International Metaverse Association

ISSN 3059-0442

Journal of Virtual Convergence Research

Volume 1 Number 1 Jan.2024

Received: 30 October 2024. Accepted: 01 December 2024

Journal of Virtual Convergence Research
2025, VOL. 1, NO. 1, 226~268
https://intlmetaverse.com/home/journal?lang=en

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Comparative Analysis of Terms of Service for Web 3.0 Platforms: Focusing on Zepeto, Roblox, and Sandbox

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Abstract

This study compares the terms of service for three major metaverse platforms—ZEPETO, Roblox, and The Sandbox—to see how they incorporate Web 3.0's four key traits: decentralization, openness, participation rewards, and data ownership. The findings show that each platform adopts Web 3.0 features differently. ZEPETO, derived from a Web 2.0 company, remains relatively centralized, though it encourages user-generated content and offers virtual currency rewards. Roblox supports a robust creator economy and allows real-currency conversions of its in-game currency, yet retains a degree of centralized oversight. The Sandbox demonstrates the highest level of decentralization by integrating blockchain, tokenizing user assets, and promoting inter-platform transactions. These results underline the need for more user-centric, standardized terms of service consistent with Web 3.0 principles and call for further research that includes the perspectives of platform operators and creators.

Keywords : Web3.0, decentralization, openness, participation rewards, data ownership

Comparative Analysis of Terms of Service for Web 3.0 Platforms: Focusing on Zepeto, Roblox, and Sandbox

1. Introduction

Technology represented by digital transformation is spreading to the public(Kim & Won, 2023). As proof of this, digital platform companies are growing at a tremendous scale around the world. As of March 2022, half of the world's top 10 companies were digital platform companies(PWC, 2022), and in the domestic market, Naver and Kakao are ranked 3rd and 6th(Jin et al., 2022). Considering these actions, it can be predicted that the digital economy will grow through digital platform companies over the next 10 years(Kim et al., 2023). Currently, big tech companies have grown rapidly through digital platforms that utilize openness, sharing, participation, and cooperation, which are the characteristics of Web 2.0 technology(Jeon & Lim, 2023).

However, the web, reorganized in the centralized manner of Web 2.0, has caused various problems such as monopolization and misuse of personal data, exposure of security vulnerabilities, unfair trade, and restrictions on entry by latecomers. In addition, data generated through business participation also belongs to the platform operator, causing a structural problem in which profits from services and advertisements are concentrated on the platform operator rather than the creator. Web 3.0 uses various terms such as blockchain, virtual currency, NFT(Non Fungible Token), artificial intelligence, and metaverse to realize decentralization to improve the centralized Internet environment and to build an environment where users can exercise data sovereignty. We are providing new services using technologies. However, even with the introduction of Web 2.0 or Web 3.0, it cannot be said that all

structural problems are solved. To use all platform services, users must register as members and agree to the user terms and conditions to use the service normally.

In the case of terms of use, the details may differ depending on the service provider and type, but in the case of the terms of use of a Web 2.0-based platform, most items are similar. In addition, in the case of the platform market, which can be said to be a monopoly market, companies using Web 2.0 services are also implementing Web 3.0 services, so are there differences in terms of use? Also, in the case of Web 3.0-based services that are different from communication methods to operating rights, what are the appropriate provisions? There has been little research on whether terms and conditions of use are provided.

Therefore, in this study, we selected three services that utilize the characteristic technologies of Web 3.0, compared and analyzed the terms and conditions of the corresponding platforms, looked at the commonalities and differences, and omitted items based on Web 3.0 characteristics, and looked into the future Web 3.0-based We aim to contribute to setting the necessary terms and conditions from the user's perspective when using various services. However, this study simply analyzed the terms of use from the user's perspective and did not take a three-dimensional view of the terms of use of Web 3.0-based platforms, including practitioners who operate the platform and creators who earn profits through creative activities on the platform. In addition, it only focuses on deriving the above problems and does not clearly suggest ways to solve the fundamental problems. Therefore, as a way to overcome these problems, follow-up research should look at the problems currently implemented in Web 3.0 from various perspectives three-dimensionally and provide specific directions for solving empirical problems.

2. Theoretical Background

2.1 Web 3.0

Web 3.0 aims to address the monopolization of major platform companies by realizing decentralization and creating an environment where users can own their data(Park & Choi, 2022). It suggests an expansion toward strengthening individual sovereignty over the internet and facilitating digital transformation, serving as a key technology for moving toward a shared economy and crypto-economic society(Im, 2022). In contrast to the one-way communication of Web 1.0, where users could only read, Web 2.0 enabled two-way communication, allowing users to both read and write, which marked a clear distinction between Web 1.0 and Web 2.0. Companies that quickly recognized these changes became central players in the Web 2.0 era and have monopolized the platform era, exhibiting the key characteristic of winner-takes-all(Hyun, 2021).

However, Web 3.0's multi-directional communication model goes beyond reading and writing to include ownership, a concept that is increasingly supported by technologies like blockchain and NFTs. Notably, Web 3.0's decentralization is not tied to any specific entity, allowing all participants unrestricted access to and use of data. This ability to share both profits and value marks Web 3.0 as a critical technological advancement in the decentralized era(Kim, 2022).

As Web 3.0 is based on emerging technologies, its definition varies across different perspectives. Seo and researchers(2022) defined Web 3.0 as a technology that ensures user sovereignty over user-generated data, allowing users to manage and control the data they create. Kim (2023) described Web 3.0 as a decentralized web where users own, protect, and control their data, digital assets, and personal information

independently of platform operators, emphasizing openness, trust, fairness, and data sovereignty. Other studies have also provided various definitions of Web 3.0, which are summarized in the table below.

Just as the definitions of Web 3.0 presented in Table 2 vary, the necessary technologies and features required to implement Web 3.0 also differ depending on these definitions. Lee and researchers(2022) defined the key features of Web 3.0 as decentralization, autonomous organizations, openness, participation rewards, and data ownership. Choi (2022) described Web 3.0 as a decentralized business ecosystem, focusing on decentralization, data ownership, and the integration of NFTs, DeFi, DAOs,

Table 1. *Characteristics of Web Technologies by Era*

Category	Web 1.0	Web 2.0	Web 3.0
Era	1990s - Early 2000s	Mid-2000s - Present	Present - Future
Features	Simple consumption of information and content	Issues of duplication, source, and ownership arise	Copyright and ownership proven through NFTs
Communication Style	One-way (Read)	Two-way (Read-Write)	Multi-directional (Read-Write-Own)
Characteristics	Information Economy	Platform Economy	Token Economy
Infrastructure	Personal Computer	Cloud, etc.	Blockchain, etc.
Operational Control	Centralized	Centralized	Decentralized

Table 2. *Definitions of Web 3.0*

Researcher	Definition of Web 3.0
Seo Jung-won et al. (2022)	An era that guarantees user sovereignty over user-generated data, allowing users to manage and control the data they create.
Kim Geun-hyeong (2023)	A decentralized web based on openness, trust, fairness, and data sovereignty, where users independently own, protect, and control their data, digital assets, and personal information, independent of platform operators.
Park Jeong-ryeong & Choi Sae-sol (2022)	A solution to improve the environment monopolized by large platform companies by realizing decentralization and creating an environment where users can own their data.
Kim Yong-tae (2022)	Its most central value is decentralization, where it is not tied to a specific entity, and all participants can freely access and utilize data, sharing profits and value.
Im Myung-hwan (2022)	Strengthening individual internet sovereignty and expanding digital transformation, leading to a shared economy and crypto-economic society.

and the metaverse. KAIST(2022) emphasized customization, decentralization, a blended reality, and a token economy as core characteristics. Other studies have also outlined different key features of Web 3.0, which are summarized in Table 3.

