Analysis of Virtual World Elements with Emphasis on Property Rights

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Abstract

In this research, a descriptive-analytical method has been employed to analyze the elements of the virtual world with an emphasis on property rights. The technological development of information and communication technology has brought numerous innovations that have not only optimized our tasks and activities but also enhanced human capacity to expand social relations across borders and in the international arena in this globalized and interconnected world. With millions of online players, persistent and durable computer-generated spaces and environments, known as virtual worlds, play a highly significant and effective role. On the one hand, virtual worlds are used for recreational and entertainment purposes; on the other hand, they can serve as a platform and venue for social interactions and educational or instructional goals, as exemplified by Second Life. In these virtual worlds, users are often represented through symbols and graphical images known as avatars, which are not only used for interaction with other users but also for engagement with virtual objects (such as virtual houses, virtual helmets, virtual clothing, etc.), which can be exchanged and transferred among users within the same virtual world. The Romano-Germanic legal system includes countries with civil law traditions. Accordingly, this codified law is characterized by a coherent, highly structured, and systematic framework. Moreover, this legal tradition, without reference to detailed descriptions, relies on general and abstract principles. Additionally, the creation of new property rights through judicial interpretation is not feasible, as the civil law system renders such possibilities highly restrictive and limited, although the degree of rigidity and strictness varies among countries.

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1. Introduction

In 2011, one of the most famous Massively Multiplayer Online Role-playing Games (MMORPG), operating on the basis of subscription and user account registration, *World of Warcraft*, registered around 10 million players from across the globe.

Interestingly, alongside this growth and development, new forms of relationships also emerged. For example, by profiting from transactions inside the social virtual world *Second Life*, Ashne Chung became a real-world millionaire. Moreover, private companies and public sectors not only train individuals inside *Second Life* and other virtual worlds, but also utilize these platforms for scientific and even defense-related purposes. These are only a few examples of how virtual worlds interact with real life. This new reality has become so deeply intertwined with our social existence that, in some cases, it may lead to profound transformations in human lifestyles. Considering the increasing importance of virtual worlds in our lives and societies, this chapter will address the differences between social virtual worlds and gaming virtual worlds by outlining concepts and features of this virtual realm. Subsequently, the relationship between the real world and the virtual world will be discussed in the section concerning the "magic circle" and the "real world" (Fairfield, 2005; Lastowka & Hunter, 2004).

2. Virtual Worlds

As one might expect, *Blazing Falls* is a virtual world. More simply, it can be described as a computer game. *Blazing Falls* is, in fact, a city within the broader environment of *The Sims Online*, a well-known game with over one hundred thousand registered users. In this virtual location and similar spaces, millions of people currently spend significant portions of their lives, make friends, build and acquire virtual property, and establish social organizations. In South Korea, the game *Lineage* has become more popular than television, with approximately 4 million participating users. In the United States, *EverQuest's Norrath* is the most common virtual world, with more than 440,000 registered users according to recent statistics. *Ultima Online* and *Dark Age of Camelot* are two strong competitors, hosting more than 250,000 and 200,000 participants respectively (Blazer, 2006).

The Sims Online, of which *Blazing Falls* is a part, was conceived by Will Wright, a legendary figure in computer games who created a long line of famous "god games" such as *SimCity*, *SimLife*, and *SimEarth*. These simulation games allow players to manipulate a simulated city, form of life, or planet and reshape it according to their preferences. In *The Sims Online*, each avatar or small figure on the computer screen represents a real person, reacting and acting in real time. Your computer may display 12 avatars talking, dancing, and eating in the living room of a spacious house. One of these avatars is "you," while the remaining 11 represent other real individuals interacting with you through their virtual embodiments. These people gathered in your virtual living room in *Blazing Falls* are, in reality, hundreds or even thousands of miles away (Badenhorst et al., 2006).

