

Metaverse - a complex jurisprudential approach to the virtual world

Judit Glavanits/Gergely Karácsony/Gábor
Kecskés/Barna Arnold Keserű

The metaverse is a space where the physical and digital worlds meet. With the development of technology, it has become possible for one's digital representation, one's avatar, to interact with others and thus to use the services and experiences provided by the metaverse. The possibilities are practically endless, we just need to ensure the technical conditions, assess the legal aspects of the whole thing and find answers to the legal problems that arise as soon as possible. Among these legal issues, this paper will focus on the challenges arising from the metaverse and affecting the international legal order based on the sovereign equality of states, as well as the regulation of the functioning of virtual worlds from a public law and in particular fundamental rights perspective, and the most important private law aspects. At the time of writing the manuscript, the early enthusiasm surrounding the metaverse is fulfilling its promises at a slower pace compared to the high expectations, in terms of the rate of growth in consumer use. There is no doubt, however, that all the issues raised in the study are of particular concern to legislators and law practitioners already today.

I. INTRODUCTORY THOUGHTS AND CONCEPTUAL DELIMITATIONS

A disruptive (or seemingly disruptive) technology always makes law practitioners, and usually with some delay legislators, reflect: whether our existing conceptual frameworks, systems and domains of interpretation are applicable to the changed circumstances. This is no different with the phenomenon of metaverse: in the context of a new stage in the 21st century, which can be regarded as a milestone in the progress of digitisation, let us consider below whether the traditional conceptual framework of jurisprudence is sufficient to understand and operate safely in the new world.

Modern technology allows 21st century humans to exist not only in the external physical environment in the traditional sense, but also in an environment where additions, extra information, certain physical details that do not exist in physical reality may be enhanced at a given moment (*augmented reality/AR*). Mixed reality(*merged or mixed reality/MR*) is when there is direct interaction between the user and the computer-generated space as a result of the merging of the virtual and physical environments.¹ Virtual reali-

¹ János Kállai, Psychological mechanisms of the computer-generated virtual reality: educational and

ty, on the other hand, is a separate entity from physical space, a digitally created, entirely artificial environment.²

The metaverse – seen by many as the future of the internet – is a space where the physical and digital worlds meet. With the development of social technology, it has become possible for one's digital representation, one's avatar, to interact with others in a work environment, at sporting or cultural events, but we can use the services and experiences provided by the metaverse even in the fitting room of a clothing store. The possibilities are practically endless, we just need to ensure the technical conditions. The term metaverse originated in the world of computer games, but has now grown far beyond that: it is not used exclusively for entertainment, but is also a health,³ educational,⁴ work platform. The tech giants of the early 2020s, such as Facebook, Microsoft or Google, all are interested parties and stakeholders in the creation and operation of the metaverse, and it currently seems that this parallel virtual world and its (legal) rules are shaped by economic actors, not by nation-state legislators.⁵

A metaverse, as defined by Mystakidis, is a universe beyond reality, an enduring multi-user environment in which physical and digital reality are mixed.⁶ A metaverse is an interconnected social network that allows simultaneous communication between both physical participants (users) and virtual elements. Ball interprets⁷ the metaverse as:

„a massive, interoperable network of 3D virtual worlds, rendered in real time, and experienced synchronously and permanently by an unlimited number of users, with a unique sense of presence and data continuity, including identity, history, entitlements, objects, communications, and payments.”

This virtual medium raises not only technological, market and psychosocial issues, but also legal ones. Bronsword argues that the emergence of virtual worlds has the potential to undermine, or at least significantly transform and subvert, trust in the law/legal system.⁸ Self-regulatory systems, worlds run by machines (codes), prompt traditional legal thinking to redefine, just as the world of cryptocurrencies and virtual currencies has shaken – the very foundations of – the previous financial system. The idea that the oper-

health applications, Medicina, Budapest 2022.

² N. Pellas et al., „Immersive Virtual Reality in K-12 and Higher Education: A systematic review of the last decade scientific literature”, Virtual Reality, 2021, 25, 835–861.

³ D. Yang et al., Expert consensus on the metaverse in medicine, Clinical eHealth, 2022, 5, 1-9.

⁴ H. Choi, Working in the Metaverse: Does Telework in a Metaverse Office Have the Potential to Reduce Population Pressure in Megacities? Evidence from Young Adults in Seoul, South Korea. Sustainability (Switzerland), 2022, 14(6), O. Kostenko, Electronic Jurisdiction, Metaverse, Artificial Intelligence, Digital Personality, Digital Avatar, Neural Networks: Theory, Practice, Perspective. World Science, 2022, 1(73).

⁵ J. Clement, Metaverse: Statistics & Facts, Statista, 2022. <https://www.statista.com/topics/8652/metaverse/#topicOverview>

⁶ S. Mystakidis, Metaverse, Encyclopedia, 2022, 2, 486–497.

