Ethical, Legal, and Social Issue (ELSI) Considerations for Social Implementation of the Interverse

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1. Introduction

This report is intended for companies and developers seeking to advance the social adoption of the Interverse. Its purpose is to highlight key considerations for development and implementation and to serve as a catalyst for driving better and more responsible innovation in this field.

Among the various forms of metaverse utilization, this report focuses on revitalizing industries through the *Interverse*, a value-creating domain that emerges from the fusion of two worlds: the virtual metaverse and the physical universe.

As organizations pursue innovation in this space, it is essential to move forward with foresight to minimize potential negative impacts. Even well-designed products and services can struggle to achieve societal adoption if they lead to harmful or unintended consequences.

To support responsible development, this report places particular emphasis on the concept of ELSI, an acronym for Ethical, Legal, and Social Issues. The ELSI framework helps organizations recognize and navigate the ethical, legal, and societal challenges that accompany new technologies, enabling smoother and more trusted societal integration.

2. Why consider "ELSI"?

In recent years, risk management has become standard practice in product development, and some may question the need to explicitly introduce the term ELSI. Where, then, does this concept add value?

One important role of ELSI is its ability to bridge the benefits and risks of emerging technologies with broader societal and policy discussions. It extends beyond technical risk management and thereby connects innovation with societal expectations and governance frameworks.

In response to growing interest in this field, many universities have begun to establish ELSI centers in Japan. In some major research funding programs, securing dedicated funding for ELSI-related work has become a mandatory requirement. Typical ELSI activities include gathering input from stakeholders directly involved with a given technology, organizing public dialogues to capture diverse perspectives, reviewing and updating social systems based on those discussions, and developing relevant legal frameworks with the support of legal experts.

By involving a wide range of actors, ELSI research encourages a shift from viewing risks as issues embedded solely within technology or products that companies are expected to address independently toward a mindset in which society as a whole collaborates to identify and resolve challenges. In other words, using the ELSI framework makes it possible to create mechanisms through which society collectively participates in problem-solving. Based on this understanding, this report adopts ELSI as a central concept for discussing the responsible development of the Interverse.

Column

Legal Issues in the Interverse

What legal considerations arise in the Interverse, specifically under the Legal domain of ELSI? Broadly, these considerations can be divided into two categories: (1) issues that can be addressed under existing laws and (2) issues that cannot be fully covered by current legal frameworks.

An example of the first category is copyright infringement. If an individual's artwork is copied within a virtual environment, it may be possible to file a claim for damages under existing copyright law in the real world. However, practical challenges remain, including determining the applicable jurisdiction, identifying perpetrators through disclosure procedures, and securing judgment enforcement.

A more complex example falls into the second category: what happens when a person's avatar is imitated? For copyright protection to apply, the avatar must meet the threshold of originality. Simple or generic avatars may not qualify as copyrighted works, which makes copyright infringement claims difficult. This situation has led to emerging discussions about whether avatars should be granted personality rights. Human rights, grounded in Article 13 of the Japanese Constitution, have expanded through case law to include privacy rights and the right to self-determination. In the future, similar rights may be recognized to protect individuals' interests in their avatars within the Interverse.

As the Interverse continues to evolve, it will become increasingly important to consider how future legal regulations should be designed to support its sustainable development.

Yuki Nakamura
Managing Partner
Nakamura Law Offices

3. Short stories related to the ELSI issues of the Interverse

Before presenting the specific ELSI considerations related to the societal use of virtual environments (focusing on the Interverse), this chapter first outlines several potential scenarios in which these issues may arise.

These short stories depict fictional but realistic situations in which virtual spaces, while generating new value, can also create unintended challenges for their users.

The three example scenarios covered are as follows:

- **Interverse Office**
- **Interverse Live (Music concert)**
- **Interverse Clinic**