Clearly, this is a new concept in gaming, even if it is not fully recognized as a "game" in the traditional sense. Offline computer games resemble the psychological world of a two-year-old child: everything around you changes only when you are present, and nothing happens when you are absent. Virtual worlds are different. *The Sims Online*, like all virtual worlds, is persistent, durable, and dynamic. When you are not in *Blazing Falls*, the environment continues to exist and evolve. While you are asleep in real life, the avatars of others are eating and sleeping in your *Blazing Falls* home; while you attend to real-life tasks, your neighbors' virtual houses are redecorated; while you sit before your real-world cooler chatting, virtual weddings take place; while you are eating dinner, new social structures are formed. When you return at night to *Blazing Falls*, you notice changes in the infrastructure and character of your neighbors (Harata, 2010).

Of course, all these changes occur in a representational (artificial) reality, and the inhabitants of *Blazing Falls* recognize each other through avatars that may or may not reflect the physical attributes of their controllers. These artificial representatives are known as "avatars," a word with Hindu religious origins. Unlike the characters in other video games, avatars can be highly customized and are primarily designed for social interactions. At present, avatars in virtual worlds communicate through text chats or "speech bubbles" appearing above their heads. They also express themselves through appearance. Users may select their avatar's face, clothing, and body shape, and communicate via body language. For instance, in *The Sims Online*, avatars yawn, clap, shout, shake fists, cry, hug, kiss, dance, and perform hundreds of other human behaviors to display their emotions to others (Fairfield, 2005).

Perhaps because virtual worlds so effectively support this type of social interaction, many visitors remain as inhabitants. For example, the average *EverQuest* player and avatar in *Norrath* spends about 20 hours per week inside the virtual world. Participants design uniforms, furniture, and houses for their avatars and sell their creations to others. They buy and trade

personal property on eBay. Clubs and mutual aid groups are formed. They persuade roommates and guild members to spend more time in the virtual world for collective benefit (Bauer et al., 1999).

Nevertheless, despite this investment of time and creativity, and the emergence of new virtual social orders, many still regard activities within virtual worlds as mere entertainment, not deserving of serious attention. In summary, the common claim is that, at a fundamental level, these social environments are not "real" and thus lack serious significance. This reasoning, however, is mistaken. In the next section, from cultural and legal perspectives, we examine the challenge of drawing simple lines between what is "real" and "not real." Our conclusion is that, for many reasons, virtual worlds and the social interactions that occur within them reflect a highly significant form of social development that merits close scrutiny (Lastowka & Hunter, 2004).

Virtual worlds are, in fact, "unreal"—that is, artificial, fabricated, imaginative, intangible, and invented. Yet, at the same time, they are also real in certain ways. Not everything artificial or constructed can be excluded from reality. If this were so, all human activities and creations—including buildings, language, and, most importantly here, laws—would have to be removed from reality. According to legal theorists such as Jack Balkin and Julian Dibbell, although laws are constructed and intangible, they cannot easily be dismissed as unimportant or meaningless (Van der Walt, 2005).

Of course, there are many meanings of the terms "real" and "unreal." Ontologically, virtual worlds resemble Disney's realms. *Tomorrowland*, *Fantasyland*, and *Main Street* are physically real, but that physical reality is largely an artificial representation of environments from science fiction, fantasy, and American history—in fact, a fusion of reality and imagination. Shared cultural spaces such as television theaters, carnivals, and even mock trials in law schools occupy positions similar to these virtual worlds. These performances provide contexts in which we are moved to fear, sadness, or despair by things that are not real. Our culture is filled with such "unreal realities," taking forms of deception, myth, fantasy, and dreaming. Myths, fictions, and shared illusions provide important foundations for cultural cohesion (Saket, 2020).

Today, millions of users embrace the "unreality" of virtual worlds by paying considerable sums to enter and exist within them. Hundreds of millions of dollars flow daily into the coffers of companies such as Sony, Electronic Arts, and other major corporations that own these virtual worlds. Reports indicate that companies like Intel and McDonald's have spent millions of dollars to showcase their products before the imaginary players in these worlds. It can be predicted that where significant amounts of real money circulate, legal consequences will follow. Yet, virtual cash alone does not confer legal importance upon virtual worlds. Grain, cereals, and children's television also generate revenue, but it is rare to find articles discussing the laws of *Frosted Flakes* or *Sesame Street* (Hart, 2011).