⁷ M. Ball, Metaverse: And How It Will Revolutionize Everything. HVG Books, Budapest, 2022.

⁸ R. Bronsword, Law, authority, and respect: three waves of technological disruption, Law, Innovation and Technology, 2022, 14:1, 5-40.

ation of virtual worlds requires regulation is not new: internal regulation, first and foremost, but also some form of integration of augmented reality events into the legal order of the physical world.⁹

There are several levels of solution for the regulation of the metaverse, which can be complementary or even contradictory. In the evolution of the metaverse, it has been mostly self-regulated, which means that the market players and the service providers (game developers in the beginning) operating the virtual space have developed their own operating principles, and as long as we are talking about issues affecting only a few hundred thousand users (per platform or virtual world), there are no mass litigation issues. At the same time, consumer protection and competition rules have begun to produce court cases that have been of greater interest to legal scholars and practitioners, so the idea of national regulation is emerging, at least at the level of applying legal analogies. At the same time, virtual worlds do not respect national borders, so the international user community – in particular the market for consumer products – is increasingly raising the issue of international harmonised regulation. Since 2008, however, we cannot ignore decentralised international self-regulation, especially given the nature of the market, similar to cryptoassets, and the fact that the interoperability between the existing metaverses and the ownership and transferability of assets are issues of concern to the service providers themselves, so they themselves are also interested in market self-regulation that brings together industry players but does not necessarily wait for slow state regulation.

II. METAVERSE IN INTERNATIONAL LAW

The international legal nature of the metaverse, including its predominantly inter-state character, and its legal implications are indisputable.¹⁰ Indeed, in an international legal order based on the sovereign equality of states, the metaverse opens up a new space, not physical but predominantly virtual, which goes beyond the system of geographical borders and more or less regulated international legal relations that exist on the globe. In the metaverse, problems arise such as *the specific nature of the state territory* (physical and virtual), *the emergence of new types of state property and state infrastructure*, the resulting *jurisdictional difficulties*, the forms of cyber warfare and new types of warfare, and the new types of *human rights violations* or ones committed by new types of conduct created by the metaverse. Ultimately, almost all legal institutions in international relations are significantly influenced by the metaverse. For the time being, we see that in a system

⁹ M. de Zwart, Piracy vs Control: Various Models of Virtual World Governance and their impact on Player Experience. *Journal For Virtual Worlds Research*, 2009; B. Chin, Regulating Your Second Life: Defamation in Virtual Worlds. *Brooklyn Law Review*, 2007, 72:4, 1303-1349.; D. Miller, Determining Ownership in Virtual Worlds: Copyright and License Agreements. *The Review of Litigation*, 2003, 22, 435.; T. Ochoa, Who Owns an Avatar? Copyright, Creativity, and Virtual Worlds. *Vanderbilt Journal of Entertainment & Technology Law*, 2012, 14(4), 959-991.

¹⁰ Beckett Cantley; Geoffrey Dietrich, „The Metaverse: A Virtual World with Real World Legal Consequences,” *Rutgers Computer and Technology Law Journal*, 2022, 49:1, 1-25.

of inter-state relations closely subject to and supervised by the sovereignty of the state, the supreme sovereign state power still acts in international relations under the illusion of the privilege of regulation, that is, in recent years there have been more and more legislative plans and steps towards making the many areas covered by the metaverse subject to inter-state regulation. Rethinking the concept of state territory and extending it into virtual space is not yet a real and elemental global demand. One of the few exceptions is the case of the low-lying state of Tuvalu, concerned for its existence and survival due to sea-level rise caused by climate change, which has created a virtual twin in the metaverse, thus ensuring the virtual survival of the sovereign state. Its example will certainly be followed by other states,¹¹ on the one hand, as other states are also affected by this threat,¹² and on the other hand, because there are tourism and economic benefits to be gained from creating a virtual twin state.

The concept of state property and state infrastructure can also be extended, since in virtual space it is possible to create new types of assets and currencies over which the state can exercise exclusive influence.

The emergence of the issue of jurisdiction in the metaverse can create a number of legal problems, given that it can give rise to private law transactions that are difficult to identify, difficult to trace, not geographically bound, or to crimes committed in virtual space, whether against a virtual avatar or virtual assets, and not necessarily physically manifested.

The traditional rules on armed and non-armed violence between states are already in need of revision in the current era following the emergence of cyber warfare, but there is little chance that states will settle this issue in a reassuring way, as the current uncertain legal perception of the military advantages offered by cyber warfare and the metaverse may result in a highly undesirable situation for states that use it.

The international legislation of states is characterised by restraint, the protection of the idea of state sovereignty and a strong focus on state interests. And this causes a sharp duality in international lawmaking: on the one hand, most states see the danger in this, which could ultimately erode the sovereignty of the state (in the metaverse, how far can the state govern and control, what do these concepts even mean, how far the state's sovereignty extends), but also brings benefits for states, as they can increase the extent of their sovereignty in virtual space in unregulated areas without, or without necessarily, triggering physical violence or conflicts of interest with other states.