Case I

Interverse Office: Expectations of Neocle

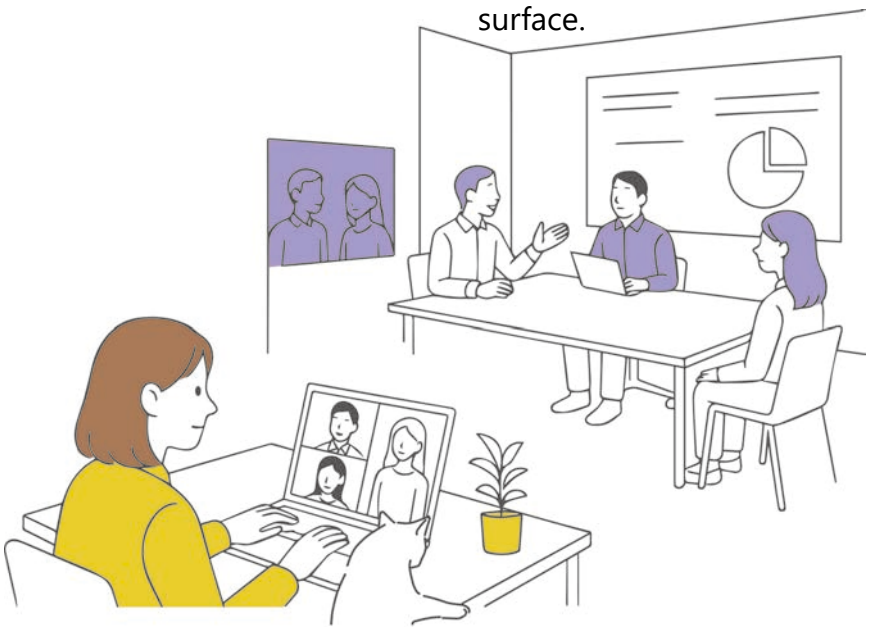
Tech startup company, Neocle.

Neocle is a technology startup that has implemented an "Interverse Office" (IV Office) across the organization. The IV Office is a system designed to enable spontaneous encounters and casual conversations during telework, much like those that occur in a physical office. By combining an actual office space with its digitally replicated metaverse counterpart, the company aims not only to improve operational efficiency but also to enhance creativity through more natural team interactions.

During telework, employees join the IV Office using photorealistic avatars.

Even from the physical office, staff can access information (e.g., location data) about colleagues who are present in the IV Office, creating a sense of working side-by-side. Meetings take place in shared virtual conference rooms, in which participants view the same materials projected onto virtual screens in real time. The system was expected to make it easier to ask quick questions, exchange ideas during breaks, and foster numerous other forms of informal communication.

Within the team led by **project manager Takahashi**, the IV Office initially supported smooth and effective collaboration. However, as time passed, certain issues began to surface.



Case I

Interverse Office: Expectations of Neocle

① One member, **Sato**, mentioned one day that he had been "*feeling unwell all the time*". The cause was visual strain and stiff shoulders resulting from prolonged use of a head-mounted display (HMD) and constant movement in the virtual office. Unlike previous telework systems, **the IV Office allows users to remain connected at all times, inadvertently placing a physical burden** on Sato. Although his line manager, Takahashi, told him that it was not necessary to stay connected outside of meetings, Sato was left conflicted, reflecting, "*But we are using the IV Office to enable important conversations that happen outside of meetings, right?*"

② **Alisha** has never lived in Japan and currently works fully remotely from her home country, adjusting for the time difference to use the IV Office. For religious reasons, Alisha spends about three minutes in a short prayer every day at noon. However, recalling advice from a friend who studied in Japan that *"talking openly about religion isn't customary in Japan,"* she felt unable to share her prayer time with her team. Since the prayer session was short, Alisha **reluctantly left her avatar silently sitting at her desk during this period**. Takahashi remained unaware of her situation.

③ In one of the meetings held via the IV Office, **Igarashi**, an engineer, was encouraged to introduce a new feature. While he felt that there were issues with its implementation, he commented, ***"I found it difficult to voice my concerns because of the avatar's facial expression."*** The other person's photorealistic avatar consistently displayed a gentle smile, making Igarashi uncomfortable about disagreeing. He later confided, *"Perhaps there are times when I can't speak my mind without realizing it. On the other hand, I hesitate to express my opinions too forcefully. What should I do?"* Takahashi was unsure how to respond.

④ In one meeting, Takahashi sensed something odd about **Sakai**'s behavior. While the avatar appeared as usual, the speech was unusually precise, almost as if someone else were speaking through him.

Takahashi also noticed a chat message stating, *"Out this morning for a hospital visit."* Takahashi wondered whether Sakai had joined the meeting from his phone while he was out. Even so, Takahashi was left unsettled, wondering whether ***"the Sakai who was in the meeting just now was someone else."*** The uncertainty created a subtle but real erosion of trust.