3. Classification of the Concept of Ownership

Nearly twenty years ago, it was declared that the death of the concept of ownership was imminent. Thomas Grey, in one of his well-known articles, suggested that theories and systems relating to ownership over the past 200 years had led to the ultimate consequence that ownership was no longer a significant category in legal and political theory. According to Grey, it was entirely evident that we had reached a point where specialists designing and manipulating the legal structures of advanced capitalist economies could perform their tasks without employing the word "ownership" at all (Wacks, 2025).

Wesley Hohfeld, with remarkable persistence, analyzed the concept of a right into its relevant components of claims and duties between individuals in society. Ownership was not excluded from this analysis. Walter Wheeler summarized Hohfeld's analysis of ownership and demonstrated that what an owner of a property actually possesses is a highly complex bundle of rights, privileges, powers, and immunities—not in relation to a single object, but in relation to other individuals.

The "bundle theory" of ownership implies an arrangement and conditional coordination of distinct and independent elements. Just like a basket of fruit—filled with oranges, apples, bananas, and peaches—people are free to rearrange and repackage it as they see fit. A person may, for example, remove the apples and still have a fruit basket. Moreover, someone may boldly speak of particular items of fruit inside the bag without necessarily claiming the broader category of the fruit basket. No particular fruit is essential to the basket itself. Likewise, the bundle theory maintains that there is no essential core of rights that naturally constitutes ownership. In law, this bundle of claims and duties can be analyzed by scholars without invoking the concept of ownership itself, and adjudicated by courts accordingly (Saket, 2020).

4. Importance of Data Ownership

According to Loshin (2002), data and information possess both intrinsic value and added value as a by-product of information processing. The degree of ownership is determined by the extent of value that each interested party derives from the use and exploitation of such information.

The general consensus of science emphasizes the principle of openness. Therefore, data sharing brings significant benefits for society at large and ensures the protection of the accuracy and integrity of scientific data in particular. The 1985 report of the National Statistical Committee on data sharing highlighted that the sharing of data and information strengthens open scientific research and encourages diversity in analysis and scientific inquiry (Hodavand & Mashhadi, 2020).

The costs and benefits of data sharing must be considered from ethical, organizational, legal, and professional perspectives. At the beginning of a research project, researchers must determine whether the intended data can be shared, under what conditions, by whom, and for what purposes.

5. Considerations and Issues in Data Ownership

Researchers must have a comprehensive understanding of the various issues related to data ownership in order to make informed decisions on the matter. These issues include the paradigm of ownership, data storage and collection, data ownership policies, balance of duties and obligations, and technology.

Ownership Paradigm:

Loshin pointed to the complexity of ownership issues by identifying a spectrum of paradigms used to claim ownership of data. These claims are based on the type and degree of participation in research activity. According to Loshin's theory, the list of parties claiming data and information ownership includes:

- **Producer:** The party that creates or generates the data and information.
- **Consumer:** The party that uses the data is considered its owner.
- **Author (Compiler):** The entity that selects and collects information from various sources.
- **Institution or Enterprise:** All data entering or produced within the enterprise belongs entirely to that enterprise.
- **Investor:** The party who invests resources to generate data claims ownership of it.
- **Decoder:** In environments where information is locked in a particular coded format, the party able to unlock it claims ownership.
- **Packager:** The party that collects information for a specific purpose and, by formatting it for a particular market or consumer group, creates added value.
- **Reader as Owner:** The value of any readable data is ranked by the reader, who gains value by adding it to a repository.
- **Actor as Owner:** The actor generating data claims ownership, primarily in reaction to another party making the same claim.
- **Buyer/Licensee as Owner:** An individual or organization purchasing or licensing data may also claim ownership (Mahmoudi, 2023).

Organizational policies lacking transparency, oversight, and formal documentation increase the risk of data integrity loss. Before beginning research, the rights, duties, expectations, and roles of each stakeholder must be clearly defined. Damage to data integrity occurs when researchers are inadequately informed about existing data ownership policies and fail to clearly identify the related rights and obligations. Below is a list of possible scenarios between stakeholders that ensure the consolidation of ownership policies:

- Between an academic institution and an industrial center (public or private sector)
- Between an academic institution and research personnel
- Partnerships between research collaborators
- Between authors and publishers

6. Concepts and Characteristics of the Virtual World

Over recent years, more and more people around the globe have turned toward virtual worlds and cyberspace. Today, these virtual environments account for the astonishing figure of 1.4 billion registered accounts. Based on demographic statistics, this figure represents a population twice as large as that of the European Union. Moreover, it should be noted that a portion of these users are not only seeking entertainment in these spaces but also pursuing genuine financial and monetary gain (Wacks, 2025).