If we look at the agenda of most international organisations involving states, we can see that international organisations are increasingly focusing their attention on addressing, or at least maintaining the appearance of addressing, the challenges posed by the metaverse within the limits of their competences. The European Union is working on a

¹¹ Small Island Digital States. UNDP, Small Island Digital States: How digital can catalyse SIDS development (New York: UNDP Global SIDS Team, 2024).

¹² S. Lok, „Sinking States, Sunken Statehood? The Recognition of Submerged States under International Law,” *Cambridge Law Review*, 2023, 8:2, 31-55.

draft regulation on artificial intelligence (EU AI ACT),¹³ the Council of Europe is adopting a framework convention on the impact of artificial intelligence on human rights, democracy and the rule of law,¹⁴ the Organisation for Economic Co-operation and Development (OECD) is continuously implementing a set of recommendations on the use of artificial intelligence, which was created in 2019,¹⁵ the North Atlantic Treaty Organisation (NATO) is collecting and systematising rules for cyber warfare through the Tallinn Manual¹⁶, while the multifaceted activity of the global United Nations (UN) in this area is striking¹⁷.

III. THE FUNDAMENTAL RIGHTS ISSUES RAISED BY VIRTUAL SPACES

The regulation of conduct in virtual worlds, and indeed of the operation of virtual worlds in general, from a public law, and in particular from a fundamental rights perspective, is a justified and absolutely topical issue for several reasons. The most important thing to remember is that the virtual world is also a world – which can seem as real as the outside world. So much so that some predictions suggest that by 2040, the virtual world will be indistinguishable from the real world – both visually and perceptually.¹⁸ Our experiences in the digital world, our lives in the digital world, can therefore at least be on a par with our experiences in the outside world. The metaverse and the events that take place there are also important because of their permanence : the main difference between a metaverse and a computer game is that the metaverse exists independently of the user's current connection status, i.e. it remains after the VR goggles are removed and can be found at a later time. It creates a parallel universe where you can do and experience the same things you do in the outside world: meet other people, use the services of retailers, attend musical events. Virtual worlds are also multi-user, meaning that the same experience and situation can be experienced by many people at the same time, and everything that happens there is happening in public, in front of other real people. In this paper, we look at two aspects of fundamental rights protection: the protection of human dignity and the respect for personal data and privacy.

In the context of human dignity, it is worth starting from Immanuel Kant's understanding of fundamental rights. Dignity is a quality that is inherent in people's humanity, that cannot be denied to them, and that belongs equally to all human beings.¹⁹ Thus, we

¹³ EU AI ACT. (Artificial Intelligence Act) and amending certain Union Legislative Acts (COM(2021)0206 – C9-0146/2021 – 2021/0106(COD)).

¹⁴ CoE Framework Convention. Council of Europe Framework Convention on Artificial Intelligence and Human Rights, Democracy and the Rule of Law. Council of Europe Treaty Series - No. [225].

¹⁵ OECD Recommendation of the Council on Artificial Intelligence. C/MIN(2024)16/FINAL.

¹⁶ Tallinn Manual 2.0. Tallinn Manual 2.0 on the International Law Applicable to Cyber Operations. 2nd edition. Ed.: Schmitt, Michael. Cambridge University Press, 2017.

¹⁷ United Nations Activities on Artificial Intelligence. 2017. International Telecommunication Union, Geneva.

¹⁸ <https://en.futuroprossimo.it/2021/03/il-futuro-della-vr-indistinguibile-dalla-realta-entro-il-2040/>.

¹⁹ Immanuel Kant: Az erkölcsök metafizikájának alapvetése – A gyakorlati ész kritikája – Az erkölcsök me-

can conclude that there may be behaviours that are prohibited because they violate the dignity of human beings or the equal nature of human dignity. Even if not expressly prohibited by law, these behaviours are not permitted, as they are against our humanity. To paraphrase this fundamental truth somewhat, there are some behaviours that are prohibited even if they take place in virtual space. Unfortunately, there have already been many examples of such behaviour, particularly in relation to harassment, and in particular sexual harassment. Participants in the *Centre for Countering Digital Hate* survey spent 12 hours in the digital space of the metaverse, some as adult users and some as child users. During this time, they were exposed to abusive behaviour, including sexual and other harassment, verbal abuse, explicit sexual content, displays of racism or extremism, every seven minutes on average.²⁰ 49% of women using VR products reported at least one incident of sexual harassment, according to another survey.²¹ Creating safe and secure virtual spaces for users that respect human dignity cannot wait.²² While it is rare in the current legislative environment that a metaverse offence is investigated by the police,²³ the legislator must act to ensure that people are protected in virtual space. A step in this direction is the *Online Safety Act*,²⁴ adopted by the United Kingdom legislature in 2023, which makes it mandatory to ensure the online safety of children and adult users. It also establishes as separate sanctionable conduct for individual users misleading or intimidating communications and incitement to self-harm, committed by any message communicated in the digital space, whether in writing, speaking or otherwise. This is particularly significant because it applies directly to individuals operating in virtual space, with the possibility of imprisonment in serious cases. The United Kingdom and the EU have also taken steps to make digital spaces safer, but the recently adopted *Digital Services Act* does not contain sanctions imposed directly on users who breach the law.