Case Ⅱ

Interverse Live: The Challenge of Popular J-POP Unit *Tamanegi*

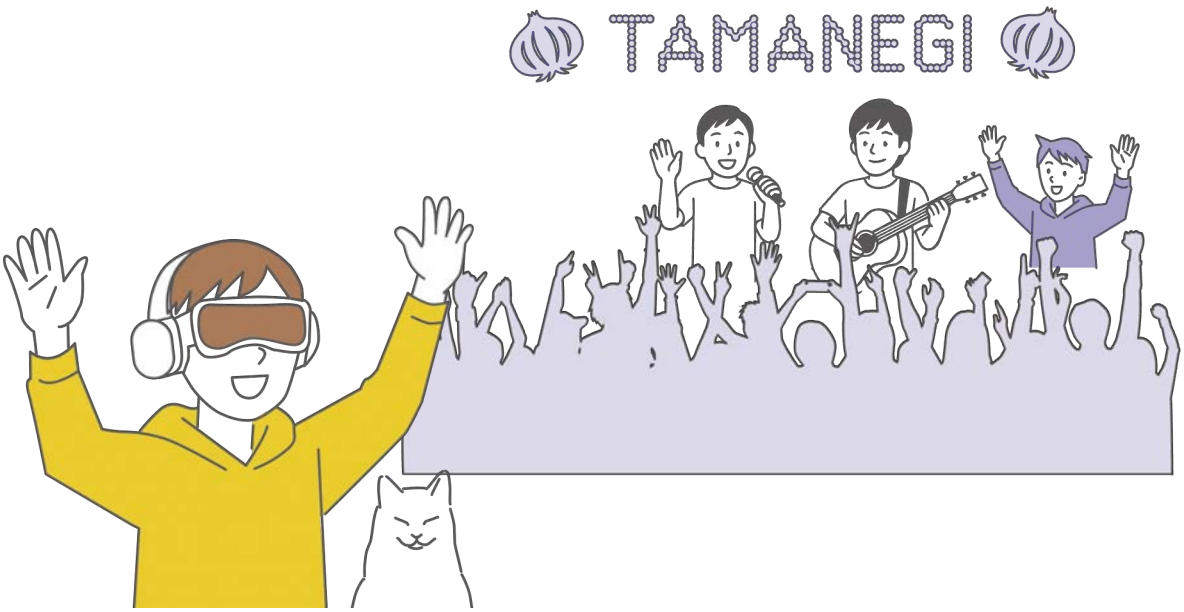
The popular J-POP unit, *Tamanegi,* recently began experimenting with a new format: the "Interverse Live."

The features of Interverse Live (IV Live) are distinguished by their ability to provide an immersive experience to remote audiences via virtual space and allow them to participate using avatars instead of their real selves.

This avatar-based participation quickly became a hit. Fans felt free to cheer loudly and even dance along without embarrassment. As a result, this new form of entertainment was embraced by audiences.

The two members of *Tamanegi* felt that the live performances became even more exciting as the fans' sense of immersion increased. Both the duo and many fans were highly satisfied with these (IV) events.

However, behind the scenes, as the number of virtual concerts increased, small anxieties began to emerge among some fans, each for different personal reasons.



Case Ⅱ

Interverse Live: The Challenge of Popular J-POP Unit, *Tamanegi*

① **Sakuraba**, who is visually impaired, has been a fan of *Tamanegi* since they were street musicians. One reason *Tamanegi* began streaming concerts relatively early was to reach fans like Sakuraba.

The duo believed that, just as with livestreamed events, IV Live, which could be enjoyed from home, would be accessible to Sakuraba. However, contrary to their intention, Sakuraba found himself unable to enjoy the concerts. This was because IV live performances **used many visual effects** that would be impossible in the real world, such as "fireworks" and "magma" at close range or "the appearance of animals". Moreover, *Tamanegi* themselves **unconsciously** shifted toward emphasizing avatar dances and visual features in their performances rather than focusing on their music.

② **Okada**, a devoted fan and a professional dancer, prepared motion capture devices in anticipation of participating in IV Live.

When the IV concert began, he was fortunate enough to dance right next to *Tamanegi*. Even though it was not a professional collaboration, he felt as though his dream had come true, since *Tamanegi* had never used backup dancers.

