen as *contra bonos mores*, resulting in customary law vesting between players inside virtual worlds. These customary laws can be rather capricious at times but differ from virtual world to virtual world.<sup>33</sup>

These customary user-created laws do, however, need to be enforced so as not to be rendered useless. Erlank explains that the players enforce these rules on their

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<sup>28</sup> The law of nature is basic principles humans have accepted as right or wrong.

<sup>29</sup> Erlank *Property in Virtual Worlds* 65.

<sup>30</sup> Erlank 2013 *De Jure* 770-782.

<sup>31</sup> World Intellectual Property Organization *Customary Law, Traditional Knowledge and Intellectual Property: An Outline of the Issues* 2.

<sup>32</sup> World Intellectual Property Organization *Customary Law, Traditional Knowledge and Intellectual Property: An Outline of the Issues* 11.

<sup>33</sup> An example would be where in the game *League of Legends* the second blue buff to spawn went to the player in the midlane position and any player in a position contrary to midlane to take the second blue buff was constituted as griefing, but after various updates this is not the situation anymore. See Raphaelcgo 2021 [https://www.reddit.com/r/summonerschool/comments/kuf584/when\\_did\\_the\\_convention\\_of\\_giving\\_blue\\_buff\\_to/](https://www.reddit.com/r/summonerschool/comments/kuf584/when_did_the_convention_of_giving_blue_buff_to/).

own without the developer becoming directly involved,<sup>34</sup> but I propose that it is not uncommon for developers to get involved in enforcing customary user-created law in order to maintain these customs.<sup>35</sup>

#### 2.2.2.1 Enforcement through the players

The more time players spend in a virtual world the more accustomed they become to doing things in a certain way. It is not always necessary to follow these customs, but in certain circumstances not doing so can be seen as *contra bonos mores* by other players.<sup>36</sup> Following these customs is of especial importance in virtual worlds where social participation and teamwork between players are essential aspects of being successful.<sup>37</sup> With the developer not prohibiting behaviour opposite to what is customarily accepted, players tend to take matters into their own virtual hands in order to enforce customary law. One of the easiest and most efficient ways of enforcement by players is through harassment.<sup>38</sup> The harassment act can be either passive<sup>39</sup> or active<sup>40</sup> and performed by one or more players.<sup>41</sup> A problem with this way of enforcement is that different people and groups tend to have different opinions on what is correct, which results in unjustified harassment, which serves no great purpose. To combat this, the decentralised nature of blockchain technology allows for virtual worlds, of which *Decentraland* is a prime example, to create what is known as a Decentralised Autonomous Organisation (DAO).

*Decentraland*, being the first virtual world to be fully decentralised,<sup>42</sup> created a DAO in order to give the people of *Decentraland* control thereof.<sup>43</sup> The DAO then allows

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<sup>34</sup> Erlank "Property and Sovereignty in Virtual Worlds" 114.

<sup>35</sup> See Chapter 2.2.2.2 for more information.

<sup>36</sup> *Contra bonos mores* can be defined as "against good morals".

<sup>37</sup> Examples include *League of Legends*, in which five players need to play together in order to win, and *World of Warcraft*, in which players form guilds in order to do tough dungeon raids together.

<sup>38</sup> Erlank *Property in Virtual Worlds* 72.

<sup>39</sup> Such as trying to make the virtual world as unpleasant as possible, for example by restricting a player's movement.

<sup>40</sup> Such as threats and insults.

<sup>41</sup> Erlank "Property and Sovereignty in Virtual Worlds" 114-116.

<sup>42</sup> Decentraland 2021 <https://dao.decentraland.org/en/>.

<sup>43</sup> Decentraland 2021 <https://dao.decentraland.org/en/>.

users, according to rules clearly stating how the voting power is decided,<sup>44</sup> to control policies and regulate behaviour inside *Decentraland*.<sup>45</sup> By doing this, the enforcement of customary user-created law is done in a fair manner in which everyone who is part of the virtual world knows the rules set out, but still the possibility of changing these rules remains. Making use of a DAO means that the virtual world and the rules thereof will not remain stagnant, and it allows for the possibility of adjustment and change (as seen in the real world).

#### 2.2.2.2 Enforcement through the developer

As most virtual worlds are centralised,<sup>46</sup> the developers try to ensure that players have the best possible experience in the virtual world by enforcing customary user-created law with the help of the players. *Riot Games* has done this by implementing a disciplinary system into *League of Legends*.<sup>47</sup> At the end of each match all players are able to report offensive, negative and disruptive behaviour of each player, which results in the disciplinary system reviewing the possible offending player's conduct and then determining whether a penalty needs to be issued or not.<sup>48</sup>

The above disciplinary system allows players to create a better virtual world by simply reporting offending players, without the need for the non-offending players to use harassment as a way of enforcement. Should non-offending players use harassment as a way of enforcement, they would then also subject themselves to the disciplinary system and a penalty might possibly be issued against them.<sup>49</sup>

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<sup>44</sup> See Decentraland 2020 <https://decentraland.org/blog/announcements/the-decentraland-dao-explained/>.

<sup>45</sup> Decentraland 2021 <https://dao.decentraland.org/en/>.

<sup>46</sup> The centralisation of a virtual world means that the world is managed by the single authority of the developer, as opposed to decentralised virtual worlds, which are not managed by a single authority such as the developer.

<sup>47</sup> Riot Games was founded in 2006 and released the game *League of Legends* in 2009, see Riot Games 2017 <https://www.riotgames.com/en/who-we-are/values>.

<sup>48</sup> Riot Games 2013 <https://support-leagueoflegends.riotgames.com/hc/en-us/articles/201752884-Reporting-a-Player>.

<sup>49</sup> Sniper 2013 <https://support-leagueoflegends.riotgames.com/hc/en-us/articles/201752884>.

### *2.2.3 Real-world regulations*

Computer program code and customary user-created law regulate behaviour only inside of the virtual world, but behind the screen there is still a person, whether a developer or a player, who has to adhere to real-world regulations both inside and outside the virtual world.

The real-world legal relationship between the developer and player tends to be regulated in terms of contract (hereafter developer-player contract). These developer-player contracts usually take the form of an End User Licence Agreement (EULA)<sup>50</sup> and a Terms of Service (ToS),<sup>51</sup> but they are mostly used in conjunction with one another as these contracts are so closely related.<sup>52</sup> These contracts are referred to as click-wrap agreements<sup>53</sup> and are seen as contracts of adhesion<sup>54</sup> due to the player not being able to negotiate the clauses of the contracts with the developer.<sup>55</sup> If a player is unhappy with the developer-player contract, then a possible remedy would be simply not to be a user of the virtual world, but depending on the facts of each case it is possible to seek external remedies, since both the developer and the player would be subjected to the laws of the jurisdiction they find themselves in, as is agreed upon via the developer-player contract.<sup>56</sup>

### **2.3 Five stages of a Virtual World**

Due to a developer's wide power and control of what to do with a virtual world, Erlank proposes five stages where the influence and governance of a developer may

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<sup>50</sup> Tends to regulate the relationship between the developer and the player in the real-world. See Erlank "Property and Sovereignty in Virtual Worlds" 105; Erlank *Property in Virtual Worlds* 100.

<sup>51</sup> Tends to regulate the behaviour of players inside the virtual world. See Erlank "Property and Sovereignty in Virtual Worlds" 105; Erlank *Property in Virtual Worlds* 100.

<sup>52</sup> Erlank "Property and Sovereignty in Virtual Worlds" 105; Erlank *Property in Virtual Worlds* 99.

<sup>53</sup> Similar to shrink-wrap agreements, this is just digitally.

<sup>54</sup> "An adhesion contract (also called a 'standard form contract' or a 'boilerplate contract') is a contract drafted by one party (usually a business with stronger bargaining power) and signed by another party (usually one with weaker bargaining power, usually a consumer in need of goods or services)." See Cornell Law School date unknown [https://www.law.cornell.edu/wex/adhesion\\_contract\\_\(contract\\_of\\_adhesion\)](https://www.law.cornell.edu/wex/adhesion_contract_(contract_of_adhesion)).

<sup>55</sup> Erlank "Property and Sovereignty in Virtual Worlds" 105; Erlank *Property in Virtual Worlds* 99.

<sup>56</sup> Erlank *Property in Virtual World* 76.

be limited, namely the creation stage, the testing stage, the normal running stage, the maintenance stage, and finally the destruction stage.<sup>57</sup>

As opposed to the real world, which is in a constant state of reality, the five stages of a virtual world should be seen as separate, and any dispute arising in a certain stage should be decided upon as if the virtual world was still in that stage. For example, if a dispute arises during the testing stage one may not rely on what happens during the normal running stage since there are two entirely different contracts regulating the virtual world (despite the virtual world remaining more or less the same).<sup>58</sup>

### 2.3.1 The creation stage

Whilst creating the virtual world, the developer can be limited by both the state and society.<sup>59</sup> The state may prevent or interfere with the development of a virtual world if the world, for example, contains something illegal.<sup>60</sup> Society may influence the creation stage of a virtual world if the world tends to be *contra bonos mores*.<sup>61</sup>

For blockchain-based games the creation stage is extremely important since it is not only about creating a virtual world but also about creating non-fungible tokens to be used in the virtual world. These non-fungible tokens play such a vital role in virtual worlds that some virtual worlds, such as *Mirandus* and *Spider Tank Project* (both developed by *Gala Games*),<sup>62</sup> are selling non-fungible tokens to be used in each of

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<sup>57</sup> Erlank "Property and Sovereignty in Virtual Worlds" 118.

<sup>58</sup> Compare, for example, the Beta Trial and Confidentiality Agreement of *ZeniMax Media Inc* (which was founded by the famous company *Bethesda*) and the Terms of Service by *ZeniMax Media Inc*, *ZeniMax Media Inc* date unknown [https://bethesda.net/data/beta\\_nda/en.html](https://bethesda.net/data/beta_nda/en.html); *ZeniMax Media Inc* date unknown <https://bethesda.net/en/document/terms-of-service>.

<sup>59</sup> Erlank "Property and Sovereignty in Virtual Worlds" 119.

<sup>60</sup> The Diamond Casino Heist, which was released as additional content for the game *Grand Theft Auto online*, does not allow South Africans to gamble with chips that were purchased with real-world money due to online gambling being illegal in South Africa. See Evans 2019 <https://rockstarintel.com/gta-online-casino-update-list-of-countries-which-have-banned-the-casino-features>; Fandom date unknown [https://gta.fandom.com/wiki/GTA\\_Online:\\_The\\_Diamond\\_Casino\\_Heist](https://gta.fandom.com/wiki/GTA_Online:_The_Diamond_Casino_Heist); Section 11 of the *National Gambling Act 7 of 2004*.

<sup>61</sup> The game *Rape Day*, which allowed the killing and rape of a woman, was to be released on the gaming platform *Steam*, but was cancelled due to a petition signed by thousands to have it banned. See Evans 2019 <https://www.bbc.com/news/blogs-trending-47484397>.

<sup>62</sup> See *Gala Games* 2021 <https://app.gala.games/games>.

the games before it is even possible to enter the virtual world.<sup>63</sup> Should developers choose to sell virtual property as non-fungible tokens for a specific virtual world during the creation stage, then they need to ensure that those non-fungible tokens may be usable as soon as the virtual world is in the normal running stage. Failure to do so may result in the *Consumer Protection Act* becoming applicable for South African citizens in order to remedy what has been bought. The reason for this is that by selling virtual property as a non-fungible token it is clearly a product under a deceptive representation, with the representation being that the non-fungible token is sold for use in the normal running stage of the game, and the deception being that the non-fungible token is not able to be used in the normal running stage.<sup>64</sup> Section 55(2)(c) of the *Consumer Protection Act* may also be applicable, since this section requires that goods be "useable and durable for a reasonable period of time." Should non-fungible tokens then be sold before the normal running stage without being able to be used when the normal running stage does indeed arise, it would be possible to argue that the goods were not usable for a reasonable period of time.

### 2.3.2 The testing stage

Should the creation stage of the virtual world pass the threshold of both the laws of the state and the moral values of society, then a *beta* virtual world will come into non-permanent existence.<sup>65</sup> Testing is usually done voluntarily and it is common that no property rights may vest in any of the virtual property, mainly due to the non-permanence of the beta virtual world.<sup>66</sup> Non-fungible tokens changed the latter a bit because the virtual property may be stored on-chain,<sup>67</sup> meaning that even if the *beta* virtual world is destroyed the non-fungible tokens belonging to users will not be destroyed with it, since the developers would not have access to the non-fungible

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<sup>63</sup> See Gala Games 2021 <https://app.gala.games/games>.

<sup>64</sup> See section 41 of the *Consumer Protection Act*.

<sup>65</sup> An example of this would be the Public Beta Environment, which Riot Games defines as "a league server where you can play with upcoming features, content and experiments that aren't yet (and may never be) ready for prime time..." See Riot Games 2013 <https://support-leagueoflegends.riotgames.com/hc/en-us/articles/201751904-Public-Beta-Environment-FAQ>.

<sup>66</sup> Erlank "Property and Sovereignty in Virtual Worlds" 119; Riot Games 2013 <https://support-leagueoflegends.riotgames.com/hc/en-us/articles/201751904-Public-Beta-Environment-FAQ>.

<sup>67</sup> See chapter 3.2.1 for an explanation of on-chain storage.



To fully understand the effect that the maintenance stage has on non-fungible tokens, it is necessary to provide some background first. To explain this, a virtual sword (that is represented by a non-fungible token) will be used. If the sword has 40 damage and 2 poison damage per second as attributes, then in a certain virtual world this might seem unfair due to other weapons not being as strong. It then becomes necessary for the developer to alter the attributes associated with the sword in order to create a balanced and fair virtual world for all users. The developer might then reduce the attributes of the sword to 30 damage and 2 poison damage per second. It is important to understand that the user still owns the sword, but the developer of the virtual world still determines how the sword interacts in the virtual world.<sup>76</sup> For a South African citizen to now try and rely on the *Consumer Protection Act* would be incorrect for the following reason. The buyer of the non-fungible token would still own the non-fungible token, but the attributes awarded to the non-fungible token are contractually regulated by the developer and not sold as part of the virtual property.<sup>77</sup> This means that the right to fair and honest dealing<sup>78</sup> has been fulfilled and not infringed upon, since the product sold is still exactly the same and still useable in the virtual world. Should certain attributes, however, be permanently awarded and then changed by the developers, it would be possible to consult the *Consumer Protection Act* to remedy the infringement, if the infringed virtual property belongs to a South African citizen.

### *2.3.5 The destruction stage*

The final stage of a virtual world would be the destruction thereof.<sup>79</sup> The developer-player contract usually allows the developer to destroy the virtual world, since it is running on only an as-is basis.<sup>80</sup> It could be argued that the developer has a social responsibility to keep the virtual world running (if there is no justified reason for its

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<sup>76</sup> See Moralis Blog 2021 <https://moralis.io/what-are-nft-games-and-how-to-make-nft-games/>.

<sup>77</sup> See Gala Games 2021 <https://app.gala.games/terms-and-conditions/>.

<sup>78</sup> See part F of the *Consumer Protection Act*.

<sup>79</sup> Examples include *Club Penguin* and *The Sims Online*.

<sup>80</sup> Erlank "Property and Sovereignty in Virtual worlds" 121; See heading 1.2 at Linden Lab 2021 <https://www.lindenlab.com/tos>.

destruction), but a possible remedy would be to for the developer to allow the player-base of the virtual world to gain control thereof.<sup>81</sup>

What makes non-fungible tokens so appealing is that they are not destroyed alongside the virtual world (which is contrary to commonly licenced virtual property in virtual worlds). Non-fungible tokens can continue to exist either on-chain<sup>82</sup> or off-chain,<sup>83</sup> despite the virtual world not existing anymore.<sup>84</sup> The obvious thing to do is to assume that the non-fungible tokens are now worthless due to it not being usable in the virtual world, but non-fungible tokens have a wide array of uses with the most obvious, in a situation where a virtual world is destroyed, being that the non-fungible token can now be seen as a collectible.<sup>85</sup>

## **2.4 Conclusion**

This chapter has served the aim of understanding the interplay between virtual worlds and the law. The three different sources of law in relation to virtual worlds were discussed to indicate the legal aspects applicable to both the developer and the user. These sources of law were then applied to the different stages a virtual world might be in, since the legal aspects applicable to a virtual world differs from one stage to the next.

When discussing the five different stages of a virtual world, non-fungible tokens were theoretically applied to each stage to illustrate the care and consideration that developers need to have when creating a virtual world (specifically virtual worlds that make use of blockchain technology and non-fungible tokens). The different ways in which non-fungible tokens can be applied to different stages of a virtual world were also discussed as a means of providing the reader with more background relating to the wide extent of this technology. This discussion of the different applications and functionality of non-fungible tokens provided insight into the options available to

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<sup>81</sup> Erlank "Property and Sovereignty in Virtual Worlds" 122-123.

<sup>82</sup> See Chapter 3.2.1 for an explanation of on-chain storage.

<sup>83</sup> See Chapter 3.2.1 for an explanation of off-chain storage.

<sup>84</sup> See Ayson 2021 <https://help.foundation.app/en/articles/4742850-delete-or-burn-an-nft>.

<sup>85</sup> *Pokémon* cards are a great example of collectibles with high value (even though there's no virtual world to use them in).

developers, thus contributing to setting out the legal rights of the developer and user (depending on how the virtual world was developed and the stage it was in at the time of an alleged infringement).

This chapter as a whole can therefore be seen as laying the foundation for all of the chapters to follow and is thus important to the logical flow of the exposition of extent to which non-fungible tokens influence virtual worlds and virtual property. As not all virtual worlds make use of non-fungible tokens, any focus or discussion relating to the application of legal aspects thereto will in most situations be of little help and result in the research question remaining moot. With this in mind, and the complete lack of case law dealing with non-fungible tokens, a lot of the applications of legal aspects concerning non-fungible tokens were theoretically applied to indicate the possibilities available to both the developer and user who make use of such technology. This should contribute to the understanding of virtual worlds that make use of non-fungible tokens and provide the necessary information for users to make better investments when dealing with virtual property in different virtual worlds.

Despite this chapter focussing on virtual worlds and their interplay with the law, non-fungible tokens were mentioned as a small indication of how this blockchain innovation is influencing virtual worlds and virtual property. The following chapter will focus on the interplay between non-fungible tokens and the law. This should provide a better understanding of the influence that non-fungible tokens have on virtual worlds and virtual property.

## Chapter 3: The Interplay between Non-Fungible Tokens and the Law

### 3.1 Background

With the interplay between virtual worlds and the law having been discussed in Chapter Two, it becomes necessary to examine the interplay between non-fungible tokens and the law to help determine the extent to which non-fungible tokens influence virtual worlds and virtual property.

Before the interplay between non-fungible tokens and the law can be explored, a basic understanding of blockchain technology and cryptocurrencies needs to be made possible to orientate the reader as to how non-fungible tokens came into existence, as well as how non-fungible tokens are currently dealt with. After providing this background, the sources of law relating to non-fungible tokens will be discussed. This will be followed by the interplay between non-fungible tokens and the law, with a specific focus on ownership, intellectual property rights and consumer protection.

#### 3.1.1 Simplifying blockchain technology

In order to grasp the use of blockchain technology it is necessary to understand the basics of what a blockchain is. As a starting point it should be noted that "blockchains provide a mechanism through which mutually distrustful remote parties (nodes) can reach consensus on the state of a ledger of information."<sup>86</sup> The word "blockchain" derives its meaning from two core elements of the concept, which are - the blocks and the chain. Each block on a blockchain network will consist of data,<sup>87</sup> a hash<sup>88</sup> and the hash of the previous block.<sup>89</sup> The first block, which is also known as

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<sup>86</sup> Sherman, Javani, Zhang and Golaszewski *On the Origins and Variations of Blockchain Technologies* 1-2.

<sup>87</sup> The data stored inside a block will depend on the type of blockchain, as in the case of the Bitcoin blockchain, in which a block would contain the information of the sender, receiver and the amount transferred. See Cryptopedia 2021 <https://www.gemini.com/cryptopedia/what-is-block-in-blockchain-bitcoin-block-size>.

<sup>88</sup> The hash is a mathematical algorithm used to generate a unique identity for the block and the content it contains. See Cryptopedia 2021 <https://www.gemini.com/cryptopedia/what-is-block-in-blockchain-bitcoin-block-size>.

<sup>89</sup> Bitcoin *Bitcoin: A Peer-to-Peer Electronic Cash System* 2-3.

the "genesis block", will not contain the hash of a previous block (since it is the first), but all following blocks will contain the hash of a previous block, which results in a chain of valid transactions.<sup>90</sup>

The question then arises as to how these transactions can be proved valid and trusted without the use of a third party. Proof-of-Work and Proof-of-Stake are models (called "consensus mechanisms") and either the one or the other is a current requirement that is needed to confirm transactions that take place on the blockchain.<sup>91</sup> In a Proof-of-Work model<sup>92</sup> a new block is created every 10 minutes.<sup>93</sup> These blocks contain various transactions and are independently verified by "miners" who solve a cryptographic algorithm by using computational power.<sup>94</sup> These various miners are all competing to solve the complex cryptographic equation first in order to get the reward, which results in miners wanting to expand their computational power, which in turns means a greater use of electricity.<sup>95</sup> It is clear that using this model requires a vast amount of electricity, a lot of which goes to waste, and thus the Proof-of-Stake model was created. In Proof-of-Stake models there is a total amount of coins in circulation on the blockchain and each coin an individual owns, and then stakes, increases the individual's chance of "forging" a new block and earning the transaction fee as reward.<sup>96</sup> The percentage of getting a reward is based on the percentage of the coins staked by an individual.<sup>97</sup> Note that any attempt to defraud the ledger or hack the network would mean that the guilty party would lose all of the coins staked.<sup>98</sup> Due to the Proof-of-Stake model not needing highly complex sums to be solved, and the winner of the rewards being chosen at random based on his or her stake, the electricity costs associated with this model are substantially

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<sup>90</sup> It is called a chain since all the blocks are linked with one another.

<sup>91</sup> BitDegree 2021 <https://www.bitdegree.org/crypto/tutorials/proof-of-work-vs-proof-of-stake>.

<sup>92</sup> These may differ and, therefore, Bitcoin's Proof-of-Work will be used as an example. See Bitcoin *Bitcoin: A Peer-to-Peer Electronic Cash System* 8.

<sup>93</sup> Bitcoin *Bitcoin: A Peer-to-Peer Electronic Cash System* 7; BitDegree 2021 <https://www.bitdegree.org/crypto/tutorials/proof-of-work-vs-proof-of-stake>.

<sup>94</sup> BitDegree 2021 <https://www.bitdegree.org/crypto/tutorials/proof-of-work-vs-proof-of-stake>.

<sup>95</sup> Bitcoin *Bitcoin: A Peer-to-Peer Electronic Cash System* 6; BitDegree 2021 <https://www.bitdegree.org/crypto/tutorials/proof-of-work-vs-proof-of-stake>.

<sup>96</sup> BitDegree 2021 <https://www.bitdegree.org/crypto/tutorials/proof-of-work-vs-proof-of-stake>.

<sup>97</sup> BitDegree 2021 <https://www.bitdegree.org/crypto/tutorials/proof-of-work-vs-proof-of-stake>.

<sup>98</sup> BitDegree 2021 <https://www.bitdegree.org/crypto/tutorials/proof-of-work-vs-proof-of-stake>.

lower.<sup>99</sup> This model also makes the reward system more centralised and eliminates the possibility of a 51% controlled attack.<sup>100</sup>

When looking to define a "blockchain" it seems that Sherman *et al*/ examined the five key elements of a blockchain to which the following definition was given:

A blockchain is a distributed ledger comprising blocks (records) of information, including the information about transactions between two or more parties. The blocks are cryptographically linked to create an immutable ledger.<sup>101</sup>

There are also three policies associated with a blockchain: an access policy, a control policy and a consensus policy. The access policy determines who has access to read the information on the blockchain.<sup>102</sup> The control policy determines who may add new blocks to the blockchain, as well as how these blocks are to be added.<sup>103</sup> Lastly, the consensus policy determines the valid state of a blockchain.<sup>104</sup>

Blockchain technology having been (simply) described, and a basic understanding thereof being induced, a description of the use thereof in cryptocurrencies and non-fungible tokens follows below.

### *3.1.2 Cryptocurrencies*

Back in 2010 Laszlo Hanyecz bought two Papa John's pizza pies for the price of 10 000 Bitcoin.<sup>105</sup> Today, amongst the crypto community, the latter resulted in what is known as "Bitcoin Pizza day", which is celebrated each year on the 22<sup>nd</sup> of May.<sup>106</sup> Now if there is any confusion as to what Bitcoin and Papa John's pizza pies have in

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<sup>99</sup> BitDegree 2021 <https://www.bitdegree.org/crypto/tutorials/proof-of-work-vs-proof-of-stake>.

<sup>100</sup> See BitDegree 2021 <https://www.bitdegree.org/crypto/tutorials/proof-of-work-vs-proof-of-stake> for more detail.

<sup>101</sup> Sherman, Javani, Zhang and Golaszewski *On the Origins and Variations of Blockchain Technologies* 1-2.

<sup>102</sup> Sherman, Javani, Zhang and Golaszewski *On the Origins and Variations of Blockchain Technologies* 1-2.

<sup>103</sup> Sherman, Javani, Zhang and Golaszewski *On the Origins and Variations of Blockchain Technologies* 1-2.

<sup>104</sup> Sherman, Javani, Zhang and Golaszewski *On the Origins and Variations of Blockchain Technologies* 1-2.

<sup>105</sup> DeCambre 2021 <https://www.marketwatch.com/story/bitcoin-pizza-day-laszlo-hanyecz-spent-3-8-billion-on-pizzas-in-the-summer-of-2010-using-the-novel-crypto-11621714395>; Ethereum 2021 <https://ethereum.org/en/stablecoins/>.

<sup>106</sup> DeCambre 2021 <https://www.marketwatch.com/story/bitcoin-pizza-day-laszlo-hanyecz-spent-3-8-billion-on-pizzas-in-the-summer-of-2010-using-the-novel-crypto-11621714395>.

common, the short answer is that the 10 000 Bitcoin spent on the two pizza pies are worth roughly five billion Rand at the time of writing. If that sounds absurd, then the story of Glauber Contessoto, also known as "The Dogecoin Millionaire", is bound to reinforce that notion. On the 5<sup>th</sup> of February 2021 Glauber Contessoto invested over 250 000 USD into DogeCoin (DOGE) and only 69 days later he became a millionaire.<sup>107</sup> What makes this totally absurd is the fact that DogeCoin was started as a jest by two engineers, Billy Markus and Jackson Palmer, who joked about it on the popular network "Reddit".<sup>108</sup> The cryptocurrency was inspired by the Shiba Inu dog meme known as "Doge"<sup>109</sup> and is currently, at the time of writing, in position number 6 among the top cryptocurrencies by value.<sup>110</sup>

Despite their sounding like a luck-based rollercoaster full of risky investments, cryptocurrencies have so much potential. The company behind Cardano (ADA), Input Output Hong Kong (IOHK), recently announced that it had partnered with the Ethiopian government in which a blockchain-based system will be created to track the performance of students in local schools.<sup>111</sup> The famous Senegalese-American singer Akon also created a cryptocurrency called Akoin on which the envisioned smart city in Senegal, which is yet to be built, will run.<sup>112</sup> To further strengthen the place of cryptocurrencies in the future, the government of El Salvador was the first country in the world to declare Bitcoin to be a legal currency.<sup>113</sup> However, for the purpose of this dissertation, cryptocurrencies are referenced as the main way of trading non-fungible tokens.

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<sup>107</sup> Locke 2021 <https://www.cnbc.com/2021/05/13/dogecoin-millionaire-refuses-to-sell-and-continues-to-buy-the-dip.html>.

<sup>108</sup> Kay 2021 <https://www.businessinsider.co.za/what-is-dogecoin-2013-12?r=US&IR=T>.

<sup>109</sup> Kay 2021 <https://www.businessinsider.co.za/what-is-dogecoin-2013-12?r=US&IR=T>.

<sup>110</sup> Lesser 2021 <https://www.tomsguide.com/news/top-cryptocurrency-by-value-bitcoin-ether-dogecoin-binancecoin>.

<sup>111</sup> Baydakova 2021 <https://www.coindesk.com/from-paper-to-cardano-blockchain-iohk-in-ethiopia>.

<sup>112</sup> Kobo 2021 <https://qz.com/africa/1994122/akon-plans-to-run-a-senegal-city-on-akoin-cryptocurrency>.

<sup>113</sup> BBC News 2021 <https://www.bbc.com/news/world-latin-america-57398274>.

### 3.1.2.1 Fiat currency and the evolving digital counterpart

The South African Rand, the United States Dollar, the Euro, the Russian Ruble and many more currencies are examples of what are known as fiat currencies.<sup>114</sup> A "fiat currency" can be defined as follows:

A fiat currency is a national currency that is not pegged to the price of a commodity such as gold or silver. The value of fiat money is largely based on the public's faith in the currency's issuer, which is normally that country's government or central bank.<sup>115</sup>

In South Africa all coins and banknotes are issued by the South African Reserve Bank (SARB), which is also the central bank of the country.<sup>116</sup> With fiat money not being linked to any commodities, it holds no intrinsic value. Therefore, inflation can cause it to become worthless.<sup>117</sup> For a fiat currency to be a valid means of payment for debts and financial obligations, it must first be declared legal tender by law.<sup>118</sup> Since 1961 the Rand has been legal tender in South Africa.<sup>119</sup>

With the cryptocurrency market steadily growing in both value and popularity, some central banks, of which the Bank of England (BoE) was the first, are working on creating their own versions of cryptocurrencies, known as Central Bank Digital Currency (CBDC).<sup>120</sup> In 2017 the president of Russia, Vladimir Putin, announced that it will issue a cryptocurrency known as the CryptoRuble, and it will be state sponsored, with no mining involved.<sup>121</sup> The testing phase for the CryptoRuble already started in June 2021, and it will be issued as a CBDC by Russia's Central Bank whilst

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<sup>114</sup> Harvey *The Legal Classification of Cryptocurrency in South African Law: An Argument for Classification as Currency* 20-21.

<sup>115</sup> IG date unknown <https://www.ig.com/za/glossary-trading-terms/fiat-currency-definition>.

<sup>116</sup> Corporate Finance Institute date unknown <https://corporatefinanceinstitute.com/resources/knowledge/finance/south-african-rand-zar/#:~:text=Like%20many%20dollar%20denominated%20currencies,the%20South%20African%20Reserve%20Bank>.

<sup>117</sup> A prime example of this is Zimbabwe, in which hyperinflation caused the monetary collapse of the country. See River Financial date unknown <https://river.com/learn/history-of-monetary-collapse-in-zimbabwe/>; Chen 2021 <https://www.investopedia.com/terms/f/fiatmoney.asp>.

<sup>118</sup> Chen 2021 <https://www.investopedia.com/terms/f/fiatmoney.asp>.

<sup>119</sup> South African Reserve Bank (SARB) date unknown <https://www.resbank.co.za/en/home/what-we-do/banknotes-and-coin>.

<sup>120</sup> Seth 2021 <https://www.investopedia.com/terms/c/central-bank-digital-currency-cbdc.asp>.

<sup>121</sup> Frankenfield 2021 <https://www.investopedia.com/terms/c/cryptoruble.asp>.

being managed by the Russian government.<sup>122</sup> Despite the CryptoRuble operating like the Russian Ruble, it has to be noted that the CryptoRuble is digital and encrypted.<sup>123</sup> It is speculated that the reason for Russia's interest in this technology is because the encryption thereof allows for an easy and discreet way of transferring money without the worry of sanctions being placed on Russia by other countries.<sup>124</sup> In South Africa the SARB is currently doing a feasibility study on CBDCs with the intention of creating the E-rand.<sup>125</sup> Countries wishing to follow this path will have the CBDC regulated and operated by the respective central bank of each country.<sup>126</sup> So what exactly is a "Central Bank Digital Currency"?

A central bank digital currency (CBDC) uses an electronic record or digital token to represent the virtual form of a fiat currency of a particular nation (or region). A CBDC is centralized; it is issued and regulated by the competent monetary authority of the country.<sup>127</sup>

In this definition it can be seen that cryptocurrencies and CBDCs differ in the following three ways: firstly, cryptocurrencies are decentralised;<sup>128</sup> secondly, they are not issued and regulated by the competent monetary authority of the country;<sup>129</sup> and lastly, they do not have a physical counterpart as they exist only in virtual form.<sup>130</sup>

The last-mentioned difference between cryptocurrencies and CBDCs is the reason why there is a difference between virtual currencies and digital currencies. Virtual

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<sup>122</sup> Frankenfield 2021 <https://www.investopedia.com/terms/c/cryptoruble.asp>.

<sup>123</sup> Frankenfield 2021 <https://www.investopedia.com/terms/c/cryptoruble.asp>.

<sup>124</sup> Frankenfield 2021 <https://www.investopedia.com/terms/c/cryptoruble.asp>.

<sup>125</sup> Vermeulen 2021 <https://mybroadband.co.za/news/cryptocurrency/408238-e-rand-for-south-africa.html>.

<sup>126</sup> Seth 2021 <https://www.investopedia.com/terms/c/central-bank-digital-currency-cbdc.asp>.

<sup>127</sup> Seth 2021 <https://www.investopedia.com/terms/c/central-bank-digital-currency-cbdc.asp>.

<sup>128</sup> Scheepers *Analysis of cryptocurrency verification challenges faced by the South African Revenue Service and tax authorities in other BRICS countries and whether SARS' powers to gather information relating to cryptocurrency transactions are on par with those of BRICS countries* 17.

<sup>129</sup> Scheepers *Analysis of cryptocurrency verification challenges faced by the South African Revenue Service and tax authorities in other BRICS countries and whether SARS' powers to gather information relating to cryptocurrency transactions are on par with those of BRICS countries* 17.

<sup>130</sup> Scheepers *Analysis of cryptocurrency verification challenges faced by the South African Revenue Service and tax authorities in other BRICS countries and whether SARS' powers to gather information relating to cryptocurrency transactions are on par with those of BRICS countries* 17.

currencies can simply be defined as "a type of unregulated digital currency that is only available in electronic form."<sup>131</sup>

### 3.1.2.2 Bitcoin, Ethereum and Stablecoins

According to its white paper, Bitcoin is described as "a peer-to-peer electronic cash system".<sup>132</sup> This system is designed for electronic transactions that do not rely on trust and provide a great deal of privacy.<sup>133</sup> All that the public can see is that a transaction occurred between two persons.<sup>134</sup> Additionally, new key pairs should, where possible, be used in order to prevent transactions from being linked to a common owner.<sup>135</sup> It is the appeal of this privacy afforded by blockchain technology that led to what was known as "The Silk Road", an online black market.<sup>136</sup> It was in this online black market that Maximilian Schmidt, a German teenager, met someone who sold illegal drugs online.<sup>137</sup> In December 2013, after finding a drug supplier online, Maximilian's own website offering illegal drugs went live, and payment was acceptable only via Bitcoin.<sup>138</sup> When he was eventually caught in 2015, it is estimated that Maximilian was running a drug trade worth 3.8 million Euros<sup>139</sup> - a more than substantial amount for an illegal business being run by a teenager from his childhood bedroom.<sup>140</sup> Of all the Bitcoin wallets seized from Maximilian there are still two the police have not yet been able to access, despite Maximilian denying that there is any money in either of them.<sup>141</sup> What Maximilian did, despite it being illegal, is a prime example of how blockchain technology and cryptocurrencies can be used. However, not all blockchains and cryptocurrencies are only an "electronic cash

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<sup>131</sup> Frankenfield 2020 <https://www.investopedia.com/terms/v/virtual-currency.asp>.