In addition to the protection of human dignity, another major legal challenge is the protection of personal data and privacy. Businesses quickly recognised the commercial and marketing potential of the new space, and started to operate as advertisers, service providers and traders in the various metagalaxies. For these companies, the greatest economic value is the information they collect about user preferences and behaviour. Businesses are collecting more and more data about users in the virtual space. And virtual reality technology provides a better tool than ever before. VR devices are able to track users' eye movements, so marketing experts with access to this information know ex-

tafizikája. Budapest, Gondolat, 1991. 101.

²⁰ See: CCDH Spent 12 Hours in Facebook's Metaverse (2021). <https://counterhate.com/research/facbooks-metaverse/>.

²¹ Az extendedmind.io felmérését idézi: M. Zima, The metaverse: virtual offences, real-world penalties? *Solicitors' Journal*, 2022, 165(7), 36-39.

²² Charamba, Kuzi, Beyond the corporate responsibility to respect human rights in the dawn of metaverse. *University of Miami International and Comparative Law Review*, 2022, 30(1), 110-149.

²³ <https://www.dailymail.co.uk/news/article-12917329/Police-launch-investigation-kind-virtual-rape-metaverse.html>.

²⁴ A Bill to make provision for and in connection with the regulation by OFCOM of certain internet services; for and in connection with communications offences; and for connected purposes. *Online Safety Act 2023* (c. 50).

actly where a person is looking, how long they are viewing content, and can draw extremely valuable conclusions about their interests and preferences, which brings the debate around profiling back to the surface. Zuboff uses the term '*observation capitalism*' to describe excessive data collection and the economic models based on it, which she describes as a „new economic order that claims human experience as free raw material for hidden commercial practices of extraction, prediction, and sales.”²⁵ It is therefore essential that clear and unambiguous information and policies on data processing are also established for virtual spaces, so that users know exactly what happens to their data.²⁶

The first difficulty in establishing lawful processing is the choice of applicable law. While the GDPR has extraterritorial scope,²⁷ this is only a solution if only data subjects in the European Union are involved in the virtual interaction. It is possible, however, that a user residing in the EU could be connected to the virtual experience at the same time as a user residing in Japan and California, in which case all three participants would be subject to different data protection regimes. It can be difficult to operate the metaverse experience in a way that complies with all relevant state regulations at the same time. The solution to this would be to segregate virtual spaces geographically, but this would take away the very essence of the community experience.

Similarly, how much say can a user have in the virtual experience offered to them based on their privacy choices? For example, take the case of surveillance-based profiling and prediction described above, which the GDPR allows only if based on the explicit consent of the data subject.²⁸ The question arises, however, to what extent does the experience in the virtual space change if the user refuses to consent to some (or even all) of the automated processing purposes?

It can be said that the problems related to people's fundamental rights have been amplified in the context of virtual spaces. However, legislation has not yet caught up with technological progress, so the task of legislators to develop and service providers to adopt the legal and ethical principles that provide a framework for a safe and legal virtual reality experience remains for the years ahead.

IV. THE PLACE OF METAVERSE IN PRIVATE LAW

Although professional and media interest in the metaverse has recently gained tremendous momentum, the legal analysis of the underlying “virtual assets”, mainly in the context of the video game industry, dates back several decades. However, advances in technology and the exponential growth in computing power and the performance of video

²⁵ Shoshana Zuboff, *The Age of Surveillance Capitalism: The Fight for a Human Future at The New Frontier of Power* 2019.

²⁶ M Artzt, Matthias – G. Weingarden, *Metaverse and privacy*. *International In-House Counsel Journal*, 2022, 15(59), 7763-7770.

²⁷ Article 3(2) of the GDPR.

²⁸ Article 22 of the GDPR.

cards have opened up new horizons in the generalisation of metaverse, which makes this research relevant again and may justify the raising of previously unanswered questions.

Already in 1994, J. Russo and M. Risch published the study „The Law of Virtual Reality. Scope of Protection for Virtual Works”.²⁹ By way of comparison, a few facts about the state of computing at that time: the first Hungarian domain address (sztaki.hu) was registered in 1991, Windows 3.1 was released in 1992, and Intel’s 100 MHz single-core processors appeared in 1994. Russo and Risch examined virtual reality from a copyright perspective, which indicated the importance of intellectual property issues related to virtual reality already in these early years.