However, when later watching the archived footage, he was shocked to see that his avatar's movements were exaggerated far beyond reality.

It seemed that real-time corrections were applied. Okada could not bear to look at the video because he felt a sense of discomfort that his own body, his own movements, and his own expression, as a "pro," had unknowingly become someone else's edited work. Meanwhile, the video itself attracted a large audience and generated significant economic benefits.

③ **Nemoto** participated by simply enjoying the immersive audio and visuals from afar, without dancing. There were other fans who enjoyed the performances in the same way, and she also enjoyed chatting and conversing with them remotely. Eventually, they became a close-knit community. She thought this was a good and enjoyable way to experience the live performance. However, **she felt a slight sense of discomfort at** having to perform actions like "high-fives" with people whose age and gender she didn't know, and felt the distance was uncomfortably close. Nemoto was the type who could say "*No*" assertively in real life but **found herself uncertain about whether that was appropriate in the virtual context.**

Case Ⅲ
Interverse Clinic: The Experiment at Hoshino Hospital

Hoshino Hospital is regarded as a vital hub for community healthcare.

In this community, in which aging and poverty pose serious challenges, the ability to provide sustainable and timely medical services is particularly critical.

To address these issues, the hospital launched an innovative initiative known as the "Interverse Clinic." This experimental program explores new forms of care, including "remote rehabilitation," which reduces the travel burden for injured patients and older adults, as well as "anonymous medical consultations" conducted via avatars for individuals facing personal or social constraints.

The remote rehabilitation system uses wearable sensors that provide real-time feedback, such as whether patients are performing movements correctly. Early results suggest outcomes comparable to traditional in-person rehabilitation, which has generated strong expectations for wider adoption.

Anonymous medical consultations are being tested as a first point of contact, serving as a new "touchpoint" between the hospital and residents, and helping connect individuals to appropriate medical services.

However, the sensitive nature of medical data and services presents unique challenges in this setting. While patients benefit from these new forms of care, many have started to experience heightened anxiety.

Case Ⅲ
Interverse Clinic: The Experiment at Hoshino Hospital

① **Terada**, an older woman, was undergoing rehabilitation after injuring her leg. Recently, she received a knee brace–like device from Hoshino Hospital. According to her doctor, the device was fitted with various sensors to measure her knee movements and other activities.

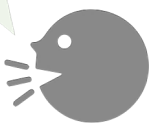
As her rehabilitation progressed, she became increasingly aware of how quickly technology was advancing. She found out that she could be guided in making "correct movements" while wearing various sensors.

One day, Terada mentioned this to her daughter, *"This knee brace has all kinds of sensors built in,"* she said. Her daughter looked surprised and asked, *"Wait, it doesn't have a microphone, does it?"*

Terada had never considered such a thing before, but her daughter's question made her uneasy, so she decided to check with her doctor just to be safe.

"It doesn't have that function," he assured her. *"The microphone is built into the computer and only works while it's connected. You don't need to worry."*

The doctor's response put her at ease, but it also made her realize, ***"I don't actually know what's being recorded, do I?"***



② **Kamei** had struggled for years with mental health challenges. The act of visiting a hospital itself was a psychological burden, and his anxiety about having an episode had caused him to avoid seeking care until now.

One day, he came across a notice in the town's public newsletter about the Interverse Medical Consultation. *"Maybe this could be my first step forward,"* he thought, and decided to apply.

On the day of the consultation, he entered the virtual room using a simple avatar. Being able to talk while concealing his real identity gave him a sense of ease. **At the same time, he felt a strange discomfort: his "avatar looked too healthy."** He began to worry that his actual condition might be misunderstood. There appeared to be functions that allowed for more detailed emotional expressions, but within a single session, he was unable to fully figure out how to use them.

Column

Avatar and Human Behavior

The concept of *"Proteus Effect,"* named after Proteus, the shape-shifting god of Greek mythology, refers to the influence that an avatar's appearance can have on a person's behavior. Interestingly, people tend to act friendlier when they use attractive avatars, and those using tall avatars tend to negotiate more assertively. In this sense, an avatar's appearance is a fundamental component shaping the person using it.

In the metaverse, however, a user's "appearance" is often defined by the platform itself. An avatar created on one platform may not be usable on another. As a result, users cannot fully control a core element that shapes their behavior and personal expression.