<sup>132</sup> Bitcoin *Bitcoin: A Peer-to-Peer Electronic Cash System* 1.

<sup>133</sup> Bitcoin *Bitcoin: A Peer-to-Peer Electronic Cash System* 6, 8.

<sup>134</sup> Bitcoin *Bitcoin: A Peer-to-Peer Electronic Cash System* 6.

<sup>135</sup> Bitcoin *Bitcoin: A Peer-to-Peer Electronic Cash System* 6.

<sup>136</sup> Frankenfield 2021 <https://www.investopedia.com/terms/s/silk-road.asp>.

<sup>137</sup> Johnson 2021 <https://grimoiredujeu.com/where-is-the-ex-teen-drug-lord-today-shiny-flakes-update/>.

<sup>138</sup> Johnson 2021 <https://grimoiredujeu.com/where-is-the-ex-teen-drug-lord-today-shiny-flakes-update/>.

<sup>139</sup> Kavanagh 2021 <https://www.the-sun.com/news/3401552/who-shiny-flakes/>.

<sup>140</sup> Kavanagh 2021 <https://www.the-sun.com/news/3401552/who-shiny-flakes/>.

<sup>141</sup> Locker 2015 <https://www.vice.com/en/article/d7yzjy/germanys-most-notorious-darknet-drug-dealer-sentenced-to-only-7-years>.

system"<sup>142</sup> or "store of value"<sup>143</sup> resulting in the creation of other blockchains and cryptocurrencies, such as Ether, which runs on Ethereum's blockchain.

The cryptocurrency Ether (ETH) is the native token of the decentralised and open-source blockchain, with smart contract functionality, known as Ethereum.<sup>144</sup> Ethereum, as opposed to Bitcoin, does not just allow for the possibility of electronic payments due to the blockchain being programmable.<sup>145</sup> This programmability allows Ethereum to be more than a payment system. It would therefore be more correct to state that Ethereum is "a marketplace of financial services, games and apps that can't steal your data or censor you."<sup>146</sup> Ethereum does, however, also describe itself as "a technology that's home to digital money, global payments, and applications."<sup>147</sup> Ethereum is well-known for having the second biggest cryptocurrency (which powers Ethereum applications and contracts),<sup>148</sup> Decentralized Autonomous Organizations (DAO), Decentralised Applications (dApps), Decentralised Finance (DeFi) and most importantly, non-fungible tokens (NFTs).<sup>149</sup> Most non-fungible tokens out there today are part of the Ethereum blockchain, meaning that the non-fungible tokens are stored and traded on the Ethereum blockchain.<sup>150</sup> One way to buy non-fungible tokens would be to visit the digital marketplace *OpenSea*.<sup>151</sup> This marketplace operates on the Ethereum blockchain, therefore most non-fungible tokens on the market are sold only for Ethereum and not for any other fiat- or cryptocurrency.<sup>152</sup> Due to these non-fungible tokens mostly being available for purchase only with

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<sup>142</sup> Bitcoin *Bitcoin: A Peer-to-Peer Electronic Cash System* 1.

<sup>143</sup> Munster 2020 <https://medium.com/road-less-ventured/why-bitcoin-is-a-superior-store-of-value-e5464d5fd619>.

<sup>144</sup> Ethereum 2021 <https://ethereum.org/en/what-is-ethereum/>; Frankenfield 2021 <https://www.investopedia.com/terms/e/ethereum.asp>.

<sup>145</sup> Ethereum 2021 <https://ethereum.org/en/what-is-ethereum/>; Reiff 2020 <https://www.investopedia.com/articles/investing/031416/bitcoin-vs-ethereum-driven-different-purposes.asp#:~:text=Ethereum%20Basics&text=Launched%20in%20July%20of%202015,interference%20from%20a%20third%20party>.

<sup>146</sup> Ethereum 2021 <https://ethereum.org/en/what-is-ethereum/>.

<sup>147</sup> Ethereum 2021 <https://ethereum.org/en/>.

<sup>148</sup> Reiff 2020 <https://www.investopedia.com/articles/investing/031416/bitcoin-vs-ethereum-driven-different-purposes.asp>.

<sup>149</sup> Ethereum 2021 <https://ethereum.org/en/what-is-ethereum/>.

<sup>150</sup> Clark 2021 <https://www.theverge.com/22310188/nft-explainer-what-is-blockchain-crypto-art-faq>.

<sup>151</sup> McNamara 2021 <https://www.benzinga.com/money/how-to-buy-nfts/>.

<sup>152</sup> McNamara 2021 <https://www.benzinga.com/money/how-to-buy-nfts/>; See OpenSea 2021 <https://opensea.io/assets>.

Ethereum and the volatility associated with cryptocurrencies, as seen in price fluctuations, stablecoins were created.<sup>153</sup> Stablecoins were designed to stay at a more or less fixed value.<sup>154</sup> For example, the stablecoin known as "USD Coin (USDC)" is a type of cryptocurrency of which 1 USDC is always worth 1 USD.<sup>155</sup> USDC is seen to have a stable value, backed by fully reserved assets, powered by Ethereum, and it allows for global transactions.<sup>156</sup> An example of a stablecoin pegged to the price of the South African Rand is ZARP which is described as "the only bank-approved, fully backed, transparent, and audited stablecoin for the South African Rand".<sup>157</sup>

Taking the above into account, it can be logically deduced that non-fungible tokens need a blockchain to continue their function and existence. Cryptocurrencies (and hopefully fiat currency in the near future) are also needed to pay the purchase price and fees associated with non-fungible tokens that are found on blockchains.

### 3.1.2.3 The South African Revenue Service (SARS) and crypto assets

In the Explanatory Memorandum on the *Taxation Laws Amendment Bill, 2020* the word "cryptocurrencies" was replaced with "crypto assets" due to the need for a uniform definition that would fit into the South African regulatory framework.<sup>158</sup> So how does this small word influence South Africans that own crypto assets?

The first and most important influence is that the aforementioned Bill would make it illegal to transfer crypto assets abroad.<sup>159</sup> This will most likely change, depending on the rules being developed by the South African Reserve Bank (SARB).<sup>160</sup> The second influence is that crypto assets will need to be declared, following normal income tax rules or under the Capital Gains Tax (CGT) paradigm. Failure to do so may result in

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<sup>153</sup> Ethereum 2021 <https://ethereum.org/en/stablecoins/>.

<sup>154</sup> Ethereum 2021 <https://ethereum.org/en/stablecoins/>.

<sup>155</sup> Coinbase date unknown <https://www.coinbase.com/usdc>.

<sup>156</sup> Coinbase date unknown <https://www.coinbase.com/usdc>.

<sup>157</sup> Venox Digital Assets date unknown <https://www.zarp.cash/>.

<sup>158</sup> South African Revenue Service 2021 <https://www.sars.gov.za/individuals/crypto-assets-tax/>; South African Revenue Service *Explanatory Memorandum on the Taxation Laws Amendment Bill, 2020* 50.

<sup>159</sup> South African Revenue Service 2021 <https://www.sars.gov.za/individuals/crypto-assets-tax/>.

<sup>160</sup> South African Revenue Service 2021 <https://www.sars.gov.za/individuals/crypto-assets-tax/>.

interest and/or penalties having to be paid.<sup>161</sup> In order to trace these crypto asset transactions, the *Income Tax Act* 58 of 1962 grants SARS a wide range of collection powers which includes the right to request financial data from third-party service providers like *Binance*, *VALR* or *Luno*.<sup>162</sup>

### **3.2 Sources of Law**

I propose computer program code and real-world regulations as sources of law for non-fungible tokens. During my research I have found no other sources of law applicable to non-fungible tokens and can find no sources of law that might play a role in the foreseeable future. Seeing as most non-fungible tokens are part of the Ethereum blockchain,<sup>163</sup> the sources of law will be focussed on non-fungible tokens on the Ethereum blockchain only in order to maintain a logical flow of the argument in the following sections.

#### *3.2.1 Computer program code*

The first source of law for non-fungible tokens is the computer program code. The Ethereum blockchain does not confine itself to one specific programming language, but most people prefer to use *Solidity*<sup>164</sup> since it has the most advanced compiler.<sup>165</sup> *Solidity* is also the first and most popular language when writing smart contracts.<sup>166</sup> This is important because all non-fungible tokens on the Ethereum blockchain are powered by smart contracts.<sup>167</sup> So what exactly is a smart contract?

According to Ethereum, a smart contract is "a collection of code (functions) and data (its state) that resides at a specific address on the Ethereum blockchain."<sup>168</sup> An

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<sup>161</sup> South African Revenue Service 2021 <https://www.sars.gov.za/individuals/crypto-assets-tax/>.

<sup>162</sup> South African Revenue Service 2021 <https://www.sars.gov.za/individuals/crypto-assets-tax/>.

<sup>163</sup> Clark 2021 <https://www.theverge.com/22310188/nft-explainer-what-is-blockchain-crypto-art-faq>.

<sup>164</sup> "Solidity is a statically-typed curly-braces programming language designed for developing smart contracts that run on Ethereum". See Solidity date unknown <https://soliditylang.org/>.

<sup>165</sup> Gupta 2018 <https://www.freelancinggig.com/blog/2018/06/15/what-programming-language-is-ethereum-written-in/>.

<sup>166</sup> Gupta 2018 <https://www.freelancinggig.com/blog/2018/06/15/what-programming-language-is-ethereum-written-in/>; CoinMarketCap date unknown <https://coinmarketcap.com/alexandria/glossary/ethereum-virtual-machine-evm>.

<sup>167</sup> Ethereum 2021 <https://ethereum.org/en/nft/>.

<sup>168</sup> Ethereum 2021 <https://ethereum.org/en/developers/docs/smart-contracts/>.

example commonly used to explain this in the real world would be that of a vending machine.<sup>169</sup> An X amount of money is inserted into the vending machine, which act is then followed by the person selecting what he or she wishes to purchase, resulting in the product being dispensed if the correct amount of money was inserted into the vending machine.<sup>170</sup> This form of logic is programmed into the vending machine. Therefore, if the input is correct then the output is guaranteed.<sup>171</sup> It should be noted that smart contracts are a type of Ethereum account.<sup>172</sup> The first account type is an externally-owned account, which is controlled by the person in possession of the private key and these accounts can initiate transactions.<sup>173</sup> The second account type is a contract account, which is a smart contract that has been unalterably deployed on the blockchain and is controlled by code (meaning that the account can send a transaction only in response to receiving a transaction).<sup>174</sup> These contract accounts also use storage space on the network and therefore cost a certain amount to create.<sup>175</sup> The network storage space is used since it is necessary for each smart contract to state the specific unique identity of the non-fungible token, the address of the owner of the non-fungible token, and lastly any other data or information relating to the non-fungible token and/or smart contract.<sup>176</sup> All of this metadata<sup>177</sup> can be stored either on-chain or off-chain.<sup>178</sup> On-chain storage occurs when the metadata of the non-fungible token can be found in the smart contract itself, thus allowing the smart contract to be modified whilst also allowing it to exist permanently.<sup>179</sup> Off-chain storage occurs when the metadata associated with a non-fungible token is not stored on the blockchain, but instead is stored either on

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<sup>169</sup> Ethereum 2021 <https://ethereum.org/en/developers/docs/smart-contracts/>.

<sup>170</sup> "money + snack selection = snack dispensed". See Ethereum 2021 <https://ethereum.org/en/developers/docs/smart-contracts/>.

<sup>171</sup> Ethereum 2021 <https://ethereum.org/en/developers/docs/smart-contracts/>.

<sup>172</sup> Ethereum 2021 <https://ethereum.org/en/developers/docs/accounts/>.

<sup>173</sup> Ethereum 2021 <https://ethereum.org/en/developers/docs/accounts/>.

<sup>174</sup> Ethereum 2021 <https://ethereum.org/en/developers/docs/accounts/>; Tipotsch 2021 <https://www.schoenherr.eu/content/formulating-a-smart-contract-and-minting-an-nft/>.

<sup>175</sup> Ethereum 2021 <https://ethereum.org/en/developers/docs/accounts/>.

<sup>176</sup> Tipotsch 2021 <https://www.schoenherr.eu/content/formulating-a-smart-contract-and-minting-an-nft/>.

<sup>177</sup> Metadata is "data that provides information about other data". See Merriam-Webster date unknown <https://www.merriam-webster.com/dictionary/metadata>.

<sup>178</sup> NFT Review 2021 <https://nft-review.com/on-chain-vs-off-chain-metadata/>.

<sup>179</sup> NFT Review 2021 <https://nft-review.com/on-chain-vs-off-chain-metadata/>.

centralised servers or on an InterPlanetary File System (IPFS).<sup>180</sup> Should the metadata be stored on a centralised server then the owner of the non-fungible token runs the risk of losing the metadata if the centralised server goes offline.<sup>181</sup> Compared with an IPFS, which is a peer-to-peer file storage system, the metadata will continue to persist if at least one of the nodes on the network is hosting.<sup>182</sup> This would mean that an IPFS is decentralised and possibly the safest option in most situations.

For an Ethereum smart contract to support non-fungible tokens it becomes necessary for the smart contract to meet the ERC-721 or ERC-1155 standard, which specifies the requirements for the code contract in order for it to be managed.<sup>183</sup> Therefore, the smart contract governs the non-fungible token since it indicates what is being represented, how it may be transferred, how royalties associated with the non-fungible token will work, and many more additional terms (depending on what the person creating the non-fungible token would like to add).<sup>184</sup>

With smart contracts and their relation to non-fungible tokens being explained, all that remains to be discussed in this section is whether or not these smart contracts actually qualify as contracts. There are five requirements that need to be met for a valid contract to exist in South Africa. These are consensus, contractual capacity, legality, physical possibility and certainty, and lastly the formalities.<sup>185</sup> For the consensus requirement to be met both parties must have corresponding intentions to conclude the specific contract, with both real and ostensible consensus being accepted.<sup>186</sup> The contractual capacity requirement is rather straightforward, but note that it will differ depending on jurisdiction.<sup>187</sup> The legality requirement simply requires that the contract is not contrary to common law, statutory law, public policy

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<sup>180</sup> NFT Review 2021 <https://nft-review.com/on-chain-vs-off-chain-metadata/>.

<sup>181</sup> NFT Review 2021 <https://nft-review.com/on-chain-vs-off-chain-metadata/>.

<sup>182</sup> NFT Review 2021 <https://nft-review.com/on-chain-vs-off-chain-metadata/>.

<sup>183</sup> Grasso date unknown <https://medium.com/geekculture/nfts-what-how-and-why-c9f5fa188056>.

<sup>184</sup> Norton Rose Fulbright 2021 <https://www.nortonrosefulbright.com/en/knowledge/publications/5995f99d/anatomy-of-an-nft>.

<sup>185</sup> Otto and Kuschke "General Principles of the Law of Contract" 43.

<sup>186</sup> Otto and Kuschke "General Principles of the Law of Contract" 43.

<sup>187</sup> For example, in South Africa children under seven years of age have no contractual capacity. See Otto and Kuschke "General Principles of the Law of Contract" 79.

or even good morals.<sup>188</sup> For the physical possibility and certainty requirement to be met it is necessary that performance must be delivered (as stated in the contract), the performance must be determined or determinable at the time when the contract is concluded and performance must be objectively possible.<sup>189</sup> For the formalities requirement to be met it is only necessary for the contract to comply with any and all formalities prescribed by the law applicable for that specific kind of contract.<sup>190</sup> I can see no reason why smart contracts would not be able to meet all of these requirements. With the latter being said, it should be noted that this would mean that the *caveat subscriptor* rule<sup>191</sup> finds application in smart contracts (unless a party has been misled regarding the terms of the contract or if the contract contains unreasonable terms).<sup>192</sup>

### *3.2.2 Real-world regulations*

Despite most non-fungible tokens not having a physical existence, these tokens are still required to conform to real-world regulations. These real-world regulations will mainly be focussed on cyber law, property law and the law of contract. Other areas of focus include intellectual property rights, consumer protection, how best to deal with virtual land and the available remedies for any infringements of the above.

### **3.3 Non-Fungible Tokens and Ownership**

It seems *prima facie* that the ownership of a non-fungible token is easily provable. Whether the virtual property represented by the non-fungible token is stored on-chain or off-chain, anyone specified by the access policy of the blockchain can simply take a look at the ledger to see which wallet (which contains specific public addresses) is associated with the smart contract address of the non-fungible token.

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<sup>188</sup> Otto and Kuschke "General Principles of the Law of Contract" 43.

<sup>189</sup> Otto and Kuschke "General Principles of the Law of Contract" 43.

<sup>190</sup> Otto and Kuschke "General Principles of the Law of Contract" 43.

<sup>191</sup> The *caveat subscriptor* rule states that "a person who signs a contract is bound to all of the terms contained therein, even if he or she did not read them or intended to be bound by them, unless the other party misled the person regarding the terms or the document contains unreasonable terms." See The Law Reviews 2021 <https://thelawreviews.co.uk/title/the-complex-commercial-litigation-law-review/south-africa>.

<sup>192</sup> The Law Reviews 2021 <https://thelawreviews.co.uk/title/the-complex-commercial-litigation-law-review/south-africa>.

This creates the underlying assumption that the owner of a wallet is also the owner of whatever virtual property is stored therein. This assumption is based on the fact that each wallet has only one owner who has exclusive use and possession of the virtual property, or part thereof, inside. However, this assumption fails to take into account the possibility of human error. It often occurs that people make mistakes (such as sending cryptocurrency or non-fungible tokens to the wrong address), but losing the exclusive use and possession of property does not automatically classify the property as a *res derelictae*<sup>193</sup> since the property was never voluntarily abandoned.<sup>194</sup>

I therefore propose that the ownership of non-fungible tokens be approached as follows. It is necessary to accept that the owner of the wallet is the owner of everything contained therein. This assumption is based on the *nemo dat quod non habet* rule<sup>195</sup> and is necessary for the ordinary course of business. If a dispute arises over the ownership of a non-fungible token then the burden of proof lies with the plaintiff, who would need to prove that the non-fungible token was transferred from the wallet of the plaintiff to the wallet of the defendant and that the plaintiff had no intention to relinquish ownership of the non-fungible token.<sup>196</sup> Note that this can happen only if the plaintiff can identify the defendant. If a non-fungible token is sent to a public address (a wallet), the owner of which is not identifiable, then ownership should be assumed to be either lost or relinquished. The justification for this is based on the fact that it is impossible to sue a public address. The defendant needs to be a natural or a juristic person and if the required details to institute an action are not met, then no action can be instituted.

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<sup>193</sup> *Res derelictae* translates to "abandoned property". See Legistify date unknown <https://www.legistify.com/glossary/res-derelicta/>.

<sup>194</sup> Erlank *Property in Virtual Worlds* 243-244.

<sup>195</sup> The *nemo dat quod non habet* rule is a legal principle meaning that "no one can give what they do not have". See Makela date unknown <https://www.armstronglegal.com.au/commercial-law/the-nemo-dat-rule/>.

<sup>196</sup> The plaintiff would need to prove that the non-fungible token is a *res deperditae* (since the owner still has the intention of owning the property, despite losing physical control thereof, which would, if proven, not allow other parties to acquire the said property by means of appropriation). See Erlank *Property in Virtual Worlds* 243-244.

For the rest of this section we will look at the remedial possibilities that may arise out of the following scenario: A has a non-fungible token worth R5 000 which he wishes to transfer to the wallet of B to extinguish existing debt of the same amount. A mistakenly transfers the non-fungible token to the public address of user C (since A mistakenly believes that the wallet is that of B and not C). That same day C sells the non-fungible token (which was mistakenly received from A) to Y for the amount of R4 000.<sup>197</sup>

### 3.3.1 *Rei vindicatio*

When a *res aliena* is sold, the conclusion of a valid contract of sale is not effected and, according to the common law, the true owner may claim his or her property with a vindicatory action known as the *rei vindicatio*.<sup>198</sup> It is important to note that the true owner can claim the property from the buyer only if the buyer bought the *res aliena* and still has the property in possession.<sup>199</sup> This means that if the property has already been sold again, then the true owner cannot claim the value from the buyer, but if the buyer made it impossible (either intentionally or negligently) for the owner to reclaim the property then it would be possible to claim the value of the property from the buyer.<sup>200</sup> The *rei vindicatio* has three requirements that need to be proven for the claim to succeed. Firstly, the plaintiff would need to provide proof of ownership of the property in question. Secondly, the property must exist and be identifiable. Thirdly, when the action is instituted the defendant must be in physical control of the property.<sup>201</sup>

In the scenario set out above, the non-fungible token of A is now in the possession of Y. If A does not know the identity of Y then ownership is assumed to be either lost or relinquished and the *rei vindicatio* can thus not be instituted, because there is not enough information about Y to institute the action. On the other hand, if A does

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<sup>197</sup> Note that, for the purpose of this example, all of the parties are South African citizens, thus excluding jurisdiction-related issues.

<sup>198</sup> Lötz "Purchase and Sale" 198.

<sup>199</sup> Lötz "Purchase and Sale" 198-199.

<sup>200</sup> Lötz "Purchase and Sale" 198-199; *Alderson & Flitton (Tzaneen) (Pty) Ltd v EG Duffeys Spares (Pty) Ltd* 1975 (3) SA 41 (T) (hereafter *Alderson & Flitton (Tzaneen) (Pty) Ltd v EG Duffeys Spares (Pty) Ltd*).

<sup>201</sup> *Jonker v Thiebaut* (1116/2018) [2019] ZANHC 16 para 14.

know Y, then A needs to fulfil the three requirements of the *rei vindicatio* action. The first requirement can be somewhat difficult to prove due to the assumption that the person who has access to the wallet in which the non-fungible token lies is assumed to be the owner of whatever is inside. This would mean that Y is the *prima facie* owner of the non-fungible token. A would therefore need to download the ledger and prove that the non-fungible token in question was mistakenly sent from his wallet to the wallet of C, who then sold it to Y.<sup>202</sup> This, however, only proves exclusive use and possession (which is coupled with the assumption of ownership) making the following difficult: A would need to convince the court that there was no intent to relinquish ownership and that it was merely a mistake, and that therefore C did not have the legal right to transfer the non-fungible token to Y.<sup>203</sup> If there is no evidence to suggest otherwise and the court accepts the argument of A, then ownership would be granted to A, which fulfils the first requirement.

The second requirement would be the easiest to fulfil due to the inherent nature of non-fungible tokens. When dealing with non-fungible tokens in which the metadata is stored on-chain, then existence and identification are two sides of the same coin – prove either and the other will be proven by default. The reason for this is that each non-fungible token is uniquely stored and identified on the blockchain network, so if the non-fungible token is identified on the blockchain then existence is automatically proven by default. The only way in which this requirement can fail is if the metadata of the non-fungible token were stored off-chain and then lost or destroyed forever. To fulfil these requirements A would need to prove only that the non-fungible token, which is in the possession of Y, was indeed the non-fungible token which was previously in the possession of A. The non-fungible token and its associated metadata must also still exist. If the metadata of the non-fungible token is stored on-chain, then A would simply need to download the ledger and show how the uniquely identifiable non-fungible token was sent from A to C and then to Y. This would result

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<sup>202</sup> This would not be difficult since everyone can view the ledger.

<sup>203</sup> This is an example of the *nemo dat quod non habet* rule: the plaintiff would need to prove that the non-fungible token is a *res deperditae* (since the owner still has the intention of owning the property, despite losing physical control thereof, which would if proven not allow other parties to acquire the said property by means of appropriation). See Erlank *Property in Virtual Worlds* 243-244.

in the existence and identification requirement being fulfilled. If the metadata is stored off-chain then identification would not be a problem, but the need to prove the existence of the virtual property itself might lead to some problems.<sup>204</sup> Identification can easily be done via *Etherscan*, since this tool allows users to view transactional data on the Ethereum blockchain (assuming that the non-fungible token in question was created on the Ethereum blockchain).<sup>205</sup>

Satisfying the third requirement could be either a very simple or a complex task, and another theoretical approach of my own will be formulated as to how this might best be dealt with. As previously stated, the owner of the wallet (in which the non-fungible token is kept) has exclusive use and possession of whatever is inside. Logically this proves physical control and fulfils the third requirement, but what if the owner of the wallet cannot access his own wallet? It often happens that people forget or lose their private keys,<sup>206</sup> which results in them not being able to access the wallet and the content contained therein. Due to the decentralised nature of most blockchain networks, especially Ethereum, in which most non-fungible tokens are stored and traded, it is not possible to recover a private key.<sup>207</sup> The private key is generated only once, after which the owner of the wallet has sole responsibility for the safekeeping thereof. There is no "forgot your password?" option because the private key is never stored centrally. The assumption should thus be made that if a private key is lost, then ownership of the wallet (including all contained therein) is relinquished. As the virtual property represented by the non-fungible token is not destroyed, the property should be regarded as *res extra commercium*.<sup>208</sup> If ownership is relinquished due to not having access, it is only logical to deduce that

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<sup>204</sup> This is because identification will always be available on the blockchain, but the virtual property may not be permanently stored on the blockchain, which allows for the possibility of it being deleted and not existing anymore.

<sup>205</sup> Collins 2021 <https://help.foundation.app/en/articles/5212594-what-is-etherscan-and-how-do-i-use-it>.

<sup>206</sup> A private key can be compared to a password which is required to access a wallet and the content contained therein.

<sup>207</sup> Etherscan Information Center 2019 <https://info.etherscan.com/lost-private-key/>.

<sup>208</sup> *Res extra commercium* may be defined as "not subject to private ownership or acquisition". See Merriam-Webster date unknown <https://www.merriam-webster.com/dictionary/extra%20commercium>.

possession falls away by default when considering the newfound *res extra commercium* status allocated to the said property.

In the scenario, A would need to prove that the non-fungible token lies in a wallet which is associated with Y. If all the requirements were fulfilled, Y would be ordered by the court to return the non-fungible token to A. Note that only Y has access to the wallet in which the non-fungible token lies. This means that only Y can do the transfer. Should Y refuse to do the transfer, however, then Y would be in contempt of the court, to which a fine or jail time might be imposed upon Y.<sup>209</sup> The latter situation is relatively simple, but fails to take into account the situation if Y lost his private key, rendering it impossible to return the non-fungible token (even if Y wanted to). If this were indeed the situation it is proposed that the assumption be used that Y relinquished the ownership of the wallet and everything contained therein, which would result in A having lost the non-fungible token. This is contradictory to the precedent set in *Alderson & Flitton (Tzaneen) (Pty) Ltd v EG Duffeys Spares (Pty) Ltd* in which the true owner would be able to claim the value of the property if the buyer made it impossible (either intentionally or negligently) for the true owner to reclaim his or her property. Note that it is not being proposed to go against the set precedent, but the base assumption is used throughout in order to create a sense of legal certainty for the purpose of this dissertation. It would be the court that would have to decide either to follow the assumption and conclude that Y is not the owner of the wallet anymore or to decide that Y was negligent and A (the true owner) can claim the value of the non-fungible token from Y. A final problem then arises which makes this eventuality rather complex. Y has the option to lie about having access to the wallet in which the non-fungible token is kept. As only Y has the private key to access the wallet in which the non-fungible token is kept, only Y has the ability to prove exclusive use and access of the wallet and what is contained therein. If Y therefore simply lies about the statement of the material fact, the third requirement of the *rei vindicatio* would not be fulfilled and A would not be able to institute the action.

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<sup>209</sup> Section 106 of the *Magistrates' Court Act* 32 of 1994.

It would seem that the *rei vindicatio* is rather useless if all it takes to stop the action is simply a false statement of fact, since it would be impossible to prove otherwise unless a transaction from the wallet in question happened after the date from which the defendant alleged that he or she could not access the wallet in which the property wanting to be claimed was kept, whilst the court case was still ongoing. To prove this, the plaintiff would need to download the updated ledger regularly to see if any activity had been initiated from that specific wallet.<sup>210</sup> If this evidence were collected, the possibility would arise that the defendant was guilty of fraud. The question would then arise whether it was cyber fraud or fraud in the common law sense. Section 8 of the *Cybercrimes Act* sets out the offence of cyber fraud as follows:

Any person who unlawfully and with the intention to defraud makes a misrepresentation (a) by means of data or a computer program; or (b) through any interference with data or a computer program as contemplated in section 5(2)(a), (b) or (e) or interference with a computer data storage medium or a computer system as contemplated in section 6(2)(a), which causes actual or potential prejudice to another person, is guilty of the offence of cyber fraud.

With regard to the scenario set out above it seems that the fraudulent statement would never be made by means of data or a computer program, nor would it be made through any interference with data or a computer program, a data storage medium or a computer system. The conduct of Y would therefore not qualify as cyber fraud, which leaves only fraud in the common law sense as an alternative which might be proven. Fraud, in the common law sense, has the five following requirements. Firstly, the defendant needs to have given a false statement of a material fact. Secondly, the defendant must have known that the statement was untrue. Thirdly, the defendant needed to have the intent to deceive the plaintiff. Fourthly, there needed to have been justifiable reliance by the plaintiff on the false statement provided by the defendant. Lastly, the plaintiff had to have suffered injury as a result.<sup>211</sup>

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<sup>210</sup> This can easily be done by an automated program.

<sup>211</sup> *S v Nkala* (20170040) [2017] ZAECGHC 51.

The first requirement is easily provable by simply downloading the updated ledger which shows that activity was initiated from the wallet of the defendant who claimed not to have the ability to initiate such action. The second requirement is not very complex but could be rather lengthy. If the defendant admits to knowing that the statement is untrue then this requirement is fulfilled, but if this is denied then the only way to prove this would be to see if any activity was initiated out of the wallet in question whilst the court case was still ongoing. This would provide *prima facie* proof that the defendant did indeed know that the statement was untrue. Should the defendant only later recover the missing private key needed to access and use the wallet, then this requirement would be fulfilled only if the defendant does not declare the new facts and return the property to the defendant as rightful owner. The third requirement needed is intent on the part of the defendant to deceive the plaintiff. This is mostly proved by circumstantial evidence, which falls outside the scope of this dissertation. The fourth requirement would most likely be proven by default due to the fact that both the court and the plaintiff have no other choice but to rely on the false statement of the defendant, unless there is evidence (such as initiated activity out of the wallet) to prove that the plaintiff knew about the false statement and decided to rely on it anyway. The fifth requirement is easily provable by simply comparing the current position of the plaintiff with the position the plaintiff would have been in if not for the fraudulent conduct of the defendant. Non-fungible tokens qualify as property, which inherently gives them value. Therefore, if a non-fungible token is fraudulently deemed to be lost, then the worth of the non-fungible token would be the injury suffered by the plaintiff.

Should the *rei vindicatio* fail, it seems that there would still be a possibility of proving fraudulent conduct from which judicial relief might be obtained by the defendant.<sup>212</sup>

### *3.3.2 Delictual claim*

In the event that Y was either a *bona fide* possessor or the information required of Y was insufficient to institute action, then it would not be possible for A to institute a

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<sup>212</sup> The judicial relief resulting from the fraudulent conduct will not be discussed since it falls outside the scope of this dissertation.

delictual claim against Y.<sup>213</sup> Should Y be an identifiable *mala fide* possessor who was no longer in possession of the *res aliena*, then it would be possible to institute the *actio legis aquiliae*<sup>214</sup> to claim patrimonial or financial loss.<sup>215</sup> In the event that C was also a *mala fide* possessor who acted in bad faith by selling the *res* to Y, the same *actio legis aquiliae* might also be instituted against C.<sup>216</sup> Note that the patrimonial or financial loss would be the amount of the actual loss.<sup>217</sup> For the sake of simplification it is only the requirements of the *actio legis aquiliae* against C which will be discussed. These requirements are as follows: conduct, wrongfulness, fault, causation and harm.<sup>218</sup>

The first requirement necessary to prove would be conduct. Seeing as non-fungible tokens are easily identifiable, all that would be necessary would be for A to download the ledger and indicate that the non-fungible token belonging to A was sent from the wallet of C to the wallet of Y. This would imply conduct due to a wallet belonging to only one person, which would render the first requirement complete. The second requirement of wrongfulness would be a little harder to answer with absolute certainty. Should C have thought that he was indeed the owner of the non-fungible token, then it would be possible that C had acted in a *bona fide* manner, which would not fulfil the requirement of wrongfulness. Should C, however, have known that the non-fungible token was not his, then the sale thereof would have been wrongful. Note that the wrongfulness of the sale does not render the contract of sale invalid and in certain situations this will allow for the possibility of estoppel to be instituted as a defence from the side of Y.<sup>219</sup> Whether the conduct of C is wrongful or not would need to be determined by the honourable court, and the reasonable man test would need to be applied.<sup>220</sup> The third requirement would be fault, which would

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<sup>213</sup> This is because the requirements of the *actio legis aquiliae* would not be fulfilled. See below.

<sup>214</sup> This is a general delictual action.

<sup>215</sup> Lötz "Purchase and Sale" 199.

<sup>216</sup> Lötz "Purchase and Sale" 199.

<sup>217</sup> For example: In the scenario the non-fungible token is worth R5000. Therefore, A can claim a maximum amount of only R5000. A cannot claim R5000 from C and another R5000 from Y.

<sup>218</sup> See Neethling and Potgieter *Deliktereg* 27-269.

<sup>219</sup> Lötz "Purchase and Sale" 196.

<sup>220</sup> Neethling and Potgieter *Deliktereg* 35.

need to be proven in the form of either intent or negligence.<sup>221</sup> The fourth requirement of causation would require a causal link to be proven. This could easily be done by downloading the ledger and indicating the possession of the non-fungible token in question. Doing this should sufficiently establish a causal link. The fifth and final requirement is that of harm (*damnum*), which could be quite difficult to ascertain due to the volatility associated with non-fungible tokens.

The South African courts have two ways of determining harm: the *sommeskadeleer* and a concrete method of comparison.<sup>222</sup> The *sommeskadeleer* takes into account the position of the plaintiff after the delict occurred and compares that position to that in which the plaintiff would have been in if the delict had not been committed.<sup>223</sup> This method of determining harm takes into account the possibility of future harm (*lucrum cessans*).<sup>224</sup> The other method of determining harm is the concrete method of comparison, in which the position of the plaintiff before the delict is compared with the position of the plaintiff after the delict.<sup>225</sup> It is proposed that this concrete method of comparison should be followed, unless a situation arises in which a hypothetical element is necessary (such as determining future harm).<sup>226</sup> In the scenario consistently used thus far it seems that it is the *sommeskadeleer*-method which will be used to determine the harm A suffered. As a general rule, the date on which the delict had been committed is the earliest date from which all the elements of a delict had been fulfilled.<sup>227</sup> This would mean that when C sold the non-fungible token to Y, the harm would be calculated at the market value for the non-fungible token at that time.<sup>228</sup> For example, if A mistakenly sent the non-fungible token to C whilst it had a market value of R5000 and C then sold this same non-fungible token to Y a day later for the market value of R6000, then the harm suffered by A would be the quantum totalling R6000.