Considering the revenue generated from virtual worlds, together with the numerous legal debates surrounding intellectual property rights and the enforceability of online contracts, these virtual environments have become significant hosts of human daily and ordinary activities. In light of this, it is necessary to examine the definitions and concepts of virtual worlds (that is, artificial and constructed worlds).

The online encyclopedia Wikipedia defines a virtual world as:

"An online community that takes the form of a computer-simulated environment, through which users are able to interact with one another and utilize and create objects. The term is largely synonymous with three-dimensional virtual worlds, where users are represented to each other as avatars. These avatars usually appear as textual, two-dimensional, or three-dimensional representations, though other forms such as tactile or auditory senses are also possible."

Richard A. Bartle, in a similar definition, likened the virtual world to a computerized space in which groups of players are able to interact with that world and with each other. From their inception, virtual worlds have become central nodes of entertainment, education, and social interaction. At the same time, a virtual world can be described as an online environment that is persistent and dynamic: persistent, because when the user is not logged in, the environment does not disappear; dynamic, because it continuously changes its virtual elements (Blazer, 2006).

The U.S. Federal Trade Commission confirmed that:

"Online virtual worlds combine three-dimensional spaces and 3D games with elements of online social networks, enabling users to interact with one another and to generate online content. Users in virtual worlds communicate socially through avatars, play games, and often engage in trade and transactions in highly detailed graphic environments using text or voice chat, audio, gestures, and video."

The Organisation for Economic Co-operation and Development (OECD) similarly defined a virtual world as:

"A persistent, computer-simulated environment that allows a wide range of users represented by avatars to interact with each other and the simulated world in real time."

According to Professor Edward Castronova, "virtual worlds are fabricated spaces within computers designed to accommodate a broad range of individuals and users." All virtual worlds are computer-simulated environments that display animated objects and events through coded instructions. Users appear in these worlds via avatars, which are in fact digital pronouns that can be modified, empowering and accompanying them in the simulated space. Although today high technology, abundant capital, and extensive personnel are required to construct and maintain such digital environments, the earliest virtual environments were far simpler and much less costly to develop and maintain (Badenhorst et al., 2006).

In 1979, the first text-based social *Multi-User Dungeon (MUD)* was created on computers. At that time, avatars could communicate with one another only through simple text commands. In *TinyMUD* (1989), users spent considerable time chatting, idling, and entertaining each other with new virtual objects. The game *Habitat* (1985) entered the market as the first multi-user world with a two-dimensional virtual interface. Furthermore, in this game, users could select cartoon-style avatars and navigate within the virtual space. In 1996, *Meridian 99* was introduced. Its novelty lay in its three-dimensional graphics, making it the first fully 3D virtual world. At present, *Second Life*, *World of Warcraft*, and *Runescape* are among the most well-known examples of virtual worlds (Van der Walt, 2005).

Considering the different definitions and forms of virtual worlds, it can be affirmed that these digital realities share certain characteristics. Virtual worlds provide a space where users, through avatars, can explore and interact with others. Furthermore, transformation within the environment continues to occur even when the user is not connected. These cumulative changes over time reflect persistence. Users communicate and interact with each other simultaneously, which demonstrates a real-time communicative feature. Such characteristics play a vital role in virtual worlds, where interaction constitutes one of the most important and valuable factors (i.e., the social network of individuals). Ultimately, the scale of these worlds will surpass imagination as computer networking facilities and capacities expand.

Social Virtual Worlds (SVWs) are internet-based three-dimensional environments where thousands or millions of users interact through their avatars. Moreover, this type of virtual world—much like social networks and online communities—encourages and strengthens social interaction among users. Some virtual worlds also enable users to produce and upgrade their own virtual goods and to engage in economic activities involving real money transactions (e.g., *Second Life*).