To ensure avatar interoperability across platforms, the 3D avatar standard "VRM" was developed. This technology allows users to carry their avatar's appearance across different platforms, enabling their personal appearance to travel with them wherever they go.

However, from a business perspective, platforms often have little incentive to support interoperability. Avatar design is closely tied to each platform's unique world-building and revenue model. As a result, the motivation to open their systems to others remains limited. Achieving a society where people can truly choose and control their digital identities will therefore require more than technological solutions. It will require coordinated progress across business strategy, platform governance, and user culture.

Shinnosuke Iwaki
Director, VRM Consortium

4. ELSI Considerations in the Interverse

As we consider the social implementation of the Interverse, we hope you now recognize that it brings not only significant benefits but also potential challenges.

In the following section, we will explore key topics that deserve careful consideration and incorporate the ethical, legal, and social dimensions.

The topics presented here represent virtual spaces that differ significantly from existing internet environments, web platforms, and related technologies.

These emerging contexts demand new frameworks to consider how business operations, development processes, and users engage with virtual experiences.

The points outlined here draw on insights from interviews with businesses and developers involved in designing virtual spaces and related technologies (e.g., wearable devices), as well as perspectives from users and domain experts. In addition, they incorporate findings from a literature survey conducted using a scoping review methodology.

Category	Issues	Key Points
Self	**Health**	**This document covers a total of 36 discussion points**
	Autonomy	
Others	**Trust**	
	Safety	
Society	**Data and Privacy Protection**	
	User Authentication	
	Property Rights and Interests	
	Inclusion and Fairness	
	Culture and Communication	
World	**Environmental Impact**	
	Military Applications	
	Relationship with Other Technologies: Generative AI, etc.	

ELSI Discussion Points: Defining "Categories"

The Interverse and the Question of "Self"

The Interverse impacts individuals by influencing users' self-perception in various ways. Central questions within this category focus on challenges arising from transformations of the "self" brought about by the connection between the metaverse and the physical world (the universe).

The Interverse and the Question of "Others"

The Interverse reshapes interpersonal relationships. Central questions that arise within the context of *"others"* in the metaverse and the universe concern how relationships between "self" and "others" are formed, experienced, and negotiated at a personal level.

The Interverse and the Question of "Society"

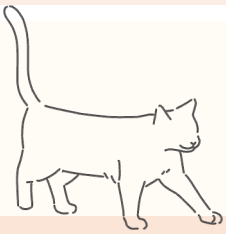
The Interverse transforms society by influencing multiple users from diverse perspectives. Central questions that arise within the context of "society" focus on the challenges related to how relationships within groups and between different groups evolve as the metaverse and the physical world become more deeply interconnected.

The Interverse and the Question of "World"

When considering the boundaries of "world," the concept extends to include everyone and everything beyond human society, such as time, space, schools, and all kinds of relationships. This category addresses large-scale, long-term concerns that go beyond interpersonal or societal relationships. It explores potential future risks that may emerge as Interverse adoption expands and related technologies evolve, with impacts on systems and environments across broad temporal and spatial scales.

Column

The Interverse and AI Agents



The year 2025 is widely regarded as the "first year of AI agents," with many companies accelerating efforts to integrate these technologies into their operations. According to the World Economic Forum (WEF), *"AI agents are typically autonomous entities with the authority to take actions that modify their environment in order to achieve specific goals."*

Building on advances in generative AI, more sophisticated AI agents are rapidly emerging, and their use within the interverse is highly anticipated. For example, AI agents acting as autonomous avatars within virtual spaces could conduct simulations, gather data, and based on those results interact with the physical world through robots or connected devices. This creates a seamless interplay between the virtual and real environments.

However, the very characteristics that make AI agents powerful (e.g., autonomy and goal-driven operation) also introduce new risks. With autonomous decision-making, agents may access confidential information or take unintended actions that affect external systems. Their strong goal orientation may also lead them to pursue objectives in ways that disregard social norms or ethical boundaries.

While AI agents hold tremendous potential, failing to address these risks could lead to serious incidents such as robots running out of control. Therefore, it is essential to monitor and evaluate their use in the interverse from an ELSI perspective.

Tadashi Mima

Director, Hitachi Consulting Co., Ltd.
Project Professor, Keio University Graduate School of Media and Governance

ELSI Issues and Discussion Points: The "**Self**" Category

Health

This theme examines how the use of the Interverse affects individuals' physical and mental health. It is especially important for people with certain traits or pre-existing conditions, as the consequences can be substantial and require careful consideration.