Through the preceding studies, it is evident that definitions and characteristics of Web 3.0 vary. However, the overarching goals of Web 3.0, as described in most of the prior research, share common themes. Unlike the service usage models of major platforms, Web 3.0 aims to create an environment where users have control over their own intellectual property, personal data, and creations. This includes ensuring data

sovereignty and protection. To achieve this, the focus is on decentralization, which offers benefits such as improved data security and sovereignty compared to traditional centralized systems(Lee et al., 2022; Park & Choi, 2022; Kim & Kim, 2022; Lim, 2023; Kim et al., 2024).

The key elements emphasized in Web 3.0 services vary based on the service type but are generally centered around decentralization. These elements include data openness, the metaverse as a space where users gather, mixed realities, participation rewards through data transactions, and systems such as NFTs and the token economy that provide these rewards.

This study will focus on analyzing Web 3.0 elements within major metaverse

Table 3. *Characteristics of Web 3.0*

Researcher	Characteristics of Web 3.0
Lee Won-sik et al. (2022)	Decentralization, Autonomous Organizations, Openness, Participation Rewards, Data Ownership
Park Jung-ryul & Choi Sae-sol (2022)	Decentralization, Data Ownership, High Security, Intelligent Services, Expanded Media Interface
KAIST (2022)	Customization, Decentralization, Blended Reality, Token Economy
Choi Hyun-ho (2022)	Decentralization, Data Ownership, A decentralized business ecosystem through NFTs, DeFi, DAOs, and the Metaverse
Kim Min-ji & Kim Jin-ah (2022)	Decentralization, Data Ownership, Token Economy, Integration with Metaverse
Im Myung-hwan (2022)	Customization, Decentralization, Blended World, Token Economy

platforms, including ZEPETO, a leading domestic metaverse platform, as well as Roblox and The Sandbox, which are global platforms. The study will specifically compare and analyze their terms of service concerning decentralization, data openness, data ownership, and participation rewards, based on insights gained from prior research.

2.2 Terms and Conditions

Terms and conditions(T&Cs) refer to the pre-established contents of a contract formulated by a business entity in a standardized format to engage in contracts with multiple customers, regardless of its title, form, or scope(Terms Regulation Act, Article 2, Paragraph 1). The reason for pre-establishing T&Cs is to save time and costs, simplify procedures, and distribute risks. However, because the business entity drafts these terms unilaterally, there is a high possibility of including unfair terms(Song, 2014). Unfair terms often result in the business entity exploiting its superior position, shifting its obligations or burdens onto the consumer, who is economically weaker, thus causing consumer harm(Choi, 2015). This issue persists with electronic T&Cs, as their digital nature makes them harder to detect, distribute, and explain to customers(Kim, 2017).

Even when utilizing various services based on Web 3.0, pre-established online terms of service are employed, giving these terms the nature of electronic contracts. Unlike the traditional Web 2.0, Web 3.0-based services allow users to generate, sell, and monetize content through diverse creative activities. However, due to the varying service types and operators of domestic Web 3.0-based services, along with their operation as extensions of Web 2.0-based businesses, clear guidelines for these services have not been established. Consequently, there is a potential for inadequate user protection.

When users are harmed by unfair terms, they may seek legal remedies by appealing to the Fair Trade Commission, which can nullify unfair provisions under the

Terms Regulation Act. However, this is often a reactive solution, occurring after harm has already been done. Additionally, individuals pursuing action against corporations face challenges in addressing the systemic issues prevalent in unfair commercial practices(Shin, 2008). As people increasingly engage in online contracts without fully understanding the terms, there is a higher risk of suffering from unfair conditions, including those in Web 3.0 services. Therefore, it is necessary to develop standardized terms that ensure basic protection for users in this evolving landscape.

Through previous studies, we confirmed the importance and characteristics of Web 3.0 and the terms and conditions that must be followed when using the current digital platform. In this study, the following research questions were derived based on these previous studies:

- Research question. How do domestic and international Metaverse platforms reflect the core features of Web 3.0, such as decentralization, openness, participation rewards, and data ownership, in their terms of use?

3. Research Methodology

3.1 Research Scope

This study aims to propose the necessity for user-focused T&Cs tailored to Web 3.0 services by examining three leading Web 3.0 platforms. As of August 16, 2024, the terms of service for ZEPETO, Roblox, and The Sandbox were analyzed.

ZEPETO, developed by Naver Z, is recognized as the number one metaverse platform in Korea(Bae, 2022), with over 340 million cumulative users and 2.83 million active creators as of 2022. The platform hosts approximately 184 million items, and creators have collectively earned over 30 billion KRW(Kim, 2022). Given that Naver is a leading Web 2.0 company, this study aims to examine how the T&Cs in ZEPETO reflect

its evolution into a Web 3.0 service.

Roblox, launched in 2006, is a global metaverse platform with more than 160 million users, 44 million daily active users, and over 8 million creators. It has generated $225.7 million in cumulative revenue from creators(Park, 2022). Given its global presence as a Web 3.0 service, Roblox's T&Cs are included for analysis.

The Sandbox, a blockchain-based metaverse platform on Ethereum, allows users to own, create, and monetize virtual assets. Initially a mobile game in 2011, The Sandbox incorporated blockchain technology in 2018 to establish a decentralized metaverse ecosystem. By 2022, it had approximately 160,000 virtual lands and a variety of major brands and artists creating their own spaces(The Sandbox, 2022). By supporting NFT-based transactions, The Sandbox strongly emphasizes user-generated content and decentralized revenue models, making it a key Web 3.0 platform for analysis.