One of the most cited studies is the comprehensive 2004 paper „The Laws of the Virtual Worlds”.³⁰ Partly as a result of this, one of the focal points of the civil law analysis of virtual goods is how these goods – because they undoubtedly have a pecuniary value – can be legally qualified. The first theories were essentially property-based and sought to answer the question of whether virtual goods could be considered property or whether we could speak of virtual property as a possible special sub-genre of property.³¹ Property rights research received an important boost from the US case *Bragg v. Linden Research, Inc.*,³² which, although settled by the parties, drew attention to the problem of the property-like nature of virtual goods and the cornerstones of the related claim enforcement.

In addition to and in contrast to the property approach, contract law and intellectual property law also deserve a mention, given that the operation of virtual realities is inconceivable in practice without end-user contracts, and that many virtual objects may be protected by intellectual property rights, in particular copyright.³³ In other words, from a private law perspective, metaverse can be examined through different lenses. However, these approaches are not mutually exclusive, but complementary, as metaverse is a complex phenomenon that interacts closely with several areas of law.

The ever-increasing technical possibilities offered by the metaverse raise a number of questions which the law must at least examine and interpret, and in some cases regulate,

²⁹ J. Russo – M. Risch, *The Law of Virtual Reality. Scope of Protection for Virtual Works*. Computer Law Treatise, 1994.

³⁰ F. Lastowka – D. Hunter, *The Laws of the Virtual Worlds*, *California Law Review*, 2004, 92(1) 1-73.

³¹ J. Fairfield, *Virtual Property*, *Boston University Law Review*, 2005, Vol. 85., 1047-1102., A. Chein, *A Practical Look at Virtual Property*, *St. John’s Law Review*, 2006, Vol. 80., 1059-1090., B. Glushko, *Tales of the (Virtual) City: Governing Property Disputes in Virtual Worlds*, *Berkeley Technology Law Journal*, 2007, Vol. 22., 507-532., H. Lim, *Virtual World, Virtual Land But Real Property*, *Singapore Journal of Legal Studies*, 2010, 304-327., M. Quadrini, *Caveat Cloudster: Why Traditional Common and Civil Property Law Should Apply to Virtual Property and How It Will Change The Legal Realities of The Internet*, *Dalhousie Journal of Legal Studies*, 2015, Vol. 24., 55-99.

³² *Bragg v. Linden Research Inc.*, 487 F. Supp. 2d 593. (E. D. Penn. 2007).

³³ D. Sheldon, *Claiming Ownership, but Getting Owned: Contractual Limitations on Asserting Property Interests in Virtual Goods*, *UCLA Law Review*, 2007, Vol. 54., 751-787., R. Vacca, *Viewing Virtual Property Ownership Through The Lens of Innovation*, *Tennessee Law Review*, 2008, Vol. 76., 33-65., C. Cifirino, *Virtual Property, Virtual Rights: Why Contract Law, Not Property Law, Must Be The Governing Paradigm in The Law of Virtual Worlds*, *Boston College Law Review*, 2014, Vol. 55., 235-264., J. Bonar-Bridges, *Regulating Virtual Property with EULAs*, *Wisconsin Law Review Forward*, 2016, Vol. 2016., 79-91.

in order to ensure uniform application of the law. Taking into account the partly or wholly private law areas, the following areas of law and their challenges can be highlighted, *inter alia*, as possible research directions.

Area of law	The challenges of the metaverse
Law in rem	Can the assets be integrated into the current property system or is it necessary to create virtual property? Can limited rights in rem (e.g. usufruct, pledge) be attached to these assets? If not, is an extension justified?
Contract law	Metaverse is inconceivable without standard contract terms. Thus, all the elements of the metaverse are to be interpreted in a contractual context, with a high proportion of the rules of consumer contracts. This can lead to highly complex contractual networks between the actors in the metaverse. What is the legally definable subject matter of contracts for virtual goods? What kind of contracts are they, how do they behave?
Right of succession	Can virtual assets, metaverse accounts be part of the estate? If so, how can this be done in practice?
Privacy law	The space of privacy can shift significantly into the metaverse. How can the protection of privacy be understood in the digital world, is our digital identity part of our personality? The metaverse can be a platform for hate speech.
Intellectual property law	The metaverse itself consists of a set of intellectual property rights, within which additional intellectual property rights are created (e.g. trademarks already exist for virtual goods). Complicated licensing systems are emerging, interoperability in the metaverse raises copyright issues, and the enforceability of intellectual property rights, which are predominantly territorial, will be a major challenge in a digital world without physical extensions.
Private international law relating to conflicts of law	The metaverse is a cross-border phenomenon, so jurisdictional and choice of law issues are inescapable, which can lead to a variety of outcomes within and outside the EU.
Consumer protection	The majority of metaverse users are consumers. The question of whether EU consumer protection provisions apply in the metaverse is not unrelated to the problem mentioned in the previous point. Effective claim enforcement mechanisms need to be built, even integrated into the metaverse.
Competition law	Just as in the real world, all forms of unfair competition can arise in the metaverse, since companies already see a huge business opportunity in competing for consumers' money in the virtual world. Cartelling, abuse of dominant positions, unfair influence on business decisions take on a new meaning in the metaverse, and effective tools are needed to act against these behaviours.