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<sup>221</sup> This requirement does not contribute to the dissertation in any necessary way and will thus not be discussed in depth.

<sup>222</sup> Neethling and Potgieter *Deliktereg* 237-238.

<sup>223</sup> Neethling and Potgieter *Deliktereg* 237-238.

<sup>224</sup> Neethling and Potgieter *Deliktereg* 238.

<sup>225</sup> Neethling and Potgieter *Deliktereg* 238.

<sup>226</sup> Neethling and Potgieter *Deliktereg* 238.

<sup>227</sup> Neethling and Potgieter *Deliktereg* 239.

<sup>228</sup> Neethling and Potgieter *Deliktereg* 253.

In conclusion, if it is not possible to reclaim the property with the *rei vindicatio* then the option of instituting a delictual claim is available, and the discussion above is thought to present a fair template of how it might be approached.

### 3.3.3 Unjustified enrichment

In the event that it is impossible to institute the *rei vindicatio* (for example, when the property is lost) or in the event that a delictual claim will not succeed, it seems that an unjust enrichment action might just provide some, if not all, remedial relief. For simplification purposes it is only the enrichment action against C that will be discussed below. For an unjust enrichment action to succeed there are four requirements that need to be met: the defendant must be enriched, the plaintiff must be impoverished, the enrichment of the defendant must be at the expense of the plaintiff, and lastly the enrichment must be unjustified (*sine causa*).<sup>229</sup>

The enrichment of the defendant is determined in the same way as in the concrete method of comparison, since the position of the defendant after the alleged enrichment is compared to the defendant's position before the alleged enrichment had occurred.<sup>230</sup> It therefore makes sense that the liability of the defendant is limited to the actual enrichment at the time at which the enrichment action is instituted.<sup>231</sup> With the enrichment being determined, the next requirement would be to determine the impoverishment of the plaintiff, as this will be used to determine the quantum which the plaintiff can claim.<sup>232</sup> The quantum of the claim will then either be the amount the plaintiff was impoverished by or it will be the amount by which the defendant has been enriched – whichever is lesser.<sup>233</sup> The third requirement can be satisfied by indicating a causal link between the enrichment and the impoverishment, since showing that the plaintiff was impoverished and the defendant enriched is not sufficient.<sup>234</sup> For the last requirement it needs to be proven that no sufficient ground

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<sup>229</sup> Brand and Lotz 2005 *LAWSA* 209.

<sup>230</sup> Brand and Lotz 2005 *LAWSA* 209; Neethling and Potgieter *Deliktereg* 238.

<sup>231</sup> Brand and Lotz 2005 *LAWSA* 209.

<sup>232</sup> Brand and Lotz 2005 *LAWSA* 209.

<sup>233</sup> Brand and Lotz 2005 *LAWSA* 209.

<sup>234</sup> Brand and Lotz 2005 *LAWSA* 209.

recognised by law exists which would justify the transfer of value from the plaintiff's estate to that of the defendant.<sup>235</sup>

In terms of the above example, the correct enrichment action to institute would be the *condictio indebiti*. The *condictio indebiti* has the object to "recover money or other property transferred in intended payment or performance of a non-existent debt".<sup>236</sup> This action does, however, have the following requirements. The first requirement is that the ownership of the money or property had to have been transferred by an act of the parties.<sup>237</sup> The second requirement is that the action lies only against the true recipient of the debt not owed.<sup>238</sup> The third requirement is that according to the law, which will indicate the true transferee, the plaintiff must have been the one to make the payment.<sup>239</sup> The fourth requirement demands the transfer of ownership of either money or property to have been made unduly in the widest sense, meaning that no legal or natural obligation existed to give it.<sup>240</sup> The fifth requirement is that of *solvendi animo per errorem*, which simply means that the payment or transfer must have been done under the mistaken belief that it was indeed due.<sup>241</sup> Lastly, if a mistake of fact or law gave rise to this action, then said mistake must be excusable.<sup>242</sup>

With the example fulfilling all of the requirements set out by the action, it becomes necessary to discuss the extent of the defendant's liability. Out of principle, the defendant should restore that which was transferred itself, unless the thing transferred is considered a *res fungibiles* allowing the defendant to transfer an equivalent quantity of the said thing.<sup>243</sup> As this dissertation is about non-fungible tokens, the thing itself will always have to be transferred. Should the thing itself not be able to be restored to the transferee, then the value thereof may be recovered

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<sup>235</sup> Brand and Lotz 2005 *LAWSA* 209.

<sup>236</sup> Brand and Lotz 2005 *LAWSA* 211.

<sup>237</sup> Brand and Lotz 2005 *LAWSA* 212.

<sup>238</sup> Brand and Lotz 2005 *LAWSA* 212.

<sup>239</sup> Brand and Lotz 2005 *LAWSA* 212.

<sup>240</sup> Brand and Lotz 2005 *LAWSA* 212.

<sup>241</sup> Brand and Lotz 2005 *LAWSA* 212.

<sup>242</sup> Brand and Lotz 2005 *LAWSA* 212.

<sup>243</sup> Brand and Lotz 2005 *LAWSA* 213.

from the recipient.<sup>244</sup> It is important to note that this value is the lesser amount between the enrichment of the defendant and the impoverishment of the plaintiff.<sup>245</sup>

### ***3.4 Non-Fungible Tokens and Intellectual Property***

The recognition of authorship and the protection of intellectual property are such age-old concepts that even the Romans had the Latin word *plagiarius* (translating as "kidnapper") for when a person copies the work of another.<sup>246</sup>

#### *3.4.1 The nature of copyright law*

As a starting point it should be noted that copyright law is part of the category of subjective rights, causing it to be distinct from real, personal and personality rights.<sup>247</sup> Section 22(1) of the *Copyright Act* 98 of 1978 (hereafter the *Copyright Act*) also categorises the copyright as moveable property, thus making it transmissible.<sup>248</sup> Pistorius states five characteristics of copyright law in order to conclude the nature thereof. These will be discussed in detail below.<sup>249</sup>

##### 3.4.1.1 Territorial in nature

With copyright being territorial in nature, there can be no international standard protecting work all around the world.<sup>250</sup> Nevertheless, various movement for international copyright protection have been created with the *Association Littéraire et Artistique Internationale*, a nongovernment organisation formed in Paris, being the most familiar, since this organisation created what is currently known as the *Berne Convention for the Protection of Literary and Artistic Works* (hereafter the *Berne Convention*).<sup>251</sup>

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<sup>244</sup> Brand and Lotz 2005 *LAWSA* 213.

<sup>245</sup> Brand and Lotz 2005 *LAWSA* 209.

<sup>246</sup> Pistorius "Copyright law" 177.

<sup>247</sup> Pistorius "Copyright law" 179.

<sup>248</sup> Pistorius "Copyright law" 179.

<sup>249</sup> Pistorius "Copyright law" 179-181.

<sup>250</sup> STOPfakes 2018 <https://www.stopfakes.gov/article?id=Is-My-Copyright-Good-in-Other-Countries>.

<sup>251</sup> Anon date unknown <https://law.jrank.org/pages/5738/Copyright-International-History-Berne-Convention.html>.

The *Berne Convention*, which has the aim of protecting the works and rights of authors, is based on the following four principles. Firstly, as seen in article 5(1) of the *Berne Convention*, there is the "national treatment" principle.<sup>252</sup> According to this principle, an author with work originating from a contracting state will enjoy the same protection that nationals would in all other contracting states.<sup>253</sup> Secondly, as seen in article 5(2) of the *Berne Convention*, there is the "automatic protection" principle, in which both the enjoyment and the exercise of an author's rights are not subject to any formalities, but the extent of the protection and redress afforded to the author is governed exclusively by the laws of the country in which the protection is claimed.<sup>254</sup> Thirdly, there is the "independence of protection" principle, in which the existence of protection for the work in the country of origin is independent of the protection offered by the *Berne Convention*.<sup>255</sup> Fourthly, the reservation principle allows ratifying countries to make reservations.<sup>256</sup>

Note that in *Gallo Africa Ltd v Sting Music (Pty) Ltd*<sup>257</sup> it was concluded that the principle of territoriality applies to both registered and unregistered rights. Thus, this principle will apply to rights on copy.<sup>258</sup> It is also informative to note that South Africa, the Netherlands, the United States of America and Japan are signatories to the *Berne Convention*.<sup>259</sup>

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<sup>252</sup> Pistorius "Copyright law" 186; A 5(1) of the *Berne Convention*; World Intellectual Property Organization date unknown [https://www.wipo.int/treaties/en/ip/berne/summary\\_berne.html](https://www.wipo.int/treaties/en/ip/berne/summary_berne.html).

<sup>253</sup> Pistorius "Copyright law" 186; World Intellectual Property Organization date unknown [https://www.wipo.int/treaties/en/ip/berne/summary\\_berne.html](https://www.wipo.int/treaties/en/ip/berne/summary_berne.html).

<sup>254</sup> Pistorius "Copyright law" 186; A 5(2) of the *Berne Convention*; World Intellectual Property Organization date unknown [https://www.wipo.int/treaties/en/ip/berne/summary\\_berne.html](https://www.wipo.int/treaties/en/ip/berne/summary_berne.html).

<sup>255</sup> Pistorius "Copyright law" 186; World Intellectual Property Organization date unknown [https://www.wipo.int/treaties/en/ip/berne/summary\\_berne.html](https://www.wipo.int/treaties/en/ip/berne/summary_berne.html).

<sup>256</sup> Pistorius "Copyright law" 186.

<sup>257</sup> *Gallo Africa Ltd v Sting Music (Pty) Ltd* 1103 JOC (A) 1108 (hereafter *Gallo Africa Ltd v Sting Music (Pty) Ltd*).

<sup>258</sup> Pistorius "Copyright law" 179; *Gallo Africa Ltd v Sting Music (Pty) Ltd* para 17.

<sup>259</sup> Legal Service India 2021 <http://www.legalserviceindia.com/copyright/bern.htm>.

#### 3.4.1.2 A negative right

The reason why copyright is regarded as a negative right is due to these rights being "rights to stop others doing certain things", as stated by Cornish, Llewelyn and Aplin.<sup>260</sup>

#### 3.4.1.3 A bundle of rights

It is the author's economic and moral rights that are protected by copyright – thus, they are seen as a bundle of rights.<sup>261</sup> The economic rights refer to the monetary gain the author may receive in respect of the work created and that the author is able to exclude others from the monetary gain and exploitation of the work if they are not authorised to do so.<sup>262</sup> Moral rights are seen to include the author's right to be identified as the author and the right to object should the author's work treated in a derogatory manner.<sup>263</sup> An example of this is Matt Furie, the author of the "Pepe the Frog" meme, who won a \$15 000 settlement against Alex Jones, a well-known radio show host, after Alex Jones used the anthropomorphic frog in far-right imagery.<sup>264</sup> It should be noted that moral rights are non-transferrable<sup>265</sup> and that the duration thereof is limited to the death of the longest surviving author.<sup>266</sup>

#### 3.4.1.4 Protects material expressions rather than ideas underlying the work

The objective of copyright is to protect both the idea of the work and the form in which the work is expressed, but the work needs to be expressed in a material form before this objective may be achieved.<sup>267</sup> An idea in itself is therefore not copyright

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<sup>260</sup> Pistorius "Copyright law" 179; Cornish, Llewelyn and Aplin *Intellectual Property: Patents, Copyright, Trade Marks and Allied Rights* 1-4.

<sup>261</sup> Pistorius "Copyright law" 180.

<sup>262</sup> Pistorius "Copyright law" 180.

<sup>263</sup> Pistorius "Copyright law" 180.

<sup>264</sup> Swinyard 2019 <https://www.theguardian.com/books/2019/jun/13/pepe-the-frog-creator-wins-15000-settlement-against-infowars>.

<sup>265</sup> Pistorius "Copyright law" 254.

<sup>266</sup> Pistorius "Copyright law" 229; Section 20(1) of the *Copyright Act*.

<sup>267</sup> Pistorius "Copyright law" 180-181.

protected and any expression of the ideas does not grant the author a monopoly over them.<sup>268</sup>

#### 3.4.1.5 An exclusive right of limited duration (subject to exceptions and limitations)

The right to exploit work is exclusive to the copyright owner and the work done by the author results in the work being the property of the author.<sup>269</sup> Copyright is also limited in duration<sup>270</sup> and falls in the public domain, allowing the work to be used freely by others when the copyright expires.<sup>271</sup> Various exceptions based on public policy (such as back-up copies and fair dealing) do, however, limit copyright protection.<sup>272</sup>

#### *3.4.2 Are the works represented by non-fungible tokens eligible for copyright protection?*

Each non-fungible token represents an asset (whether virtual or not). Therefore, it is the asset in question that needs to qualify for copyright protection and not the non-fungible token. According to the *Copyright Act*, copyright protection can be found in every original literary work, musical work, artistic work, sound recording, cinematograph film, broadcast, programme-carrying signal, published edition and computer program.<sup>273</sup> In addition to all of these modes of transmission, traditional works and indigenous cultural expressions (or knowledge) are also categories worth copyright protection, as can be seen in the *Intellectual Property Law Amendment Act 28 of 2013* (hereafter the *Intellectual Property Law Amendment Act*).<sup>274</sup> It is noteworthy that in *Golden China TV Games Centre v Nintendo Co Ltd*<sup>275</sup> the court protected video games under the cinematograph film category, but computer programs were excluded from the definition of cinematograph film after the

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<sup>268</sup> Pistorius "Copyright law" 180.

<sup>269</sup> Pistorius "Copyright law" 181.

<sup>270</sup> Section 3 of the *Copyright Act*.

<sup>271</sup> Pistorius "Copyright law" 181.

<sup>272</sup> Pistorius "Copyright law" 181.

<sup>273</sup> Section 2(1)(a)-(g) of the *Copyright Act*.

<sup>274</sup> Pistorius "Copyright law" 195; Section 3(k) of the *Intellectual Property Law Amendment Act*.

<sup>275</sup> *Golden China TV Games Centre v Nintendo Co Ltd* [1996] 4 All SA 667 (SCA).

*Copyright Act* was amended in 1997, resulting in video games now being protected as computer programs.<sup>276</sup>

### 3.4.3 Requirements for the subsistence of copyright

The only common-law requirement for the subsistence of copyright is that of propriety, meaning that work deemed as *contra bonos mores* cannot be awarded copyright protection.<sup>277</sup> As the moral values of society are not static, this requirement should be applied with caution.<sup>278</sup>

The statutory requirements for the subsistence of copyright are firstly that the work must be original<sup>279</sup> and secondly that the work must be reduced to a material form.<sup>280</sup> The third requirement is either that the author must be a qualified person or that the first publication (or manufacture) of the work occurred in South Africa.<sup>281</sup> The originality requirement can be quite confusing since it is even possible for infringing works to be deemed original.<sup>282</sup> What is noteworthy about this requirement is the "sweat of the brow test", which takes into account the degree of skill, labour and judgment (all of which are coupled with time) when determining originality.<sup>283</sup> In *Moneyweb (Pty) Ltd v Media 24 Ltd*<sup>284</sup> it was noted that "the time and effort spent must involve more than a mechanical, or slavish, copying of the existing material."<sup>285</sup> With respect to the requirement that the work has to exist in a material form, it should be noted that a representation in digital data qualifies as existing in a material form and therefore the virtual assets represented by non-fungible tokens would qualify as existing in a material form.<sup>286</sup>

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<sup>276</sup> Pistorius "Copyright law" 197.

<sup>277</sup> Pistorius "Copyright law" 213.

<sup>278</sup> Pistorius "Copyright law" 213; Cornish, Llewelyn and Aplin *Intellectual Property: Patents, Copyright, Trade Marks and Allied Rights* 12-58.

<sup>279</sup> Pistorius "Copyright law" 203; Section 2(2)(a) of the *Copyright Act*.

<sup>280</sup> Pistorius "Copyright law" 203; Section 2(2)(b) of the *Copyright Act*.

<sup>281</sup> Pistorius "Copyright law" 203; Section 3 of the *Copyright Act*.

<sup>282</sup> Pistorius "Copyright law" 206; Section 2(3) of the *Copyright Act*.

<sup>283</sup> Pistorius "Copyright law" 204-205.

<sup>284</sup> *Moneyweb (Pty) Ltd v Media 24 Ltd* (31575/2013) [2016] ZAGPJHC 81 (hereafter *Moneyweb (Pty) Ltd v Media 24 Ltd*).

<sup>285</sup> *Moneyweb (Pty) Ltd v Media 24 Ltd* para 15; Pistorius "Copyright law" 205.

<sup>286</sup> Pistorius "Copyright law" 208; Section 2(2)(b) of the *Copyright Act*.

#### 3.4.4 *The author of the work and the owner of the copyright*

Depending on the category in which the work falls, the definition of the term "author" will differ, but section 1(1)(iv)(a)-(f) of the *Copyright Act* sets this out clearly. For example, a painting would be an artistic work to which the author would be the first to create the work. On the other hand, a virtual world would be categorised as a computer program, resulting in the author being the person who exercised control over the making of the virtual world.<sup>287</sup>

In *Haupt t/a Softcopy v Brewers Marketing Intelligence (Pty) Ltd*<sup>288</sup> the court concluded that in some instances an independent contractor may be the author of a computer program if said contractor exercised control over the making of the program. Therefore, the control exercised is rather broad.<sup>289</sup> Co-authorship is also a regular occurrence with written work, and the case of *Peter-Ross v Ramesar*<sup>290</sup> is an adequate example of how this is approached. In this case both parties were academics who collaborated on scientific work which was then written and published solely by the plaintiff, who then claimed sole authorship of the work.<sup>291</sup> The court stated that the view of "who pushed the pen" is too narrow to create sole authorship, and held that both parties would be co-author of the published work.<sup>292</sup> This might seem *prima facie* contradictory to the fact that, as previously mentioned, copyright does not protect ideas.<sup>293</sup> One should, however, take into account that the expression of ideas is indeed protected by copyright and in the case of *Peter-Ross v Ramesar* the idea was expressed through the publication of the article, resulting in both parties being co-authors of the work.<sup>294</sup>

The general rule, as seen in section 21(1)(a) of the *Copyright Amendment Act 56 of 1980* (hereafter the *Copyright Amendment Act*), is that copyright of a work initially

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<sup>287</sup> Section 1(1)(iv)(a)-(f) of the *Copyright Act*.

<sup>288</sup> *Haupt t/a Softcopy v Brewers Marketing Intelligence (Pty) Ltd* 2006 (4) SA 458 (SCA) (hereafter *Haupt t/a Softcopy v Brewers Marketing Intelligence (Pty) Ltd*).

<sup>289</sup> Pistorius "Copyright law" 222.

<sup>290</sup> *Peter-Ross v Ramesar* 2008 JDR 0660 (C) (hereafter *Peter-Ross v Ramesar*).

<sup>291</sup> Pistorius "Copyright law" 223; *Peter-Ross v Ramesar* paras 2-3.

<sup>292</sup> Pistorius "Copyright law" 223; *Peter-Ross v Ramesar* paras 15-22.

<sup>293</sup> See Chapter 3.4.1.4 for more information.

<sup>294</sup> See Chapter 3.4.1.4; *Peter-Ross v Ramesar* paras 17-22.

vests in the author (or in some cases co-authors). Two noteworthy exceptions to this rule are commissioned works and works that were excluded by way of an agreement.<sup>295</sup> According to section 21(1)(c) of the *Copyright Amendment Act*, the person commissioning work in accordance with payment (or the arrangement of payment) will be the owner of the copyright over such work if the work relates to photographs, paintings, drawn portraits, gravures, cinematograph films or sound recordings.<sup>296</sup> The general rule may also be excluded by an agreement, and such an agreement does not require any formalities. Thus, an oral agreement would also qualify.<sup>297</sup>

#### 3.4.5 The transfer and licensing of copyright

According to section 22(1) of the *Copyright Act* "copyright shall be transmissible as movable property by assignment, testamentary disposition or operation of law."<sup>298</sup> The *Intellectual Property Law Amendment Act* does not, however, allow for copyright vesting in indigenous work to be transmissible by one of the latter three ways.<sup>299</sup> With respect to the licensing of copyright, which is basically an agreement in which the licensor grants the licensee permission to perform certain acts and exercise certain rights, the licence can either be non-exclusive or exclusive.<sup>300</sup>

A non-exclusive licence may (in the event of a lack of specifically prescribed legal formalities) be written, oral or inferred by conduct.<sup>301</sup> The waiving of the copyright must, however, be strictly proven and is never presumed.<sup>302</sup> When a non-exclusive licence agreement is binding the licensee is granted the right to use the intellectual property, but not to the exclusion of others.<sup>303</sup> On the other hand, an exclusive licence grants the licensee the right to use the intellectual property to the exclusion

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<sup>295</sup> Pistorius "Copyright law" 226, 228.

<sup>296</sup> Pistorius "Copyright law" 226.

<sup>297</sup> Pistorius "Copyright law" 228; Section 21(1)(e) of the *Copyright Amendment Act*.

<sup>298</sup> Pistorius "Copyright law" 253; Section 22(1) of the *Copyright Act*.

<sup>299</sup> Pistorius "Copyright law" 253; Section 28J(1)(b) of the *Intellectual Property Law Amendment Act*.

<sup>300</sup> Pistorius "Copyright law" 255.

<sup>301</sup> Pistorius "Copyright law" 255.

<sup>302</sup> Pistorius "Copyright law" 255; *Haupt t/a Soft Copy v Brewers Marketing Intelligence (Pty) Ltd* 2005 (1) SA 398 (C).

<sup>303</sup> Pistorius "Copyright law" 255.

of others.<sup>304</sup> Exclusive licences do require formalities, as set out in section 22(3) of the *Copyright Act*, with these formalities basically being that they should be written and signed by (or on behalf of) the licensor (or exclusive sub-licensor in certain situations).<sup>305</sup> It is important to note that neither of these licences confers any proprietary rights associated with the licensed work to the holder of such a licence therefore, a licence holder will not be able to enforce copyright against a third party as this needs to be done by the copyright owner.<sup>306</sup>

#### 3.4.5.1 Click-wrap licences

A click-wrap licence may be defined as "a type of contract that is widely used with software licenses and online transactions in which a user must agree to terms and conditions prior to using the product or service."<sup>307</sup> These licences have been developed specifically for electronic commerce and are therefore commonly displayed, prior to using the product or service, on a screen whereon the terms and conditions (or at least an indication that the consumer should be aware of the said terms and conditions) are viewable.<sup>308</sup>

With non-fungible tokens allowing for users to have vested property rights in virtual property, these click-wrap licences can still remain applicable in blockchain-based games. For example, in *Gods Unchained* (a card game in which cards can be represented by non-fungible tokens and then traded) the basic cards that you get to start playing the game are not non-fungible tokens, but merely a click-wrap licence allowing you to start playing the game without needing to buy cards represented by non-fungible tokens.<sup>309</sup>

#### 3.4.5.2 Licensing orphaned works

Orphaned work may be defined as "work in which copyright still subsists but none of the rights holders in that work is identified or, even if one or more of them is

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<sup>304</sup> Pistorius "Copyright law" 255.

<sup>305</sup> Pistorius "Copyright law" 255; Section 22(3) of the *Copyright Act*.

<sup>306</sup> Pistorius "Copyright law" 255.

<sup>307</sup> Techopedia 2013 <https://www.techopedia.com/definition/4243/clickwrap-agreement>.

<sup>308</sup> Pistorius "Copyright law" 257.

<sup>309</sup> See *Gods Unchained* 2021 <https://godsunchained.com/>.

identified, none is located, despite a diligent search for the rights holders having been conducted."<sup>310</sup> In short, to license orphan work, the person wishing to receive a licence has to conduct a diligent search to find the copyright owner<sup>311</sup> and may only approach the commission for a licence after the latter has been done.<sup>312</sup> The commission then has the discretion of awarding a non-exclusive licence to the applicant, which is subject to royalty payments in addition to the terms and conditions set by the commission.<sup>313</sup>

This is where intellectual property and its relationship with non-fungible tokens get interesting. If virtual property is being represented by and sold as a non-fungible token, then the copyright owner of the said virtual property would most likely be the developer of the virtual world in which the item is used (assuming this situation relates to virtual worlds).<sup>314</sup> The developer, assuming it is a company, would either need to constantly exist as a juristic person or it would need to transfer, in accordance with section 22(1) of the *Copyright Act*, the copyright of all its work, after it ceases to exist, in order to sustain the copyright on the work. The reason for the latter is not that the copyright duration has expired, but that a juristic person, unlike a natural person, cannot benefit from the *Intestate Succession Act* 81 of 1987 (hereafter the *Intestate Succession Act*) in which the Intellectual Property right of the work would, by way of testament, transfer to relatives as set out in the *Intestate Succession Act*.<sup>315</sup> Should a company then dissolve without legally transferring the intellectual property rights over its work, the work of the company would become orphaned work (since the owner of the copyright does not exist). In the event that users only had non-exclusive licences to use the virtual property, it would be much harder to obtain a licence to use the said virtual property after the dissolution of the company. This is because one may not have access to the virtual property, or in extreme cases the virtual property might even have been deleted, causing them to

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<sup>310</sup> Pistorius "Copyright law" 258.

<sup>311</sup> Pistorius "Copyright law" 259.

<sup>312</sup> Pistorius "Copyright law" 259.

<sup>313</sup> Pistorius "Copyright law" 259.

<sup>314</sup> Pistorius "Copyright law" 226; Section 21(1)(c) of the *Copyright Amendment Act*.

<sup>315</sup> The *Intestate Succession Act* does not say that a juristic person can inherit any of the estate, so this would need to be done by way of a will, which matter falls outside the scope of the *Intestate Succession Act*.

make their way out of existence. However, in the case of the virtual property being represented by and sold as non-fungible tokens, the person purchasing the virtual property itself as a non-fungible token would allow the person to keep the virtual property in existence by way of on-chain storage.<sup>316</sup> This might prompt non-fungible token owners of virtual property, which are not useable in the virtual world anymore, to approach the commission in an attempt to acquire a non-exclusive licence over the orphan work. This allows for the possibility, for example, of a virtual piece of art to be showcased in a completely different virtual world than originally intended (depending on the licence, of course), since the digital art would continue to exist and is accessible by the owner of the non-fungible token. In the case of digital collectibles, this may become very popular with the attention non-fungible tokens are gaining.

#### *3.4.6 Copyright infringements and the available remedies*

To create ("mint") a non-fungible token it is necessary firstly to purchase Ether (ETH) from a digital currency exchanger<sup>317</sup> since Ether is required to create a non-fungible token, to buy a non-fungible token and pay the gas fees<sup>318</sup> associated with the transaction.<sup>319</sup> Secondly, a crypto wallet (such as *MetaMask*) is needed in order to store Ether and process the associated transactions on the Ethereum blockchain.<sup>320</sup> The wallet is needed because marketplaces (such as *OpenSea*) are simply peer-to-peer exchanges that do not store any non-fungible tokens. They are used only as tools for others to interact with the blockchain in a user-friendly way.<sup>321</sup> *OpenSea*

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<sup>316</sup> See Chapter 3.2.1 for an explanation of on-chain storage.

<sup>317</sup> A digital currency exchanger can be defined as "a person or business that acts as an online market maker and exchanges legal tender and other electronic currencies for electronic currencies, and vice versa, for a commission." See Chen 2021 <https://www.investopedia.com/terms/d/digital-currency-exchanger-dce.asp>.

<sup>318</sup> A gas fee can be defined as "the fee required to conduct a transaction on Ethereum successfully." See Ethereum 2021 <https://ethereum.org/en/developers/docs/gas/>.

<sup>319</sup> OpenSea 2021 <https://support.opensea.io/hc/en-us/articles/360061676254-How-do-I-create-an-OpenSea-account->.

<sup>320</sup> OpenSea 2021 <https://support.opensea.io/hc/en-us/articles/360061676254-How-do-I-create-an-OpenSea-account->.

<sup>321</sup> OpenSea 2021 <https://support.opensea.io/hc/en-us/articles/360061676254-How-do-I-create-an-OpenSea-account->.

itself states that "it's only a fun place to buy, sell, create, and trade NFTs."<sup>322</sup> Thirdly, one needs to connect the *MetaMask* wallet with one's *OpenSea* account, after which the buying, selling, creation and trading of non-fungible tokens are now possibilities for the user.<sup>323</sup>

With the above finished, one simply needs to click on the "Create a Collection" button and follow the steps.<sup>324</sup> It is at this stage that a logo, name and description need to be given to the non-fungible token being created.<sup>325</sup> When this has been completed, the user's non-fungible token will be listed on the *OpenSea* marketplace as available for purchase. It is important to note that none of the above steps prevents someone from creating a non-fungible token of copyright-protected works. The *OpenSea* Terms of Service state only that "You agree that you will not violate any law, contract, intellectual property, or other third party right, and that you are solely responsible for your conduct, while accessing or using the Service or participating in the Auction."<sup>326</sup> This in turn allows for a wide array of copyright infringements, leaving both the owner of the copyright and the purchaser of the non-fungible token in a position requiring remedial attention. This prompts the question as to what remedies are available to the owner of the copyright and how does this affect the owner of the copyright-infringed works?

According to Pistorius, the remedies that are available for copyright infringement are damages, additional damages, notional royalties and "delivery up".<sup>327</sup> When a copyright infringement takes place, the result is a type of delict to which the principles of delictual liability<sup>328</sup> would apply when instituting an action for

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<sup>322</sup> OpenSea 2021 <https://support.opensea.io/hc/en-us/articles/360061676254-How-do-I-create-an-OpenSea-account->.

<sup>323</sup> OpenSea 2021 <https://support.opensea.io/hc/en-us/articles/360061676254-How-do-I-create-an-OpenSea-account->.

<sup>324</sup> OpenSea 2021 <https://support.opensea.io/hc/en-us/articles/360063498313-How-do-I-create-an-NFT->.

<sup>325</sup> OpenSea 2021 <https://support.opensea.io/hc/en-us/articles/360063498313-How-do-I-create-an-NFT->.

<sup>326</sup> OpenSea 2021 <https://opensea.io/tos>.

<sup>327</sup> Pistorius "Copyright law" 311-314.

<sup>328</sup> This means that the five elements of a delict (conduct, wrongfulness, fault, causation and damage) need to be fulfilled.

damages.<sup>329</sup> An example of this would be the fault-requirement: section 24(2) of the *Copyright Act* states that "where in an action for infringement of copyright it is proved or admitted that an infringement was committed but that at the time of the infringement the defendant was not aware and had no reasonable grounds for suspecting that copyright subsisted in the work to which the action relates, the plaintiff shall not be entitled under this section to any damages against the defendant in respect of the infringement but shall be entitled to an account of profits in respect of the infringement whether any other relief is granted under this section or not."

Where an infringement of copyright brought under section 24 of the *Copyright Act* is either proven or admitted, then the courts will have regard, in addition to all other material considerations, to the flagrancy of the infringement<sup>330</sup> and any benefit shown to have accrued to the defendant by reason of the infringement.<sup>331</sup> Should the court then be satisfied that effective relief is not otherwise available to the plaintiff, then the court will have the discretion to award additional damages when assessing the damage of the infringement.<sup>332</sup> The notional royalties remedy allows for the plaintiff in a suit for copyright infringement at the plaintiff's discretion to seek a calculated amount based on reasonable royalty in lieu of damages.<sup>333</sup>

If the plaintiff to an infringement action is successful, then the court has the discretion to award an interdict against the defendant, which restrains the defendant from infringing the plaintiff's copyright. The situation often arises in which the defendant is in possession of infringing articles that can easily be used for more infringements, but to remedy this the court has the discretion to make an order for "delivery up".<sup>334</sup> Delivery up orders the defendant to deliver "infringing copies or plates used or intended to be used for infringing copies" to the plaintiff, thereby allowing the plaintiff to erase the material offending the plaintiff's copyright or even

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<sup>329</sup> Pistorius "Copyright law" 311.

<sup>330</sup> Section 24(3)(a) of the *Copyright Act*.

<sup>331</sup> Section 24(3)(b) of the *Copyright Act*.

<sup>332</sup> Pistorius "Copyright law" 313; Section 24(3) of the *Copyright Act*.

<sup>333</sup> Pistorius "Copyright law" 312.

<sup>334</sup> Pistorius "Copyright law" 314.

to destroy the infringing articles.<sup>335</sup> It is important to note that the infringing material does not become the property of the plaintiff upon delivery. Instead it is only delivered either to be erased or to be destroyed.<sup>336</sup> Pistorius explains the latter situation through the example of infringing cinematograph film on a video tape – the plaintiff can simply erase the cinematograph film from the video tape and then return the video tape to the defendant, as it is the property of the defendant.<sup>337</sup> With fault not being a prerequisite for a successful claim, the delivery up order can be a rather reliable remedy to stop copyright infringement.<sup>338</sup> According to Pistorius, the delivery order is said to enhance the efficacy of the interdict and thus a claim for delivery should be combined with an interdict.<sup>339</sup>

To conclude this section, it is clear that, just as in the real world, there is no absolute way to stop copyright infringements. Instead, there are remedies available to the infringed party which can be instituted against the infringing party. People who have bought articles containing infringing work (whether in the form of a non-fungible token or not) will be able to keep those articles, since the infringed party will have the opportunity to claim damages for that sale from the infringing party. All-in-all, I can determine no copyright infringement challenges non-fungible tokens face that any other physical items in the real world do not similarly face.

### ***3.5 Non-Fungible Tokens and Consumer Protection***

The *Consumer Protection Act* has the purpose to "promote and advance the social and economic welfare of consumers in South Africa" and non-fungible tokens being sold by developers of virtual worlds are by no means excluded from this Act.<sup>340</sup> During my research I have found that a possible problem consumers might face is that they do not really know what they own when purchasing a non-fungible token from developers of virtual worlds. It is suspected that this is due to the poor descriptions associated with various non-fungible tokens. The company *Gala Games*,

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<sup>335</sup> Pistorius "Copyright law" 314.

<sup>336</sup> Pistorius "Copyright law" 314.

<sup>337</sup> Pistorius "Copyright law" 314.

<sup>338</sup> Pistorius "Copyright law" 314.

<sup>339</sup> Pistorius "Copyright law" 314.