This study compares and analyzes the T&Cs of the three platforms based on four key characteristics of Web 3.0: decentralization, openness, participation rewards, and data ownership. The definitions of these characteristics are as follows:

- Decentralization : In contrast to the centralized ecosystems of Web 1.0 and Web 2.0, Web 3.0 pursues decentralization(Kim, 2022). This shift addresses vulnerabilities such as data insecurity, the absence of data ownership, misuse, and limitations in scalability(In et al., 2023). As decentralization is central to Web 3.0, this study defines it as a structure in which data storage, processing, and management are conducted by multiple independent nodes (users), rather than a single central server. Each platform’s implementation of decentralization within their T&Cs will be analyzed based on this definition.
- Openness : Openness in Web 3.0 is a critical factor for ensuring better access

to technology, granting users control, and allowing them to manage their data in a transparent environment(In, 2023). Web 3.0 platforms require an open structure where participants can exchange data without being restricted by a centralized platform (Lim et al., 2022). In this study, openness refers to the degree to which the platform's technology and operational information are publicly accessible, and the extent to which users and developers can participate in the platform's development and improvement. Openness may also be reflected in the transparency of code, allowing community participation in code review and development(In, 2023).

- Participation Rewards : Unlike Web 2.0 platforms, such as Meta and Instagram, where users contributed content but did not receive direct financial compensation, Web 3.0 provides direct and meaningful rewards for user participation and activity. Web 3.0 utilizes technologies such as blockchain and smart contracts to quantify user contributions and offer rewards in the form of tokens or other assets. Participation rewards in this study are defined as financial or non-financial benefits granted to users based on their contributions to platform development, operation, or content creation, typically paid in the platform’s internal currency or tokens.
- Data Ownership : Web 3.0 adds the concept of ownership to the reading and writing capabilities of Web 2.0(Kim, 2022). This shift introduces a fundamentally different approach compared to Web 2.0, where platforms control and monopolize user data. In Web 3.0, users have full ownership and control of their data, deciding how it is stored, accessed, and shared. In this study, data ownership refers to the user's rights to complete ownership and management

of their data, including the ability to use, share, or delete it as they see fit, and to receive rewards for third-party use of their data. The study will analyze how each platform's T&Cs reflect this aspect of data ownership.

3.2 Research Methodology

This study employs a comparative analysis, following previous research by Yang & Lee(2009), and Jeon(2023), to examine the four key features of Web 3.0. The analysis is based on the terms and conditions(T&Cs) of each platform as of August 2024, focusing on how well they align with the formalization of Web 3.0 services.

The T&Cs of Roblox, ZEPETO, and The Sandbox were extracted from their respective websites. These terms were analyzed to compare the global platforms Roblox and The Sandbox with ZEPETO, a domestic service, in terms of their alignment with Web 3.0 principles. The primary focus is on the Web 3.0 characteristics identified earlier: decentralization, openness, participation rewards, and data ownership. The study aims to provide a basis for drafting future T&Cs for Web 3.0-based services.

To confirm this, the terms and conditions of use of Roblox, Zepeto, and Sandbox were derived from each website, and based on the derived items, the Web 3.0-based global platform Roblox and Sandbox were compared with the domestic service Zepeto, and the same We checked whether there were any differences in terms of use between services oriented toward Web 3.0. At this time, a comparative analysis was conducted focusing on the main features of Web 3.0 defined above, such as decentralization, openness, participation compensation, and data ownership, and the analysis criteria for the study were divided into compositional aspect analysis and content aspect analysis. The structural aspect was analyzed by identifying the number of items, frequency of use, common terms, and differentiated terms in the terms and conditions of each platform

service. The analysis of the content aspect analyzed the contents of the terms and conditions based on the four selected analysis criteria: openness, decentralization, data ownership, and participation compensation.

4. Research Results

4.1 Overview of Terms and Conditions Comparison

ZEPETO, Roblox, and The Sandbox exhibit characteristics that align with the technological features outlined in prior research by Park and Choi(2022), which detail the evolution of web technologies across different eras. ZEPETO, in terms of communication style and economic operation, demonstrates characteristics of Web 3.0, such as multi-directional communication and a token economy. However, it still relies on a centralized cloud system for infrastructure and operational control. This is likely due to ZEPETO being a service derived from Naver, and therefore, it continues to share servers and various data resources with Naver.

In contrast, while Roblox and The Sandbox also exhibit multi-directional communication and token-based economies typical of Web 3.0, there are key differences in their levels of centralization and infrastructure. The Sandbox, for instance, utilizes

Table 4. *Characteristics of Three Services Based on Web Technologies*

Category	ZEPETO	Roblox	Sandbox
Communication Style	Multi-directional	Multi-directional	Multi-directional
Economic Operation Method	Token Economy	Token Economy	Token Economy
Infrastructure	Cloud	Cloud, Blockchain	Cloud, Blockchain
Operational Control	Centralized	Centralized	Decentralized

blockchain technology and operates on a more decentralized model. This distinction in infrastructure and operational control highlights variations in the way each platform approaches Web 3.0 technologies and principles.

When examining the structural aspects of the terms and conditions, clear differences emerge between the platforms. The terms, policies, and guidelines of each service show distinct commonalities and differences.

All three platforms clearly state their copyright policies regarding user-generated content(UGC). They specify that the platform holds the right to use user-generated content within the platform. Additionally, each platform has policies on handling user data and provides detailed information on the protection of personal data. They also include specific limitations to prevent improper use of the service. Thus, all three platforms emphasize the importance of UGC and clearly define the rights and responsibilities of users regarding it.

When analyzing the terminology used in the terms and conditions, common concepts that are essential to the platforms are evident. Frequently mentioned topics include service usage, user rights and responsibilities, content management, intellectual property protection, and legal liability. However, when analyzing the distinctive terminology within each platform's terms, it becomes clear that rather than focusing on user-oriented terms, each platform reflects its own unique characteristics, technology, and business model. Specifically, ZEPETO focuses on avatars and 3D animation; the Sandbox emphasizes blockchain and NFT-based virtual economies; and Roblox frequently uses terms related to game development and creator economies.

Table 5. *Comparison of General Terms of Service for Domestic and Global Platforms*

Terms of Service			ZEPETO	Roblox
Service	Purpose	O	O	O
	Definition of Terms	O	O	O
	Validity and Modification of Terms	O	O	O
	Rules Other Than the Terms and Formation of Contract	O	O	O
	Limitations on Service Use (Platform Sanctions)	O	O	O
	Service Provision, Modification, and Termination	O	O	O
	Use of Paid Services	O	O	O
	Service Usage Methods and Precautions	O	O	O
	Explicit Statement on Advertisement Provision	O	O	O
	Termination of Service Agreement (Withdrawal)	O	O	O
Account	Account Management	O	O	O
	Account Deletion and Recovery	O	O	O
	Group Account	O	O	O
Posting &	Post Management	O	O	O

Copyright	Rights Attribution and Use of Works	O	O	O
	Copyright Infringement Remedy Methods	O	O	O
	Commercial Use of Posts	O	O	O
Content Management (Content, Intellectual Property Rights)	Company's Content	O	O	O
	User, Others, and Other Content	O	O	O
	Software License	O	O	O
Personal Information	Content Regarding Deletion of Member Information	O	O	O
	Personal Information Protection	O	O	O
Company	Company's Obligations	O	O	O
	Company's Disclaimer	O	O	O
User	User's Obligations and Rights	O	O	O
	Youth Protection	O	O	X
Other	Mention of Disputes	O	O	O

From a quantitative perspective, the number of sections in the terms and policy guides varies between the services: ZEPETO has 12, The Sandbox has 16, and Roblox has 30, showing that The Sandbox and Roblox provide more detailed regulations.