Gaming Virtual Worlds (GVWs), while sharing many features of virtual worlds such as spatial metaphor, persistence, real-time communication, and networked computers, are distinguished by having predefined narratives and structures. Additionally, they more explicitly regulate players' activities. Most gaming virtual worlds aim to create environments that, alongside other features, encourage players to exchange information, experiences, and items. Popular examples in this category include *World of Warcraft* and *Runescape* (Fairfield, 2005).

The unique features of gaming virtual worlds are also emphasized in the OECD report:

"Massively Multi-player Online Games (MMOGs) have predefined histories and sets of goals, and in most cases the game world is predominantly created by designers with limited opportunities for user-created content."

In general, the mechanisms that motivate users in these environments are varying combinations of available rewards. The outcome is the emergence of adventures, stories, and, most importantly, meaningful interactions and relationships among users.

Relationship Between the "Magic Circle" and the "Real World"

Imagine a group of children playing hide-and-seek, football, tag, or any other children's game. Each of these games has its own rules that permit or prohibit certain moves and actions by the children. When the game ends, "those constraints" disappear, and the children return to their normal lives. Athletes in basketball, baseball, or tennis must follow specific rules during play; otherwise, a sanction (appropriate to the bounds of the game) will be imposed on the player. It is also possible that an in-game event will have consequences that extend beyond the lines and boundaries of that sport. For example, consider the case of the young man who died while playing American football in 2005. In such a case, should criminal law be applied in the same manner? Some in-game situations that are out of the ordinary can test the boundaries between the rules of the game and the real world. For many years now, those boundaries have also been tested within virtual worlds. (Lastowka & Hunter, 2004)

The growing number of users inside these virtual gaming and social worlds, together with the increasing volume of transactions and exchanges between companies and users (or among users themselves), raises questions in the reader's mind about the boundaries of virtual worlds in relation to the "real case," as well as the degree of interaction between these two realities. In light of this fact, it is necessary to describe certain features of this intersection of domains and borders.

The Dutch (German) historian Johan Huizinga, in studying the element of play in culture, notes that the stage of play, the card table, the magic circle, the temple, the arena, the screen, the tennis court, and the courtroom are all similar in form and function to playing fields governed by specific rules. All of these are temporary worlds within the ordinary, real world of humans, dedicated to a distinct activity. (Badenhorst et al., 2006)

The essence of the Dutch historian's idea can be observed in the teachings of Professor Edward Castronova. He states that a virtual world has a membrane or shell within which virtual interactions and rules are embedded. This delicate barrier separating the two realities is called the magic circle. This shell can be conceived as a kind of shield (in computing terms, a protective wall of commands) that safeguards the fantasy world from the outside world. The internal world requires definition and protection, because anyone entering it must know a distinct and different set of rules. Of course, in the case of artificial and constructed worlds, this membrane is porous. In fact, it cannot be completely sealed; people pass through it constantly in both directions. As a result, the valuation of things in virtual space becomes subject to the valuation of things outside virtual space. In these conditions, one may surmise that certain aspects of fantasy and reality become so intertwined that it is difficult to draw a clear and precise boundary between the two realms. Thus, the close relationship between these realities cannot be denied. Moreover, the real world assigns value to things that exist only in the virtual world. Castronova calls this process "social validation." (Fairfield, 2005)

Eva Nieuwdorp likewise believed that the magic circle should not be seen as a murky hemisphere that separates two different realities. Instead, she advances the idea of an "organic entity" that is in constant interaction with its surroundings. For the same reason, she too emphasizes the theory of a cellular membrane through which certain aspects of fantasy and the real world pass from both sides. (Bauer et al., 1999)

Earlier, Castronova stated that the market, neutrality policy, and law are three strands that are intertwined with virtual worlds. In other words, these strands frequently pass through the membrane that separates the two worlds. Regarding the market, he points to the auction website eBay, which previously enabled the sale of virtual goods for real money. However, in late January 2007, eBay prohibited the auction of "characters, currency, weapons, clothing, and accounts" for online games such as *World of Warcraft* and similar titles. Notwithstanding this directive, the virtual world *Second Life* was not included in that list. Regardless of eBay's ban on virtual goods (in terms of contractual issues between users and companies), some users today venture into trading virtual items or dealing in virtual currency through grey markets. Consequently, new markets emerged, and companies such as Black Snow Interactive profited greatly from unusual activities at the beginning of the twenty-first century. (Lastowka & Hunter, 2004)

(Explanation: Grey market or parallel imports: when price differentials for a particular manufactured product become substantial between two countries (or two markets), independent buyers or risk-takers enter the market, purchase products in lower-priced countries, and re-export them to higher-priced countries, thereby profiting from the price differences. This practice is called parallel importing or the grey market.)