Advertising law	The metaverse is an infinite advertising space, and cross-border advertising, which is difficult to control in the metaverse, poses serious risks, especially for minors.
Media law and entertainment	The metaverse offers the potential for the widespread distribution of audiovisual media content and the production of such content by users. New forms of entertainment can emerge, free from physical constraints, where traditional media law rules, copyright rules or even rules on the protection of minors are difficult to enforce.
Labour law	The metaverse opens up new dimensions in teleworking, as the metaverse itself can become a workspace.

V. THE INDUSTRIAL AND CONSUMER METAVERSE – A DIFFERENT WORLD?

The forerunner of the industrial metaverse is the *smart factory*, where 4 core areas are already highly technology-intensive and digitalised: production (quality sensing, asset intelligence, product development and testing), supply chain (network design, digital warehousing, control towers), customer service (after-sales services, virtual product experience, contact), and employee recruitment (hiring, training, motivation).³⁴ The industrial metaverse is a part of the previously defined metaverse, a new ecosystem where participants such as people, machines and objects are connected and seamlessly integrated into the physical world through technologies such as blockchains, digital twins and decentralised autonomous organisations (DAOs).³⁵ The concept of blockchains will no longer need to be explained in 2024, DAO is as old as the shared ledger systems, but has received less attention from a legislative perspective. A DAO is an organisation that exists and operates autonomously in an online space, through a complex network of smart contracts interconnected in such a way that decisions are made and executed by the program itself, with human intervention only when the program is unable to perform the task.³⁶ The term digital twins has a specific industrial origin: it refers to the virtual representation and two-layer real-time communication of the digital equivalent of a process or a physical object. In the application of digital twin technology, digital copies are made of certain operations, goods, assets, business processes, which can potentially improve performance, modernise and make planning and maintenance more efficient.³⁷ The de-

³⁴ M. Mabkhot, et al., Requirements of the smart factory system: A survey and perspective. *Machines*, 2016, Vol. 6, Issue 2; M. Ryalat et al., Design of a Smart Factory Based on Cyber-Physical Systems and Internet of Things towards Industry 4.0. *Applied Sciences* (Switzerland), 2023, 13(4).

³⁵ S. Huang et al., Towards Industrial Metaverse: Opportunities and Challenges. *Journal of Advanced Manufacturing Science and Technology*, 2023, 3(4).

³⁶ J. Glavanits – P. B. Király, A blockchain-technológia alkalmazásának jogi előkérdései: a fogalmi keretek pontosításának szükségessége. *Jog-Állam-Politika*, 2018, 3, 173-183.

³⁷ D. Mourtzis, Digital Twin Inception in the Era of Industrial Metaverse. *Frontiers in Manufacturing Technology*, 2023, 3.

velopment of the industrial metaverse is therefore driven primarily by the need to increase process efficiency, improve precision in design and construction, and reduce costs overall. It benefits sectors such as manufacturing, health care, real estate sales and tourism, as detailed above.

From a legal-regulatory point of view, the industrial metaverse is most significant in terms of industrial espionage, data protection and data security, and the processing of personal data, but the phenomenon also implies that the developer of the industrial metaverse itself should pay special attention to the above issues, therefore – in addition to ensuring a high level of intellectual property protection – a high level of industrial, economic self-regulation can be expected.

According to a 2021 survey, consumers chose to join the metaverse because it allowed them to do things they would not have been able to do in real life (39% of respondents said this), but it also gave many consumers the chance to exercise their creativity and imagination, or travel the world without actually leaving home (37%). An interesting sociological finding is that 34% of respondents said that it is easier to meet new people in the metaverse without having to experience the awkwardness of meeting them in person.³⁸

Research shows that a significant proportion of companies operating in the physical world plan to sell their products in the metaverse in the next 5-10 years. However, compared to traditional sales channels, in virtual space, operators are in much more intimate, less transparent contact with consumers, who are easier to observe, manipulate and commoditise. The latter may need some explanation: the providers (and presumably operators) of the metaverse will be, or already are, for-profit companies, who cannot be expected to make their products available to users for free. There are already many ways to pay: as we can see today, behind the free services, it is actually the user who pays with their data, contributing to the monitoring of their activity and habits and to their sale for marketing purposes. One possible way to reduce abuse and manipulation is to educate consumers in the sense that if they paid for services instead of seeming to get them for free, they would not put themselves (or their data) on the market without being aware of this and the consequences. The marketing of the future in the metaverse could be personalised: based on the avatar and the observed characteristics, metaverse traders will be able to effectively market their products with personalised offers, which will also increase consumer vulnerability.³⁹

³⁸ A. Petrosian, Benefits of the metaverse worldwide 2021. Statista, 2022. <https://www.statista.com/statistics/1285117/metaverse-benefits/>.