In terms of dispute resolution, significant differences also appear. The Sandbox operates a decentralized structure in which users assume all rights, responsibilities, and risks. Roblox prefers arbitration when disputes arise between users, while ZEPETO leans toward legal resolution. These differences are also reflected in policies on responsibility limits, account management, and business models. The Sandbox actively uses cryptocurrency (SAND) and blockchain technology, supporting NFT transactions and emphasizing decentralization and openness. On the other hand, ZEPETO and Roblox use their own virtual currencies (Zem and Robux, respectively) but place less emphasis on the integration of blockchain technology.

4.2 Comparison of Decentralization

ZEPETO provides a user-participatory virtual world, managing user data internally while demonstrating a tendency towards decentralization, particularly centered on user-generated content(UGC). In contrast, Roblox allows users to directly create and operate games and environments, granting decentralized authority over creative activities within the platform. When compared to the other two services, Roblox exhibits a more expanded tendency toward decentralization. The Sandbox, from the outset, emphasizes decentralization by referring to itself as "The Sandbox(TSB), a decentralized community-driven platform."

Looking more closely at ZEPETO, it regulates the behavior of users and creators through its community guidelines, encouraging mutual cooperation to maintain the community. It outlines user accounts and access to ZEPETO while emphasizing cooperation and autonomy between users and creators regarding community guidelines and dispute resolution. Naver Z reserves the right to monitor user activities and impose sanctions if necessary, while users are required to adhere to these procedures. In the

event of guideline violations, punitive actions such as content removal or temporary/permanent account suspension may be enforced. These regulations focus on promoting user interaction while maintaining order and preventing illegal activities or infringements on others' rights.

ZEPETO Terms of Service, Article 4:

- The Company has established community guidelines to ensure that all users can freely express themselves while safely and enjoyably using ZEPETO services. Users must comply with the community guidelines when using ZEPETO.

ZEPETO Terms of Service, Article 1, Clause 1:

- By agreeing to these Terms of Service, users enter into a service contract with Naver Z and are subject to the laws of the Republic of Korea, regardless of any conflict of law provisions.

ZEPETO Terms of Service, Article 1, Clause 3:

- To fully utilize all ZEPETO services, users must register as members. Users can apply for membership, and Naver Z will review and approve membership applications.

ZEPETO Terms of Service, Article 3, Clause 6:

- Users are solely responsible for all issues and disputes arising from their 'user content,' and 'Naver Z' shall not bear any responsibility unless there is willful misconduct or gross negligence. If 'user content' violates applicable laws, these Terms, or the company's guidelines, the company may take measures such as content deletion or temporary/permanent account suspension after notifying the user in advance. In urgent cases, notification may be provided after the fact.

Roblox Article 3. Group:

- Group. Under the Roblox Terms of Service, a "Group" is considered to exist when Creators unite and register as a single unit on the Service using a single email address for the purpose of releasing experiences or other virtual content through the Service.
- Rights and Permissions. By joining a Group, each Creator grants the owner(subject to change) the right, on behalf of the Creator, to (i) authorize Roblox to use the UGC created by the Group as specified in this Creator Agreement or any other agreement between the owner and Roblox, and (ii) receive sole and exclusive payment for any activities performed by the Group on or through the Service or for any UGC sold by the Group. Group members waive any and all claims they may have against Roblox in connection with any payments made by Roblox to the owner on behalf of the Group and agree to seek recourse for such payments solely from the owner of the Group. The permissions granted to the owner of the Group may be modified by separate agreements between the Group members. Except as required by law, accounting obligations between the owner and members of the Group shall arise solely under any written agreement within the Group, and Roblox shall not be bound by such agreements.

In Roblox's case, the platform also establishes community standards, regulating user and creator behavior and encouraging cooperation to maintain the community. The section on "User Accounts and Access to the Service" states that if users violate the community standards, Roblox reserves the right to take enforcement actions such as account suspension, service access restrictions, or account deletion. In the "Dispute

Resolution(Between Users and Creators)" section, users are encouraged to resolve issues directly with UGC creators before reporting to Roblox, with Roblox intervening if necessary. The terms stipulate that users must accept the outcome if Roblox steps in to resolve disputes. The "Dispute Resolution(Between Users and Roblox)" section outlines that disputes between Roblox and users should follow the Mandatory Informal Dispute Resolution(MIDR) process before resorting to legal action. The "Disputes(Creator Terms)" section indicates that creators are responsible for handling UGC-related issues and may need to refund Robux to users in case of complaints, with Roblox deducting corresponding Robux from the creator's earnings to compensate users.

The Sandbox allows users to create, purchase, transfer, and trade digital game assets using The Sandbox, and they can purchase LAND parcels within the platform to host interactive experiences like games. Users have control over the pricing and business models of these games. The "Sale and Payment of Assets and Games" section specifies that all financial transactions conducted on The Sandbox must be carried out using MetaMask on the Ethereum network, and The Sandbox has no control over these transactions or the information related to them.

Sandbox "Sale and Payment of Assets and Games":

- Any purchase or sale of assets and/or games conducted on The Sandbox must be carried out using MetaMask (or another Ethereum-compatible wallet and browser) on the Ethereum network. TSB has no control over these transactions or their associated information, nor does it have the ability to reverse any transactions. As a result, TSB is not responsible for any claims or damages arising from these transactions with you or any third party.

In terms of user content, The Sandbox stipulates that users are fully responsible for

the information and content they submit or use on the platform. However, it grants The Sandbox the authority to enforce usage restriction policies regarding harmful content, and it reserves the right to modify or discontinue services without notice to users.

Both ZEPETO and Roblox regulate user and creator behavior, clearly outlining dispute resolution procedures to maintain order within the platform and facilitate smooth user interaction. ZEPETO guarantees user safety through community guidelines and, like Roblox, encourages users and creators to resolve issues directly, with Naver Z stepping in as a mediator when necessary. These platforms operate around UGC, with users and creators playing a significant role in maintaining platform order. The Sandbox,

Table 6. *Comparison of Terms of Service Regarding Decentralization*

Category	ZEPETO	Roblox	Sandbox
Platform Operation Structure	Centralized Server Operation	Centralized Server Operation	Decentralized Community Platform Operation
Use of Decentralization-related Technologies (Blockchain, etc.)	Not specified	Not specified	Blockchain, Token Economy (Ethereum, MetaMask), NFT
User Authority Distribution	Limited decentralized authority based on interaction	A certain level of decentralized authority based on interaction	Named as a decentralized community-driven platform, emphasizing authority distribution
Creator Group	Not specified	Group definition and authority specified	Not specified (User = assumed as Creator)

on the other hand, positions users primarily as creators, granting them rights over creation and ownership while also imposing full responsibility. Similar to other platforms, The Sandbox retains enforcement authority in cases of usage restrictions related to harmful content.