<sup>340</sup> Section 3 of the *Consumer Protection Act*.

which are currently developing a virtual world (*Mirandus*) in which all the virtual assets associated with the virtual world are being sold as non-fungible tokens, will be used as an example

At the time of writing, a Majestic Inn (which is a virtual asset represented by and sold as a non-fungible token) is up for sale for the price of 72 321.396 Gala tokens (roughly R170 000).<sup>341</sup> The description of this non-fungible token simply states that it is a 20x40 structure in which a transcendent meal may be enjoyed after awaking from a king-like slumber.<sup>342</sup> In answering the question of what is being bought when purchasing this non-fungible token, it seems that the description is clearly of no assistance. Is it the structure (which qualifies as virtual property) that is being bought or merely a licence to use it? The possibility also exists that it is the patent of the structure that is being bought or even a servitude in some instances. As a developer-players contract exists, it would be a logical next step to consult the Terms and Conditions set out by *Gala Games* in order to get a better understanding of what is being bought when buying a non-fungible token from the developers. Section 1 of the *Gala Games* Terms and Conditions states that "GALA is a decentralized distributed application on a blockchain network, using smart contracts (each a 'Smart Contract') to enable its Users to own, buy, sell, transfer, and share unique digital rewards that can be visualized on the GALA site through the GALA App."<sup>343</sup> Furthermore, the following is stated in section 1.2:

The GALA Blockchain allows each User to store items, characters, digital rewards, and other attributes on the GALA Blockchain public ledger that allows for decentralized, immutable record of ownership. Each User owns the non-fungible token (an "NFT") for any of the in-game items on the GALA Blockchain. When a User purchases, earns, or receives any NFT or digital reward the Smart Contract process, the User owns completely and outright the NFT or digital reward.<sup>344</sup>

With this in mind, it seems that any non-fungible token purchased from *Gala Games* transfers the ownership title of the virtual property to the purchaser. The intellectual

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<sup>341</sup> Gala Games 2021 <https://app.gala.games/games/buy-item/0x010f0000000000000000000000000000?currency=GALA>.  
<sup>342</sup> Gala Games 2021 <https://app.gala.games/games/buy-item/0x010f0000000000000000000000000000?currency=GALA>.  
<sup>343</sup> See heading 1 at Gala Games 2021 <https://app.gala.games/terms-and-conditions/>.  
<sup>344</sup> Gala Games 2021 <https://app.gala.games/terms-and-conditions/>.

property associated with the virtual property is not transferred, however, since it is not explicitly stated that it is included.<sup>345</sup> There is no indication that users are purchasing a licence to use the non-fungible tokens, but it is expressly stated (twice) that the users own the non-fungible tokens on purchase.

When taking into account the Terms and Conditions (as well as the description of the non-fungible tokens up for sale and the visual representation of what is being bought), it seems fair to assume that the virtual property itself is being bought and owned by the purchaser (excluding the intellectual property rights, of course). Should *Gala Games* then, hypothetically, later amend the Terms and Conditions (as they legally may in accordance with the Terms and Conditions) to state that the non-fungible tokens being sold is in essence only a licence to use the virtual property associated with the non-fungible token, instead of actually owning the virtual property, then the *Consumer Protection Act* might be able to remedy this. Section 29 of the *Consumer Protection Act* reads as follows:

A producer, importer, distributor, retailer or service provider must not market any goods or services (a) in a manner that is reasonably likely to imply a false or misleading representation concerning those goods or services, as contemplated in section 41; or (b) in a manner that is misleading, fraudulent or deceptive in any way, including in respect of (i) the nature, properties, advantages, or uses of the goods and service...<sup>346</sup>

Furthermore, Section 41 of the *Consumer Protection Act* states that:

(1) In relation to the marketing of any goods or services, the supplier must not, by words or conduct – (a) directly or indirectly express or imply a false, misleading or deceptive representation concerning a material fact to a consumer; (b) use exaggeration, innuendo or ambiguity as to a material fact, or fail to disclose a material fact if that failure amounts to a deception; or (c) fail to correct an apparent misapprehension on the part of a consumer, amounting to a false, misleading or deceptive representation, or permit or require any other person to do so on behalf of the supplier.<sup>347</sup>

To combat this, *Gala Games* would most likely raise the issue of jurisdiction, or just amend the Terms and Conditions to state that when a non-fungible token is bought

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<sup>345</sup> This is due to the international copyright standard. See heading 3.6 at *Gala Games 2021* <https://app.gala.games/terms-and-conditions/>.

<sup>346</sup> Section 29 of the *Consumer Protection Act*.

<sup>347</sup> Section 41 of the *Consumer Protection Act*.

from them it is, in essence, only a licence to buy, sell, transfer and share the virtual property that is being bought and not the virtual property itself. With regard to the jurisdiction, the Terms and Conditions clearly state that any dispute is governed by the laws of the state of Wyoming, USA.<sup>348</sup> This jurisdiction would likely be crucial only with regard to the mediation, arbitration and judicial resolution of the dispute, but this would not exclude the *Consumer Protection Act* from being applicable, since section 5(1)(b) of the Act states that "This Act applies to the promotion of any goods or services, or of the supplier of any goods or services, within the Republic."<sup>349</sup> Should *Gala Games* then not wish for the *Consumer Protection Act* to apply, the company should not be selling non-fungible tokens to consumers in South Africa. This does not mean that the company would not have a South African playerbase, since it is still possible for South Africans to buy *Gala Games*-related non-fungible tokens on marketplaces such as *OpenSea*<sup>350</sup> without the *Consumer Protection Act* then being applicable. Should *Gala Games*, however, not raise jurisdiction as an issue, it is likely that the company would just amend the Terms and Conditions as stated above. Should the *Consumer Protection Act* be applicable, then this would not be allowed according to section 68(1)(c), which states that "If a consumer has exercised, asserted or sought to uphold any right set out in this Act or in an agreement or transaction with a supplier, the supplier must not, in response alter, or propose to alter, the terms and conditions of a transaction agreement with the consumer, to the detriment of the consumer."<sup>351</sup>

With the above in mind, it is clear that the *Consumer Protection Act* offers protection to consumers purchasing non-fungible tokens from developers. Due to the nature of non-fungible tokens, any transaction pertaining to non-fungible tokens will be an electronic transaction, so the *Consumer Protection Act* cannot be read in isolation, since the *Electronic Communications and Transactions Act* will also find application when dealing with transactions of non-fungible tokens.

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<sup>348</sup> See heading 12.5 at Gala Games 2021 <https://app.gala.games/terms-and-conditions/>.

<sup>349</sup> Section 5(1)(b) of the *Consumer Protection Act*.

<sup>350</sup> *OpenSea* is a decentralised marketplace.

<sup>351</sup> Section 68(1)(c) of the *Consumer Protection Act*.

### *3.5.1 Consumer protection in terms of the Electronic Communications and Transactions Act 25 of 2002*

Chapter VII of the *Electronic Communications and Transactions Act* deals with consumer protection.<sup>352</sup> At the start of this chapter, section 42(1) of the *Electronic Communications and Transactions Act* sets out its scope by stating that "This Chapter applies only to electronic transactions." Thus, the chapter will always be applicable when dealing with non-fungible tokens.<sup>353</sup> The latter can be heavily debated when looking at the requirements for a valid contract of sale, but the discussion to follow should strengthen the argument as to why electronic transactions are always applicable when dealing with non-fungible tokens. According to Nagel *et al*, a contract of sale can be defined as follows:

The contract of sale is a specific, nominated, reciprocal agreement to buy and sell, in terms of which the seller has the true intention to deliver a determined or determinable object together with all his rights in the object undisturbed, to the buyer, and the buyer has the true intention of paying a determined or determinable price for the object.<sup>354</sup>

The contract of sale having been defined, it becomes necessary to examine the requirements for a valid contract of sale, these requirements being consensus, contractual capacity, legality, physical possibility and the relevant formalities.<sup>355</sup> The consensus requirement can easily be fulfilled since the parties only need to reach consensus regarding the *essentialia* (which include the nature of the contract, the object being sold as a non-fungible token, and the purchase price of the object as a non-fungible token) of the contract of sale.<sup>356</sup> The contractual capacity, legality and physical possibility requirements are rather straightforward and do not contribute to the aim of this chapter. They will therefore be mentioned but not discussed. The requirement of formalities is up for debate, however, and will need to be discussed. According to common law no formalities are required for a valid or enforceable contract of sale when dealing with moveable property, but for the purchase and sale

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<sup>352</sup> See Chapter VII of the *Electronic Communications and Transactions Act*.

<sup>353</sup> Section 42(1) of the *Electronic Communications and Transactions Act*.

<sup>354</sup> Lötzer "Purchase and Sale" 195.

<sup>355</sup> Lötzer "Purchase and Sale" 195.

<sup>356</sup> Lötzer "Purchase and Sale" 196.

of immovable property certain statutory formalities are required for a valid or enforceable contract of sale.<sup>357</sup>

With non-fungible tokens clearly qualifying as moveable property there would be, according to common law, no formalities required for a valid or enforceable contract of sale (unless otherwise agreed between the parties).<sup>358</sup> As previously mentioned,<sup>359</sup> it is possible to create a non-fungible token for an asset which physically exists which then allows for a *prima facie* proof of ownership over an object by way of the non-fungible token. Should a non-fungible token for a physical asset (such as a house) be created and should a person buy the said non-fungible token (assuming there is a clear indication that it is the physical house itself being sold) then the contract of sale would be invalid since it does not meet the formalities requirement. The logic behind this reasoning is that despite the non-fungible token being moveable, the object of the contract of sale is not. Therefore, one has to look at what is being sold instead of how it is being sold.

With non-fungible tokens being moveable virtual property, a contract of sale in which the transaction is not recorded on the blockchain can lead to legal uncertainty. For example, if person A buys a non-fungible token on a digital marketplace and then enters into a written contract of sale in which person B pays person A in cash for the object of the non-fungible token, then I see no reason as to why this contract of sale would be null and void. This example meets all the requirements for a valid contract of sale. The problem with this is that, according to the blockchain, the owner of the non-fungible token would still be person A. At this stage it is important to remember that the non-fungible token does not necessarily contain the virtual property itself, so the virtual property could have been transferred without the non-fungible token indicating who the new owner of the said virtual property is. This situation in turn allows person A to sell the virtual property and transfer ownership via the blockchain

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<sup>357</sup> Lötz "Purchase and Sale" 201.

<sup>358</sup> Harvey indicates that, according to Roman-Dutch law, an incorporeal is seen as moveable or immovable depending on whether the object of the right is moveable or not. Thus, non-fungible tokens will most surely be classified as moveable – see Harvey *The Legal Classification of Cryptocurrency in South African Law: An Argument for Classification as Currency* 37; Lötz "Purchase and Sale" 201-202.

<sup>359</sup> See Chapter 3.2.2 for more information.

to someone new, resulting most of the time in two *bona fide* claims of ownership with the *prima facie* ownership favouring the owner as indicated by the non-fungible token on the blockchain. Assuming the contract of sale between person A and B is valid, then the *nemo dat quod non habet* rule will find application, which would render any following sales of the non-fungible token as null and void. Despite having a remedy available in such situations, this does not solve the problem of how easy it is to wrongfully sell the same virtual property twice.

The above mess could simply be avoided by making use of the "Pink Slip" concept commonly used in America when buying or selling a car.<sup>360</sup> A Pink Slip is a "certificate of title which establishes a person as the owner of a car legally."<sup>361</sup> This means that in America a contract of sale for a car cannot be valid unless the Pink Slip is changed to indicate who the new legal owner of the car is. Comparing this to non-fungible tokens and the example above, it is clear that the purpose non-fungible tokens and Pink Slips aim to achieve is ultimately the same. Therefore, it is proposed that all non-fungible tokens should be dealt with as Pink Slips to ensure clarity on who is the legal owner of all respective virtual property. Making this a formality would also ensure that there would be no way to bypass the royalties associated with the resale of non-fungible tokens, since this is done automatically by way of smart contracts.<sup>362</sup>

Working on the assumption that an electronic transaction always occurs when a contract of sale for a non-fungible token is valid, then as previously stated Chapter VII of the *Electronic Communications and Transactions Act* would always be applicable. Section 42 of the *Electronic Communications and Transactions Act* does say to which electronic transactions it would not apply, with section 42(2)(i) clearly stating that "Section 44 does not apply to electronic transactions for the provision of

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<sup>360</sup> Buck 2018 <https://www.drivingsales.com/lara-buck/blog/why-pink-slip-is-so-important-when-you-buy-a-new-car>.

<sup>361</sup> Buck 2018 <https://www.drivingsales.com/lara-buck/blog/why-pink-slip-is-so-important-when-you-buy-a-new-car>.

<sup>362</sup> Macy 2021 <https://medium.com/security-token-offering/nft-royalties-building-revenue-through-nfts-fcad63e87f4c>.

gaming or lottery services."<sup>363</sup> This raises the question as to whether all virtual worlds are to be seen as games or not. This will need to be determined on a case-to-case basis after taking into account the type of virtual world being dealt with. *Decentraland*, for example, is not designed to be a game, but rather a virtual alternative to the real world. I would thus argue that *Decentraland* does not fall within the category of gaming, rendering section 44 of the *Electronic Communications and Transactions Act* applicable to electronic transactions with regard to the virtual world of *Decentraland*. On the other hand, the virtual world of *Mirandus* is clearly seen to be a blockchain-based fantasy Massive Multiplayer Online Role Playing Game.<sup>364</sup> With the virtual world of *Mirandus* clearly qualifying as a game, any electronic transactions that occur between the developers and consumers would mean that section 44 of the *Electronic Communications and Transactions Act* would not find application. This would result in the consumer not being entitled to a cooling-off period after a successful electronic transaction with respect to the virtual world of *Mirandus*.

To conclude the discussion of the consumer protection available to South Africans dealing with non-fungible tokens, it is without doubt obvious that South African consumers are not without protection.

### **3.6 Conclusion**

In this chapter, the interplay between non-fungible tokens and the law was discussed in detail (with specific focus on the problematic areas uncovered during my research).

The chapter started off by providing the reader with a simplified description of blockchain technology. This simplification was necessary to orientate the reader in respect of the interplay between non-fungible tokens and the law. A lack of understanding as to how non-fungible tokens function on a blockchain would cause

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<sup>363</sup> Section 44 of the *Electronic Communications and Transactions Act* grants the consumer a cooling-off period in certain circumstances; Section 42 of the *Electronic Communications and Transactions Act*.

<sup>364</sup> On the *Gala Games* website *Mirandus* is listed under games. See Gala Games 2021 <https://app.gala.games/games>.

confusion as to why the law is applied the way it is when dealing with this new technology. The discussion also explored cryptocurrencies, since cryptocurrencies also make use of blockchain technology and functions as the main manner in which non-fungible tokens can be traded. When discussing cryptocurrencies, a distinction was drawn between fiat currency and the evolving digital counterpart thereof. From this distinction it was concluded that both fiat currency and digital currency (in the form of Central Bank Digital Currency) are highly regulated by governments, but virtual currencies (commonly known as cryptocurrencies) are unregulated. The discussion explored Bitcoin, Ethereum and stablecoins as a way of providing the reader with information regarding some of the popular cryptocurrencies (as there is such a wide array of cryptocurrencies). This served as an indication of how the same blockchain technology can differ, depending on the functionality in which the blockchain was designed. Despite the availability of all of these cryptocurrencies, the lack of regulation thereof can be seen to cause problems with regard to the legal status of such cryptocurrencies in South Africa. It is for this reason that the view of cryptocurrencies in South Africa taken by the South African Revenue Service was discussed, in order to ensure that the reader understands that cryptocurrencies are not seen as legal tender in South Africa, but rather as a digital asset (a crypto asset) to which different taxation rules would then be applied in respect of any income deriving from such digital assets. The presentation of this context is thus of extreme importance since it laid the foundation for the understanding of what was to be presented in the rest of the chapter.

Having concluded the presentation of the context, the sources of law applicable to non-fungible tokens were discussed, with computer program code and real-world regulations being the only two sources to find applicability in relation to non-fungible tokens. The first source of law, namely computer program code, was discussed in terms of the Ethereum blockchain as an example, since most non-fungible tokens are deployed on the Ethereum blockchain by way of smart contracts. An in-depth examination of these smart contracts was then performed to indicate the relation these contracts have with non-fungible tokens (with an example being whether or not the metadata of the non-fungible token is stored on-chain or off-chain, since this

might influence the legal aspects applicable). These smart contracts were then discussed to indicate whether or not they do indeed qualify as contracts or not. It was then determined that the five requirements of a valid contract are indeed met in smart contracts, and I was able to make the statement that I can see no reason as to why these smart contracts would not qualify as contracts in the legal sense. Real-world regulations, being the second source of law, were then mentioned to remind the reader that non-fungible tokens do not need to be coupled with a physical existence in order for real-world regulations to be applicable. The focus of these real-world regulations on non-fungible tokens was then described and was discussed in detail in the rest of the chapter.

After the conclusion of the background and sources of law (relating to non-fungible tokens), the next areas of focus for Chapter Three was the interplay between non-fungible tokens and legal aspects relating to ownership, intellectual property and consumer protection. It was shown that the ownership of a non-fungible token is easily provable, which then prompts the assumption that the owner of the wallet (in which the non-fungible token is found) is the owner of all contained therein. It was further shown that this assumption fails to take into account the possibility of human error in which property is transferred to the wrong wallet. For this reason the *rei vindictio*, delictual claim and unjustified enrichment were discussed as possible remedies for people who make such errors but still wish to reclaim their property (or the value thereof). Due to the lack of case law, these remedies were applied to an example laid out by me to indicate that the legal aspects in South Africa can provide some relief (depending on the circumstances of each situation).

With the discussion of the legal aspects relating to the ownership of non-fungible tokens concluded, the next topic was the legal aspects of intellectual property relating to non-fungible tokens. During my research it was found that many people do not understand how intellectual property rights apply to non-fungible tokens. With most non-fungible tokens being protected by way of copyright, this section focussed mainly thereon. To ensure that the reader understood how copyright is applied, the nature of copyright was discussed, as was the matter of which works (represented

by a non-fungible token) actually qualify for copyright protection. The requirements for the subsistence of copyright were then discussed, followed by the distinction between the author and the owner of the copyright, since this distinction sets out the legal rights of both the author and the owner, which distinction influences who may legally transfer which rights. The transfer and licensing of these works were then discussed (with specific focus on clip-wrap licences and orphaned works). The legal aspects of intellectual property rights relating to non-fungible tokens were then concluded by examining the available remedies for copyright infringements.

Lastly, the legal aspects of consumer protection relating to non-fungible tokens were discussed. In this section the virtual world of *Mirandus* was used as an example to indicate what both developers and users should be aware of when supplying either goods or services to South African users. As non-fungible tokens are traded electronically, the *Electronic Communications and Transaction Act* also finds applicability due to the consumer protection portion found within the act. With so many blockchain-based games starting to rise in popularity, it is important for South African users to know when their consumer protection rights are being infringed and what they as users are protected against.

In summary, this chapter showed how non-fungible tokens integrate with the law of specific problem areas identified during my research. With many more areas of focus being applicable to non-fungible tokens, the areas discussed were the main areas misunderstood by most people who make use of non-fungible tokens. It was also indicated in all of these problematic areas how non-fungible tokens are changing the legal aspects applicable to virtual property and, after the next chapters, an overall conclusion will be possible to indicate to what extent the introduction of non-fungible tokens are influencing virtual worlds and virtual property.

## Chapter 4: Virtual Land

### 4.1 Background

The famous Samuel Langhorne Clemens, also known as Mark Twain, advised us to "Buy land, they're not making it anymore."<sup>365</sup> In the early 1900s that might have been sound financial advice, but land in the 21<sup>st</sup> century is not what it used to be. In 2001 Dubai started construction on *Palm Island* (three artificial islands on the Dubai coast), which is currently the world's largest archipelago.<sup>366</sup> Since 2013 China has made artificial islands accumulating up to 1295 hectare of new land.<sup>367</sup> Despite Clemens clearly being wrong, he will eventually be correct to a certain degree. The physical world is limited when it comes to land, and even though that limit is not yet known, the premises suggested by Clemens remains valid.

As a way of combating the limitations of land in the physical world, virtual worlds such as *Decentraland* started to rise in popularity not just for gamers but for everyone. *Decentraland* is a virtual world consisting of 90 000 parcels of LAND, with each parcel measuring at 16x16m.<sup>368</sup> These land parcels are traded as non-fungible tokens, with registration being done via the Ethereum LAND smart contract and verification done by way of the Ethereum blockchain.<sup>369</sup> The priciest parcel of land has been sold for as high as \$913 228.20 or 1.3 million MANA (*Decentraland's* native cryptocurrency),<sup>370</sup> but what exactly makes virtual land in a virtual world like *Decentraland* so valuable? In the physical world land value is determined by the

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<sup>365</sup> Goodreads date unknown <https://www.goodreads.com/quotes/597766-buy-land-they-re-not-making-it-anymore>.

<sup>366</sup> Burbano 2021 <https://tomorrow.city/a/dubai-man-made-islands>.

<sup>367</sup> Asia Maritime Transparency Initiative date unknown <https://amti.csis.org/island-tracker/china/#:~:text=China%20has%2020%20outposts%20in,and%207%20in%20the%20Spratlys.&text=Since%202013%2C%20China%20has%20engaged,its%20presence%20in%20the%20Paracels>.

<sup>368</sup> Decentraland 2021 <https://docs.decentraland.org/decentraland/faq/>.

<sup>369</sup> Decentraland 2021 <https://docs.decentraland.org/decentraland/faq/>; De Saro 2021 [https://finance.yahoo.com/news/most-expensive-virtual-plot-land-185000712.html#:~:text=Most%20Expensive%20Virtual%20Plot%20of%20Land%20Ever%20Sells%20for%20%24900%2C000%20on%20Decentraland,-article&text=A%20plot%20of%20virtual%20land,%20Dfungible%20tokens%20\(NFTs\)](https://finance.yahoo.com/news/most-expensive-virtual-plot-land-185000712.html#:~:text=Most%20Expensive%20Virtual%20Plot%20of%20Land%20Ever%20Sells%20for%20%24900%2C000%20on%20Decentraland,-article&text=A%20plot%20of%20virtual%20land,%20Dfungible%20tokens%20(NFTs)).

<sup>370</sup> De Saro 2021 [https://finance.yahoo.com/news/most-expensive-virtual-plot-land-185000712.html#:~:text=Most%20Expensive%20Virtual%20Plot%20of%20Land%20Ever%20Sells%20for%20%24900%2C000%20on%20Decentraland,-article&text=A%20plot%20of%20virtual%20land,%20Dfungible%20tokens%20\(NFTs\)](https://finance.yahoo.com/news/most-expensive-virtual-plot-land-185000712.html#:~:text=Most%20Expensive%20Virtual%20Plot%20of%20Land%20Ever%20Sells%20for%20%24900%2C000%20on%20Decentraland,-article&text=A%20plot%20of%20virtual%20land,%20Dfungible%20tokens%20(NFTs)).

supply and demand of land, alongside the inherent value associated with a certain piece of land supplied.<sup>371</sup> With regard to virtual land, I propose functionality as a third determiner of value.

#### *4.1.1 Land supply*

The reason for the limited supply of virtual land is the fact that "land value increases when demand for land exceeds the supply of available land."<sup>372</sup> This results in the value of land growing as the popularity of a virtual world grows, since this leads to a bigger demand for virtual land despite there being only a set supply – the basic economic theory of supply and demand.<sup>373</sup> According to Fairfield, it is this artificial scarcity which drives the value and is an important characteristic of virtual property known as rivalrousness.<sup>374</sup> This rivalrous *indicia* is not alone a determiner of what classifies as virtual property, with Fairfield also proposing persistence and interconnectivity as necessary *indicia*.<sup>375</sup> Blazer went on to expand on Fairfield's three *indicia* of virtual property by adding secondary markets and value-added-by-users as two additional *indicia* of virtual property.<sup>376</sup>

It is possible to simply programme more virtual land in a virtual world, but this would increase supply with the demand diminishing, resulting in the worth of virtual land declining (and possibly reaching zero value). It is, therefore, necessary for a virtual world to limit the amount of virtual land parcels up for sale in order for the virtual land parcels to maintain or even grow in value. The possibility also exists for the virtual world to be unpopular, resulting in the value of virtual land parcels declining (as may happen in the physical world when a neighbourhood starts to deteriorate).

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<sup>371</sup> This is used to determine the market value of the land (note that this may differ in situations of expropriation). See du Plessis 2015 *PELJ* 1728; Chen 2020 <https://www.investopedia.com/terms/l/landvalue.asp>.

<sup>372</sup> Chen 2020 <https://www.investopedia.com/terms/l/landvalue.asp>.

<sup>373</sup> Fernando 2021 <https://www.investopedia.com/terms/l/law-of-supply-demand.asp>.

<sup>374</sup> Erlank "Digital Property" (forthcoming) 8.

<sup>375</sup> Erlank "Digital Property" (forthcoming) 8.

<sup>376</sup> Erlank "Digital Property" (forthcoming) 9.

#### *4.1.2 Inherent value*

Inherent value plays a huge role in the value of land, both in the physical and virtual worlds. In the physical world two similar sized land parcels can be worth different amounts due to the inherent value linked to each parcel of land respectively. Land parcel A may not contain fertile soil but land parcel B does, resulting in land parcel B being worth more, despite both land parcel A and land parcel B being the same size. The aforementioned example could possibly also apply in a virtual world in which, for example, certain land parcels gives bonuses when farming on them due to the land parcel being placed next to something like a river, which can be used for watering all those virtual crops. In the virtual world inherent value can also be seen to add to land parcels, depending on where the land parcel is located. If for example a virtual land parcel is located close to a popular neutral zone, the inherent value of the property would be much higher for users who wish to advertise products (due to the fact that it will be seen by many more users). Inherent value may also increase if a land parcel was owned by someone famous. Due to the transparency and provable chain of ownership associated with non-fungible tokens, it is easy to determine whether or not the virtual land was indeed owned by someone famous (which might contribute to the inherent value thereof).

#### *4.1.3 Functionality*

Virtual land offers an increased amount of functionality. In the physical world the functionality of real estate is mostly limited by zoning laws. For example, it would not be possible to build a housing estate on land that has been zoned as agricultural.<sup>377</sup> In virtual worlds these zoning laws might not be applicable at all. The functionality of land in the physical world is also limited when wanting to convert the land from one business to another. In the real world, if a piece of land with a mining operation built on it is to be converted to an electronics shop, this would take an immense amount of labour, time and money to complete (assuming that the possibility for this to happen exists). In the virtual world, however, it can take less than a week to

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<sup>377</sup> Van Deventer 2018 <https://www.vandeventers.law/Legal-Articles/entryid/285/property-zoning-and-rezoning-applications-in-south-africa>; Van Wyk 2010 *PELJ* 216-217.

transform one business into another due to the functionality offered by computer program code.<sup>378</sup>

## ***4.2 The Application of Zoning Laws***

Incompatible land usage is a large reason for the imposition of zoning laws.<sup>379</sup> These laws can be seen to differ immensely on national and international level, which means that it would be rather arbitrary to apply a particular jurisdiction's zoning laws to a virtual world. Zoning laws in virtual worlds will thus be significantly influenced by pre-existing legal aspects, but it should be noted that these virtual zoning laws are applicable only to their particular virtual world.

### *4.2.1 Zoning laws in South Africa*

There are three basic land zoning categories in South Africa – residential, business and industrial.<sup>380</sup> All three of these are subject to control measures governed by the following: common and statutory law, general plans, development plans, town planning schemes and restrictive conditions contained in the title deeds of properties.<sup>381</sup>

At this stage, the common and statutory law does not require a discussion. The general plans indicate how a town is laid out and property may not be used if it is in conflict with these plans.<sup>382</sup> The development plans are done by the local authority and indicate rules as to what kind of property may be developed where, for example.<sup>383</sup> Town planning schemes are also prepared by each local authority, and these documents consist of both a scheme map and scheme clauses, which are to be

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<sup>378</sup> See NonFungible 2021 <https://nonfungible.com/blog/here-comes-a-new-trend-construction-on-virtual-land> for more information.

<sup>379</sup> The World Bank date unknown <https://urban-regeneration.worldbank.org/node/39>.

<sup>380</sup> Van Deventer 2018 <https://www.vandeventers.law/Legal-Articles/entryid/285/property-zoning-and-rezoning-applications-in-south-africa>.

<sup>381</sup> Private Property 2015 <https://www.privateproperty.co.za/advice/property/articles/restrictions-on-your-property/3710>.

<sup>382</sup> Private Property 2015 <https://www.privateproperty.co.za/advice/property/articles/restrictions-on-your-property/3710>.

<sup>383</sup> Private Property 2015 <https://www.privateproperty.co.za/advice/property/articles/restrictions-on-your-property/3710>.

read in conjunction with one another.<sup>384</sup> Examples of development controls contained in a town plan are use zones (regulating the use of a property and what may be built on it), density zones (regulating the number of dwellings permissible on various erf sizes), floor area ratios (regulating how much floor space may be utilised for building), height regulations (regulating how high property may be built), coverage regulations (regulating how much building coverage there may be on an erf), building restriction areas (regulating how far buildings must be from the boundaries of properties) and lastly, parking regulations (regulating the number of allowed parking bays).<sup>385</sup> Including restrictive conditions in the title deed of a property serves the aim of creating specific property that certain inhabitants would find appealing. This is why, for instance, some buildings may only be in certain colours.<sup>386</sup> These restrictions can be lifted by applying to the High Court (by way of an order authorising their lifting), but there has to be a good enough reason.<sup>387</sup>

#### *4.2.2 Zoning laws in virtual worlds*

Just as zoning laws differ from local authority to local authority in the real world, so too will virtual zoning laws in a virtual world most likely differ from those of another (if there are any).<sup>388</sup> In the virtual world of *Cryptovoxels*<sup>389</sup> each land parcel has three restrictions – height, width and depth.<sup>390</sup> Despite these restrictions there remains a total lack of virtual zoning laws and, as expected, conflict between virtual

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<sup>384</sup> Private Property 2015 <https://www.privateproperty.co.za/advice/property/articles/restrictions-on-your-property/3710>.

<sup>385</sup> Private Property 2015 <https://www.privateproperty.co.za/advice/property/articles/restrictions-on-your-property/3710>.

<sup>386</sup> Private Property 2015 <https://www.privateproperty.co.za/advice/property/articles/restrictions-on-your-property/3710>.

<sup>387</sup> Private Property 2015 <https://www.privateproperty.co.za/advice/property/articles/restrictions-on-your-property/3710>.

<sup>388</sup> It should be noted that these virtual zoning laws only exist in the virtual world (as decided by the developer), thus it can find no application in the real world.

<sup>389</sup> "Cryptovoxels is a virtual world and metaverse, powered by the Ethereum blockchain. Players can buy land and build stores and art galleries. Editing tools, avatars and text chat are built in". See Cryptovoxels date unknown <https://www.cryptovoxels.com/>.

<sup>390</sup> Haigney 2021 <https://www.curbed.com/2021/04/metaverse-crypto-nfts-cryptovoxels.html>.

neighbours is increasing.<sup>391</sup> The monastery and ranch built by Ogar, a meta-architect in the virtual world of *Cryptovoxels*, will be used as examples.

Ogar was commissioned by a German client to build a monastery on a virtual land piece in *Cryptovoxels*.<sup>392</sup> After the completion of this project, Ogar was commissioned by an American client to build a ranch (complete with virtual animals, farming equipment and related structures) on a virtual plot of land right next to the monastery.<sup>393</sup> The German client felt that the ranch clashed with the aesthetics of the monastery and offered the American client a bigger land parcel if he was willing to move the ranch, but this was to no avail since the American client refused, which forced the monastery and the ranch to co-exist.<sup>394</sup> After all, the American client was well within the height, width and depth restrictions set out by *Cryptovoxels*. There are no other virtual zoning laws in the virtual world of *Cryptovoxels* prohibiting this from happening.

It can be concluded from this example that the inherent value of the virtual land comes into question. Imagine buying one of five virtual seaside properties only to have the other four plots to be used as pirate-themed docks. The chances of the seaside mansion property's value decreasing due to the area it is in are increased in such situations. In *Cryptovoxels* the availability of virtual land is not limited, so this might not always be that big an issue. On the other hand, land is limited in virtual worlds such as *Decentraland*, so the inherent value associated with a virtual land parcel will be of extreme importance when determining the overall value of the parcel.<sup>395</sup>

Another example of a virtual neighbour dispute also involved Ogar, after he built a beach for a client.<sup>396</sup> After the beach had been built, some of the pixels overflowed onto the land parcel of a neighbour, in effect causing an encroachment.<sup>397</sup> Think of it

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<sup>391</sup> Haigney 2021 <https://www.curbed.com/2021/04/metaverse-crypto-nfts-cryptovoxels.html>.

<sup>392</sup> Haigney 2021 <https://www.curbed.com/2021/04/metaverse-crypto-nfts-cryptovoxels.html>.

<sup>393</sup> Haigney 2021 <https://www.curbed.com/2021/04/metaverse-crypto-nfts-cryptovoxels.html>.

<sup>394</sup> Haigney 2021 <https://www.curbed.com/2021/04/metaverse-crypto-nfts-cryptovoxels.html>.

<sup>395</sup> Haigney 2021 <https://www.curbed.com/2021/04/metaverse-crypto-nfts-cryptovoxels.html>.

<sup>396</sup> Haigney 2021 <https://www.curbed.com/2021/04/metaverse-crypto-nfts-cryptovoxels.html>.

<sup>397</sup> Haigney 2021 <https://www.curbed.com/2021/04/metaverse-crypto-nfts-cryptovoxels.html>.

as equivalent to planting a tree on your property, and then after a few years the branches of the tree have grown to such a degree that they are now extended over the property of a neighbour. In the real world the general principle is that such branches may be cut down by the infringed party after reasonable notice has been given to the infringing party to attend to the issue.<sup>398</sup> In the virtual world, this would be a luxury not available to an infringed party, since the code would most likely restrict users from altering the property of another.<sup>399</sup> In response to the overflowing beach pixels, the neighbour set up a billboard with the words "Move your beach. You are on my parcel" in an attempt to resolve the dispute.<sup>400</sup>

An in-depth analysis of zoning problems in virtual land is beyond the scope of this dissertation, but to offer a solution - it is suggested that all developers should set out virtual zoning laws for their respective virtual worlds as they see fit. In the end it is not illegal not to have virtual zoning laws in virtual worlds, nor is it necessary to provide virtual zoning laws (since users of the virtual world can decide beforehand whether or not they wish to build in a virtual world without zoning laws).

### ***4.3 The Application of Fixtures***

The application of fixtures in the real world has been well-defined in South Africa, with a strong precedent being established by the High Court of Appeal in the case of *McDonald Ltd v Radin*.<sup>401</sup> A case regarding the fixtures of virtual property has yet to be heard by a South African court. This allows for the opportunity to interpret how fixtures work in the real world and whether the application thereof in a virtual world would differ, especially when taking into account the various laws of nature each virtual world has.

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<sup>398</sup> Dykes van Heerden 2016 <https://dvh.law.za/neighbour-law-nuisance-falling-leaves-overhanging-branches-water-flow-dispute-resolution/#:~:text=The%20general%20principle%20governing%20overhanging,in%20the%20courts%20whether%20such.>

<sup>399</sup> For example, in Minecraft you can alter the property of another because the code allows for it.

<sup>400</sup> Haigney 2021 <https://www.curbed.com/2021/04/metaverse-crypto-nfts-cryptovoxels.html>.

<sup>401</sup> *McDonald Ltd v Radin and the Potchefstroom Dairies & Industries Co Ltd* 1915 AD 454 (hereafter *McDonald Ltd v Radin*); Perfect Hideaways 2020 <https://perfecthideawaysforsale.co.za/fixtures-when-is-something-permanently-attached-to-a-property/>.