As to the strand of neutrality policy, Castronova believes that there is a relationship of submission between user interests and the decisions of the code authority (typically the game developers). For example, off-platform gatherings in which users discuss matters occurring within the magic circle break the distinction and distance between the virtual and the real in a distinctly reformist way. Regarding law, he states that the theory of cyberspace as a single, unique jurisdiction is no longer novel, and that artificial and constructed worlds have today themselves become the subject of explicit legal analysis. In this regard, it is noteworthy that, for example: contractual matters between companies and users relating to End-User License Agreements (EULAs) or Terms of Service (TOS); privacy and data-protection issues concerning user data; virtual objects that receive a degree of legal protection analogous to movable property; and states seeking to regulate aspects of social virtual worlds—are only part of the issues that arise in cyberspace. (Van der Walt, 2005)

Considerations

As noted earlier, there is still no consensus among researchers on the precise concept of a virtual world. Nevertheless, one can say that most views converge at their core. The spatial metaphor, persistence, real-time communications, and networks of persons and computers are vital elements within any virtual world. Thus, the definition provided by the OECD creates a comprehensive synthesis of the principal aspects of this new domain. (Hart, 2011)

Is everything a game? Is it worth noting that the classification between social virtual worlds and gaming virtual worlds may differ depending on the researcher's line of reasoning? Moreover, since these two kinds of worlds share many elements, the difference between them is not entirely clear, and these types of virtual worlds are not mutually exclusive. In my view, a virtual world may be regarded as a broad genus, with Social Virtual Worlds (SVWs) and Gaming Virtual Worlds (GVWs) as mere species.

In addition, the concept of the magic circle was introduced. This idea is not, by itself, new; it is continually debated among scholars of virtual worlds. The nature of the magic circle can be conceived as a shell or wall that separates the virtual from the real. The porous aspect of this thin barrier not only allows the exchange of ideas, but also shows that the virtual and the real are intrinsically interconnected.

Given the staggering number of 1.4 billion users connecting to various virtual worlds, it is easy to see that this is not a narcotic addiction. Our society is truly experiencing a transformation in its interaction with virtual worlds, and there is likely no turning back. It is fair to say that not only are certain virtual matters resolved within virtual worlds, but also fields such as politics, markets, and law pass through the porous shell that separates the two realities. It is likewise clear that virtual worlds do not aim merely to entertain; they seek to enable diverse forms of interaction between users and between platform owners and players (Saket, 2020). In efforts to regulate the relationship between companies and users in virtual worlds, EULAs are of particular importance in this research.

7. The Nature and Essence of Cyber Assets

Before defining cyber assets, it is necessary to provide a brief explanation of property within the legal system. In many respects, property is an ambiguous and indeterminate concept; however, according to prevailing interpretations, what we call

property possesses value and creates a set of rights and obligations. In legal terms, property comprises fundamental characteristics such as material value, scarcity, and the granting of certain prerogatives to its owners. What we call the value of property corresponds to the level of satisfaction of individuals and their need for the asset, which may be material or immaterial. Scarcity refers to the exclusivity of rights associated with property to a specific person. In other words, by law, rights attached to a particular asset are vested exclusively in one or a few individuals, and not everyone can enjoy them. This dimension of property reflects the exclusive control and exploitation of the asset by its owner. Therefore, based on the essential characteristics of typical property, property in civil law is understood as a combination of objects with specific conditions and an exclusive right of control and exploitation (Hodavand & Mashhadi, 2020).