4.3 Comparison of Openness

Roblox demonstrates limited openness, as its services are largely restricted, particularly in terms of access to its own technology and intellectual property (IP). This is outlined in its User Terms, specifically Section 8, which covers licenses and restrictions related to the service. For example, Roblox explicitly states that users cannot access its proprietary technology or IP beyond what is provided through the platform's object code.

Roblox User Terms – Section 8. License to and Restrictions on Use of the Service:

- License to the Service. Subject to your compliance with these User Terms or other Roblox Terms, Roblox grants you a non-exclusive, limited, revocable, non-transferable license to use the Service for personal entertainment purposes on your own devices. This includes the right to download software made available as part of the Service, but only in object code form.

Roblox Terms of Service – Section 8. License to the Service and Restrictions:

- Limitations on Use of the Service. In addition to the restrictions set forth in the Roblox Terms or additional terms, you may not (a) rent, lease, sell, redistribute, or sublicense any part of the Service, (b) copy, modify, distribute, publicly perform or display, reverse engineer, decompile, disassemble, or create derivative works of the Service or any technology associated with or incorporated into the Service, (c) circumvent any technical measures designed

to protect the Service or any technology associated therewith, or (d) reverse engineer, decompile, disassemble, decrypt, or otherwise attempt to extract or obtain access to any portion of the source code of the Service(except to the extent that portions of the code contained within the Service are open sourced and the applicable open source license expressly permits reverse engineering, copying, or other modification), (e) use the Service to create any content that is(as determined by Roblox in its sole discretion) malicious, violent, or otherwise in violation of these Roblox Terms, additional terms, guidelines, or policies, or (f) use the Service(or any part thereof or technology therein) in a manner that infringes, misappropriates, or otherwise violates any third-party intellectual property rights or other rights or violates any applicable law.

However, some parts of the service do offer more openness, as third-party content, tools, or materials can be accessed within Roblox, including links to other websites or integration with external accounts. Users are also allowed to post independently developed advertising content, although legal responsibility for such content remains with the user.

Roblox Integrity – Advertising:

- Unlike Roblox immersive ads, developers can post ad content independently in their experiences. In such cases, the experience developer is responsible for directly uploading and controlling the delivery of the ad content. When posting ads independently, developers must comply with all Roblox rules (including Terms of Service, Advertising Guidelines, and all other community guidelines), as well as applicable laws and regulations, in addition to the rules specified below. If ad content violates these rules, actions such as content removal,

experience suspension, or account suspension may be taken.

- Developers must have full control over independent ad posting. If a developer displays independent ads in an experience, that experience cannot programmatically call third-party ad services. Developers cannot share personally identifiable user engagement information with advertisers, and must comply with the Creator Analytics Terms of Service and Roblox Terms of Service when handling all user information.

Roblox Terms of Service – 9. Third-Party Services - a. Third-Party Services:

- Third-Party Services. Some parts of the Service may include or make available content, tools, or other materials (including but not limited to experiences) from third parties (individuals or companies other than Roblox) ("Third-Party Services"). This may include links to websites that are not suitable for all ages, features that allow users to link their user accounts with other accounts (such as Facebook accounts), or third-party buttons (such as like or share). As stated in this Section 9, Roblox does not control or assume responsibility for Third-Party Services (including, but not limited to, how third parties collect, use, and store your information). You understand that by using the Service, and more specifically Third-Party Services, you may be subject to policies, such as fees, terms, and/or privacy policies, that are not controlled by Roblox. By using the Service and integrated Third-Party Services, you agree to pay all fees and comply with all terms, conditions, and policies presented by such Third-Party Services.

Roblox Terms of Service – 9. Third-Party Services:

- Autodesk. Roblox Studio includes code developed by Autodesk(Autodesk, Inc.

> Copyright 2016 Autodesk, Inc. All rights reserved). This code is provided "as is" and Autodesk, Inc. disclaims all warranties, express or implied, including but not limited to the implied warranties of merchantability, fitness for a particular purpose, or non-infringement of third-party rights. In no event shall Autodesk, Inc. be liable for any direct, indirect, incidental, special, exemplary, or consequential damages whatsoever(including, without limitation, damages for procurement of substitute goods or services; loss of use, data, or profits; or business interruption) however caused and on any theory of liability, whether in contract, strict liability, or tort(including negligence) arising in any way out of the use of this code.

While Roblox restricts access to its own technology, it allows limited integration with external tools and services, indicating a degree of openness, particularly for third-party content and advertising. This is a marked difference from ZEPETO, which remains more closed, though both platforms still maintain relatively restricted openness in a broader Web 3.0 context.

The Sandbox, by contrast, demonstrates a higher level of openness, allowing users to create and own assets and games, which can be bought and downloaded via third-party applications or websites. This is explicitly stated in the Terms under "Asset and Game Ownership," providing users with the ability to distribute their creations beyond The Sandbox platform.

Sandbox Ownership of Assets and Games

- If you make your Assets and Games available for purchase by other users in accordance with these Terms, you acknowledge and agree that such Assets and Games may be (i) purchased on The Sandbox, (ii) downloaded from third-party

applications or websites operated by TSB (openness), and (iii) that the purchase of such Assets and Games is subject to these Terms.

Sandbox Other Websites and Services

- The Service may contain links and features that allow you to access other third-party websites or services that we do not own or control ("Third-Party Services"). These Third-Party Services may have their own terms of use. We do not control the Third-Party Services and are not responsible for the content of any linked site. The existence of a link does not imply that TSB endorses, sponsors, or is affiliated with the Third-Party Service. Exercise caution before proceeding with any Third-Party Service or entering into any transaction with a third party linked from the Service. TSB shall under no circumstances be liable for the technical availability of any Third-Party Service, the content, advertising, products, and/or services made available through any Third-Party Service, or for any transactions entered into between you and any Third-Party Service to which you may be directed from the Service. Under no circumstances shall TSB be a party to or in any way be responsible for any dispute between you and any Third-Party Service.

When comparing openness in the context of Web 3.0 principles, both ZEPETO and Roblox demonstrate more closed systems, with limited access to external technology and platforms. However, Roblox does offer slightly more openness through its integration with third-party tools and content, marking a notable distinction from ZEPETO. In contrast, The Sandbox shows significantly higher openness, enabling users to leverage their assets and games across multiple platforms. Despite these differences, all

three platforms have room for improvement in terms of fully embracing Web 3.0's open and decentralized nature.