### 4.3.1 Fixtures in South Africa

In South African property law, the concept of a fixture sprouts from the Roman Law principle *superficies solo cedit* which roughly translates to mean that the owner of the land is the owner of everything permanently attached thereto.<sup>402</sup> This is commonly seen to occur by way of *accessio*.<sup>403</sup>

In *Opperman v Stanley*,<sup>404</sup> a part of the plaintiff's farm was rented to the first defendant for a period of seven years.<sup>405</sup> During these years certain improvements were made and the court had to decide whether or not these improvements (a weighbridge and two augers) permanently formed part of the plaintiff's immovable property by way of *accessio*.<sup>406</sup> According to the written lease agreement, both the plaintiff and the first defendant agreed that certain fixed improvements would be made, but that permission from the plaintiff was required and that any fixed improvements would form part of the property of the plaintiff, and that the first defendant would not be entitled to any compensation in respect thereof.<sup>407</sup> In answering the issue at hand the court turned to the traditional approach, as seen in *McDonald Ltd v Radin*,<sup>408</sup> which may be summarised as follows:

The question whether an article originally movable has become immovable through annexation by human agency to realty depends upon the circumstances of each case. The elements chiefly to be considered are the nature of the particular article, the degree and manner of its annexation, and the intention of the person annexing it.<sup>409</sup>

The court concluded that both the weighbridge and the augers could be removed without causing irreparable damage to the property (the land) and therefore could

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<sup>402</sup> Perfect Hideaways 2020 <https://perfecthideawaysforsale.co.za/fixtures-when-is-something-permanently-attached-to-a-property/>.

<sup>403</sup> *Accessio* may be defined as "the addition of something to personal property through the addition of labor." See USLegal date unknown <https://definitions.uslegal.com/a/accession/>; Bingham 1907 *Columbia Law Review* 20.

<sup>404</sup> *Opperman v Stanley* 2010 JDR 1529 (GNP) (hereafter *Opperman v Stanley*).

<sup>405</sup> *Opperman v Stanley* para 3.

<sup>406</sup> *Opperman v Stanley* para 1.

<sup>407</sup> *Opperman v Stanley* para 4.

<sup>408</sup> *McDonald Ltd v Radin*.

<sup>409</sup> *Opperman v Stanley* para 12.

not be classified as immovable or fixed improvements, resulting in the plaintiff's action being dismissed with costs.<sup>410</sup>

#### 4.3.2 Fixtures in virtual worlds

The possible application of fixtures in the virtual world of *Decentraland* and *Mirandus* will be discussed in order to show how different virtual worlds may result in the different application of fixtures, when taking into account the natural laws of the virtual world in which the alleged fixture has been developed.

##### 4.3.2.1 Fixtures in *Decentraland*

In *Decentraland* virtual land parcels may be rented to other players.<sup>411</sup> Should the lessee then decide to attach or programme objects to the virtual land, then the application of the *superficies solo cedit* principle comes into question.

Following the traditional approach as set out in *McDonald Ltd v Radin*,<sup>412</sup> the first element to be considered is the nature of the particular object.<sup>413</sup> Considering the first element, one must examine the fixture to conclude if it is indeed of such a nature and purpose that the fixture forms part of the property (since the fixture is permanently attached and removal thereof will cause damage to the land/property).<sup>414</sup> In a virtual world, such as *Decentraland*, this element would never be fulfilled, since attachment is never permanent, nor would any removal of a virtual object cause damage to the land/property. Some virtual worlds may, however, allow for this possibility, resulting in the first element possibly being fulfilled. The second element to be considered is the degree and manner in which the fixture was annexed.<sup>415</sup> When considering the second element one must decide if the fixture is indeed both physically embedded and attached, inevitably resulting in damages to

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<sup>410</sup> *Opperman v Stanley* paras 16-18.

<sup>411</sup> Republic 2021 <https://republic.co/blog/real-estate/investing-in-decentraland-in-2021>.

<sup>412</sup> *McDonald Ltd v Radin*.

<sup>413</sup> *Opperman v Stanley* para 11.

<sup>414</sup> Perfect Hideaways 2020 <https://perfecthideawaysforsale.co.za/fixtures-when-is-something-permanently-attached-to-a-property/>.

<sup>415</sup> *Opperman v Stanley* para 11.

the land/property if it is to be removed.<sup>416</sup> This element would never be fulfilled since anything in a virtual world (including the virtual world itself) is seen as an incorporeal. Therefore, no physical attachment can ever take place. The latter argument is logical and compelling enough to leave it be, but it seems too narrow and outdated. Should the virtual world allow for land/property to be permanently attached and the removal thereof to cause damages, then this element could be fulfilled despite the element specifically requiring the attachment to be physical. This element has been applied only to disputes in the real world. Thus a precedent has not been set as to how this should apply to virtual worlds (which in turn leaves room for the common law to be developed with regard to fixtures in virtual worlds). The third element to be fulfilled is the intention with which the annexure was done.<sup>417</sup> To fulfil this element, it has to be concluded that the intention of the person who performed the fixture was indeed for the object to permanently attach to the property.<sup>418</sup>

In answering these questions, the court would have to reach a relatively certain conclusion on whether the court was dealing with a fixture or a moveable object. However, it should be noted that (as seen in *McDonald Ltd v Radin*) "each case must depend on its own facts."<sup>419</sup>

#### 4.3.2.2 Fixtures in *Mirandus*

The reason why fixtures in *Mirandus* are important to discuss is due to the approach the developers took in regard to land deeds and structures. In an article published by the developers, *Gala Games* used a homestead as an example.

The homestead is the smallest land deed available for purchase as a non-fungible token and accumulates a plot size of 10x15.<sup>420</sup> The homestead plot consists of three

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<sup>416</sup> Perfect Hideaways 2020 <https://perfecthideawaysforsale.co.za/fixtures-when-is-something-permanently-attached-to-a-property/>.

<sup>417</sup> *Opperman v Stanley* para 11.

<sup>418</sup> Perfect Hideaways 2020 <https://perfecthideawaysforsale.co.za/fixtures-when-is-something-permanently-attached-to-a-property/>.

<sup>419</sup> *Opperman v Stanley* para 10.

<sup>420</sup> Gala Games 2020 <https://blog.gala.games/mirandus-monday-all-about-homesteads-face8ba80e7>.

parts: a 10x10 medium plot, a 5x5 small plot and a 5x5 farming plot.<sup>421</sup> This allows players who, for example, purchased a 10x10 tavern structure as a non-fungible token to place the said structure on the 10x10 medium plot area of the homestead deed owner if an agreement between both parties involved is reached.<sup>422</sup> Should the virtual world of *Mirandus* allow for structures (such as taverns) to be moveable from one location to another, then it should logically be seen as moveable property, if this can be done without causing damage to the land/property of the homestead deed owner. If the placement of such structures can be done only once, then the virtual property becomes immovable and the possibility for it to be classified as a fixture becomes strong. Should *Mirandus* be designed this way, then the first two elements will be fulfilled without much difficulty, leaving only the element of intention up for debate. The player permanently attaching a structure to a plot of land to which another player is the deed owner obviously knows that that such an attachment is permanent and the land to which the structure is attached is owned by another. Therefore, it seems that all elements will be easily fulfilled, resulting in it being extremely difficult for a court to not conclude that all structures in *Mirandus* become fixtures as soon as attachment to a plot occurs.

Despite the above logically making sense when interpreting the law around property and fixtures, it seems rather unfair and one-sided. All of the possible issues arising out of fixtures can easily be avoided should developers simply make structures moveable. Therefore, it is recommended that virtual land should be dealt with as immovable, but the structures placed upon the virtual land should be dealt with as moveable (assuming that the whole concept the virtual world aims to achieve is not contrary to this).

#### ***4.4 Constitutional Protection of Virtual Property in South Africa***

The right to property has been recognised as fundamental in South Africa since the Interim Constitution and the property clause contained therein came into effect in

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<sup>421</sup> Gala Games 2020 <https://blog.gala.games/mirandus-monday-all-about-homesteads-face8ba80e7>.

<sup>422</sup> Gala Games 2020 <https://blog.gala.games/mirandus-monday-all-about-homesteads-face8ba80e7>.

1993.<sup>423</sup> Currently, the fundamental right to property is protected in terms of the property clause as seen in section 25 of the Constitution. For this chapter non-fungible tokens will be limited to include only non-fungible tokens coupled with virtual property (specifically virtual land), but in order for the virtual property associated with the non-fungible token to be constitutionally protected against state interference it must first qualify as property in terms of section 25 of the Constitution.<sup>424</sup> If virtual property does not qualify as property then it would not be granted constitutional protection and the research question would also remain moot.

As a starting point, any interpretation of the property clause should be done in terms of the provisions set out in section 39(1) of the Constitution due to this section being applicable to all fundamental rights.<sup>425</sup> It seems that section 25(4)(b) of the Constitution applies a broad definition to property since it simply states that "property is not limited to land". The Constitutional Court, in the *First Certification* case,<sup>426</sup> also went on to apply a broad interpretation of the concept "property" in terms of the Constitution after accepting that the institutionalisation of property is possible, even if a clause expressly guaranteeing a right to property is absent.<sup>427</sup> This broad definition, in the constitutional law context, is supported by both Alexander<sup>428</sup> and Van der Walt.<sup>429</sup> A logical presumption would thus be that virtual property does indeed qualify as property in terms of the Constitution and should be awarded Constitutional protection (should the need for it arise). Following the presumption that virtual property is constitutionally protected, it is still unclear as to who is being protected and against what virtual property is being protected.

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<sup>423</sup> Muller *et al Silberberg and Schoeman's: The Law of Property* 607; Section 28 of the *Constitution of the Republic of South Africa* 200 of 1993.

<sup>424</sup> Bekker *Defining virtual property in terms of the constitutional property clause* 30; Kellerman *The Constitutional Property Clause and Immaterial Property Interests* 168.

<sup>425</sup> Muller *et al Silberberg and Schoeman's: The Law of Property* 609-611.

<sup>426</sup> *Ex parte Chairperson of the Constitutional Assembly: In re Certification of the Constitution of the Republic of South Africa* 1996 (10) BCLR 1253 (CC) (hereafter the *First Certification* case) para 72.

<sup>427</sup> Muller *et al Silberberg and Schoeman's: The Law of Property* 616-617; The *First Certification* case para 72.

<sup>428</sup> Bekker *Defining virtual property in terms of the constitutional property clause* 36; Alexander *The Global Debate Over Constitutional Property* 163.

<sup>429</sup> Bekker *Defining virtual property in terms of the constitutional property clause* 36; Van der Walt *Constitutional Property Law* 86-87.

According to section 8 of the Constitution, the Bill of Rights is applicable to all natural and juristic persons in South Africa. As to what the virtual property is protected against, the answer can be interpreted from section 25 to be state interference, in the unconstitutional form of either deprivation or expropriation, with regard to the property of a natural or juristic person (hereafter persons). The need for this protection arises due to the vertical relationship, which results in an imbalance of power, between the state and persons.<sup>430</sup> On the other hand, persons have a horizontal relationship with one another.<sup>431</sup> Despite developers having a horizontal relationship with the users in the real world, as soon as users enter the virtual world a vertical relationship starts to exist between the user's avatar and the developer. The reasoning for this is that the differing power relationship between the user and developer automatically ascribes the developer powers similar to that of a state over its citizens.

With these analogous powers existing between the state and the developer, deprivation and expropriation are property infringements that will need to be discussed since it is not impossible for the situation to arise in which deprivation or expropriation will be attempted in a virtual world by either the developers or the state. For example, if there are a hundred plots of virtual land and one person buys 90% thereof but does not use it, the virtual world will most likely not be as popular due to 90% thereof being unused and solely owned. Should something like this happen, all the years spent developing the virtual world could be seen as wasted. Would the developer then be able to expropriate the virtual land of a user or would the user be protected from the expropriation? To answer this, both deprivation and expropriation will need to be discussed in detail. It is important to note, however, that in terms of section 25 of the Constitution property rights may be constitutionally infringed either by way of deprivation or expropriation. It is necessary to differentiate between these terms since the formal requirements differ and one therefore needs

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<sup>430</sup> See Section 8(1) of the Constitution, which states: "The Bill of Rights applies to all law, and binds the legislature, the executive, the judiciary and all organs of state."

<sup>431</sup> See Section 8(2) of the Constitution, which states: "A provision of the Bill of Rights binds a natural or a juristic person if, and to the extent that, it is applicable, taking into account the nature of the right and the nature of any duty imposed by the right."

to identify the infringement in order to determine whether the infringement is indeed valid and justifiable in terms of section 36(1) of the Constitution, or unconstitutional.

#### *4.4.1 Deprivation*

Deprivation can be defined as "limitations on the use, enjoyment and exploitation of property in the public interest."<sup>432</sup> Most deprivations are done without compensation, since section 25(1) of the Constitution places no obligation to pay any compensation for the deprivation of property. This section does, however, set out formal requirements in order to legitimately deprive a person of property. Section 25(1) of the Constitution reads as follows:

No one may be deprived of property except in terms of law of general application, and no law may permit arbitrary deprivation of property.

The first requirement for the deprivation of property is that the said deprivation be done in terms of a law of general application. This requirement appears not only in the property clause but also in the limitation clause found in section 36 of the Constitution. Despite no clear definition of the law of general application, law can be classified as such if it has been properly adopted and applied in general.

The second requirement is that the laws that permit the deprivation of property may not be arbitrary. In the *FNB case*<sup>433</sup> it was concluded that arbitrariness may be neither substantive, nor procedural.<sup>434</sup> Substantive law<sup>435</sup> in the real world differs immensely from that in virtual worlds. Depending on the choice of the virtual world one may, for example, deprive others of their property if the natural laws of that world allow for this. Procedural law<sup>436</sup> would, therefore, also differ from that of the real world depending on the substantive law of the virtual world a user is in and the developer-player contract regulations. With there being many virtual worlds, each with its own virtual laws, the best option to determine if deprivation was arbitrary or

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<sup>432</sup> Marais 2015 *ISSN* 2983.

<sup>433</sup> *First National Bank of SA Ltd t/a Wesbank v Commissioner for the South African Revenue Service* 2002 (7) BCLR 702 (CC) (hereafter the *FNB case*).

<sup>434</sup> Muller *et al Silberberg and Schoeman's: The Law of Property* 631; The *FNB case* para 100.

<sup>435</sup> Law that regulates how people in a certain jurisdiction may behave.

<sup>436</sup> Law that regulates how the substantive law is procedurally enforced.

not would be to apply the concept of proportionality.<sup>437</sup> This would allow for an arbitrary deprivation to be unconstitutional but justifiable in terms of section 36(1) of the Constitution.

The last requirement, although not explicitly mentioned, is that the deprivation should be for a public purpose or in the public interest. This requirement is assumed by the working of comparative law.<sup>438</sup> With most virtual worlds accommodating players from all over the world, the nature of the public interest can be rather controversial and problematic, since the public interest of an American user, for instance, would probably differ from that of a South African user. For this reason it is recommended that when determining public interest the courts should interpret the public purpose of the reasonable person in the virtual world in question instead of focussing on a specific jurisdiction or only certain users. This would ensure that justice is impartial and non-discriminatory, as envisaged by the United Nations.<sup>439</sup>

Should all three requirements for the deprivation of property be met, then the deprivation would be valid. If the deprivation does not meet all three requirements, then it is unconstitutional and illegal - if it cannot be justified in terms of the limitation clause.

#### *4.4.2 Expropriation*

Expropriation can be defined as the acquisition of property for a public purpose upon which compensation is payable towards the affected person.<sup>440</sup> It is seen as a subspecies of deprivation in terms of South African law,<sup>441</sup> so in order for it to be valid it must meet the requirements of section 25(1) of the Constitution and the requirements set out in section 25(2) and (3) of the Constitution. Section 25(2) of the Constitution reads as follows:

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<sup>437</sup> This concept can be found in Section 36(1) of the Constitution.

<sup>438</sup> Muller *et al Silberberg and Schoeman's: The Law of Property* 637-638.

<sup>439</sup> United Nations date unknown <https://www.un.org/ruleoflaw/thematic-areas/access-to-justice-and-rule-of-law-institutions/access-to-justice>.

<sup>440</sup> Section 25 of the Constitution.

<sup>441</sup> Muller *et al Silberberg and Schoeman's: The Law of Property* 647; The *FNB* case para 57.

Property may be expropriated only in terms of law of general application (a) for a public purpose or in the public interest; and (b) subject to compensation, the amount of which and the time and manner of payment of which have either been agreed to by those affected or decided or approved by a court.

Section 25(3) of the Constitution reads as follows:

The amount of the compensation and the time and manner of payment must be just and equitable, reflecting an equitable balance between the public interest and the interest of those affected, having regard to all relevant circumstances, including (a) the current use of the property; (b) the history of the acquisition and use of the property; (c) the market value of the property; (d) the extent of direct state investment and subsidy in the acquisition and beneficial capital improvement of the property; and (e) for the purpose of expropriation.

Before the requirements of expropriation can be met, the requirements of deprivation need to be met due to expropriation being a subspecies of deprivation.<sup>442</sup> The first requirement of expropriation can therefore be seen to be that the expropriation needs to be done in terms of a law of general application.<sup>443</sup> The second requirement is that the expropriation needs to be for a public purpose or in the interest of the public.<sup>444</sup> The approach is the same as in deprivation, above. The final requirement is that compensation needs to be paid to those affected by the expropriation in the prescribed methods.<sup>445</sup>

#### *4.4.3 The constitutionality of property infringements in virtual worlds*

With deprivation and expropriation having been discussed in detail, there seems to be no reason as to why virtual land would be exempt from deprivation or expropriation by the state (assuming the property infringement is either constitutional or justifiable). What remains a problem is whether or not a developer would be able to infringe on the virtual land of users by way of deprivation or expropriation.

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<sup>442</sup> See footnote 441.

<sup>443</sup> Section 25(2) of the Constitution.

<sup>444</sup> Section 25(2)(a) of the Constitution.

<sup>445</sup> Section 25(2)(b) of the Constitution.

In Van der Walt's notes and comments on the *Modderklip case*,<sup>446</sup> he states the following:

... (a) s 25(1)-(3) probably does not have any direct horizontal application, because both deprivation and expropriation are actions that can only be undertaken with the necessary state authority, although (b) these provisions could find (normal, vertical) application whenever a private person acts in a way that both qualifies as deprivation or expropriation and can be ascribed to the state for some reason, and (c) s 25 finds indirect horizontal application, in the s 39(2) sense of 'radiation' or development of the common law, just like any other provision in the Bill of Rights.<sup>447</sup>

When applying these notes and comments to virtual land, it can be said with certainty that any deprivation or expropriation by the developer would be arbitrary. Furthermore, any deprivation or expropriation done by the developer would most likely not be ascribed to the state (unless the developer is, for example, court ordered to deprive or expropriate the virtual land of a user). The only possibility left would then be for section 25 of the Constitution to find an indirect horizontal application which is justifiable under section 39(2) of the Constitution. Section 39(2) of the Constitution states the following:

When interpreting any legislation, and when developing the common law or customary law, every court, tribunal or forum must promote the spirit, purport and objects of the Bill of Rights.<sup>448</sup>

When interpreting Van der Walt's notes and comments, as well as section 39(2) of the Constitution, the possibility may exist for developers to deprive or expropriate the virtual land of users if it can be justified in terms section 39(2) of the Constitution. It is proposed that this justification for the deprivation or expropriation be done by way of the doctrine of utilitarianism.<sup>449</sup> In terms of the example presented in Chapter 4.4, the developer of the said world would need to convince the court as to why the expropriation of one user owning 90% (who is neither using nor selling any of it) of the virtual land in a virtual world is justifiable. The first and most obvious reason

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<sup>446</sup> *President of the Republic of South Africa v Modderklip Boerdery (Pty) Ltd* 2005 (8) BCLR 786 (CC) (hereafter the *Modderklip case*).

<sup>447</sup> Van der Walt 2005 21 *SAJHR* 156; Muller *et al Silberberg and Schoeman's: The Law of Property* 611-612.

<sup>448</sup> Section 39(2) of the Constitution.

<sup>449</sup> "Utilitarianism is a philosophical and economic doctrine that the best social policy is that which does the most good for the greatest number of people." See USLegal date unknown <https://definitions.uslegal.com/u/utilitarianism/>.

would be to prove that it is *contra bonos mores* since justifiable economic and social development, as seen in section 24(b)(iii) of the Constitution, is not being promoted. The second way would be for the developer to prove that citizens are not gaining access to land on an equitable basis, as seen in section 25(5) of the Constitution. The third and final possibility would be to argue that the property right of the user is to be limited in terms of section 36(1) of the Constitution. This section reads as follows:

The rights in the Bill of Rights may be limited only in terms of law of general application to the extent that the limitation is reasonable and justifiable in an open and democratic society based on human dignity, equality and freedom, taking into account all relevant factors, including (a) the nature of the right; (b) the importance of the purpose of the limitation; (c) the nature and extent of the limitation; (d) the relation between the limitations and its purpose; and (e) less restrictive means to achieve the purpose.<sup>450</sup>

With the above in mind, any deprivation or expropriation of virtual land will always be unconstitutional. Despite the unconstitutionality, it would be a matter for the court to decide whether or not the said property infringement is justifiable in terms of section 39(2) of the Constitution. Should developers find themselves in a situation in which deprivation or expropriation is needed, then they are not without a remedy and may approach a court to prove the justification thereof to allow the developers to undertake the deprivation or expropriation.

#### *4.4.4 Remedies for unlawful property infringements in virtual worlds*

Before discussing the remedies for unlawful property infringements in virtual worlds, some confusion may need to be cleared up regarding as to how a developer would be able to deprive or expropriate the virtual land of a user which is represented by a non-fungible token. The first way would be for the user to transfer the non-fungible token to the developers for them to take control of the virtual land. Should this not be the case then the developers are able to alter the code of the virtual world, resulting in the virtual world not acknowledging the non-fungible token. This is rather like an indirect expropriation since the user still owns the virtual land, but in the virtual world that virtual land would not exist (since the coordinates can be replaced

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<sup>450</sup> Section 36(1) of the Constitution.

by a new plot of virtual land represented by a non-fungible token). Should this situation occur, then a user may have some remedies available.

The first remedy would be the *actio negatoria*. This remedy would compel the developer to restore the *status quo* of a user if there had been any interference with the user's enjoyment of his property and should structures have been unlawfully placed on a user's property then this remedy would allow for the removal of those structures.<sup>451</sup> The second remedy would be the *rei vindicatio*. This remedy allows a user to reclaim property from whoever is unlawfully holding it. Due to the nature of the virtual world, the infringement could easily be remedied by simply restoring the *status quo ante* by way of code (this would be the same for non-fungible tokens, unless the non-fungible tokens are in possession of the developer – a transfer of the non-fungible tokens would be more likely then).<sup>452</sup>

Other non-property remedies may include a delictual claim for damages, an unjust enrichment claim and even contractual remedies.<sup>453</sup>

#### **4.5 Virtual Land Court Cases**

The virtual land court cases to be discussed will be based on two popular court cases concerning the virtual world offered by *Second Life*.<sup>454</sup> In *Second Life* virtual land (which can be described as a 3D representation of virtual world space) is virtual space that *Linden Lab* licenses.<sup>455</sup> These virtual spaces are stored on the *Second Life* servers and are made available to users in the form of virtual units.<sup>456</sup> With nearly half a million acres<sup>457</sup> of virtual land in the world of *Second Life*, users are granted the opportunity to buy land and customise it in almost any way they see fit.<sup>458</sup> To

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<sup>451</sup> This will most likely be the remedy used when deprivation has unlawfully taken place.

<sup>452</sup> This will most likely be the remedy used when expropriation has unlawfully taken place.

<sup>453</sup> The contractual remedies would mostly be remedies for the developer. See heading 10 at Linden Lab 2021 <https://www.lindenlab.com/tos>.

<sup>454</sup> See Chapter 1.1 for background on *Second Life*.

<sup>455</sup> See heading 3.4 at Linden Lab 2021 <https://www.lindenlab.com/legal/second-life-terms-and-conditions>.

<sup>456</sup> See heading 3.4 at Linden Lab 2021 <https://www.lindenlab.com/legal/second-life-terms-and-conditions>.

<sup>457</sup> Roughly 202 342 Hectare.

<sup>458</sup> Second Life date unknown <https://secondlife.com/land/faq>.

buy virtual land users need to pay an initial fee on the available piece of land they want and afterwards the users have to pay an ongoing fee for the rent of the land, because the land takes up virtual space on the servers and servers cost money to maintain.<sup>459</sup> A way of seeing this would be to compare the ongoing rent of virtual land with municipal rates and taxes in the real world. Note, however, that the wording used by *Linden Lab* is that of virtual space/a virtual unit, not virtual property. As an owner of virtual land in *Second Life*, the owner does not have any property rights in the owned land. The owner merely has a limited licence<sup>460</sup> to access the land and the features associated with it.<sup>461</sup>

Despite the virtual world of *Second Life* not making use of any blockchain technology or non-fungible tokens, the court cases to be discussed below remain relevant to researching how virtual property in virtual worlds has been dealt with. This in turn allows for a better perspective on how virtual land may be dealt with when non-fungible tokens do find application.

#### 4.5.1 *Bragg v Linden Research, Inc*

In this case Marc Bragg (hereafter Bragg) sued *Linden Research Inc* and its Chief Executive Officer, Philip Rosedale, (hereafter collectively *Linden Lab*) after contending that his virtual property has been unlawfully confiscated and that he had been denied access to the virtual world of *Second Life*.<sup>462</sup> Bragg further contended that he had an ownership interest in the virtual property maintained in the virtual world of *Second Life*.<sup>463</sup>

In 2005, after the statements regarding the ownership of virtual property in *Second Life*,<sup>464</sup> Bragg went on to "invest" in virtual land since he was of the opinion that he would gain ownership interest in the virtual land because of the representations

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<sup>459</sup> With non-fungible tokens, however, a gas fee is paid only once to transfer the non-fungible token to the buyer; *Second Life* date unknown <https://secondlife.com/land/faq>.

<sup>460</sup> Referred to as a "Virtual Land License".

<sup>461</sup> See heading 3.4 at *Linden Lab* 2021 <https://www.lindenlab.com/legal/second-life-terms-and-conditions>.

<sup>462</sup> *Bragg v Linden Research Inc*.

<sup>463</sup> *Bragg v Linden Research Inc*.

<sup>464</sup> See Chapter 1.1 for more information.

made by *Linden Lab*.<sup>465</sup> On 30 April 2006 a dispute arose after Bragg bought a piece of virtual land for \$300. According to *Linden Lab* this was done by way of an exploit and thus froze Bragg's account, resulting in Bragg not only not having access to the server (and thus his virtual property), but also in him losing all of his virtual property and *Linden Dollars* connected to the account.<sup>466</sup> Unfortunately this case was settled outside court before a judgment or opinion on Bragg's ownership interest in the virtual land could be given. Despite this, it seems that Bragg was indeed deprived of his virtual property following the expropriation thereof.

#### 4.5.2 *Evans v Linden Research, Inc*

In the case of *Evans v Linden Research, Inc* a class action suit was brought against *Linden Lab*. The class action claimed that *Linden Lab* had unilaterally terminated or suspended their accounts and had not compensated them for the value of their "property", which resulted in unjust enrichment for *Linden Lab*.<sup>467</sup> Furthermore, the class action stated that false representations of ownership of property in *Second Life* had been made and that their "property" had therefore wrongfully been confiscated.<sup>468</sup>

The basis of the claim can be traced back to the statement made by *Linden Lab* when *Second Life* began.<sup>469</sup> Later *Linden Lab* changed its terms of service to ensure that users agreed that they had no ownership rights in *Second Life*, since the terms of service, as can be seen at time of writing, now state that "virtual land is in-world space that we license".<sup>470</sup> This all-or-nothing approach established in the terms of service empowers only *Linden Lab*. No matter what the users chose, the decision would have gone against them in one way or another. As *Linden Lab* did not offer them any other relief possibilities the class-action members decided to seek help

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<sup>465</sup> *Bragg v Linden Research Inc.*

<sup>466</sup> *Bragg v Linden Research Inc.*

<sup>467</sup> *Evans v Linden Research Inc.*

<sup>468</sup> *Evans v Linden Research Inc.*

<sup>469</sup> See Chapter 1.1 for more information.

<sup>470</sup> *Evans v Linden Research Inc*; See heading 3.4 at Linden Lab 2021 <https://www.lindenlab.com/legal/second-life-terms-and-conditions>.

from the judiciary. In the end the class action settlement was approved by the court and compensation was awarded to the users for the loss of their property.<sup>471</sup>

Despite the campaign of Philip Rosedale and the original wording on the *Linden Lab* homepage, after the *Evans v Linden Research, Inc* case *Linden Lab* compensated all *Second Life* users affected by the false property rights statements. This resulted in current and subsequent users of *Second Life* not having any property rights in the virtual land they own in *Second Life* (as stated in the current terms of service). All *Second Life* users therefore acknowledge that they have no property rights when deciding to use *Second Life* and are therefore aware of the risk of losing everything they own in the virtual world without compensation at the mercy of *Linden Lab*. Despite the developer-player contract not acknowledging the existence of any virtual property in *Second Life* as property, this does not mean that users are without remedies, since property is objectively determined and not subjectively determined by way of contract.<sup>472</sup> The non-acknowledgement of virtual property by the developers of *Second Life* therefore does not override the objective determination courts tend to use. Since *Linden Lab* does not offer any remedies in the developer-player contract, any affected user may seek external help through the courts.

#### 4.5.3 *The application of non-fungible tokens*

If the virtual land in the above court cases were to be owned as non-fungible tokens, then the actions of *Linden Lab* would most likely constitute an arbitrary deprivation and/or expropriation of virtual property. Non-fungible tokens and limited licences to use property do differ to a wide extent and any comparison made would need to be detailed, but all of this would be to no avail since it does not contribute to answering the research question of this dissertation. What remains important is that non-fungible tokens would have made the above cases much simpler since the ownership of the virtual land in question would have been easily provable and any changes to the terms of service might allow the *Consumer Protection Act* and other remedies to

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<sup>471</sup> *Evans v Linden Research Inc.*

<sup>472</sup> *Muller et al Silberberg and Schoeman's: The Law of Property* 617.

be applicable.<sup>473</sup> This is a small example of the extent to which non-fungible tokens influence virtual worlds and virtual property.

#### **4.6 Conclusion**

Chapter Four has dealt with virtual land as a topic on its own, due to the uncertainty surrounding the legal aspects applicable to virtual land being sold as non-fungible tokens in virtual worlds. This chapter started off by examining how land supply and the inherent value of land are used to determine the overall value of the property in the real world. Functionality was then proposed as a third determiner of value when dealing with virtual land.

With non-fungible tokens granting property rights to the owners of virtual land, there is no doubt that permitting free reign over a virtual world would lead to incompatible land uses. For this reason, the application of zoning laws in South Africa was examined, followed by a discussion concerning the application of zoning laws in virtual worlds. With height, width and depth being the common restrictions land parcels in virtual worlds face, these restrictions are not nearly enough to constitute fully fledged zoning laws. This lack of regulation could lead to the inherent value of land either diminishing or increasing, depending on how other users tend to use their land situated in close proximity to that of the user in question. This creates a rather large problem since the land value can constantly fluctuate due to the high functionality virtual land offers. It is possible to buy a virtual land parcel in an area dominated by houses only to wake up next morning to an exact replica of the Trojan Horse used by the Greeks during the Trojan War. Ignoring how absolutely fascinating this is, situations like this do indeed influence the land value, which leads to investments in virtual land becoming much more risky, which in turn causes the market value of the virtual land to become rather worthless as a true indication of value. This can also lead to users abusing the property they own in order to frustrate other users into selling their virtual land for much less than it might actually be

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<sup>473</sup> LexisNexis 2021  
<https://www.lexisnexis.com/communities/corporatecounselnewsletter/b/newsletter/archive/2017/03/07/actual-legal-questions-raised-by-virtual-reality-from-assault-to-virtual-property-rights-to-intellectual-property-concerns.aspx>.

worth. As zoning laws in the real world differ immensely on both national and international level, it was proposed that developers should set out their own virtual zoning laws to ensure that users are allowed the option of making informed choices before investing in the virtual land sold in a specific virtual world.

The next problematic area in which non-fungible tokens are influencing virtual worlds and virtual property is the application of fixtures. As there is a lack of case law with regard to the application of fixtures in virtual worlds, the application of fixtures in South Africa (the real world) was discussed and then theoretically applied to virtual worlds to determine whether or not the applicable legal aspects would differ. As all virtual worlds differ in one way or another, the theoretical application was done in terms of the virtual world of *Decentraland* and *Mirandus*. It was found that fixtures in virtual worlds should not be a problem at all. Virtual land offers high functionality and thus any fixtures can simply be removed by way of computer program code which can restore the virtual land as it was before the alleged fixture took place. Should the virtual world allow for the application of fixtures, then I see no reason why the legal aspects relating to fixtures as contractually agreed upon would not find application when a dispute should arise. It is suggested that such disputes should be avoided in most virtual worlds, since they can raise unnecessary jurisdictional and property rights issues, which fall outside the scope of this dissertation.

An important issue pertaining to land has always been the deprivation and expropriation thereof. With virtual land qualifying as property in terms of section 25 of the Constitution, to ignore the applicability of these two infringements on virtual land would be a grave mistake. The constitutional protection of virtual property in South Africa was therefore included in this chapter. The similarities and differences between deprivation and expropriation were set out and discussed in full, and this was followed by a discussion of the constitutionality of these infringements in virtual worlds and the remedies sprouting from these unlawful property infringements when dealing with virtual worlds. It was concluded that deprivation and expropriation might possibly be undertaken by the developers, with the necessary court approval, if the situation warranted these infringements.

The final part of this chapter examined two popular virtual land court cases. Unfortunately, in neither of these cases did the court give a ruling (since both cases were settled outside court), nor was the virtual land in question represented by non-fungible tokens. Despite this, it could still be shown that deprivation and expropriation do indeed find application in virtual worlds (even more so due to the influence of non-fungible tokens).

This chapter is therefore able to conclude with the statement that non-fungible tokens are without doubt influencing virtual worlds and virtual property – specifically when dealing with virtual land.

## Chapter 5: Cyber Law

### 5.1 Background

The real world is full of celebrities and a Nigerian Prince or two. Unfortunately, so is the internet. People often receive data messages out of the blue from someone either claiming to be royalty or someone famous, who may promise a once-in-a-lifetime investment opportunity or simply just ask for money with the guarantee of returning it at least twofold.<sup>474</sup>

Commonly known as the Nigerian Prince Scam, which originated somewhere in the 1990s,<sup>475</sup> these kinds of internet fraud are nothing new and evolves almost in conjunction with technology. In 2019 alone more than 700 000 USD were lost to the Nigerian Prince Scam.<sup>476</sup> As a South African it becomes increasingly hard to claim that one will not somewhere in the future, if not already, fall victim to one of these scams. With approximately 2.2 billion Rand being lost a year in South Africa due to cyber attacks, it is painfully clear why we as a country are rated as having the third-highest number of cybercrime victims worldwide.<sup>477</sup>

Whether this happens because the victim is old, uneducated or just an impulsive thrill seeker – this dissertation does not focus on why people are victims of cyber fraud.<sup>478</sup> Instead, this chapter hones in on whether or not virtual property will actually qualify as property in terms of private law. This will then allow for the South African victims of such cybercrimes and various other cyber illegalities to have certain remedies at their disposal whilst also allowing for the possibility of prosecution against the perpetrator by way of the *Cybercrimes Act*.