³⁹ L. Rosenberg, Growing Need for Metaverse Regulation. In: K. Arai (Ed.): IntelliSys, LNNS 544, 2022, 1–8.

VI. WHERE IS THE METAVERSE HEADING AND WILL IT HAVE ITS OWN LEGAL PROBLEMS?

In 2024, the early enthusiasm surrounding the metaverse is fulfilling its promises at a slower pace compared to the high expectations, in terms of the rate of growth in consumer use. In the B2C sector, developments continue to focus on entertainment, experiences and community events, but there is more interest than expected in industrial applications and especially digital twins. What seems clear, however, is that distributed technologies, decentralised computing, data storage and transmission will be a key element of future developments. As we have seen in the case of blockchain-based solutions, technological progress can be boosted if the legislator is on board with the development. The acceptance and use of virtual payments has been greatly enhanced by the emergence of supportive regulation in a growing number of countries. Following this example, if public systems (e.g. health, education) use virtual spaces, the market will increasingly turn in this direction.

In relation to the legal problems that arise, we share the view that since the creators of virtual worlds exist in the physical world, their activities cannot be considered independent in the virtual space, and therefore their actions and decisions can be „anchored” in the physical world. Of the legal problems described above, it is not the consumer in the virtual world that is the real novelty, but the space itself and its cross-border nature, so international law and private international law relating to conflicts of law certainly have a role to play in determining jurisdiction and applicable law if they want to continue to operate with concepts such as „place of performance of the contract” or „place of delivery of movable property”.

In constitutional law and fundamental rights issues, an answer needs to be found to the question of whether the virtual person and their data enjoy the same rights as the physical form of the virtual person, and if the legislator answers this question with a clear yes, the fundamental rights protection and its entire conceptual framework will almost automatically apply to the virtual space.

In our view, the fewest practical problems arise in the civil law, including property law, questions of the metaverse, if we accept the anchoring of the activity of the person in the metaverse to a physical person. Of course, we are not claiming that the legislator can transfer the entire body of private law into the virtual space without any special consideration, but we are convinced that the task facing law practitioners is not an insurmountable one in jurisprudential terms.

BIBLIOGRAPHY

A. Chein, A Practical Look at Virtual Property, *St. John's Law Review*, 2006. Vol. 80., 1059-1090.

- A. Petrosian, Benefits of the metaverse worldwide 2021. Statista, 2022. <https://www.statista.com/statistics/1285117/metaverse-benefits/>.
- B. Chin, Regulating Your Second Life: Defamation in Virtual Worlds. *Brooklyn Law Review*, 2007, 72:4, 1303-1349.
- B. Glushko, Tales of the (Virtual) City: Governing Property Disputes in Virtual Worlds, *Berkeley Technology Law Journal*, 2007, Vol. 22., 507-532.
- Beckett Cantley; Geoffrey Dietrich, „The Metaverse: A Virtual World with Real World Legal Consequences,” *Rutgers Computer and Technology Law Journal* 49, no. 1 (2022): 1-25.
- Bragg v. Linden Research Inc.*, 487 F. Supp. 2d 593. (E. D. Penn. 2007)
- C. Cifrino, Virtual Property, Virtual Rights: Why Contract Law, Not Property Law, Must Be The Governing Paradigm in The Law of Virtual Worlds, *Boston College Law Review*, 2014, Vol. 55., 235-264.
- Charamba, Kuzi, Beyond the corporate responsibility to respect human rights in the dawn of metaverse. *University of Miami International and Comparative Law Review*, 2022, 30(1), 110-149.
- CoE Framework Convention. Council of Europe Framework Convention on Artificial Intelligence and Human Rights, Democracy and the Rule of Law. Council of Europe Treaty Series - No. [225]. 17 May 2024. Committee of Ministers of the Council of Europe.
- D. Miller, Determining Ownership in Virtual Worlds: Copyright and License Agreements. *The Review of Litigation*, 2003, 22, 435.
- D. Mourtzis, Digital Twin Inception in the Era of Industrial Metaverse. *Frontiers in Manufacturing Technology*, 2023, 3.
- D. Sheldon, Claiming Ownership, but Getting Owned: Contractual Limitations on Asserting Property Interests in Virtual Goods, *UCLA Law Review*, 2007, Vol. 54., 751-787.
- D. Yang et al., Expert consensus on the metaverse in medicine, *Clinical eHealth*, 2022, 5, 1-9. <https://doi.org/10.1016/j.ceh.2022.02.001>.
- EU AI ACT. Act. (COM(2021)0206 – C9-0146/2021 – 2021/0106(COD))
- F. Lastowka – D. Hunter, The Laws of the Virtual Worlds, *California Law Review*, 2004, 92(1) 1-73. DOI: 10.2307/3481444
- Grayscale (2021) The Metaverse. Web 3.0 Virtual Cloud Economies. Grayscale. https://grayscale.com/wp-content/uploads/2021/11/Grayscale_Metaverse_Report_Nov2021.pdf