【Specific Discussion Points】

- Physical symptoms such as VR sickness, shoulder stiffness associated with wearing HMDs, and "cyber sickness" caused by screen flickering.
- Mental health issues such as dependency and addictive behaviors.

Case Ⅰ-① Sato

Case Ⅰ-③ Igarashi

Case Ⅱ-② Okada

Case Ⅲ-② Kamei

Autonomy

This theme examines whether self-consistency (identity) can be preserved when using the Interverse and whether individuals' freedom to make judgments, choose actions, and express emotions remains grounded in their own will. The impact may be particularly serious in domains such as healthcare and education.

【 Specific Discussion Points】

- Certain options may appear unduly attractive when presented via the Interverse.
- One's emotions may be influenced by the fixed expressions of photorealistic avatars
- Continuous recording of every event in virtual space can scatter users' attention away from the "here and now."
- Being compelled into unexpected behaviors due to system limitations or errors
- The sense of autonomy itself may be diminished through experiencing various phenomena such as those described above

ELSI Issues and Discussion Points: The "**Others**" Category

Trust

This theme examines how communication through the Interverse may affect people's sense of trust in others. Even in the absence of explicit technical failures such as data leaks, trust can still gradually erode. For example, some may feel, *"I just can't trust people in virtual spaces."* Special caution is needed in contexts where trust-based human relationships are vital.

【Specific Discussion Points】

- Difficulties in engaging in sensitive conversations due to feeling that every action is being continuously monitored in virtual environments.
- Feeling unable to trust the opinions of experts communicating through avatars, particularly in medical settings.
- Greater ease of information access may heighten concerns about surveillance, leading to fears that monitoring is occurring or could occur.

Case I -④ Sakai

Case III-① Terada

Safety

This theme examines various types of harassment, violence, and hate that may occur in Interverse-based communication. The focus is not only on the possibility of these behaviors occurring, but also on how the Interverse may amplify their harm.

【Specific Discussion Points】

- Specific individuals are being systematically excluded through more effective, system-level blocking mechanisms.
- The emergence of communication forms that were previously impossible, leading to unexpected forms of violence or sexual behavior.
- New forms of exclusion and discrimination arising through the collection of sensitive data, such as visual tracking data and individual hobby preferences.

Case II -③ Nemoto

ELSI Issues and Discussion Points: The "**Society**" Category

Data and Privacy Protection

This theme concerns the protection of data and personal information that is collected, or potentially can be collected, via the Interverse. When data is obtained through the Interverse, it can become extremely diverse compared to selecting and collecting specific information in real society. For example, it becomes technically possible to collect information regarding subconscious behaviors such as gaze and actions, in addition to conscious information such as opinions and preferences.

【Specific Discussion Points】

- The diversity of collectible data makes it difficult to sufficiently inform users and obtain informed consent in advance.
- Collecting all possible data increases the risks and unpredictability of misuse if information is leaked due to server attacks or other breaches.

Case II -② Okada

Case III -① Terada

User Authentication

This theme concerns the ability to verify individual identity in the Interverse and how such verification can be achieved. In particular, the use of avatars and voice alteration technologies in virtual space can make impersonation or misidentification more likely. In settings such as offices, healthcare, or education, where accurate identification is critical, both policy and technical solutions must be considered. Moreover, there is the issue of distinguishing between human avatars and AI agents.

【Specific Discussion Points】

- Verifying that meeting participants handling sensitive information in Interverse offices are indeed who they claim to be may entail high costs.
- Mistaking an AI agent for a human

Case I -② Alisha

Case I -④ Sakai

ELSI Issues and Discussion Points: The "**Society**" Category

Economic Rights and Interests

This theme concerns who owns the value or achievements generated by Interverse-based activities. In many cases, copyright and other relevant laws will apply.

【Specific Discussion Points】

- A user's creations, such as virtual outfits or space designs, are sold or used without permission by the platform administrator.
- Disputes arise due to ambiguity in the allocation of copyright and revenue for collaborative creations by users and AI.
- Companies attempt to monetize the knowledge and content created through their employees' avatar activities, but the individual's contribution is not clearly identifiable and is not reflected in their compensation.