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<sup>474</sup> Leonhardt 2019 <https://www.cnbc.com/2019/04/18/nigerian-prince-scams-still-rake-in-over-700000-dollars-a-year.html>.

<sup>475</sup> Laughlin 2021 <https://www.siue.edu/its/news/2021/03/the-prince-is-back.shtml>.

<sup>476</sup> Leonhardt 2019 <https://www.cnbc.com/2019/04/18/nigerian-prince-scams-still-rake-in-over-700000-dollars-a-year.html>.

<sup>477</sup> Matshead 2020 <https://www.masthead.co.za/newsletter/cybercrime-in-south-africa/#:~:text=A%20disturbing%20fact%20from%20this,a%20year%20to%20cyber%2Dattack> S.

<sup>478</sup> Whitty 2019 *Journal of Financial Crime* 277.

## ***5.2 Private Protection of Virtual Property in South Africa***

In terms of constitutional law property can be interpreted in a broad sense,<sup>479</sup> but it is defined in a narrow sense in private law.<sup>480</sup> The main problems arising from interpreting virtual property as property in terms of the private law are that virtual property is incorporeal and the value thereof is either not acknowledged (due to the developer-player contract) or is not quantifiable. It is necessary to bear in mind that the latter would not apply to non-fungible tokens, since their value is determinable and provable. Should an incorporeal, therefore, be classified as property in private law, this would be done by way of an exception.<sup>481</sup>

In his LLD-dissertation Cloete states that this narrow interpretation is not generally accepted.<sup>482</sup> Cloete goes on to discuss how the wide interpretation of property in terms of the Constitution may be afforded to the private law context of property due to property not being limited by corporeality in terms of the Constitution.<sup>483</sup> Cloete explains that either a pragmatic approach needs to be adopted in the private law context of property, to include corporeal and incorporeal objects that have use and value, or the wide interpretation of the Constitution must be used to accommodate incorporeal objects.<sup>484</sup> Cloete does note, however, that public and private property law need to be distinguished from each other.<sup>485</sup> This is due to the Constitution already offering protection to certain interests and rights. Thus, there is no need to offer protection in terms of property.<sup>486</sup> Cloete therefore proposes that *ad hoc* legislation be issued in certain situations to offer the necessary protection.<sup>487</sup>

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<sup>479</sup> See Chapter 4.4 for more information.

<sup>480</sup> In the private law context property needs to have the following characteristics: corporeality, an impersonal nature, being external to a person, independent existence, susceptibility to human control, and use and value to a person. See Erlank *Property in Virtual Worlds* 220.

<sup>481</sup> Bekker *Defining virtual property in terms of the constitutional property clause* 16; Erlank *Property in Virtual Worlds* 220.

<sup>482</sup> Cloete *Onstoflike Sake in die Nuwe Suid-Afrikaanse Sakereg* 4; Erlank *Property in Virtual Worlds* 221.

<sup>483</sup> Cloete *Onstoflike Sake in die Nuwe Suid-Afrikaanse Sakereg* 6, 332.

<sup>484</sup> Cloete *Onstoflike Sake in die Nuwe Suid-Afrikaanse Sakereg* 331-333.

<sup>485</sup> Cloete *Onstoflike Sake in die Nuwe Suid-Afrikaanse Sakereg* 333.

<sup>486</sup> Cloete *Onstoflike Sake in die Nuwe Suid-Afrikaanse Sakereg* 333.

<sup>487</sup> Cloete *Onstoflike Sake in die Nuwe Suid-Afrikaanse Sakereg* 333.

*Ad hoc* legislation for the protection of intellectual property has already been promulgated in South Africa.<sup>488</sup> However, the *Cybercrimes Act* shows development in the recognition and protection of virtual property in South Africa. The most important part of the *Cybercrimes Act* in relation to the protection of virtual property would be section 12, which states that "the common law offence of theft must be interpreted so as to not exclude the theft of incorporeal property."<sup>489</sup> South Africa currently defines theft as "an unlawful and intentional appropriation of a moveable corporeal property."<sup>490</sup> Despite South African courts not yet having heard a case dealing with the theft of virtual property in virtual worlds, the courts have heard cases in which incorporeal property was offered protection against theft.<sup>491</sup> In *S v Harper*<sup>492</sup> the court determined that an incorporeal is capable of being stolen<sup>493</sup> and in *S v Ndebele*<sup>494</sup> the court held that *contrectatio*<sup>495</sup> is constituted when an appropriation deprives an owner of the characteristics of a thing to which it attaches.<sup>496</sup>

### **5.3 Foreign Law Cases**

Some Asian and Western legal systems, unlike South Africa, have developed further in terms of the protection of virtual property. Due to the theoretical nature of this dissertation and South Africa's lack of precedent and legislation protecting virtual property, foreign court cases will be discussed below in order to show how virtual property is dealt with and remedied in foreign countries.<sup>497</sup> Unfortunately none of

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<sup>488</sup> Examples include the *Trade Marks Act* 194 of 1993 and *Copyright Act* 98 of 1978.

<sup>489</sup> Section 12 of the *Cybercrimes Act*.

<sup>490</sup> *Ndayi v S* [2002] ZAFSHC 11 para 6; Snyman *Criminal Law* 469.

<sup>491</sup> Examples include *S v Ndebele* 2012 1 SACR 245 (GSJ), *S v Kotze* 1961 1 SA 118 (SCA) and *S v Mintoor* 1996 1 SASV 514 (K).

<sup>492</sup> *S v Harper* 1981 2 SA 638 (D).

<sup>493</sup> *S v Harper* 1981 2 SA 638 (D) para 664.

<sup>494</sup> *S v Ndebele* 2012 1 SACR 245 (GSJ).

<sup>495</sup> *Contrectatio* means to handle the property of another. See USLegal date unknown <https://definitions.uslegal.com/c/contrectatio>.

<sup>496</sup> This is most likely why the characteristics of virtual property is determined in the virtual world, and not sold as part of the non-fungible token, as to avoid appropriation when changes need to be made to the virtual world and virtual property within; *S v Ndebele* 2012 1 SACR 245 (GSJ) paras 254-255.

<sup>497</sup> Note that, due to the language barrier, most of these foreign court cases were discussed from secondary sources. This is, however, a commonly accepted practice when researching the field of virtual property law.

these court cases deal with non-fungible tokens, but they nevertheless remain relevant to this chapter and to the overall aim of the dissertation.

### 5.3.1 China

The first case to be discussed is that of *Zhang Bin*.<sup>498</sup> Zhang sold an account connected to the virtual world *Paradise* to Mr. Shen and then proceeded to steal back the account. Zhang was shortly thereafter arrested for theft by the local police and his case was heard in the Ningbo Haishu District Court. The court found that virtual property is capable of being stolen because not only is it controllable and transferable, but it is so without losing value. Zhang was therefore sentenced to one year imprisonment (with a two-year suspension of the sentence) and received a fine. Developers would argue that neither the account nor the virtual items connected to the account is seen as virtual property due to the developer-player contract. In the *Zhang* case the court did not mention this developer-player contract and it can be logically concluded that the court approached virtual property objectively. Therefore, no regard needs to be paid to the subjective element in which the developer decides to define virtual property. It does seem, however, that the court focussed mainly on whether the virtual goods were indeed of value or not.<sup>499</sup>

The second case is *Li Hong Cheng*.<sup>500</sup> Li was a player in the virtual world *Red Moon* and had his account hacked, resulting in him losing all of his virtual property inside the virtual world. Using contract and consumer law, Li sued the *Arctic Ice Science and Technology, Inc* (*Red Moon's* developers) and the Beijing Chaoyang District People's Court found that *Arctic Ice Science and Technology, Inc* (as a service provider) was responsible for a player's in-game property. The court did not base this finding on whether the property was virtual or not, but on if it indeed had value. The

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<sup>498</sup> *Zhang Bin*, Ningbo Haishu District Court (date unknown). See Martindale *Criminal Prosecution for Virtual Property Theft*, Erlank *Property in Virtual Worlds* 93.

<sup>499</sup> *Zhang Bin*, Ningbo Haishu District Court (date unknown). See Martindale *Online Games and Virtual Property*.

<sup>500</sup> *Li Hong Cheng*, Feb 2003 Chaoyang District Court. See Martindale *Online Games and Virtual Property*, Erlank *Property in Virtual Worlds* 91.

court struggled in determining the value and therefore ruled that Li's virtual property be restored to him instead of that he should be monetarily compensated.<sup>501</sup>

### 5.3.2 South Korea

A South Korean Judge, Yoon, analysed Korean cases with specific focus on virtual property and Real Money Trade (RMT).<sup>502</sup> Yoon argued that the clauses in developer-player contracts which ban RMT are of doubtful legal validity since they are an infringement of the players' right to the intangible value they created.<sup>503</sup> Yoon concluded that developers do not take an active role in regulating RMT, resulting in increased revenue for them, and should a problem occur then the players need to seek external remedies by way of the courts due to the clauses banning RMT.<sup>504</sup>

### 5.3.3 The Netherlands

In Western legal systems the Dutch Court of Leeuwarden had an interesting case in which two teenagers were convicted of theft after using violence and threats to steal virtual items belonging to another teenager.<sup>505</sup> Article 310 of the Dutch Criminal Code has the aim of protecting "goods" but it needed to be decided by the court whether virtual property does indeed classify as goods under this article.<sup>506</sup> The court ruled that goods can have value despite that value not being quantifiable.<sup>507</sup> The two teens received sentences of 160 hours community service, which needed to be completed in 12 months, and were also required to return the stolen items to their rightful owner.

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<sup>501</sup> Also see the *Qi Jian*, Dec 2004 Jinhua Wucheng District Court and *Zeng*, Jan 2006 Shenzhen Nanshan District Court cases in which theft was not an appropriate charge due to it not being possible to accurately quantify the monetary value of virtual goods. See Martindale *Online Games and Virtual Property*.

<sup>502</sup> Yoon 2004 SSRN 1.

<sup>503</sup> Yoon 2004 SSRN 50.

<sup>504</sup> Yoon 2004 SSRN 50.

<sup>505</sup> LJN: BG0939, Rechtbank Leeuwarden, 17/676123-07 VEV; Erlank *Property in Virtual Worlds* 95-97.

<sup>506</sup> Article 310 of the Criminal Code (*Wetboek van Strafrecht*).

<sup>507</sup> This is important because South Africa objectively determines what classifies as property (As seen in Chapter Three), but here the subjective value the victim attached to the virtual property was a deciding factor.

#### *5.3.4 Remedies for South Africans*

Due to the different nature of each virtual world and the developer-player contracts regulating them, each case before a court would have to be decided on the basis of an *ad hoc* analysis of the facts in order to determine the correct remedies applicable.

The first factor to take into account is if it is the developer, the player or a third party who has allegedly been affected. Third parties are not part of the developer-player contract and therefore third parties would have no contractual remedies available to them (since they are not bound by the developer-player contract). The second factor is to determine the virtual law applicable in the virtual world. Real-world remedies would not be applicable if the virtual world allows for such infringements. The last factor to determine is whether or not the alleged infringement did indeed infringe on the virtual property of the person allegedly affected. It has been said that virtual property is likely to obtain protection in both the constitutional and private law sense, but virtual worlds are managed differently and have different purposes.

The court cases above seem to focus on whether the virtual property had monetary or sentimental value and then went on to remedy the infringement by awarding either compensation or the return of the virtual property. In South Africa it is likely that the *rei vindicatio*, *actio negatoria* and *mandament van spolie* (spoliation order) would be the three applicable property remedies available to affected users. These remedies could possibly also be accompanied by a delictual claim for damages and an unjustified enrichment claim. Contractual remedies would likely also be available to the developer and the player. It all depends on the *ad hoc* analysis of the facts.

#### **5.4 Cyber Law in South Africa**

In this section of the text, the cyber laws applicable will be discussed in terms of cybercrimes, malicious communications and jurisdiction. All of these heading are found in the *Cybercrimes Act*, and are deemed by me to be the most important when dealing with virtual worlds and non-fungible tokens.

### 5.4.1 Cybercrimes

For the purpose of discussing cybercrimes, the virtual world of *Earth 2* will be used as an example.<sup>508</sup> The homepage describes *Earth 2* as follows:

Earth 2 is a futuristic concept for a second earth; a metaverse, between virtual and physical reality in which real-world geolocations on a sectioned map correspond to user generated digital virtual environments. These environments can be owned, bought, sold, and in the near future deeply customized.<sup>509</sup>

*BigfryTV*, a YouTube channel, disagrees with this definition and would rather describe *Earth 2* as a clown factory firing on all cylinders.<sup>510</sup> The reasoning behind this is due to many people considering *Earth 2* to be nothing more than a scam.<sup>511</sup>

Despite an overwhelming amount of scam claims, the developers of *Earth 2* assured the public that this is not true and that *Earth 2* is still in different phases of development. Phase 1 of *Earth 2*, which attends to users claiming virtual land, is currently live, and this phase represents the central global body which has the aim of determining the ownership of digital assets and property inside the virtual world of *Earth 2*.<sup>512</sup> The trading platform that launched with this phase allows for users to "buy and trade virtual land inside Earth 2".<sup>513</sup> Phase 2 will focus on resources, which involves the virtual land inside *Earth 2*, to start generating resources which are vital for building and economic purposes.<sup>514</sup> These resources will also be tradable and this phase is expected to be released as early as possible in 2021.<sup>515</sup> Phase 3 will focus

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<sup>508</sup> In *Gods Unchained* (a card game in which the cards can be represented by non-fungible tokens and then traded) people are taking screenshots of official cards and are using those images to create non-fungible token that are not useable in-game (since they are not official cards). This unlawful and intentional misrepresentation that amounts to actual and potential prejudice can be seen as fraudulent behaviour. The reason why *Earth 2* is used as example, and not *Gods Unchained*, is because these unofficial cards are often removed from marketplaces (such as *OpenSea*), making it extremely difficult to obtain sources indicating the fraudulent behaviour. See *Gods Unchained* 2021 <https://godsunchained.com/> for more information on the game.

<sup>509</sup> Earth 2 2021 <https://earth2.io/>.

<sup>510</sup> See BigfryTV 2021 <https://www.youtube.com/watch?v=PwpRocLJHyw>.

<sup>511</sup> Dilmegani 2021 <https://research.aimultiple.com/earth2/>; Mohapatra 2021 <https://www.timesnownews.com/business-economy/real-estate/article/people-are-buying-digital-real-estate-on-earth-2-should-one-tread-with-caution/761632>.

<sup>512</sup> Earth 2 2021 <https://earth2.io/phase-1>; Earth 2 2021 <https://earth2.io/ideology-approach-phases>.

<sup>513</sup> Earth 2 2021 <https://earth2.io/phase-1>.

<sup>514</sup> Earth 2 2021 <https://earth2.io/ideology-approach-phases>.

<sup>515</sup> Earth 2 2021 <https://earth2.io/ideology-approach-phases>.

on the terrain system and, at the time of writing, all that is known about this phase is that there is more to come!<sup>516</sup> Phase 2 has still not been implemented in 2021, nor has there been any indication regarding progress in developing this phase.

5.4.1.1 Cyber fraud

Section 8 of the *Cybercrimes Act* sets out the offence of cyber fraud as follows:

Any person who unlawfully and with the intention to defraud makes a misrepresentation (a) by means of data or a computer program; or (b) through any interference with data or a computer program as contemplated in section 5 (2) (a), (b) or (e) or interference with a computer data storage medium or a computer system as contemplated in section 6 (2) (a), which causes actual or potential prejudice to another person, is guilty of the offence of cyber fraud.

With this definition and *Earth 2* in mind, a deeper investigation into ponzi and pyramid schemes becomes necessary to determine whether or not the developers of *Earth 2* would be guilty of cyber fraud at this stage.

According to Nedbank, a ponzi scheme is "a scheme that is operated by fraudsters who con people into investing their hard-earned money in a business venture or investment that promises high returns in a short period of time."<sup>517</sup> These schemes are always illegal and tend to collapse when recruitment slows down due to the money of new investors being used to pay the older investors.<sup>518</sup> To now compare *Earth 2* to a ponzi scheme would be rather far-fetched. The developers of *Earth 2* are not making promises of any high returns in a short period of time. On the contrary, when one examines the statement of purpose supplied on their website it can clearly be seen that they do have long-term goals for the virtual world (albeit minimal, and there is not much progress to support their statement).<sup>519</sup> It is also stated on their website that "we are still in the early stages and there is no pressure to claim land",

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<sup>516</sup> Earth 2 2021 <https://earth2.io/ideology-approach-phases>.

<sup>517</sup> Nedbank date unknown  
<https://www.nedbank.co.za/content/nedbank/desktop/gt/en/aboutus/legal/fraud-awareness/pyramid-and-ponzi-schemes.html>.

<sup>518</sup> Nedbank date unknown  
<https://www.nedbank.co.za/content/nedbank/desktop/gt/en/aboutus/legal/fraud-awareness/pyramid-and-ponzi-schemes.html>.

<sup>519</sup> Earth 2 2021 <https://earth2.io/>.

which does not tie in with the short timeframe mentioned in the Nedbank definition of a Ponzi scheme.<sup>520</sup>

Despite *Earth 2* clearly not fitting into the description of a ponzi scheme, what remains rather alarming are the two referral systems offered by *Earth 2*. The first referral system is that of Periodic Bonuses in which in-game credits are received for playing and owning land when other players buy property located in the same country as that in which you own virtual land (property).<sup>521</sup> The second referral system is that of a 5% bonus in which users buying land will be granted the opportunity to enter a referral code which results in the purchaser getting 5% back on the purchase and the owner of the referral code will be given 5% credit when the sale is concluded.<sup>522</sup> On the website of *Earth 2*, which explains the referrals, it is stated that users should "be sure to ask a friend to join so you can exchange referral codes and receive your extra credit", which is starting to sound like a pyramid scheme. A pyramid scheme is "an illegal investment practice in which individuals recruit others to invest their money, which is then paid to the earlier investors."<sup>523</sup> It is important to note that companies which make use of multi-level marketing, such as *Herbalife*, are not necessarily considered pyramid schemes and thus illegal, since these businesses involve the selling of products.<sup>524</sup> The use of referrals is also not illegal and many companies make use of this kind of guerrilla marketing strategy.<sup>525</sup>

*Earth 2* clearly makes use of a referral system in which friends of current users are recruited as a way to get more users and money into the virtual world. This fits into the definition which requires those recruited to invest money. Referral systems are nothing new, but what makes the referral system of *Earth 2* intriguing is that money needs to be invested before the referral will work. This again fits into the definition, which requires those recruited to invest money. As soon as the referral takes place,

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<sup>520</sup> Earth 2 2021 <https://earth2.io/>.

<sup>521</sup> Earth 2 2021 <https://earth2.io/benefits>.

<sup>522</sup> Earth 2 2021 <https://earth2.io/benefits>.

<sup>523</sup> New York State Attorney General date unknown <https://ag.ny.gov/consumer-frauds/pyramid-schemes>.

<sup>524</sup> Hayes 2021 <https://www.investopedia.com/terms/p/pyramidscheme.asp>; Nedbank date unknown <https://www.nedbank.co.za/content/nedbank/desktop/gt/en/aboutus/legal/fraud-awareness/pyramid-and-ponzi-schemes.html>.

<sup>525</sup> Don't Panic 2019 <https://www.dontpaniclondon.com/what-is-guerrilla-advertising/>.

in-game credit (which is a kind of virtual currency) will be granted to both the purchaser and owner of the referral code.<sup>526</sup> Nowhere is it stated that this virtual currency found in-game is backed by anything, so it can be assumed that the value is worthless since nothing prevents the developers of *Earth 2* from creating more in-game currency. This could lead to problems if all users of *Earth 2* wish to withdraw their funds (since the possibility exists that the in-game funds are actually a misrepresentation not only of the liquidity of the company, but also of how much money users actually have). It remains questionable whether or not it is indeed the money of the new investors which is being used to pay the older investors and referrals. During my research I could find no reason as to why this would be needed (although this is probably the case in order to maintain the liquidity of the company).

Giving *Earth 2* the benefit of the doubt, the only debatable point which remains is whether or not *Earth 2* makes use of multi-level marketing (which requires the selling of products).<sup>527</sup> To date the only thing being sold on *Earth 2* is virtual land, which is "not a product, but an ownership share of three-dimensional space."<sup>528</sup> According to *Earth 2* there is more to come, however, in the following phases of the virtual world that will involve the selling of products.<sup>529</sup> Whether this will happen or not is anyone's guess at this point. It is therefore not possible at this stage to decide whether *Earth 2* is a ponzi or a pyramid scheme (so if it turns out to be a scam, it is a really good one), but this does not exclude the applicability of cyber fraud in the near future.

A better example which comes rather close to home and has already been adjudicated upon is that of Kholiwe Moses Janda. After hacking into the JB Marks municipal account, situated in Potchefstroom, Janda went on to transfer 1.7 million

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<sup>526</sup> Earth 2 2021 <https://earth2.io/benefits>.

<sup>527</sup> Hayes 2021 <https://www.investopedia.com/terms/p/pyramidscheme.asp>.

<sup>528</sup> Murray 2018 <https://www.fresheconomicthinking.com/2018/09/what-is-land-it-is-not-product-but.html#:~:text=What%20is%20land%3F-,It%20is%20not%20a%20product%2C%20but%20an,share%20of%20three%2Ddimensional%20space&text=Instead%2C%20land%20is%20a%20bundle,owner%20of%20a%20land%20title>.

<sup>529</sup> Earth 2 2021 <https://earth2.io/>.

ZAR into his own business account.<sup>530</sup> After finally being caught, Janda was charged with fraud and money laundering, and he is now serving 15 years on each charge.<sup>531</sup> It is clear that the internet does not provide criminals with an opportunity to avoid culpability. Users in virtual worlds who are considering scamming other users out of their virtual property should therefore tread lightly – especially in South Africa.

#### *5.4.2 Malicious Communications*

Data messages from various places all around the world both inside and outside virtual worlds can become malicious at any time. This section of the chapter aims to explore how malicious communications can affect users of virtual worlds and non-fungible tokens. Furthermore, discussion of the legal aspects applicable will help the understanding of how malicious data messages can be transmitted inside and outside of virtual worlds by way of non-fungible tokens.

##### 5.4.2.1 Data message which incites damage to property or violence

Imagine a group of gamers playing *Rust*.<sup>532</sup> Making use of the global text chat in game, these gamers decided to plan a raid (which involves inciting virtual violence and damage to virtual property against other players with the hope of getting some good loot at the end of the day). This would by no means be illegal, since raiding is a game mechanic found in-game which forms part of the natural laws of the virtual world of *Rust*.<sup>533</sup> So when, then, would a data message which incites damage to property or violence be illegal? Section 14 of the *Cybercrimes Act* sets out the answer as follows:

Any person who discloses, by means of an electronic communications service, a data message to a person, group of persons or the general public with the intention to incite (a) the causing of any damage to property belonging to; or (b) violence against, a person or a group of persons, is guilty of an offence.

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<sup>530</sup> van der Westhuizen 2021 <https://potchefstroomherald.co.za/93971/cyber-hacker-who-stole-r17-from-jb-marks-sentenced/>.

<sup>531</sup> van der Westhuizen 2021 <https://potchefstroomherald.co.za/93971/cyber-hacker-who-stole-r17-from-jb-marks-sentenced/>.

<sup>532</sup> "Rust is a multiplayer-only survival game". See Kim 2021 <https://za.ign.com/rust/149785/news/heres-why-everyones-playing-rust-again>.

<sup>533</sup> Rustafied 2021 <https://www.rustafied.com/raiding-in-rust>.

With basically anything being able to be represented by a non-fungible token, data messages are not excluded. An example would be the first ever tweet, posted by Jack Dorsey (Twitter's founder and CEO), which reads "just setting up my twttr" and sold for an astonishing amount of 2.9 million USD.<sup>534</sup> Should a non-fungible token then represent a data message which incites violence or property damage, the owner of the non-fungible token will most likely be guilty of the offence set out in section 14 of the *Cybercrimes Act* (as seen above).

#### 5.4.2.2 Data message which threatens persons with damage to property or violence

Inciting violence or damage to property by means of a data message is not the only way in which these messages can be harmful. Section 15 of the *Cybercrimes Act* reads as follows:

A person commits an offence if they, by means of an electronic communications service, unlawfully and intentionally discloses a data message, which (a) threatens a person with (i) damage to property belonging to that person or a related person; or (ii) violence against that person or a related person; or (b) threatens a group of persons or any person forming part of, or associated with, that group of persons with (i) damage to property belonging to that group of persons or any person forming part of, or associated with, that group of persons; or (ii) violence against the group of persons or any person forming part of, or associated with, that group of persons, and a reasonable person in possession of the same information, with due regard to all the circumstances, would perceive the data message, either by itself or in conjunction with any other data message or information, as a threat of damage to property or violence to a person or category of persons contemplated in paragraph (a) or (b), respectively.

With data messages found in non-fungible tokens or virtual worlds being by no means exempt from this section, people who make use thereof should be careful when sending data messages (even if they do so virtually by way of an avatar). A prime example of this would be the then 19-year-old Josh Pillault, who on the fourth of October 2012 got into an argument on *Runescape*.<sup>535</sup> After being told that he was insane and urged to commit suicide, Josh replied that he would "level" Oxford High (a local high school in Mississippi), which message was followed by his statement

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<sup>534</sup> Ledger Insights 2021 <https://www.ledgerinsights.com/jack-dorsey-sells-his-first-tweet-as-an-nft-for-2-9-million/>.

<sup>535</sup> Wood 2018 <https://www.pcgamer.com/man-jailed-6-years-for-threats-made-in-runescape-finally-released/>.

that he was waiting to "blow brains out of skulls".<sup>536</sup> Josh was arrested four days later by the Federal Bureau of Investigation (FBI) and charged with "knowingly and wilfully communicating a threat by means of the internet, an instrument of interstate and foreign commerce, concerning an attempt to kill and injure individuals and unlawfully damage and destroy buildings by means of fire and explosives."<sup>537</sup> Josh felt that he was innocent and stated that he had never had any intention of killing a person, but his court-appointed attorney told him that "if the words are spoken, it is a crime", which convinced Josh to plead guilty after nine months of defending his innocence.<sup>538</sup> In the end Josh was sentenced to six years in prison.<sup>539</sup>

For even casual gamers this would seem excessive. Virtual worlds, and most likely soon non-fungible tokens too, are full of toxic behaviour.<sup>540</sup> This does not, however, provide persons with a "get out of jail free card" just because others are doing the same. People, including those who communicate by way of avatars in virtual worlds, should take responsibility for their actions, and however excessive the sentence might seem, it serves as an example for people that their virtual actions do indeed have real-world consequences. Despite Josh's claims that he never had the intention to hurt anyone, his messages were indeed sent intentionally and such threats should indeed be dealt with before they develop into much worse situations.<sup>541</sup>

Despite the above case being in the jurisdiction of the United States of America, I can see no reason as to why these facts would not be applicable to an offence in terms of section 15 of the *Cybercrimes Act*.

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<sup>536</sup> Wood 2018 <https://www.pcgamer.com/man-jailed-6-years-for-threats-made-in-runescape-finally-released/>.

<sup>537</sup> Wood 2018 <https://www.pcgamer.com/man-jailed-6-years-for-threats-made-in-runescape-finally-released/>.

<sup>538</sup> Wood 2018 <https://www.pcgamer.com/man-jailed-6-years-for-threats-made-in-runescape-finally-released/>.

<sup>539</sup> Wood 2018 <https://www.pcgamer.com/man-jailed-6-years-for-threats-made-in-runescape-finally-released/>.

<sup>540</sup> Wired 2020 <https://www.wired.com/story/toxicity-in-gaming-is-dangerous-heres-how-to-stand-up-to-it/>.

<sup>541</sup> Wired 2020 <https://www.wired.com/story/toxicity-in-gaming-is-dangerous-heres-how-to-stand-up-to-it/>.

#### 5.4.2.3 Disclosure of data message of intimate image

Zoe Scaman, who founded *Bodacious*, tweeted in March 2021 that "From now on, if you send me an unsolicited dick pic or a shitty message, I'm going to turn it into an NFT, etching it onto the blockchain with your name attached as the artist."<sup>542</sup> With such lewd behaviour clearly wrong and illegal, Scaman's proposed actions might also not be legal. Section 16(1) of the *Cybercrimes Act* clearly states the following:

Any person ("A") who unlawfully and intentionally discloses, by means of an electronic communications service, a data message of an intimate image of a person ("B"), without the consent of B, is guilty of an offence.<sup>543</sup>

Section 16(2) of the *Cybercrimes Act* then goes on to set out the meaning of person "B" and an intimate image as follows:

For the purposes of subsection (1) – (a) "B" means (i) the person who can be identified as being displayed in the data message; (ii) any person who is described as being displayed in the data message, irrespective of the fact that the person cannot be identified as being displayed in the data message; or (iii) any person who can be identified from other information as being displayed in the data message; and (b) "intimate image" means a depiction of a person (i) real or simulated, and made by any means in which (aa) B is nude, or the genital organs or anal region of B is displayed, or if B is a female person, transgender person or intersex person, their breasts, are displayed; or (bb) the covered genital or anal region of B, or if B is a female person, transgender person or intersex person, their covered breasts, are displayed; and (ii) in respect of which B so displayed retains a reasonable expectation of privacy at the time that the data message was made in a manner that (aa) violates or offends the sexual integrity or dignity of B; or (bb) amounts to sexual exploitation.<sup>544</sup>

Whether the received image of male genitalia was unsolicited or not falls outside the scope of this dissertation, but the proposed actions by Scaman are indeed worth discussing. The first problem would be copyright, but this was discussed in detail in Chapter Three. The second problem relevant to this section would be that the image is to be represented by a non-fungible token, with the person who sent the image to be labelled as the author thereof. In terms of section 16(2)(b) of the *Cybercrimes Act*, Scaman would indeed have received an intimate image (since there is a reasonable expectation of privacy and the image contains nudity). However, section

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<sup>542</sup> *Sic*, Stavros 2021 <https://www.insidehook.com/article/internet/dick-pic-nfts>.

<sup>543</sup> *Sic*.

<sup>544</sup> *Sic*.

16(2) of the *Cybercrimes Act* requires the person depicted in the image to be identified, described or otherwise identifiable. Therefore, should an image of only a male's genitalia be uploaded to the blockchain as a non-fungible token, then in most cases I can see no way in which the person in the image may be identifiable, which in turn does not meet the requirements of this section. Scaman did in fact state that she would attach the name of the sender of the image to the image itself, which would make that person easily identifiable as the author, therefore, fulfilling the requirements of this section.

It is clear from a consideration of section 16 of the *Cybercrimes Act* that Scaman would be guilty of an offence if she attached the name of the person who sent the image on the non-fungible token. However righteous and justifiable Scaman's actions may seem, her actions could easily be regarded as illegal and should thus not be undertaken lightly. Various other legal remedies exist for Scaman to use as deterrents against people who send such unsolicited images.

#### 5.4.2.4 Electronic communications service provider to furnish particulars to court

As previously mentioned, one of the key appealing factors of blockchain technology is the amount of privacy it offers to users.<sup>545</sup> With virtual worlds and non-fungible tokens not necessarily offering the same amount of privacy, the possibility still exists that no personal information is needed to use the aforementioned.<sup>546</sup> This complete lack of personal information, which is most likely an outcome of the lack of regulation for this kind of technology, can render it rather difficult to institute an action against an alleged infringer. Section 21 of the *Cybercrimes Act* tends to make it easier to discover this information (should it exist and be available). Before this personal information can be received, it is necessary for section 20(1) and (3) of the *Cybercrimes Act* to be complied with. Section 20(1) of the *Cybercrimes Act* requires the following:

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<sup>545</sup> See chapter 3.1.2.2 for more information.

<sup>546</sup> For example, the only information Axie Infinity requires to play is the user's email address. See The Lunacian 2021 <https://axie.substack.com/p/axie-community-alpha-getting-started>.

A complainant (hereinafter referred to as the applicant) who lays a charge with the South African Police Service that an offence contemplated in section 14, 15 or 16 has allegedly been committed against them, may on an *ex parte* basis in the prescribed form and manner, apply to a magistrate's court for a protection order pending the finalisation of the criminal proceedings to (a) prohibit any person to disclose or further disclose the data message which relates to the charge; or (b) order an electronic communications service provider whose electronic communications service is used to host or disclose the data message which relates to the charge, to remove or disable access to the data message.

Section 20(3) of the *Cybercrimes Act* goes on to state the following:

If the court is satisfied that there (a) is *prima facie* evidence that an offence referred to in section 14, 15 or 16, has allegedly been committed against the applicant; and (b) are reasonable grounds to believe that a person referred to in subsection 1 (a) disclosed the data message in question; or (c) are reasonable grounds to believe that the electronics communications service of the electronic communications provider referred to in subsection 1 (b), is used to host or was or is used to disclose the data message in question, the court may, subject to such conditions as the court may deem fit, issue the order referred to in subsection (1), in the prescribed form.

Should a protection order in terms of section 20(1) of the *Cybercrimes Act* be made, with the court satisfied in terms of section 20(3) of the *Cybercrimes Act* that the protection order must be issued, where the identity or address of the person against whom the order is made is not known the court may do the following in terms of section 21(1) of the *Cybercrimes Act*:

(a) adjourn the proceedings to any time and date on the terms and conditions which the court deems appropriate; and (b) issue a direction in the prescribed form, directing an electronic communications service provider, that is believed to be able to furnish such particulars, to furnish the court in the prescribed manner by means of an affidavit in the prescribed form with (i) the electronic communications identity number from where the data message originated; (ii) the name, surname, identity number and address of the person to whom the electronic communications identity number has been assigned; ... or (vi) an assessment whether or not the electronic communications service provider is in a position to (aa) remove the data message or link to such message; or (bb) disable access to the data message or a link to such data message.

The electronic communications service provider would have five ordinary court days to provide the requested information.<sup>547</sup> This timeline can be extended on the grounds that the information cannot be provided timeously.<sup>548</sup> The direction of the

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<sup>547</sup> Section 21(3)(a) of the *Cybercrimes Act*.

<sup>548</sup> Section 21(3)(b)(i) of the *Cybercrimes Act*.

court may also be cancelled on the grounds that the communications service provider does not provide a service to either the respondent or the complainant, or that the requested information is not available on the records.<sup>549</sup> Should the communications service provider or person in control of the computer program not provide the requested information within the stipulated timeframe, or make a false statement in the affidavit, then the said communications service provider or person in control of the computer program would be guilty of an offence.<sup>550</sup>

Section 21 of the *Cybercrimes Act* truly is a substantial piece of legislation that enables complainants to be protected despite the amount of privacy offered by electronic means and technology. Some digital currency exchangers, such as *VALR* and *Binance*, require users to go through a validation process (which requires personal information such as the user's identification document) before any money can be deposited or withdrawn.<sup>551</sup> The verification process of *Binance* is so rigorous that my identification document in the form of the booklet was denied, because the system only accepts the newly implemented identification document card. I also tried my passport, which expired in 2015, and within minutes the verification was denied. Should any illegal activity then occur from validated users, such digital currency exchangers would be compelled under section 21 of the *Cybercrimes Act* to furnish the court with such information upon request.