4.4 Comparison of Participation Rewards

One of the core features of Web 3.0 is the token economy, which involves virtual currencies and economic systems. Naver's ecosystem, such as ZEPETO, expands through user-generated content and participation, relying on an advertising-based revenue model. In ZEPETO, users can sell avatars and virtual items in the marketplace, earning virtual currency (ZEM), which creators can convert into real-world currency. Roblox similarly allows developers to generate revenue within its platform using its virtual currency (Robux), which can also be converted into real-world money. Thus, both ZEPETO and Roblox offer reward systems for participation.

The Sandbox showcases the token economy more explicitly by allowing users to sell their assets through The Sandbox Marketplace, with payments(after deducting fees) transferred to the user via blockchain immediately.

Table 7. *Comparison of Terms of Service Regarding Openness*

Category	ZEPETO	Roblox	Sandbox
Interoperability between platforms	Not possible	Not possible (However, some code is possible)	Possible (User assets and games can be sold on third-party platforms)
API Access and Provision of Developer Tools	API unauthorized use prohibited, no mention of tool provision	Access and provision	The Sandbox service is provided as SaaS
Developer Community Participation	Not specified	Developer forum, etc.	Not specified

In ZEPETO, various methods are available for users and creators to earn rewards through participation. According to ZEPETO's Terms of Use, Article 3: ZEPETO IP Content and User Content, users can create and post photos, videos, text, graphics, items, and other materials using ZEPETO IP content, encouraging active interaction.

ZEPETO Article 3, Section 2:

- Users can create and post photos, videos, text, graphics, items, and other materials using ZEPETO IP content. Naver Z encourages active interaction between users by suggesting or recommending content and features based on user activity within ZEPETO.

ZEPETO allows users to purchase or subscribe to UGC (User Generated Content) created by other users with real currency. Creators can earn revenue from their content by selling items in the ZEPETO marketplace using ZEPETO coins. ZEPETO provides various ways for creators to generate income, as outlined in the following section.

ZEPETO Article 3, Section 5:

- By creating and posting User Content on ZEPETO, the user grants the company and its affiliates a non-exclusive, perpetual, worldwide, royalty-free, sublicensable, and transferable license to use, store, reproduce, distribute, transmit, broadcast, and publicly display such content for ZEPETO-related services.

In Roblox, "User Terms, Section 4" and Developer Terms, Section 4 detail the use of virtual content, UGC subscriptions, and the Robux economy. Users can subscribe to and purchase UGC with real currency, and creators can sell UGC and participate in Roblox's developer exchange program(DevEx) to convert Robux into real currency, provided they meet certain criteria. Additionally, creators can earn extra Robux based on

user engagement through the “Premium Payouts(EBP)” system.

Roblox Creator Terms of Service 4.

- The Roblox Creator Economy section allows creators to sell their created UGC and, for creators who meet certain criteria, participate in Roblox's Developer Exchange Program(DevEx) to earn Robux and exchange them for real currency at the exchange rate set by Roblox. Additionally, it allows qualified creators to generate additional "earned Robux" based on the participation achieved by their "experiences" under the name of "EBP" or "Premium Payouts."

Roblox Creator Terms of Service Article 4: Roblox Creator Economy.

- In the sale of all "UGC"(excluding 2D "virtual items"("classic clothing")) on the "Service," there are three roles. Each role is entitled to a share of Robux generated from the sale(hereinafter referred to as "Robux Allocation").
- Seller/Distributor: For the purposes of "Robux Allocation" under this Article, a "Distributor" means (i) a "Creator"(in the case of items sold in an experience created by the Creator), (ii) another "Creator" on the "Service"(in the case of items sold in an experience not created by the Creator), or (iii) "Roblox"(in the case of items sold on the marketplace). For clarity, regardless of whether the Distributor is a "Creator" or "Roblox" in this Article, the "Roblox" is the seller of record for all sales or transactions on the "Platform."
- "Roblox" allows creators who meet certain criteria to participate in the Developer Exchange Program(hereinafter referred to as the "DevEx Program"). In accordance with certain requirements, policies, and restrictions that "Roblox" determines in its sole discretion(but with reasonable prior notice), Creators participating in the "DevEx Program" may exchange "earned Robux" for real

currency at the exchange rate determined by "Roblox" in its sole discretion (the exchange rate and general requirements, policies, and restrictions of the "DevEx Program" are posted here(hereinafter referred to as the "DevEx Terms")).

In The Sandbox, users can sell assets and games through The Sandbox Marketplace. The transactions occur on the blockchain, and the proceeds(minus transaction fees) are immediately transferred to the user's account. All financial transactions are performed using MetaMask via the Ethereum network, and users are responsible for paying their own taxes.

Sandbox Sale and Payment of Assets and Games:

- Your assets can be sold through The Sandbox Marketplace. The purchase price is agreed upon by both parties, and The Sandbox controls the scarcity of assets in the marketplace. Payments for asset sales are transferred to the seller's account via blockchain after deducting transaction fees. Users are responsible for all taxes related to their activities within The Sandbox.
- If you choose to purchase and/or sell Assets and/or Games on The Sandbox, all financial transactions involved must be conducted exclusively through the Ethereum network using MetaMask(or other compatible Ethereum wallets and browsers). TBS has no information or control over these payments or transactions and cannot reverse any transactions. With this in mind, TBS shall not be liable to you or any third party for any claims or damages that may arise as a result of any transactions you enter into through The Sandbox.
- Each sales transaction on The Sandbox is subject to a fee payable by the purchaser to TBS. This fee is automatically applied as part of the sales transaction.

- Between you and TBS, you are solely responsible for paying all sales taxes, use taxes, value-added taxes, and other taxes, duties, and assessments(collectively, "Taxes") that are now or may hereafter be imposed or assessed by any governmental authority in connection with your use of The Sandbox(including, but not limited to, all Taxes that may be imposed as a result of the ownership, transfer, or creation of Assets and/or Games), excluding any taxes on TBS' net income

ZEPETO, Roblox, and The Sandbox all provide systems that reward users and creators for their participation. ZEPETO allows creators to sell UGC for ZEPETO coins, which can generate income, though the platform does not support converting ZEM into real-world currency. Roblox offers a more robust system where users can subscribe to UGC with real currency and developers can exchange Robux for real money through the DevEx program. The Sandbox, meanwhile, offers the highest level of autonomy, allowing creators to control transactions through blockchain, with The Sandbox only collecting transaction fees, making it the most decentralized and creator-friendly system.

4.5 Data Ownership Comparison

First, ZEPETO explicitly recognizes the ownership of user data and created content, allowing users to manage their creations. Roblox grants users ownership of the content they generate, while retaining the right to use such content for promotional purposes both inside and outside the platform. The Sandbox, however, takes a more decentralized approach, ensuring that all ownership of assets and games created by users belongs to the creators. It guarantees ownership by converting these assets into NFTs, tokenizing them to ensure users' data ownership and intellectual property rights

are fully protected.