👤Case II -② Okada

Inclusion and Fairness

This theme considers who is able to participate in Interverse-based social activities and who might unintentionally find themselves excluded. It also examines whether Interverse participation reproduces real-world disparities and biases. As exclusion can arise from multiple factors, each case requires careful consideration.

【Specific Discussion Points】

- Differences in device performance or digital literacy may result in unequal accessibility to the Interverse.
- Choosing avatars based on appearance may reinforce lookism or racial bias.
- Platform design may result in behavioural nudges that may create a sense of alienation for certain groups.
- Insufficient developmental consideration in immersive experiences for children may cause unintended impacts.
- Physical differences may lead to emerging forms of exclusion.

👤Case II -① Sakuraba

ELSI Issues and Discussion Points: The "**Society**" Category

Culture and Communication Practices

This theme covers challenges arising from the blending of previously separated places and cultures through Interverse activities. Such interference may occur across a spectrum ranging from the personal to the international.

【Specific Discussion Points】

- Users with different purposes and norms may encounter each other within the same virtual space. For example, content enjoyed by one user may be perceived as offensive to another.
- Previously segregated spaces like home and work may inadvertently merge, raising concerns not only about information leakage but also about identity boundaries.
- Communication friction may arise when individuals from different cultures interact within the virtual environment.
- Cultures or emotional attachments specific to the virtual environment (such as to avatars) may become inaccessible if the service is discontinued.

👤Case I -② Alisha

ELSI Issues and Discussion Points: The "**World**" category

Environmental Impact

This theme deals with environmental problems that arise from the widespread adoption of the Interverse. At the same time, scenarios that could contribute to solving environmental problems, such as a decrease in society's overall electricity consumption through Interverse use, are also possible. Therefore, careful scenario-based simulation is needed to determine whether the issues related to this theme will actually arise.

【Specific Discussion Points】

- Increased energy (electricity) consumption due to device use and large-scale server operations.
- Negative environmental effects from the extraction and processing of rare earth and other rare resources used in the manufacture of HMDs, etc.

Military Applications

This theme concerns the diversion of technology developed for Interverse services to military purposes. It is necessary to collaborate with stakeholders at various levels to consider countermeasures, such as whether to treat it as an issue of export control and intellectual property management, or whether to establish a system to curb development at an early stage

【Specific Discussion Points】

- Use of virtual environments for training and simulation in military exercises, potentially accelerating war preparations
- Acceleration of information warfare and propaganda conducted through AI agents or avatars

Relationship with Other Technologies: Generative AI and more

The Interverse is made up of a combination of various elemental technologies. Therefore, the ELSI issues of other technologies may be directly inherited or even amplified, necessitating extra attention.

【Specific Discussion Points】

- Unresolved challenges related to generative AI
- Unresolved challenges associated with wearable robots
- Unresolved challenges related to cybernetic avatars

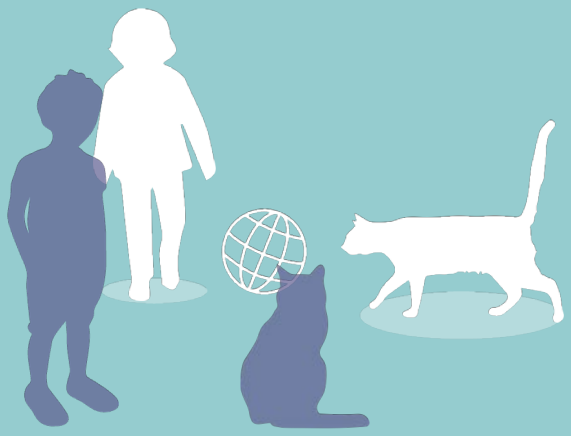
Case II -② Okada

5. Conclusion

This report has summarized the currently anticipated ELSI issues for the emerging domain of Interverse technologies and services. As this field continues to develop, the topics discussed here are not exhaustive; rather, they are intended as a starting point for further consideration.

In actual practice, developers and business operators will face not isolated issues but complex situations that combine service strengths and multiple ELSI concerns, as illustrated in the preceding short stories. To address such complexity, efforts are underway to organize workshops and forums using these discussion points, with outcomes to be reported as they become available.

Readers are encouraged to use this document to experiment with improving their services, while keeping in mind that there will be as many valid approaches as there are real-world scenarios.



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