#### 5.4.2.5 Penalties

The corresponding penalty for an offence committed in terms of sections 14, 15 or 16 of the *Cybercrimes Act* can be imprisonment (not exceeding three years), a fine or both of the aforementioned.<sup>552</sup> Should the provisions of section 20(9) or (10), 21(7), 22(4) or (8) of the *Cybercrimes Act* be contravened by a communications

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<sup>549</sup> Section 21(3)(b)(ii)(aa)-(cc) of the *Cybercrimes Act*.

<sup>550</sup> Section 21(7)(a)-(b) of the *Cybercrimes Act*.

<sup>551</sup> Binance 2021 <https://www.binance.com/en/support/announcement/96f8819ce9bd429a8e733f87e92a2207>;  
VALR 2021 <https://support.valr.com/hc/en-us/articles/360014053531-What-are-VALR-s-verification-levels->.

<sup>552</sup> Section 19(7) of the *Cybercrimes Act*.

service provider, then upon conviction the sentence could be imprisonment (not exceeding two years), a fine or both of the aforementioned.<sup>553</sup>

Malicious communications found in virtual worlds, non-fungible tokens or on blockchain networks should thus be considered serious offences with real-world consequences.

#### *5.4.3 Jurisdiction*

Virtual worlds and jurisdiction seem to always be issues with regard to private international law. On the other hand, non-fungible tokens can also cause problems in this area due to the technology it functions on. With so many users and developers situated in different jurisdictions, forum shopping<sup>554</sup> by way of law of contract has become a great tool for developers to contractually force users to settle disputes in the jurisdiction chosen by the developers (as seen in the developer-player contract).<sup>555</sup>

As virtual worlds and non-fungible token marketplaces offer services and/or products, section 48(1)(a)(ii) of the *Consumer Protection Act* will find application. This section prohibits a supplier of goods or services from supplying the said goods or services on unfair, unreasonable or unjust terms.<sup>556</sup> It is argued that to limit South Africans to a certain jurisdiction in which the *Consumer Protection Act* and *Cybercrimes Act* do not find application would be unfair, unreasonable and unjust due to the one-sided protection in favour of the developers likely to be found in the jurisdiction chosen by the developer. Assuming that this argument holds, the *Cybercrimes Act* sets out when South African courts would have jurisdiction over such matters. Section 24(1) of the *Cybercrimes Act* reads as follows:

A court in the Republic has jurisdiction to try any offence referred to in Part I or Part II of Chapter 2, if (a) the accused was arrested in the territory of the Republic, on

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<sup>553</sup> Section 23 of the *Cybercrimes Act*.

<sup>554</sup> Forum shopping may be defined as "the practice of choosing the court or jurisdiction that has the most favorable rules or laws for the position being advocated." See Ewert and Weslow 2011 [https://www.wiley.law/media/publication/116\\_Weslow--INTABulletin--05\\_01\\_11.pdf](https://www.wiley.law/media/publication/116_Weslow--INTABulletin--05_01_11.pdf).

<sup>555</sup> McKnight 1993 *De Rebus* 1093-1096; Gala Games 2021 <https://app.gala.games/terms-and-conditions/>.

<sup>556</sup> Section 48(1)(a)(ii) of the *Consumer Protection Act*.

board a vessel, a ship, an off-shore installation or fixed platform, or an aircraft registered or required to be registered in the Republic; (b) the person to be charged is (i) a citizen of the Republic or ordinary resident in the Republic; (ii) a company, incorporated or registered as such under any law, in the Republic; or (iii) any body of persons, corporate or unincorporated, in the Republic; ... or (g) the evidence reveals any other basis recognised by law in terms of which the court may assert jurisdiction to try the offence.

Section 24(1) of the *Cybercrimes Act* can be seen to offer South African courts (which have been approached by victims of cybercrime, malicious communications and other offences) a wide range of jurisdiction when considering how easy it is to commit these crimes from virtually anywhere. This section furthermore expands the aforementioned jurisdiction by way of deeming the offence to be committed in South Africa, as seen in Section 24(2) of the *Cybercrimes Act*, in the following situations:

Any act alleged to constitute an offence referred to in Part I or Part II of Chapter 2 and which is committed outside the Republic by a person other than a person contemplated in subsection (1), must, regardless of whether or not the act constitutes an offence at the place of its commission, be deemed to have been committed in the Republic if (a) that person is extradited to the Republic; or (b) that person (i) is found to be in the Republic; and (ii) is for one or other reason not extradited by the Republic or if there is no application to extradite the person.

Another important section with regard to jurisdiction would be section 24(3) of the *Cybercrimes Act*, which reads as follows:

Where a person is charged with attempting, conspiring, aiding, abetting, inducing, inciting, instigating, instructing, commanding or procuring to commit an offence or as an accessory after the offence, the offence is deemed to have been committed not only at the place where the act was committed, but also at every place where the person so acted.

This description of the offence is rather like the description of theft, which is "a delict continuum of a continuous crime".<sup>557</sup> Despite cybercrimes and malicious communications not necessarily being continuous crimes, section 24(3) of the *Cybercrimes Act* also deems the offence to have been committed at places where the person acted as set out in this section. This is similar to driving a stolen car into the jurisdiction of Lesotho, for example, which would result in Lesotho as well as South Africa having jurisdiction with regard to the theft of the car.

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<sup>557</sup> *Ssengendo v S* (A564/13) [2014] ZAWCHC 147 (22 September 2014) para 27.

It is noteworthy that should an offence referred to in Part I or Part II of Chapter 2 of the *Cybercrimes Act* have been committed outside the Republic, then prosecution may be instituted against the accused only with the written permission of the National Director of Public Prosecutions.<sup>558</sup> The prosecution must also commence before a court designated by the National Director of Public Prosecutions,<sup>559</sup> and the original written permission and designation must be handed in at the said court, whilst a copy thereof must also be served on the accused.<sup>560</sup>

To conclude the discussion on jurisdiction, it seems that the *Cybercrimes Act* offers South African citizens a wide range of protection, no matter where the said offence was committed, and the ability to approach South African courts due to the jurisdiction that is legally awarded to these courts. With technology evolving and cybercrimes being committed all over the world, especially relating to virtual worlds and non-fungible tokens, South Africans should be sure to study the legislation of the above act to ensure that citizens are aware of their rights (even if the offence is done virtually).

## **5.5 Conclusion**

Chapter Five dealt with the private protection of virtual property. This was followed by discussion of the cyber laws applicable to South Africans and others in terms of the *Cybercrimes Act*.

During this chapter it was indicated that various countries, which include South Africa, do indeed protect virtual property (for whatever reason deemed acceptable in each country). The court cases exemplifying such protection were then briefly discussed in order to indicate the possible remedies that might be available to South Africans in similar situations. This was then followed by a discussion of cyber law in South Africa with cybercrimes, malicious communications and jurisdiction being the main points of discussion. With various examples being applied to these points of discussion, the reader will have a sense of how the legal aspects relating to virtual

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<sup>558</sup> Section 24(4)(a)(i) of the *Cybercrimes Act*.

<sup>559</sup> Section 24(4)(a)(ii) of the *Cybercrimes Act*.

<sup>560</sup> Section 24(4)(b) of the *Cybercrimes Act*.

worlds and virtual property will be changed due to the legal protection offered to South African citizens in terms of the *Cybercrimes Act* and the influence of non-fungible tokens. These changes will then also serve as indication of the extent as to how non-fungible tokens are influencing virtual worlds and virtual property.

## **Chapter 6: Overview and Conclusion**

### ***6.1 Overview***

With so much to take into account, an overview will be given below to orientate the reader before the overall conclusion is drawn.

In Chapter One a background was given as to what non-fungible tokens are and how they are being used in virtual worlds. A problem statement was derived from this background, which led to the formulation of a research question, which was followed by a hypothesis of my own. It was hypothesised that the introduction of non-fungible tokens influences virtual worlds and virtual property to a wide extent, specifically as to the remedies available to the users of virtual worlds and virtual property.

Chapter Two drew on the interplay between virtual worlds and the law by discussing the sources of law applicable to virtual worlds, followed by discussion of the five stages in which a virtual world may be. This chapter indicated how different virtual worlds in different stages integrate with the law, and thus the reader was already exposed to the idea of legal aspects changing due to the influence of non-fungible tokens.

Chapter Three started by supplying the reader with a rudimentary simplification of blockchain technology, cryptocurrencies and the legal status of such in South Africa. With this background given, the sources of law applicable to non-fungible tokens were then discussed. Out of these sources of law it was found that ownership, intellectual property and consumer protection were three topics that adversely affected many users of non-fungible tokens due to the uncertain extent to which non-fungible tokens are influencing virtual worlds and virtual property. These topics were then discussed in full, with particular attention to the interplay between non-fungible tokens and the law, whilst also providing an understanding of how non-fungible tokens influence virtual worlds and virtual property.

Chapter Four proceeded to focus on virtual land and the constitutional protection of virtual property. A background was given as to how land, including virtual land,

derives value. This was followed by discussion of the application of zoning laws and fixtures on virtual land from a South African perspective. The constitutional protection of virtual property in South Africa was then discussed, with deprivation and expropriation being the two property infringements examined in detail. This chapter then concluded with a discussion of virtual land court cases and what the application of non-fungible tokens in such cases would result in.

As virtual property is constitutionally protected, Chapter Five started by examining the private protection of virtual property in South Africa. This was followed by a discussion of foreign case law, out of which possible remedies for South Africans in similar situations were deduced. Cyber law in South Africa then became the focus of this chapter, which examined cybercrimes, malicious communications and jurisdiction. Each of these topics was then discussed in full, with some examples being given to indicate the application of the *Cybercrimes Act*.

## **6.2 Conclusion**

The research question in this dissertation was "To what extent does the introduction of non-fungible tokens influence virtual worlds and virtual property?"

By now it should be clear that this is not a research question that can be answered in full within the limits of this dissertation. The legal aspects relating to the interplay between virtual worlds and virtual property is just too wide. Focus was therefore directed to specific topics, and the legal aspects related to those topics were then applied to non-fungible tokens in order to indicate the extent of the influence that non-fungible tokens have on virtual worlds and virtual property. When examining the latter, it was deduced that non-fungible tokens are indeed changing the legal aspects relating to the interplay between virtual worlds and virtual property, but that in most cases these changes also fit into an existing legal framework. Generally no need arises for *ad hoc* legislation to regulate non-fungible tokens, since the existing legal framework already does this. The legal aspects and the changes associated with them are thus not always the problem. In most cases the problem is how these legal aspects are to be applied to non-fungible tokens when dealing with virtual worlds

and virtual property, specifically when considering all the remedies that came to light due to the influence of non-fungible tokens on virtual worlds and virtual property. This in turn proved my hypothesis to be true.

To give a definitive answer as a conclusion to this study, it seems that the changing legal aspects and remedial possibilities associated with virtual worlds and virtual property after the introduction of non-fungible tokens are proof of the wide influence this technology has on virtual worlds and virtual property.

## **BIBLIOGRAPHY**

### ***Literature***

Alexander 2006 *The Global Debate over Constitutional Property*

Alexander GS 2006 *The Global Debate over Constitutional Property* (The University of Chicago Press 2006)

Baydakova 2021 <https://www.coindesk.com/from-paper-to-cardano-blockchain-iohk-in-ethiopia>

Baydakova A 2021 *Cardano in Africa: Inside IOHK's Ethiopia Blockchain Deal* <https://www.coindesk.com/from-paper-to-cardano-blockchain-iohk-in-ethiopia> accessed 27 October 2021

Bekker *Defining virtual property in terms of the constitutional property clause*

Bekker L *Defining virtual property in terms of the constitutional property clause* (LLM-dissertation North-West University 2014)

Bitcoin *Bitcoin: A Peer-to-Peer Electronic Cash System*

Bitcoin *Bitcoin: A Peer-to-Peer Electronic Cash System* (2008) available at <https://bitcoin.org/bitcoin.pdf> accessed 1 November 2021

Brand and Lotz 2005 *LAWSA*

Brand FDJ and Lotz JG "Enrichment" 2005 *LAWSA* 207-243

Cloete *Onstoflike Sake in die Nuwe Suid-Afrikaanse Sakereg*

Cloete R *Onstoflike Sake in die Nuwe Suid-Afrikaanse Sakereg* (LLD-dissertation University of South Africa 2001)

Cornish, Llewelyn and Aplin *Intellectual Property: Patents, Copyright, Trade Marks and Allied Rights*

Cornish WR, Llewelyn D and Aplin T *Intellectual Property: Patents, Copyright, Trade Marks and Allied Rights* (Sweet & Maxwell London 2013)

du Plessis 2015 *PELJ*

du Plessis WJ "Valuation in the constitutional era" 2015 *PELJ* 1726-1759

Erlank 2013 *De Jure*

Erlank W "Acquisition of ownership inside virtual worlds" 2013 *De Jure* 770-782

Erlank "Digital Property"

Erlank W "Digital Property" in Van der Merwe DP (ed) *Information and Communications Technology Law* 3<sup>rd</sup> ed 2021 (LexisNexis) (forthcoming)

Erlank "Property and Sovereignty in Virtual Worlds"

Erlank W "Property and Sovereignty in Virtual Worlds" in Smith JC *Property and Sovereignty: Legal and Cultural Perspectives* (Ashgate England 2013) 99-124

Erlank *Property in Virtual Worlds*

Erlank W *Property in Virtual Worlds* (LLD-dissertation Stellenbosch University 2012)

Harvey *The Legal Classification of Cryptocurrency in South African Law: An Argument for Classification as Currency*

Harvey NA *The Legal Classification of Cryptocurrency in South African Law: An Argument for Classification as Currency* (LLM-dissertation University of Cape Town 2019)

Kellerman *The Constitutional Property Clause and Immaterial Property Interests*

Kellerman M *The Constitutional Property Clause and Immaterial Property Interests* (LLD-dissertation Stellenbosch University 2011)

Lötz "Purchase and Sale"

Lötz DJ "Purchase and Sale" in Nagel CJ *et al* *Commercial Law* (LexisNexis 2019) 193-211

Marais 2015 *ISSN*

Marais EJ "When does state interference with property (now) amount to expropriation? An analysis of the Agri SA court's state acquisition requirement (part I)" 2015 *ISSN* 2983-3031

Martindale *Criminal Prosecution for Virtual Property Theft*

Martindale *Criminal Prosecution for Virtual Property Theft* (2009) available at [https://www.martindale.com/criminal-law/article\\_Sheppard-Mullin-Richter-Hampton-LLP\\_586720.htm](https://www.martindale.com/criminal-law/article_Sheppard-Mullin-Richter-Hampton-LLP_586720.htm) accessed 27 October 2021

Martindale *Online Games and Virtual Property*

Martindale *Online Games and Virtual Property* (2009) available at [https://www.martindale.com/internet-law/article\\_Sheppard-Mullin-Richter-Hampton-LLP\\_689960.htm](https://www.martindale.com/internet-law/article_Sheppard-Mullin-Richter-Hampton-LLP_689960.htm) accessed 27 October 2021

McKnight 1993 *De Rebus*

McKnight J "Forum-Shopping" 1993 *De Rebus* 1093-1096

Muller *et al Silberberg and Schoeman's: The Law of Property*

Muller G *et al* (eds) *Silberberg and Schoeman's: The Law of Property* 6<sup>th</sup> ed (LexisNexis 2020)

Neethling and Potgieter *Deliktereg*

Neethling J and Potgieter JM *Deliktereg* 7<sup>de</sup> Uitgawe (LexisNexis 2014)

Otto and Kuschke "General Principles of the Law of Contract"

Otto JM and Kuschke B "General Principles of the Law of Contract" in Nagel CJ *et al Commercial Law* (LexisNexis 2019) 23-129

Pistorius "Copyright law"

Pistorius T "Copyright law" in van der Merwe APS *et al Law of Intellectual Property in South Africa* (LexisNexis 2016) 177-356

Scheepers *Analysis of cryptocurrency verification challenges faced by the South African Revenue Service and tax authorities in other BRICS countries and whether SARS' powers to gather information relating to cryptocurrency transactions are on par with those of BRICS countries*

Scheepers J *Analysis of cryptocurrency verification challenges faced by the South African Revenue Service and tax authorities in other BRICS countries and whether SARS' powers to gather information relating to cryptocurrency*

*transactions are on par with those of BRICS countries* (M. Com-dissertation University of Cape Town 2019)

South African Revenue Service *Explanatory Memorandum on the Taxation Laws Amendment Bill, 2020*

South African Revenue Service *Explanatory Memorandum on the Taxation Laws Amendment Bill, 2020* (2021) available at <https://www.sars.gov.za/wp-content/uploads/Legal/ExplMemo/LPrep-EM-2020-03-Explanatory-Memorandum-on-the-TLAB-2020-21-January-2021.pdf> accessed 1 November 2021

Sherman, Javani, Zhang and Golaszewski *On the Origins and Variations of Blockchain Technologies*

Sherman AT, Javani F, Zhang H and Golaszewski E *On the Origins and Variations of Blockchain Technologies* (2018) available at <https://arxiv.org/ftp/arxiv/papers/1810/1810.06130.pdf> accessed 1 November 2021

Slade 2015 *ISSN*

Slade BV "The 'law of general application' requirement in expropriation law and the impact of the Expropriation Bill of 2015" 2015 *ISSN* 346-362

Snyman *Criminal Law*

Snyman CR *Criminal Law* 4<sup>th</sup> ed (LexisNexis Butterworths Durban 2005)

Van der Walt *Constitutional Property Law*

Van der Walt AJ *Constitutional Property Law* (Juta Cape Town 2005)

Van der Walt 2005 21 *SAJHR*

Van der Walt AJ "The state's duty to protect property owners v the state's duty to provide housing: Thoughts on the *Modderklip* case" 2005 21 *SAJHR* 144-161

Van Loggerenberg 2016 *BRICS LJ*

Van Loggerenberg D "CIVIL JUSTICE IN SOUTH AFRICA" 2016 *BRICS LJ* 125-147

Van Wyk 2010 *PELJ*

Van Wyk J "Parallel Planning Mechanisms as a 'Recipe for Disaster' 2010 *PELJ* 214-234

Whitty 2019 *Journal of Financial Crime*

Whitty MT "Predicting susceptibility to cyber-fraud victimhood" 2019 *Journal of Financial Crime* 277-292

World Intellectual Property Organization *Customary Law, Traditional Knowledge and Intellectual Property: An Outline of the Issues*

World Intellectual Property Organization *Customary Law, Traditional Knowledge and Intellectual Property: An Outline of the Issues* (2013) available at [https://www.wipo.int/export/sites/www/tk/en/resources/pdf/overview\\_customary\\_law.pdf](https://www.wipo.int/export/sites/www/tk/en/resources/pdf/overview_customary_law.pdf) accessed 1 November 2021

Yoon 2004 SSRN

Yoon 2004 "Real Money Trading in MMORPG items from a Legal and Policy Perspective" 2004 SSRN 1-59

### ***Case Law***

#### ***China***

*Li Hong Cheng*, Feb 2003 Chaoyang District Court

*Qi Jian*, Dec 2004 Jinhua Wucheng District Court

*Zeng*, Jan 2006 Shenzhen Nanshan District Court

*Zhang Bin*, Ningbo Haishu District Court (date unknown)

#### ***Netherlands***

LJN: BG0939, Rechtbank Leeuwarden, 17/676123-07 VEV

#### ***South Africa***

*Alderson & Flitton (Tzaneen) (Pty) Ltd v EG Duffeys Spares (Pty) Ltd* 1975 (3) SA 41 (T)

*Ex parte Chairperson of the Constitutional Assembly: In re Certification of the Constitution of the Republic of South Africa* 1996 (10) BCLR 1253 (CC)

*First National Bank of SA Ltd t/a Wesbank v Commissioner for the South African Revenue Service* 2002 (7) BCLR 702 (CC)

*Gallo Africa Ltd v Sting Music (Pty) Ltd* 1103 JOC (A) 1108

*Golden China TV Games Centre v Nintendo Co Ltd* [1996] 4 All SA 667 (SCA)

*Haupt t/a Soft Copy v Brewers Marketing Intelligence (Pty) Ltd* 2005 (1) SA 398 (C).

*Haupt t/a Softcopy v Brewers Marketing Intelligence (Pty) Ltd* 2006 (4) SA 458 (SCA)

*Jonker v Thiebaut* (1116/2018) [2019] ZANCHC 16

*McDonald Ltd v Radin and the Potchefstroom Dairies & Industries Co Ltd* 1915 AD 454

*Moneyweb (Pty) Ltd v Media 24 Ltd* (31575/2013) [2016] ZAGPJHC 81

*Ndayi v S* [2002] ZAFSHC 11

*Opperman v Stanley* 2010 JDR 1529 (GNP)

*Peter-Ross v Ramesar* 2008 JDR 0660 (C)

*President of the Republic of South Africa v Modderklip Boerdery (Pty) Ltd* 2005 (8) BCLR 786 (CC)

*Ssengendo v S* (A564/13) [2014] ZAWCHC 147

*S v Harper* 1981 2 SA 638 (D)

*S v Kotze* 1961 1 SA 118 (SCA)

*S v Mintoor* 1996 1 SASV 514 (K)

*S v Ndebele* 2012 1 SACR 245 (GSJ)

*S v Nkala* (20170040) [2017] ZAECGHC 51

### ***United States of America***

*Bragg v Linden Research Inc* 487 FSupp 2d 593 (ED PA 2007)

*Evans v Linden Research Inc* C-11-01078 DMR (ND CAL 2012)

### ***Legislation***

#### ***Netherlands***

Criminal Code (*Wetboek van Strafrecht*) 1881

#### ***South Africa***

*Constitution of the Republic of South Africa* 200 of 1993

*Constitution of the Republic of South Africa*, 1996

*Consumer Protection Act* 68 of 2008

*Copyright Act* 98 of 1978

*Copyright Amendment Act* 56 of 1980

*Cybercrimes and Cybersecurity Bill*

*Electronic Communications and Transactions Act* 25 of 2002

*Income Tax Act* 58 of 1962

*Intellectual Property Law Amendment Act* 28 of 2013

*Intestate Succession Act* 81 of 1987

*Magistrates' Court Act* 32 of 1944

*National Gambling Act* 7 of 2004

*Trade Marks Act* 194 of 1993

### ***International instruments***

*Berne Convention for the Protection of Literary and Artistic Works* (1886)

### ***Internet sources***

ALA TechSource 2009

<https://journals.ala.org/index.php/ltr/article/view/4254/4860#bib3>

ALA TechSource 2009 *From Text-Based Games to 3-D Social Virtual Worlds*

<https://journals.ala.org/index.php/ltr/article/view/4254/4860#bib3> accessed 27 October 2021

Anon date unknown <https://law.jrank.org/pages/5738/Copyright-International-History-Berne-Convention.html>

Anon date unknown *International Copyright*

<https://law.jrank.org/pages/5738/Copyright-International-History-Berne-Convention.html> accessed 27 October 2021

Asia Maritime Transparency Initiative date unknown <https://amti.csis.org/island-tracker/china/#:~:text=China%20has%20%20outposts%20in,and%207%20in%20the%20Spratlys.&text=Since%202013%2C%20China%20has%20engaged,its%20presence%20in%20the%20Paracels>

Asia Maritime Transparency Initiative date unknown *China Island Tracker*

[https://amti.csis.org/island-](https://amti.csis.org/island-tracker/china/#:~:text=China%20has%20%20outposts%20in,and%207%20in%20the%20Spratlys.&text=Since%202013%2C%20China%20has%20engaged,its%20presence%20in%20the%20Paracels)

[tracker/china/#:~:text=China%20has%20%20outposts%20in,and%207%20in%20the%20Spratlys.&text=Since%202013%2C%20China%20has%20engaged,its%20presence%20in%20the%20Paracels](https://amti.csis.org/island-tracker/china/#:~:text=China%20has%20%20outposts%20in,and%207%20in%20the%20Spratlys.&text=Since%202013%2C%20China%20has%20engaged,its%20presence%20in%20the%20Paracels) accessed 27 October 2021

Ayson 2021 <https://help.foundation.app/en/articles/4742850-delete-or-burn-an-nft>

Ayson S 2021 *Delete or burn an NFT*  
[Shttps://help.foundation.app/en/articles/4742850-delete-or-burn-an-nft](https://help.foundation.app/en/articles/4742850-delete-or-burn-an-nft) accessed  
11 November 2021

BBC News 2021 <https://www.bbc.com/news/world-latin-america-57398274>

BBC News 2021 *Bitcoin: El Salvador makes cryptocurrency legal tender*  
<https://www.bbc.com/news/world-latin-america-57398274> accessed 27 October  
2021

BigfryTV 2021 <https://www.youtube.com/watch?v=PwpRocLJHyw>

BigfryTV 2021 *Earth 2 – The Scam that Keeps on Taking*  
<https://www.youtube.com/watch?v=PwpRocLJHyw> accessed 27 October 2021

Binance 2021  
[https://www.binance.com/en/support/announcement/96f8819ce9bd429a8e733f87e9  
2a2207](https://www.binance.com/en/support/announcement/96f8819ce9bd429a8e733f87e92a2207)

Binance 2021 *Updates to Terminologies*  
[https://www.binance.com/en/support/announcement/96f8819ce9bd429a8e733f8  
7e92a2207](https://www.binance.com/en/support/announcement/96f8819ce9bd429a8e733f87e92a2207) accessed 27 October 2021

BitDegree 2021 [https://www.bitdegree.org/crypto/tutorials/proof-of-work-vs-proof-  
of-stake](https://www.bitdegree.org/crypto/tutorials/proof-of-work-vs-proof-of-stake)

BitDegree 2021 *Proof of Work VS Proof of Stake: Which One Is Better?*  
<https://www.bitdegree.org/crypto/tutorials/proof-of-work-vs-proof-of-stake>  
accessed 27 October 2021

Blizzard 2021 [https://www.blizzard.com/en-gb/legal/fba4d00f-c7e4-4883-b8b9-  
1b4500a402ea/blizzard-end-user-license-agreement](https://www.blizzard.com/en-gb/legal/fba4d00f-c7e4-4883-b8b9-1b4500a402ea/blizzard-end-user-license-agreement)

Blizzard 2021 *Blizzard End User License Agreement*  
[https://www.blizzard.com/en-gb/legal/fba4d00f-c7e4-4883-b8b9-  
1b4500a402ea/blizzard-end-user-license-agreement](https://www.blizzard.com/en-gb/legal/fba4d00f-c7e4-4883-b8b9-1b4500a402ea/blizzard-end-user-license-agreement) accessed 27 October 2021

Buck 2018 [https://www.drivingsales.com/lara-buck/blog/why-pink-slip-is-so-  
important-when-you-buy-a-new-car](https://www.drivingsales.com/lara-buck/blog/why-pink-slip-is-so-important-when-you-buy-a-new-car)

Buck 2018 <https://www.drivingsales.com/lara-buck/blog/why-pink-slip-is-so-important-when-you-buy-a-new-car> accessed 27 October 2021

Burbano 2021 <https://tomorrow.city/a/dubai-man-made-islands>

Burbano L 2021 *What happened to Dubai man-made islands?*  
<https://tomorrow.city/a/dubai-man-made-islands> accessed 27 October 2021

Chen 2021 <https://www.investopedia.com/terms/d/digital-currency-exchanger-dce.asp>

Chen J 2021 *Digital Currency Exchanger (DCE)*  
<https://www.investopedia.com/terms/d/digital-currency-exchanger-dce.asp>  
accessed 12 November 2021

Chen 2021 <https://www.investopedia.com/terms/f/flatmoney.asp>

Chen J 2021 *Fiat Money* <https://www.investopedia.com/terms/f/flatmoney.asp>  
accessed 27 October 2021

Chen 2020 <https://www.investopedia.com/terms/l/landvalue.asp>

Chen J 2020 *Land Value* <https://www.investopedia.com/terms/l/landvalue.asp>  
accessed 27 October 2021

Clark 2021 <https://www.theverge.com/22310188/nft-explainer-what-is-blockchain-crypto-art-faq>

Clark M 2021 *NFTs, Explained* <https://www.theverge.com/22310188/nft-explainer-what-is-blockchain-crypto-art-faq> accessed 27 October 2021

Coinbase date unknown <https://www.coinbase.com/usdc>

Coinbase date unknown *USD Coin (USDC)* <https://www.coinbase.com/usdc>  
accessed 27 October 2021

CoinMarketCap date unknown <https://coinmarketcap.com/alexandria/glossary/ethereum-virtual-machine-evm>

CoinMarketCap date unknown *Ethereum Virtual Machine (EVM)*  
<https://coinmarketcap.com/alexandria/glossary/ethereum-virtual-machine-evm>  
accessed 27 October 2021

Collins 2021 <https://help.foundation.app/en/articles/5212594-what-is-etherscan-and-how-do-i-use-it>

Collins C 2021 *What is Etherscan and how do I use it?*  
<https://help.foundation.app/en/articles/5212594-what-is-etherscan-and-how-do-i-use-it> accessed 27 October 2021

Cornell Law School date unknown  
[https://www.law.cornell.edu/wex/adhesion\\_contract\\_\(contract\\_of\\_adhesion\)](https://www.law.cornell.edu/wex/adhesion_contract_(contract_of_adhesion))

Cornell Law School date unknown *Adhesion Contract (Contract of Adhesion)*  
[https://www.law.cornell.edu/wex/adhesion\\_contract\\_\(contract\\_of\\_adhesion\)](https://www.law.cornell.edu/wex/adhesion_contract_(contract_of_adhesion))  
accessed 27 October 2021

Corporate Finance Institute date unknown  
<https://corporatefinanceinstitute.com/resources/knowledge/finance/south-african-rand->

[zar/#:~:text=Like%20many%20dollar%2Ddenominated%20currencies,the%20South%20African%20Reserve%20Bank](https://corporatefinanceinstitute.com/resources/knowledge/finance/south-african-rand-zar/#:~:text=Like%20many%20dollar%2Ddenominated%20currencies,the%20South%20African%20Reserve%20Bank)

Corporate Finance Institute date unknown *What Is South African Rand (ZAR)?*  
<https://corporatefinanceinstitute.com/resources/knowledge/finance/south-african-rand-zar/#:~:text=Like%20many%20dollar%2Ddenominated%20currencies,the%20South%20African%20Reserve%20Bank> accessed 27 October 2021

Cryptopedia 2021 <https://www.gemini.com/cryptopedia/what-is-block-in-blockchain-bitcoin-block-size>

Cryptopedia 2021 *How a Block in the Bitcoin Blockchain Works*  
<https://www.gemini.com/cryptopedia/what-is-block-in-blockchain-bitcoin-block-size> accessed 12 November 2021

Cryptovoxels date unknown <https://www.cryptovoxels.com/>

Cryptovoxels date unknown *Cryptovoxels – a user owned virtual world*  
<https://www.cryptovoxels.com/> accessed 27 October 2021

DeCambre 2021 <https://www.marketwatch.com/story/bitcoin-pizza-day-laszlo-hanyecz-spent-3-8-billion-on-pizzas-in-the-summer-of-2010-using-the-novel-crypto-11621714395>

DeCambre M 2021 *Bitcoin Pizza Day? Laszlo Hanyecz spent \$3.8 billion on pizzas in the summer of 2010 using the novel crypto*  
<https://www.marketwatch.com/story/bitcoin-pizza-day-laszlo-hanyecz-spent-3-8-billion-on-pizzas-in-the-summer-of-2010-using-the-novel-crypto-11621714395>  
accessed 27 October 2021

Decentraland 2020 <https://decentraland.org/blog/announcements/the-decentraland-dao-explained/>

Decentraland 2020 *The Decentraland DAO Explained*  
<https://decentraland.org/blog/announcements/the-decentraland-dao-explained/>  
accessed 27 October 2021

Decentraland 2021 <https://dao.decentraland.org/en/>

Decentraland 2021 *Decentraland DAO* <https://dao.decentraland.org/en/> accessed 27 October 2021

Decentraland 2021 <https://docs.decentraland.org/decentraland/faq/>

Decentraland 2021 *FAQ* <https://docs.decentraland.org/decentraland/faq/>  
accessed 27 October 2021

Decentraland 2021 <https://decentraland.org/terms/>

Decentraland 2021 *Terms of Use* <https://decentraland.org/terms/> accessed 27 October 2021

Decentraland 2021 <https://decentraland.org/>

Decentraland 2021 *Welcome to Decentraland* <https://decentraland.org/> accessed 27 October 2021

Dilmegani 2021 <https://research.aimultiple.com/earth2/>

Dilmegani C 2021 *Earth 2: Ponzi scheme or an in-game currency without a game?* <https://research.aimultiple.com/earth2/> accessed 27 October 2021

Don't Panic 2019 <https://www.dontpaniclondon.com/what-is-guerrilla-advertising/>

Don't Panic 2019 *What is Guerrilla Advertising? – 9 Examples of Effective Campaigns* <https://www.dontpaniclondon.com/what-is-guerrilla-advertising/> accessed 27 October 2021

De Saro 2021 [https://finance.yahoo.com/news/most-expensive-virtual-plot-land-185000712.html#:~:text=Most%20Expensive%20Virtual%20Plot%20of%20Land%20Ever%20Sells%20for%20%24900%2C000%20on%20Decentraland,-article&text=A%20plot%20of%20virtual%20land,%2Dfungible%20tokens%20\(NFTs\)](https://finance.yahoo.com/news/most-expensive-virtual-plot-land-185000712.html#:~:text=Most%20Expensive%20Virtual%20Plot%20of%20Land%20Ever%20Sells%20for%20%24900%2C000%20on%20Decentraland,-article&text=A%20plot%20of%20virtual%20land,%2Dfungible%20tokens%20(NFTs))

De Saro 2021 *Most Expensive Virtual Plot of Land Ever Sells for \$900,000 on Decentraland* [https://finance.yahoo.com/news/most-expensive-virtual-plot-land-185000712.html#:~:text=Most%20Expensive%20Virtual%20Plot%20of%20Land%20Ever%20Sells%20for%20%24900%2C000%20on%20Decentraland,-article&text=A%20plot%20of%20virtual%20land,%2Dfungible%20tokens%20\(NFTs\)](https://finance.yahoo.com/news/most-expensive-virtual-plot-land-185000712.html#:~:text=Most%20Expensive%20Virtual%20Plot%20of%20Land%20Ever%20Sells%20for%20%24900%2C000%20on%20Decentraland,-article&text=A%20plot%20of%20virtual%20land,%2Dfungible%20tokens%20(NFTs)) accessed 27 October 2021

Dykes van Heerden 2016 <https://dvh.law.za/neighbour-law-nuisance-falling-leaves-overhanging-branches-water-flow-dispute-resolution/#:~:text=The%20general%20principle%20governing%20overhanging,in%20the%20courts%20whether%20such>

Dykes van Heerden 2016 *Neighbour Law – Nuisance, falling leaves, overhanging branches, water flow and dispute resolution* <https://dvh.law.za/neighbour-law-nuisance-falling-leaves-overhanging-branches-water-flow-dispute-resolution/#:~:text=The%20general%20principle%20governing%20overhanging,in%20the%20courts%20whether%20such> accessed 27 October 2021