In ZEPETO, user-generated content(UGC) is discussed in detail under "Article 3 of the Terms of Use: ZEPETO IP Content and User Content". It first defines ZEPETO IP content owned by Naver Z, and grants users rights over UGC at the time of posting, while simultaneously assigning them responsibility. Users are required to comply with ZEPETO's community guidelines, and Naver Z reserves the right to monitor, modify, and

Table 8. *Comparison of Terms of Service Regarding Participation Rewards*

Category	ZEPETO	Roblox	Sandbox
User Participation Reward System	Revenue generation possible through created content	Revenue generation possible through created content	Revenue generation through the sale of created assets and games
Creator Incentives	Obtaining various rewards, including Zepeto Coin	Additional Robux payment based on user engagement achieved by content	Grants users all rights to payments and transactions, excluding fees, and ownership
Virtual Economy and Currency System	Zepeto Coin, ZEM	Robux, DevEx Program	Ethereum via MetaMask, Blockchain transactions
User Participation Restrictions	Sanction measures if community guidelines are violated	Participation restrictions according to community regulations	Participation restrictions according to usage restriction regulations

delete content that violates the terms. This also applies to cases where users infringe existing copyright or trademark rights. Although Naver Z does not directly mediate disputes, it can investigate and remove content involved in such disputes.

ZEPETO Article 3, Section 1:

- ZEPETO IP content refers to all content provided by the company to construct and operate the ZEPETO service. The copyright, trademark rights, design rights, trade dress, patent rights, and other intellectual property rights of ZEPETO IP content are owned by the company and are protected by applicable laws.

ZEPETO Article 3, Section 4:

- The copyright and other intellectual property rights of user-generated content belong to the user but do not affect the copyright or other intellectual property rights of ZEPETO IP content, which is the original work.

ZEPETO also holds the right to use user-submitted content for promotional and marketing purposes, as outlined below.

ZEPETO Article 3, Section 5:

- By creating and posting user content on ZEPETO, the user grants the company and its affiliates a non-exclusive, royalty-free, perpetual, worldwide license to use, reproduce, distribute, transmit, broadcast, and display such content for ZEPETO-related services.

ZEPETO retains the right to monitor, modify, or delete user content that violates the terms, as specified in below.

ZEPETO Article 3, Section 6:

- Users are solely responsible for any disputes arising from their user content, and

Naver Z assumes no liability unless intentional or gross negligence is involved. If user content violates applicable laws, the terms, or the company's guidelines, the company may take actions such as content removal or account suspension with prior notice to the user.

Roblox's approach is similar, as "Section 6: Intellectual Property and UGC" and "Creator Terms, Section 2: Intellectual Property" cover user-generated content. Roblox IP, including classic avatars, is owned by the company, but creators retain rights to their UGC. Creators must comply with the platform's guidelines, and Roblox reserves the right to monitor and modify UGC if it violates the terms. Additionally, Roblox does not mediate disputes directly, but it can investigate and remove content involved in legal conflicts.

Roblox Terms of Service 6. Intellectual Property and UGC:

- Roblox IP. The interface, graphics (including but not limited to Roblox Classic Avatars and modified Classic Avatars, as defined in Section 2 of the Creator Terms), trademarks, designs, information, artwork, data, code, products, software, and all other elements of the Service (including rights therein and rights thereto) ("Roblox Intellectual Property" or "Roblox IP") are protected by law and the Roblox Terms of Service. All Roblox IP is the property of Roblox and its licensors. Roblox IP includes all UGC licensed to Roblox by Creators in accordance with the Creator Terms. Except as permitted elsewhere in the Roblox Terms or applicable additional terms, you may not use any Roblox IP contained in the Service, except with the separate permission of the owner for each instance. Roblox reserves all rights in Roblox IP not otherwise granted in these Roblox Terms or additional terms.

Roblox Creator Terms of Service 2. Intellectual Property:

- Roblox Studio. Roblox provides a free software tool (the "Studio") that allows Creators to create, develop, modify, operate, and publish experiences and 3D virtual content (collectively, "UGC" as originally defined in the Terms of Service) on the Service. Roblox owns and/or controls all rights in and to the Studio and all elements thereof. Subject to your compliance with these Creator Terms, Roblox grants you a non-exclusive, limited, revocable, non-sublicensable, and non-transferable license (the "Studio License") to use the Studio solely for the purpose of creating, developing, modifying, uploading, and publishing your UGC on the Service. You may use the Studio only in compliance with these Creator Terms.

As stipulated in Article 5 of the Roblox Creator Agreement regarding Roblox Music, Creators can place and play up to 250 tracks, including sound effects, from the "licensed music" provided by Roblox from third parties. However, they are prohibited from creating streaming services or music libraries using this music. While Creators retain all copyright to their User-Generated Content (UGC) that they create and post, they grant Roblox and users a royalty-free right and license to use and promote this UGC. However, it's specified that content posted on the Service that was previously published outside the Service is excluded from Roblox's rights.

Roblox Creator Terms of Service Article 5: Music on Roblox:

- License. Roblox grants Creators a non-exclusive, personal, limited, revocable, and non-transferable license to synchronize licensed music with their experiences or other UGC ("Licensed UGC") solely within and through the Service, and for the duration that Roblox provides such licensed music, as well as the right to play, listen to, and otherwise interact with Licensed UGC containing licensed music

> solely within the Service and for as long as Roblox provides such licensed music. Creators are not required to provide attribution for the licensed music they use within their experiences or other UGC, but may do so at their discretion.

The Sandbox offers the most decentralized model, allowing creators to retain full ownership of assets and games. These assets are tokenized into NFTs to guarantee ownership and prove scarcity, ensuring that creators have full control over their creations. Furthermore, The Sandbox permits creators to sell their assets and games freely on third-party applications, as specified in:

> Sandbox Ownership of Assets and Games:
>
> • During the Service operation, you may upload the Assets and Games you created to The Sandbox in accordance with these Terms. Except as otherwise expressly stated herein, you will always remain the owner of your Assets and Games, and TSB does not claim any ownership rights in your Assets and Games. Otherwise, the following provisions apply to Assets and Games. These Terms apply to all Assets and Games that you contribute to The Sandbox or TSB websites.

You are solely responsible for ensuring that all Assets and Games you submit to the Service comply with all applicable laws and third-party rights, including but not limited to intellectual property rights, privacy rights, and rights of publicity. You agree that all information contained in your Assets and Games may be used in accordance with our Privacy Policy. TSB shall always have the sole discretion to accept or reject any Assets and/or Games.

By using the Service, you grant TSB a worldwide, non-exclusive, royalty-free, perpetual, irrevocable, sublicensable, and transferable license to use, reproduce, publicly display, distribute, and modify your publicly shared Assets and Games for the purpose of

developing, distributing, providing, improving, and promoting the Service, our activities, and your publicly shared Assets and Games. You also grant us the right to use your name and trademark (if any) in connection with our use of your publicly shared Assets and Games.