- H. Lim, Virtual World, Virtual Land But Real Property, Singapore Journal of Legal Studies, 2010, 304-327.
- I. Kant: Az erkölcsök metafizikájának alapvetése – A gyakorlati ész kritikája – Az erkölcsök metafizikája. Budapest, Gondolat, 1991.
- J. Bonar-Bridges, Regulating Virtual Property with EULAs, Wisconsin Law Review Forward, 2016, Vol. 2016., 79-91.
- J. Fairfield, Virtual Property, Boston University Law Review, 2005, Vol. 85., 1047-1102.
- J. Glavanits – P. B. Király, A blockchain-technológia alkalmazásának jogi előkérdései: a fogalmi keretek pontosításának szükségessége. Jog-Állam-Politika, 2018, 3, 173-183.
- J. Russo – M. Risch, The Law of Virtual Reality. Scope of Protection for Virtual Works. Computer Law Treatise, 1994. <https://www.computerlaw.com/articles/the-law-of-virtual-reality/>
- Kállai János, A számítógép által létrehozott virtuális valóság pszichológiai mechanizmusai: oktatás- és egészségügyi alkalmazások, Medicina, Budapest 2022.
- L. Rosenberg, Growing Need for Metaverse Regulation. In: K. Arai (Ed.): IntelliSys, LNNS 544, 2022, 1–8.
- M. Artzt - G. Weingarden, Metaverse and privacy. International In-House Counsel Journal, 2022, 15(59), 7763-7770. 7764.o.
- M. Ball, Metaverzum. Így forradalmasítja valóságunkat a virtuális világ. HVG Könyvek, Budapest, 2022.
- M. de Zwart, Piracy vs Control: Various Models of Virtual World Governance and their impact on Player Experience. Journal For Virtual Worlds Research, 2009. <https://dx.doi.org/10.4101/jvwr.v2i3.663>
- M. Quadrini, Caveat Cloudster: Why Traditional Common and Civil Property Law Should Apply to Virtual Property and How It Will Change The Legal Realities of The Internet, Dalhousie Journal of Legal Studies, 2015, Vol. 24., 55-99.
- M. Ryalat et al., Design of a Smart Factory Based on Cyber-Physical Systems and Internet of Things towards Industry 4.0. Applied Sciences (Switzerland), 2023, 13(4).
- M. Zima, The metaverse: virtual offences, real-world penalties? Solicitors' Journal, 2022, 165(7), 36-39.
- Mabkhot, M. M., Al-Ahmari, A. M., Salah, B., & Alkhalefah, H., Requirements of the smart factory system: A survey and perspective. Machines, 2018, 6(2). <https://doi.org/10.3390/MACHINES6020023>

O. Kostenko, *Electronic Jurisdiction, Metaverse, Artificial Intelligence, Digital Personality, Digital Avatar, Neural Networks: Theory, Practice, Perspective*. World Science, 2022, 1(73). https://doi.org/10.31435/rsglobal_ws/30012022/7751

OECD Recommendation of the Council on Artificial Intelligence. C/MIN(2024)16/FINAL.

Pellas, N., Mystakidis, S., Kazanidis, I., „Immersive Virtual Reality in K-12 and Higher Education: A systematic review of the last decade scientific literature”, *Virtual Reality*, 2021, 25, 835–861.

R. Vacca, *Viewing Virtual Property Ownership Through The Lens of Innovation*, *Tennessee Law Review*, 2008, Vol. 76., 33-65.

S. Huang et al., *Towards Industrial Metaverse: Opportunities and Challenges*. *Journal of Advanced Manufacturing Science and Technology*, 2023, 3(4).

S. Lok, „Sinking States, Sunken Statehood? The Recognition of Submerged States under International Law”, *Cambridge Law Review*, 2023, 8:2, 31-55.

S. Mystakidis, *Metaverse*, *Encyclopedia*, 2022, 2, 486–497. <https://doi.org/10.3390/encyclopedia2010031>

Shoshana Zuboff, *The Age of Surveillance Capitalism: The Fight for a Human Future at The New Frontier of Power* 2019.

Small Island Digital States. UNDP, *Small Island Digital States: How digital can catalyse SIDS development* (New York: UNDP Global SIDS Team, 2024).

T. Ochoa, *Who Owns an Avatar? Copyright, Creativity, and Virtual Worlds*. *Vanderbilt Journal of Entertainment & Technology Law*, 2012, 14(4), 959-991.

Tallinn Manual 2.0. *Tallinn Manual 2.0 on the International Law Applicable to Cyber Operations*. 2nd edition. General editor Schmitt, Michael. Cambridge University Press, 2017. doi.org/10.1017/9781316822524

United Nations Activities on Artificial Intelligence. 2017. *International Telecommunication Union*, Geneva.