Earth 2 2021 <https://earth2.io/>

Earth 2 2021 *Earth 2* <https://earth2.io/> accessed 27 October 2021

Earth 2 2021 <https://earth2.io/benefits>

Earth 2 2021 *Benefits of owning Earth 2 Land* <https://earth2.io/benefits> accessed 27 October 2021

Earth 2 2021 <https://earth2.io/ideology-approach-phases>

Earth 2 2021 *Ideology, Approach & Phases* <https://earth2.io/ideology-approach-phases> accessed 27 October 2021

Earth 2 2021 <https://earth2.io/phase-1>

Earth 2 2021 *Phase 1* <https://earth2.io/phase-1> accessed 27 October 2021

Ethereum 2021 <https://ethereum.org/en/>

Ethereum 2021 *Ethereum* <https://ethereum.org/en/> accessed 27 October 2021

Ethereum 2021 <https://ethereum.org/en/developers/docs/accounts/>

Ethereum 2021 *Ethereum Accounts* <https://ethereum.org/en/developers/docs/accounts/> accessed 27 October 2021

Ethereum 2021 <https://ethereum.org/en/developers/docs/gas/>

Ethereum 2021 *Gas and Fees* <https://ethereum.org/en/developers/docs/gas/> accessed 12 November 2021

Ethereum 2021 <https://ethereum.org/en/developers/docs/smart-contracts/>

Ethereum 2021 *Introduction to Smart Contracts* <https://ethereum.org/en/developers/docs/smart-contracts/> accessed 27 October 2021

Ethereum 2021 <https://ethereum.org/en/nft/>

Ethereum 2021 *Non-fungible tokens (NFT)* <https://ethereum.org/en/nft/> accessed 27 October 2021

Ethereum 2021 <https://ethereum.org/en/stablecoins/>

Ethereum 2021 *Stablecoins* <https://ethereum.org/en/stablecoins/> accessed 27 October 2021

Ethereum 2021 <https://ethereum.org/en/what-is-ethereum/>

Ethereum 2021 *What is Ethereum?* <https://ethereum.org/en/what-is-ethereum/> accessed 27 October 2021

Etherscan Information Center 2019 <https://info.etherscan.com/lost-private-key/>  
Etherscan Information Center 2019 <https://info.etherscan.com/lost-private-key/>  
accessed 17 November 2021

Evans 2019 <https://www.bbc.com/news/blogs-trending-47484397>

Evans P 2019 *Rape Day game pulled by Steam platform after outcry*  
<https://www.bbc.com/news/blogs-trending-47484397> accessed 27 October 2021

Evans 2019 <https://rockstarintel.com/gta-online-casino-update-list-of-countries-which-have-banned-the-casino-features>

Evans K 2019 *GTA Online Casino update – List of countries which have banned the Casino features* <https://rockstarintel.com/gta-online-casino-update-list-of-countries-which-have-banned-the-casino-features> accessed 27 October 2021

Ewert and Weslow 2011 [https://www.wiley.law/media/publication/116\\_Weslow--INTABulletin--05\\_01\\_11.pdf](https://www.wiley.law/media/publication/116_Weslow--INTABulletin--05_01_11.pdf)

Ewert JP and Weslow D 2011 *Forum Shopping in Europe and the United States*  
[https://www.wiley.law/media/publication/116\\_Weslow--INTABulletin--05\\_01\\_11.pdf](https://www.wiley.law/media/publication/116_Weslow--INTABulletin--05_01_11.pdf) accessed 27 October 2021

Fandom date unknown  
[https://gta.fandom.com/wiki/GTA\\_Online:\\_The\\_Diamond\\_Casino\\_Heist](https://gta.fandom.com/wiki/GTA_Online:_The_Diamond_Casino_Heist)

Fandom date unknown *The Diamond Casino Heist*  
[https://gta.fandom.com/wiki/GTA\\_Online:\\_The\\_Diamond\\_Casino\\_Heist](https://gta.fandom.com/wiki/GTA_Online:_The_Diamond_Casino_Heist) accessed 27 October 2021

Fernando 2021 <https://www.investopedia.com/terms/l/law-of-supply-demand.asp>

Fernando J 2021 *Law of Supply and Demand*  
<https://www.investopedia.com/terms/l/law-of-supply-demand.asp> accessed 27 October 2021

Feuerstein 2020 <https://fadel.com/licensing-ip-management-in-the-gaming-industry/>

Feuerstein JD 2020 *Licensing & IP Management in the Gaming Industry*  
<https://fadel.com/licensing-ip-management-in-the-gaming-industry/> accessed 27  
October 2021

Frankenfield 2021 <https://www.investopedia.com/terms/c/cryptorable.asp>  
Frankenfield J 2021 *CryptoRuble*  
<https://www.investopedia.com/terms/c/cryptorable.asp> accessed 27 October  
2021

Frankenfield 2021 <https://www.investopedia.com/terms/e/ethereum.asp>  
Frankenfield J 2021 *Ethereum*  
<https://www.investopedia.com/terms/e/ethereum.asp> accessed 27 October 2021

Frankenfield 2021 <https://www.investopedia.com/terms/s/silk-road.asp>  
Frankenfield J 2021 *Silk Road (Website)*  
<https://www.investopedia.com/terms/s/silk-road.asp> accessed 27 October 2021

Frankenfield 2020 <https://www.investopedia.com/terms/v/virtual-currency.asp>  
Frankenfield J 2020 *Virtual Currency*  
<https://www.investopedia.com/terms/v/virtual-currency.asp> accessed 27 October  
2021

Gala Games 2021 <https://app.gala.games/games>  
Gala Games 2021 *Games* <https://app.gala.games/games> accessed 27 October  
2021

Gala Games 2021 [https://app.gala.games/games/buy-  
item/0x010f000000000000000000000000000000000000000000000000000000000000?currency=GALA](https://app.gala.games/games/buy-item/0x010f000000000000000000000000000000000000000000000000000000000000?currency=GALA)  
Gala Games 2021 [https://app.gala.games/games/buy-  
item/0x010f000000000000000000000000000000000000000000000000000000000000?currency=GALA](https://app.gala.games/games/buy-item/0x010f000000000000000000000000000000000000000000000000000000000000?currency=GALA) accessed 17  
November 2021

Gala Games 2020 [https://blog.gala.games/mirandus-monday-all-about-homesteads-  
face8ba80e7](https://blog.gala.games/mirandus-monday-all-about-homesteads-face8ba80e7)

Gala Games 2020 *Mirandus Monday: All About Homesteads*  
<https://blog.gala.games/mirandus-monday-all-about-homesteads-face8ba80e7>  
accessed 27 October 2021

Gala Games 2021 <https://app.gala.games/terms-and-conditions/>

Gala Games 2021 *Terms and Conditions* <https://app.gala.games/terms-and-conditions/> accessed 27 October 2021

Gods Unchained 2021 <https://godsunchained.com/>

Gods Unchained 2021 *Gods Unchained* <https://godsunchained.com/> accessed 15 November 2021

Goodreads date unknown <https://www.goodreads.com/quotes/597766-buy-land-they-re-not-making-it-anymore>

Goodreads date unknown *Mark Twain*  
<https://www.goodreads.com/quotes/597766-buy-land-they-re-not-making-it-anymore> accessed 27 October 2021

Grasso date unknown <https://medium.com/geekculture/nfts-what-how-and-why-c9f5fa188056>

Grasso D date unknown *NFTs – What, How, and Why*  
<https://medium.com/geekculture/nfts-what-how-and-why-c9f5fa188056>  
accessed 27 October 2021

Gupta 2018 <https://www.freelancinggig.com/blog/2018/06/15/what-programming-language-is-ethereum-written-in/>

Gupta K 2018 *What programming language is Ethereum written in?*  
<https://www.freelancinggig.com/blog/2018/06/15/what-programming-language-is-ethereum-written-in/> accessed 27 October 2021

Haigney 2021 <https://www.curbed.com/2021/04/metaverse-crypto-nfts-cryptovoxels.html>

Haigney S 2021 *Does the Metaverse Need a Zoning Board?*  
<https://www.curbed.com/2021/04/metaverse-crypto-nfts-cryptovoxels.html>  
accessed 27 October 2021

Hayes 2021 <https://www.investopedia.com/terms/p/pyramidscheme.asp>

Hayes A 2021 *Pyramid Scheme*  
<https://www.investopedia.com/terms/p/pyramidscheme.asp> accessed 27 October 2021

IG date unknown <https://www.ig.com/za/glossary-trading-terms/flat-currency-definition>

IG date unknown *Fiat currency definition* <https://www.ig.com/za/glossary-trading-terms/flat-currency-definition> accessed 27 October 2021

Johnson 2021 <https://grimoiredujeu.com/where-is-the-ex-teen-drug-lord-today-shiny-flakes-update/>

Johnson TD 2021 *Where is the ex-teen drug lord today? Shiny flakes update*  
<https://grimoiredujeu.com/where-is-the-ex-teen-drug-lord-today-shiny-flakes-update/> accessed 27 October 2021

Kavanagh 2021 <https://www.the-sun.com/news/3401552/who-shiny-flakes/>

Kavanagh J 2021 *Who is Shiny Flakes?* <https://www.the-sun.com/news/3401552/who-shiny-flakes/> accessed 27 October 2021

Kay 2021 <https://www.businessinsider.co.za/what-is-dogecoin-2013-12?r=US&IR=T>

Kay G 2021 *The history of Dogecoin, a cryptocurrency that started as a joke on Reddit years ago and recently surged 600% in a Wall Street Bets copycat rally*  
<https://www.businessinsider.co.za/what-is-dogecoin-2013-12?r=US&IR=T>  
accessed 27 October 2021

Kim 2021 <https://za.ign.com/rust/149785/news/heres-why-everyones-playing-rust-again>

Kim MTM 2021 *Here's Why Everyone's Playing Rust Again*  
<https://za.ign.com/rust/149785/news/heres-why-everyones-playing-rust-again>  
accessed 27 October 2021

Kobo 2021 <https://qz.com/africa/1994122/akon-plans-to-run-a-senegal-city-on-akoin-cryptocurrency>

Kobo K 2021 *Akon wants to run a Senegal city on cryptocurrency – could it work?* <https://qz.com/africa/1994122/akon-plans-to-run-a-senegal-city-on-akoin-cryptocurrency> accessed 27 October 2021

Krafton 2021 <https://na.battlegrounds.pubg.com/tos-website/>

Krafton 2021 *Terms of Service GA & Website*  
<https://na.battlegrounds.pubg.com/tos-website/> accessed 27 October 2021

Laughlin 2021 <https://www.siu.edu/its/news/2021/03/the-prince-is-back.shtml>

Laughlin J 2021 *The Prince is Back and He Still Needs Your Help Moving Some Money, Old Scams are New Scams* <https://www.siu.edu/its/news/2021/03/the-prince-is-back.shtml> accessed 27 October 2021

Ledger Insights 2021 <https://www.ledgerinsights.com/jack-dorsey-sells-his-first-tweet-as-an-nft-for-2-9-million/>

Ledger Insights 2021 *Jack Dorsey sells his first tweet as an NFT for \$2.9 million*  
<https://www.ledgerinsights.com/jack-dorsey-sells-his-first-tweet-as-an-nft-for-2-9-million/> accessed 27 October 2021

Legal Service India 2021 <http://www.legalserviceindia.com/copyright/bern.htm>

Legal Service India 2021 *Berne Convention Member Countries*  
<http://www.legalserviceindia.com/copyright/bern.htm> accessed 27 October 2021

Legistify date unknown <https://www.legistify.com/glossary/res-derelicta/>

Legistify date unknown *Res Derelicta Meaning*  
<https://www.legistify.com/glossary/res-derelicta/> accessed 27 October 2021

Leonhardt 2019 <https://www.cnbc.com/2019/04/18/nigerian-prince-scams-still-rake-in-over-700000-dollars-a-year.html>

Leonhardt M 2019 *'Nigerian Prince' email scams still rake in over \$700,000 a year – here's how to protect yourself* <https://www.cnn.com/2019/04/18/nigerian-prince-scams-still-rake-in-over-700000-dollars-a-year.html> accessed 27 October 2021

Lesser 2021 <https://www.tomsguide.com/news/top-cryptocurrency-by-value-bitcoin-ether-dogecoin-binancecoin>

Lesser J 2021 *Top cryptocurrency 2021 by value: Bitcoin, Ether, Dogecoin, BinanceCoin and more* <https://www.tomsguide.com/news/top-cryptocurrency-by-value-bitcoin-ether-dogecoin-binancecoin> accessed 27 October 2021

LexisNexis 2021

<https://www.lexisnexis.com/communities/corporatecounselnewsletter/b/newsletter/archive/2017/03/07/actual-legal-questions-raised-by-virtual-reality-from-assault-to-virtual-property-rights-to-intellectual-property-concerns.aspx>

LexisNexis 2021 *Actual Legal Questions Now Being Asked in Virtual Worlds* <https://www.lexisnexis.com/communities/corporatecounselnewsletter/b/newsletter/archive/2017/03/07/actual-legal-questions-raised-by-virtual-reality-from-assault-to-virtual-property-rights-to-intellectual-property-concerns.aspx> accessed 27 October 2021

Linden Lab 2021 <https://www.lindenlab.com/about>

Linden Lab 2021 *About Linden Lab* <https://www.lindenlab.com/about> accessed 27 October 2021

Linden Lab 2021 <https://www.lindenlab.com/tos>

Linden Lab 2021 *Terms of Service* <https://www.lindenlab.com/tos> accessed 27 October 2021

Linden Lab 2021 <https://www.lindenlab.com/legal/second-life-terms-and-conditions>

Linden Lab 2021 *Second Life Terms and Conditions* <https://www.lindenlab.com/legal/second-life-terms-and-conditions> accessed 27 October 2021

Locke 2021 <https://www.cnbc.com/2021/05/13/dogecoin-millionaire-refuses-to-sell-and-continues-to-buy-the-dip.html>

Locke T 2021 *This 'Dogecoin Millionaire' refuses to sell and bought during the dip – now his stash is worth \$2 million* <https://www.cnbc.com/2021/05/13/dogecoin-millionaire-refuses-to-sell-and-continues-to-buy-the-dip.html> accessed 27 October 2021

Locker 2015 <https://www.vice.com/en/article/d7yzjy/germanys-most-notorious-darknet-drug-dealer-sentenced-to-only-7-years>

Locker T 2015 *Germany's Most Notorious Darknet Drug Dealer Sentenced to Only 7 Years* <https://www.vice.com/en/article/d7yzjy/germanys-most-notorious-darknet-drug-dealer-sentenced-to-only-7-years> accessed 27 October 2021

Macy 2021 <https://medium.com/security-token-offering/nft-royalties-building-revenue-through-nfts-fcad63e87f4c>

Macy S 2021 *NFT Royalties – Building Revenue through NFTs* <https://medium.com/security-token-offering/nft-royalties-building-revenue-through-nfts-fcad63e87f4c> accessed 12 November 2021

Makela date unknown <https://www.armstronglegal.com.au/commercial-law/the-nemo-dat-rule/>

Makela M date unknown *The Nemo Dat Rule* <https://www.armstronglegal.com.au/commercial-law/the-nemo-dat-rule/> accessed 27 October 2021

Matshead 2020 <https://www.masthead.co.za/newsletter/cybercrime-in-south-africa/#:~:text=A%20disturbing%20fact%20from%20this,a%20year%20to%20cyber%20Dattacks>

Matshead 2020 *Cybercrime in South Africa* <https://www.masthead.co.za/newsletter/cybercrime-in-south-africa/#:~:text=A%20disturbing%20fact%20from%20this,a%20year%20to%20cyber%20Dattacks> accessed 27 October 2021

McNamara 2021 <https://www.benzinga.com/money/how-to-buy-nfts/>

McNamara R 2021 *How to buy non-fungible tokens (NFTs)*  
<https://www.benzinga.com/money/how-to-buy-nfts/> accessed 27 October 2021

Merriam-Webster date unknown <https://www.merriam-webster.com/dictionary/extra%20commercium>

Merriam-Webster date unknown *Extra Commercium* <https://www.merriam-webster.com/dictionary/extra%20commercium> accessed 27 October 2021

Merriam-Webster date unknown <https://www.merriam-webster.com/dictionary/metadata>

Merriam-Webster date unknown *Metadata* <https://www.merriam-webster.com/dictionary/metadata> accessed 12 November 2021

Mohapatra 2021 <https://www.timesnownews.com/business-economy/real-estate/article/people-are-buying-digital-real-estate-on-earth-2-should-one-tread-with-caution/761632>

Mohapatra S 2021 *People are buying digital real estate on Earth 2: Should one tread with caution?* <https://www.timesnownews.com/business-economy/real-estate/article/people-are-buying-digital-real-estate-on-earth-2-should-one-tread-with-caution/761632> accessed 27 October 2021

Moralis Blog 2021 <https://moralis.io/what-are-nft-games-and-how-to-make-nft-games/>

Moralis Blog 2021 *What are NFT Games and How to Create Them?*  
<https://moralis.io/what-are-nft-games-and-how-to-make-nft-games/> accessed 11 November 2021

Munster 2020 <https://medium.com/road-less-ventured/why-bitcoin-is-a-superior-store-of-value-e5464d5fd619>

Munster B 2020 *Why Bitcoin is a superior store of value*  
<https://medium.com/road-less-ventured/why-bitcoin-is-a-superior-store-of-value-e5464d5fd619> accessed 27 October 2021

Murray 2018 <https://www.fresheconomicthinking.com/2018/09/what-is-land-it-is-not-product-but.html#:~:text=What%20is%20land%3F-,It%20is%20not%20a%20product%2C%20but%20an,share%20of%20three%2Ddimensional%20space&text=Instead%2C%20land%20is%20a%20bundle,owner%20of%20a%20land%20title>

Murray CK 2018 *What is land? It is not a product, but an ownership share of three-dimensional space* <https://www.fresheconomicthinking.com/2018/09/what-is-land-it-is-not-product-but.html#:~:text=What%20is%20land%3F-,It%20is%20not%20a%20product%2C%20but%20an,share%20of%20three%2Ddimensional%20space&text=Instead%2C%20land%20is%20a%20bundle,owner%20of%20a%20land%20title> accessed 27 October 2021

Nedbank date unknown <https://www.nedbank.co.za/content/nedbank/desktop/gt/en/aboutus/legal/fraud-awareness/pyramid-and-ponzi-schemes.html>

Nedbank date unknown *Pyramid and Ponzi schemes* <https://www.nedbank.co.za/content/nedbank/desktop/gt/en/aboutus/legal/fraud-awareness/pyramid-and-ponzi-schemes.html> accessed 27 October 2021

New York State Attorney General date unknown <https://ag.ny.gov/consumer-frauds/pyramid-schemes>

New York State Attorney General date unknown *Don't Get Caught in a Pyramid Scheme* <https://ag.ny.gov/consumer-frauds/pyramid-schemes> accessed 27 October 2021

NFT Review 2021 <https://nft-review.com/on-chain-vs-off-chain-metadata/>

NFT Review 2021 *On-chain vs. Off-chain Metadata* <https://nft-review.com/on-chain-vs-off-chain-metadata/> accessed 27 October 2021

Nightingale 2021 <https://www.makeuseof.com/what-do-you-actually-own-if-you-buy-an-nft/>

Nightingale R 2021 *What Do You Actually Own If You Buy An NFT?*  
<https://www.makeuseof.com/what-do-you-actually-own-if-you-buy-an-nft/>  
accessed 27 October 2021

NonFungible 2021 <https://nonfungible.com/blog/here-comes-a-new-trend-construction-on-virtual-land>

NonFungible 2021 *Here comes a new trend: construction on virtual land*  
<https://nonfungible.com/blog/here-comes-a-new-trend-construction-on-virtual-land>  
accessed 14 November 2021

Norton Rose Fulbright 2021  
<https://www.nortonrosefulbright.com/en/knowledge/publications/5995f99d/anatomy-of-an-nft>

Norton Rose Fulbright 2021 *Anatomy of an NFT*  
<https://www.nortonrosefulbright.com/en/knowledge/publications/5995f99d/anatomy-of-an-nft>  
accessed 27 October 2021

OpenSea 2021 <https://opensea.io/assets>

OpenSea 2021 *Browse NFTs* <https://opensea.io/assets> accessed 27 October 2021

OpenSea 2021 <https://support.opensea.io/hc/en-us/articles/360061676254-How-do-I-create-an-OpenSea-account->

OpenSea 2021 *How do I create an OpenSea Account?*  
<https://support.opensea.io/hc/en-us/articles/360061676254-How-do-I-create-an-OpenSea-account->  
accessed 27 October 2021

OpenSea 2021 <https://opensea.io/tos>

OpenSea 2021 *Terms of Service* <https://opensea.io/tos> accessed 27 October 2021

Perfect Hideaways 2020 <https://perfecthideawaysforsale.co.za/fixtures-when-is-something-permanently-attached-to-a-property/>

Perfect Hideaways 2020 *Fixtures – when is something permanently attached to a property?* <https://perfecthideawaysforsale.co.za/fixtures-when-is-something-permanently-attached-to-a-property/> accessed 27 October 2021

Private Property 2015  
<https://www.privateproperty.co.za/advice/property/articles/restrictions-on-your-property/3710>

Private Property 2015 *Restrictions on your property*  
<https://www.privateproperty.co.za/advice/property/articles/restrictions-on-your-property/3710> accessed 27 October 2021

Raphaelcgo 2021  
[https://www.reddit.com/r/summonerschool/comments/kuf584/when\\_did\\_the\\_convention\\_of\\_giving\\_blue\\_buff\\_to/](https://www.reddit.com/r/summonerschool/comments/kuf584/when_did_the_convention_of_giving_blue_buff_to/)

Raphaelcgo 2021 *When did the convention of giving blue buff to your midlaner dell off?*  
[https://www.reddit.com/r/summonerschool/comments/kuf584/when\\_did\\_the\\_convention\\_of\\_giving\\_blue\\_buff\\_to/](https://www.reddit.com/r/summonerschool/comments/kuf584/when_did_the_convention_of_giving_blue_buff_to/) accessed 27 October 2021

Ray date unknown <https://medium.com/lansaar/nfts-and-smart-contracts-6c4c5516d5a0>

Ray S date unknown *NFTs and Smart Contracts*  
<https://medium.com/lansaar/nfts-and-smart-contracts-6c4c5516d5a0> accessed 27 October 2021

Reiff 2020 <https://www.investopedia.com/articles/investing/031416/bitcoin-vs-ethereum-driven-different-purposes.asp#:~:text=Ethereum%20Basics&text=Launched%20in%20July%20of%202015,interference%20from%20a%20third%20party>

Reiff N 2020 *Bitcoin vs. Ethereum: What's the Difference?*  
<https://www.investopedia.com/articles/investing/031416/bitcoin-vs-ethereum-driven-different-purposes.asp#:~:text=Ethereum%20Basics&text=Launched%20in%20July%20o>

f%202015,interference%20from%20a%20third%20party accessed 27 October 2021

Republic 2021 <https://republic.co/blog/real-estate/investing-in-decentraland-in-2021>  
Republic 2021 *Investing in Decentraland in 2021* <https://republic.co/blog/real-estate/investing-in-decentraland-in-2021> accessed 27 October 2021

Riot Games 2013 <https://support-leagueoflegends.riotgames.com/hc/en-us/articles/201751904-Public-Beta-Environment-FAQ>

Riot Games 2013 *Public Beta Environment FAQ* <https://support-leagueoflegends.riotgames.com/hc/en-us/articles/201751904-Public-Beta-Environment-FAQ> accessed 27 October 2021

Riot Games 2013 <https://support-leagueoflegends.riotgames.com/hc/en-us/articles/201752884-Reporting-a-Player>

Riot Games 2013 *Reporting a Player* <https://support-leagueoflegends.riotgames.com/hc/en-us/articles/201752884-Reporting-a-Player> accessed 27 October 2021

Riot Games 2017 <https://www.riotgames.com/en/who-we-are/values>

Riot Games 2017 *Our Story* <https://www.riotgames.com/en/who-we-are/values> accessed 27 October 2021

Riot Games 2021 <https://euw.leagueoflegends.com/en-gb/how-to-play>

Riot Games 2021 *Learn The Basics* <https://euw.leagueoflegends.com/en-gb/how-to-play> accessed 27 October 2021

Riot Games 2021 <https://www.riotgames.com/en/terms-of-service>

Riot Games 2021 *Terms of Service* <https://www.riotgames.com/en/terms-of-service> accessed 11 November 2021

River Financial date unknown <https://river.com/learn/history-of-monetary-collapse-in-zimbabwe/>

River Financial date unknown *The History of Monetary Collapse in Zimbabwe*  
<https://river.com/learn/history-of-monetary-collapse-in-zimbabwe/> accessed 12  
November 2021

Rossney 1996 <https://www.wired.com/1996/06/avatar-2/?pg=3>

Rossney R 1996 *Metaworlds* <https://www.wired.com/1996/06/avatar-2/?pg=3>  
accessed 27 October 2021

Rustafied 2021 <https://www.rustafied.com/raiding-in-rust>

Rustafied 2021 *Raiding in Rust* <https://www.rustafied.com/raiding-in-rust>  
accessed 27 October 2021

Second Life date unknown <https://secondlife.com/land/faq>

Second Life date unknown *Land in Second Life* <https://secondlife.com/land/faq>  
accessed 27 October 2021

Seth 2021 <https://www.investopedia.com/terms/c/central-bank-digital-currency-cbdc.asp>

Seth S 2021 *Central Bank Digital Currency (CBDC)*  
<https://www.investopedia.com/terms/c/central-bank-digital-currency-cbdc.asp>  
accessed 27 October 2021

Sniper 2013 <https://support-leagueoflegends.riotgames.com/hc/en-us/articles/201752884>

Sniper S 2013 *Player Reporting Guide and FAQ* <https://support-leagueoflegends.riotgames.com/hc/en-us/articles/201752884> accessed 27  
October 2021

Solidity date unknown <https://soliditylang.org/>

Solidity date unknown *Solidity Programming Language* <https://soliditylang.org/>  
accessed 27 October 2021

South African Reserve Bank (SARB) date unknown  
<https://www.resbank.co.za/en/home/what-we-do/banknotes-and-coin>

South African Reserve Bank (SARB) date unknown *Banknotes and coin*  
<https://www.resbank.co.za/en/home/what-we-do/banknotes-and-coin> accessed  
27 October 2021

South African Revenue Service 2021 [https://www.sars.gov.za/individuals/crypto-  
assets-tax/](https://www.sars.gov.za/individuals/crypto-assets-tax/)

South African Revenue Service 2021 *Crypto Assets & Tax*  
<https://www.sars.gov.za/individuals/crypto-assets-tax/> accessed 27 October  
2021

STOPfakes 2018 [https://www.stopfakes.gov/article?id=Is-My-Copyright-Good-in-  
Other-Countries](https://www.stopfakes.gov/article?id=Is-My-Copyright-Good-in-Other-Countries)

STOPfakes 2018 *Is My Copyright Good in Other Countries?*  
<https://www.stopfakes.gov/article?id=Is-My-Copyright-Good-in-Other-Countries>  
accessed 27 October 2021

Stavros 2021 <https://www.insidehook.com/article/internet/dick-pic-nfts>

Stavros J 2021 *People Are Turning Dick Pics Into NFTs. Should You?*  
<https://www.insidehook.com/article/internet/dick-pic-nfts> accessed 27 October  
2021

Strickland and Pollette 2021 [https://computer.howstuffworks.com/internet/social-  
networking/networks/second-life.htm](https://computer.howstuffworks.com/internet/social-networking/networks/second-life.htm)

Strickland J and Pollette C 2021 *How Second Life Works*  
[https://computer.howstuffworks.com/internet/social-  
networking/networks/second-life.htm](https://computer.howstuffworks.com/internet/social-networking/networks/second-life.htm) accessed 27 October 2021

Swinyard 2019 [https://www.theguardian.com/books/2019/jun/13/pepe-the-frog-  
creator-wins-15000-settlement-against-infowars](https://www.theguardian.com/books/2019/jun/13/pepe-the-frog-creator-wins-15000-settlement-against-infowars)

Swinyard H 2019 *Pepe the Frog creator wins \$15,000 settlement against  
Infowars* [https://www.theguardian.com/books/2019/jun/13/pepe-the-frog-  
creator-wins-15000-settlement-against-infowars](https://www.theguardian.com/books/2019/jun/13/pepe-the-frog-creator-wins-15000-settlement-against-infowars) accessed 27 October 2021

Techopedia 2013 <https://www.techopedia.com/definition/4243/clickwrap-agreement>

Techopedia 2013 *Clickwrap Agreement*  
<https://www.techopedia.com/definition/4243/clickwrap-agreement> accessed 27 October 2021

The Law Reviews 2021 <https://thelawreviews.co.uk/title/the-complex-commercial-litigation-law-review/south-africa>

The Law Reviews 2021 *The Complex Commercial Litigation Law Review: South Africa* <https://thelawreviews.co.uk/title/the-complex-commercial-litigation-law-review/south-africa> accessed 27 October 2021

The Lunacian 2021 <https://axie.substack.com/p/axie-community-alpha-getting-started>

The Lunacian 2021 *Axie Community Alpha: Getting Started!*  
<https://axie.substack.com/p/axie-community-alpha-getting-started> accessed 27 October 2021

The World Bank date unknown <https://urban-regeneration.worldbank.org/node/39>

The World Bank date unknown *Zoning and Land Use Planning* <https://urban-regeneration.worldbank.org/node/39> accessed 27 October 2021

Thomson Reuters 2021 [https://uk.practicallaw.thomsonreuters.com/1-107-6055?transitionType=Default&contextData=\(sc.Default\)&firstPage=true](https://uk.practicallaw.thomsonreuters.com/1-107-6055?transitionType=Default&contextData=(sc.Default)&firstPage=true)

Thomson Reuters 2021 *Deed* [https://uk.practicallaw.thomsonreuters.com/1-107-6055?transitionType=Default&contextData=\(sc.Default\)&firstPage=true](https://uk.practicallaw.thomsonreuters.com/1-107-6055?transitionType=Default&contextData=(sc.Default)&firstPage=true) accessed 27 October 2021

Tipotsch 2021 <https://www.schoenherr.eu/content/formulating-a-smart-contract-and-minting-an-nft/>

Tipotsch AK 2021 *Formulating a smart contract and minting an NFT*  
<https://www.schoenherr.eu/content/formulating-a-smart-contract-and-minting-an-nft/> accessed 27 October 2021

United Nations date unknown <https://www.un.org/ruleoflaw/thematic-areas/access-to-justice-and-rule-of-law-institutions/access-to-justice>

United Nations date unknown *Access to Justice*  
<https://www.un.org/ruleoflaw/thematic-areas/access-to-justice-and-rule-of-law-institutions/access-to-justice> accessed 27 October 2021

USLegal date unknown <https://definitions.uslegal.com/a/accession/>  
USLegal date unknown *Accession Law and Legal Definition*  
<https://definitions.uslegal.com/a/accession/> accessed 27 October 2021

USLegal date unknown <https://definitions.uslegal.com/c/contractatio>  
USLegal date unknown *Contractatio Law and Legal Definition*  
<https://definitions.uslegal.com/c/contractatio> accessed 27 October 2021

USLegal date unknown <https://definitions.uslegal.com/u/utilitarianism/>  
USLegal date unknown *Utilitarianism Law and Legal Definition*  
<https://definitions.uslegal.com/u/utilitarianism/> accessed 27 October 2021

VALR 2021 <https://support.valr.com/hc/en-us/articles/360014053531-What-are-VALR-s-verification-levels->  
VALR 2021 *What are VALR's verification levels?* <https://support.valr.com/hc/en-us/articles/360014053531-What-are-VALR-s-verification-levels-> accessed 27 October 2021

van der Westhuizen 2021 <https://potchefstroomherald.co.za/93971/cyber-hacker-who-stole-r17-from-jb-marks-sentenced/>  
van der Westhuizen V 2021 *Cyber hacker who stole R1,7 from JB Marks sentenced* <https://potchefstroomherald.co.za/93971/cyber-hacker-who-stole-r17-from-jb-marks-sentenced/> accessed 27 October 2021

Van Deventer 2018 <https://www.vandeventers.law/Legal-Articles/entryid/285/property-zoning-and-rezoning-applications-in-south-africa>  
Van Deventer C 2018 *Property Zoning and Rezoning Applications in South Africa* <https://www.vandeventers.law/Legal-Articles/entryid/285/property-zoning-and-rezoning-applications-in-south-africa> accessed 27 October 2021

Venox Digital Assets date unknown <https://www.zarp.cash/>

Venox Digital Assets date unknown *ZARP Stablecoin* <https://www.zarp.cash/>  
accessed 27 October 2021

Vermeulen 2021 <https://mybroadband.co.za/news/cryptocurrency/408238-e-rand-for-south-africa.html>

Vermeulen J 2021 *E-rand for South Africa*  
<https://mybroadband.co.za/news/cryptocurrency/408238-e-rand-for-south-africa.html> accessed 27 October 2021

Wilser 2020 <https://www.coindesk.com/markets/2020/06/25/the-people-of-decentraland-will-greet-you-now/>

Wilser J 2020 *The People of Decentraland Will Greet You Now*  
<https://www.coindesk.com/markets/2020/06/25/the-people-of-decentraland-will-greet-you-now/> accessed 27 October 2021

Wired 2020 <https://www.wired.com/story/toxicity-in-gaming-is-dangerous-heres-how-to-stand-up-to-it/>

Wired 2020 *Toxicity in Gaming Is Dangerous. Here's How to Stand Up to It*  
<https://www.wired.com/story/toxicity-in-gaming-is-dangerous-heres-how-to-stand-up-to-it/> accessed 27 October 2021

Wood 2018 <https://www.pcgamer.com/man-jailed-6-years-for-threats-made-in-runescape-finally-released/>

Wood A 2018 *Man jailed 6 years for threats made in Runescape finally released*  
<https://www.pcgamer.com/man-jailed-6-years-for-threats-made-in-runescape-finally-released/> accessed 27 October 2021

World Intellectual Property Organization date unknown  
[https://www.wipo.int/treaties/en/ip/berne/summary\\_berne.html](https://www.wipo.int/treaties/en/ip/berne/summary_berne.html)

World Intellectual Property Organization date unknown *Summary of the Berne Convention for the Protection of Literary and Artistic Works (1886)*  
[https://www.wipo.int/treaties/en/ip/berne/summary\\_berne.html](https://www.wipo.int/treaties/en/ip/berne/summary_berne.html) accessed 24 November 2021

ZeniMax Media Inc date unknown [https://bethesda.net/data/beta\\_nda/en.html](https://bethesda.net/data/beta_nda/en.html)

ZeniMax Media Inc date unknown *Beta Trial and Confidentiality Agreement*

[https://bethesda.net/data/beta\\_nda/en.html](https://bethesda.net/data/beta_nda/en.html) accessed 11 November 2021

ZeniMax Media Inc date unknown <https://bethesda.net/en/document/terms-of-service>

ZeniMax Media Inc date unknown *Terms of Service*

<https://bethesda.net/en/document/terms-of-service> accessed 11 November 2021