In practice and in real circumstances, cyber assets possess fundamental characteristics such as immateriality, value, legitimacy, and other attributes of real-world property. These assets primarily exist in cyberspace and are referred to as cyber assets with exchangeable value, since they result from users' investment of time, energy, and money in the form of information. Examples include the level and status of a user account (beginner or professional), cyber currencies, and virtual equipment. These assets are generally classified into three categories. The first category consists of cyber assets with economic benefits, such as arrows, weapons, swords, or other equipment in online games. The second category encompasses cyber user accounts, which may hold economic or emotional significance. Examples include accounts in online stores, entertainment platforms, and social media such as Instagram, as well as accounts in email services and similar cases. The third category includes cyber monetary units or cyber currencies. The cryptocurrency Bitcoin is one of the most well-known examples, possessing economic value and having recently crossed from cyberspace into the real world.

According to Article 127 of the General Principles of Civil Law of China, one of the leading countries in the field of cyber assets, cyber assets are recognized as property and have been included within the category of objects generating legal rights. This recognition has not only expanded the classification of property but has also established a legal basis for protecting rights associated with cyber assets, regardless of whether they belong to platforms or to users. This issue has created a legal foundation for introducing cyber assets into the property category. In what follows, several theoretical perspectives on the legal characteristics of cyber assets will be discussed. It is evident that the appropriate definition of cyber assets depends on the application of these theories within judicial systems (Wacks, 2025).

The "Nothing" Theory: This theory asserts that cyber assets exist only in cyberspace, and their nature is confined to the characteristics designated for them by the operators of cyber environments. Accordingly, cyber assets have no value in the real world if they are not located in cyberspace. Therefore, legal protection of such assets is unnecessary, and they are ultimately regarded as "nothing."

The "Claim" Theory: Under this theory, rights associated with cyber assets belong to the creators and investors of cyber environments and arise from contractual relationships between operators and users of these environments. Consequently, every cyber asset is part of the contractual framework and belongs to the operators of the cyber platform, with its transfer and sale falling under their authority. It should be added that property-related rights can be classified into two categories: rights derived from the ownership of an object, and rights arising from the existence of an asset (property, object, service, etc.) against a person. For instance, the provision of services or the granting of a loan confers rights upon service providers against recipients. For example, if a borrower fails to repay a loan, the bank or financial institution may seize his or her property.

The Intellectual Property Theory: According to this theory, cyber assets are new, creative, and reproducible objects. Cyber assets are considered intellectual achievements of the operators and creators of cyber environments, who produced games, equipment, currencies, accounts, and other cyber assets through intellectual effort.

The Intangible Property Theory: This theory holds that although cyber assets are a form of data and cyberspace-based entities that exist in digital environments, many of them already interact with the real world. Cyber assets thus share general characteristics with real goods, such as value and utility, and can therefore be legally protected as intangible property.

The "New Right" Theory: This theory argues that the classification of cyber assets should go beyond the traditional categories of property and be defined as a new form of property. Since cyber assets are valuable and require legal protection, neither the traditional property categories nor existing legal frameworks can adequately address them.

The Real Right Theory: According to this theory, whenever exclusive legal rights, independent management, or economic benefits are attached to an asset, it can be regarded as a legal subject. Since cyber assets can be exclusive, manageable, and

treated as objects within the legal system, they can be included among valuable objects produced by ownership and labor (Mahmoudi, 2023).

8. Conclusion

The concept of virtual ownership is not a new subject. Electronic money in bank accounts (which has been in common use for years) is an example that allows an intangible commodity to be regarded as equivalent to a virtual object. Through a specific design of computer code, virtual objects within virtual worlds can acquire features and characteristics similar to those of a tangible item (such as a movable property or a parcel of land). Nevertheless, considering civil law and the legal limitations, granting protection to a virtual sword in the same way as to a real and physical object appears impractical.

Moreover, although virtual items may hold economic value, no civil or criminal cases concerning virtual ownership have yet been observed within the judicial framework. Similar to the legal protection afforded to electricity under civil law, if lawmakers determine the necessity of legal protection, virtual objects could be granted similar and equivalent legal safeguards. Therefore, regarding the intangible nature of a virtual object, providing legal protection under property rights within the framework of civil law seems unlikely. To ensure the protection of virtual objects through civil law principles, changes and amendments in the definition of "thing" are required so that it can encompass and substitute for this specific type of intangible object.

Ethical Considerations

All procedures performed in this study were under the ethical standards.

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Conflict of Interest

The authors report no conflict of interest.

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