You may make your Assets and Games available for purchase on The Sandbox. Each Asset is a non-fungible token ("NFT") on a blockchain. By uploading an Asset and making it available for sale on the The Sandbox Marketplace, you retain ownership of all intellectual property rights associated with that Asset but agree to allow a specific number of copies of the Asset to be sold as NFTs. The end user who purchases an Asset will own that specific underlying NFT and will have the right to sell, trade, give away, or otherwise dispose of the NFT as they see fit. However, each Asset will be tokenized to prove its rarity and provide a certificate of ownership.

If you make your Assets and Games available for purchase by other users in accordance with these Terms, you acknowledge and agree that such Assets and Games may be (i) purchased on The Sandbox, (ii) downloaded from third-party applications or websites operated by TSB (openness), and (iii) that the purchase of such Assets and Games is subject to these Terms.

While TSB will attempt to ensure that all Assets and Games uploaded to The Sandbox are uploaded and made available for sale by the original creator, TSB is not responsible if other users violate our Terms of Service (including these Terms) or create Assets or Games that they do not originally create.

Please note that when purchasing an Asset on The Sandbox, the Asset creator retains copyright over the Asset, and you may not use the Asset for any commercial purposes. However, you do acquire the right to display and resell the Asset."

Table 9. *Comparison of Terms of Service Regarding Data Ownership*

Category	ZEPETO	Roblox	Sandbox
Data Ownership and Rights	Presents user and creator copyright (However, the company can use it for marketing purposes)	Presents user and creator copyright	Acknowledges user and creator ownership
User-Generated Content Copyright and Ownership	Ownership belongs to the user	Assigns rights and responsibilities regarding copyright and ownership	Assigns rights and responsibilities regarding copyright and ownership
Transparency and Accessibility of User Data	Users can access and manage their content through privacy settings	Grants users a free license to the creator's UGC	Licenses for user content to The Sandbox are provided non-exclusively
Personal Information Protection and Data Security	Specifies Privacy Policy	Specifies Privacy Policy	Specifies Privacy Policy
User-Generated Content (UGC) Utilization	Presents policies primarily related to virtual items and avatars	Presents relatively detailed regulations and policies regarding created games	Presents specific sales policies regarding created assets and games
Discontinuation of UGC Provision	ZEPETO can discontinue provision at its sole discretion	Roblox can discontinue provision at its sole discretion	Sandbox can discontinue provision at its sole discretion

Additionally, The Sandbox has the right to use user-submitted assets and games for promotional purposes, and it can accept or reject content at its discretion.

ZEPETO, Roblox, and The Sandbox all clearly define ownership and responsibility

for user-generated content. In ZEPETO, Naver Z retains promotional rights to user content, while users retain copyright. Similarly, Roblox allows creators to maintain ownership of UGC but grants itself promotional rights. In contrast, The Sandbox provides creators with the most autonomy by tokenizing assets into NFTs, allowing full ownership while also granting the platform promotional rights. The Sandbox further ensures content scarcity and ownership through blockchain technology, setting it apart from the other platforms in terms of decentralization.

5.5. Conclusion and Limitations

Through this research, we were able to identify distinct characteristics of Web 3.0 services and confirm the need for clear changes in regulations governing users to align with these characteristics. However, not all of the traits of Web 3.0 outlined in previous studies were present in current platforms. The four key traits—decentralization, openness, participation rewards, and data ownership—are not equally represented, with notable differences across platforms. An analysis of how each platform implements these features reveals that while some emphasize certain aspects, others show deficiencies. To fully realize Web 3.0, it is essential that all core features be balanced and well-integrated, necessitating a reevaluation and improvement of user agreements and policies.

First, regarding "decentralization", both ZEPETO and Roblox operate through centralized servers, regulating and mediating user and creator actions. On the other hand, The Sandbox positions itself as a decentralized, community-driven platform using blockchain technology and token economies. However, all three platforms maintain centralized control over certain aspects of service management through their terms of use. To truly embrace decentralization—a core principle of Web 3.0—platforms must grant users more authority and responsibility, ultimately increasing transparency, trust, and user engagement.

Second, in terms of "openness", ZEPETO and Roblox exhibit limited interoperability with other platforms, as well as restrictions on API access and developer tools. Conversely, The Sandbox allows assets and games created by users to be purchased and utilized in third-party applications, offering a higher degree of openness. For Web 3.0 to fully realize its potential, free movement and sharing of data and content is critical. Platforms should work toward building open ecosystems where users can deploy their content across diverse environments.

Third, in the area of "participation rewards", all three platforms provide systems that reward users and creators for their contributions. ZEPETO and Roblox enable users to generate income via virtual currencies, with Roblox offering the ability to exchange its currency for real-world money. The Sandbox, leveraging blockchain, immediately compensates users minus transaction fees. Therefore, platforms should continue to evolve these participation reward systems to encourage user engagement and foster sustainable growth. Blockchain-based transparent reward systems are likely to enhance user trust and positively influence creators' motivation.

Finally, regarding "data ownership", ZEPETO and Roblox acknowledge user ownership of content while retaining the right to use that content for marketing purposes. Additionally, The Sandbox tokenizes user-created assets and games as NFTs to ensure scarcity and ownership. Clear data ownership is a crucial element of Web 3.0, as it empowers users with full control over their content, fostering creative freedom and enhancing trust in the platform. This shift toward a user-centered ecosystem is vital.

Tech industry leaders like Tim O'Reilly and Jack Dorsey have dismissed Web 3.0 as a mere marketing term. However, much like how people during the late 18th century did not realize they were living in the age of the Industrial Revolution, we may only fully

grasp this paradigm shift in retrospect. Just as Savery and Newcomen's rudimentary steam engine evolved into Watt's more sophisticated version, sparking industrial change, today's underdeveloped Web 3.0 technologies will likely become the catalyst for profound transformation through trial and error.

Considering the impact of innovative technologies like generative AI on Web 3.0 services, I believe it is necessary to revise terms of service to include user literacy, ethics, and usage guidelines for those using these technologies. Users must be supported in their understanding and responsible use of these advancements. Incorporating the latest guidelines and ethical considerations into terms of service will foster a healthy interaction between users and technologies, ensuring a positive and productive digital environment.

However, this study simply analyzed the terms of use from the user's perspective and did not take a three-dimensional view of the terms of use of Web 3.0-based platforms, including practitioners who operate the platform and creators who earn profits through creative activities on the platform. In addition, it only focuses on deriving the above problems and does not clearly suggest ways to solve the fundamental problems. Therefore, as a way to overcome these problems, follow-up research should look at the problems currently implemented in Web 3.0 from various perspectives three-dimensionally and provide specific directions for solving empirical problems.

Funding: This work was supported in part by the MSIT(Ministry of Science and ICT), Korea, under the Graduate School of Metaverse Convergence support program (202439002.01-RS-2022-00156318) supervised by the IITP (Institute for Information & Communications Technology Planning & Evaluation).

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