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Creative Metaverses: *Sui generis* Copyright for User-Generated Content in Web 4.0

Private Regulatory Models and Technologies Interaction with a Justified Copyright Law

Law and Information Society
Master's thesis

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Internet services are converging to become pervasive and collaborative extended reality environments, which enable increased creativity, if the regulatory and infrastructural conditions are correct. In the first place, EU copyright law structures a market and provides incentives & freedoms for creators and rightholders engaging in the metaverse to create, consume, and sell digital products and experiences. The granted freedom and incentives to create, together with well-functioning interoperable exchanges of intangibles, form the backbone of a Web 4.0 ecosystem, which goes beyond escapism to boost European cultural production and innovation.

The regulatory approaches to structuring such a creative ecosystem would benefit from approaches tried and tested true in practice by enterprises. Therefore, private regulatory regimes are examined in terms of both what ought to be corrected and where they have succeeded. Thus, certain legal approaches are extended from their theoretical vacuums to reality by discovering their utilization in platform business models. Digital exhaustion, open content communities, and exceptions are thereby among the principles identified as potentially beneficial new *sui generis* law. Moreover, approaches to originality and authorship present repercussions to incentivizing a creative ecosystem, but they are found to be rather well-defined presently. Then, the practical effectivity of copyright law is refined by describing supporting technologies, which ought to be standardized.

Simultaneously, the study presents insight into the state of incentives and copyright on the internet more generally, uncovering a debate between the production of quantities by content industries *versus* the production of originality by individual creators, aiming to help strike a balance between the strives to economic exploitation *versus* free creation. On that note, since the aim is to locate improvements to current (digital) copyright laws of the EU, it is necessary to take stock of issues currently plaguing online content ecosystems. Particularly, user-generated content ('UGC') is examined, because by all accounts, it has an ever-increasing importance in the Web 4.0 platform ecosystem – it is also an exemplary subject matter, when studying the effects of private economic concentration on a healthy creative ecosystem.

Ultimately, private concentrations have by monopolization the power to restrict the emergence of technology, which would support the execution of a balanced copyright regime. Rights management information technology and licensing technology, as well as related transactions technology such as identity authentication, are the most important tools, which need to be standardized and facilitated in order for the presented incentives mechanisms to be feasible in practice. Otherwise, the idealistic Web 4.0 risks devolving to an oligopoly of platforms reminiscent of the present internet.

Key words: EU, copyright, regulation, UGC, open-source, open-content, knowledge commons, rights management, licensing, RMI, interoperability, standards, digital exhaustion, exceptions, limitations, incentives, blockchain, virtual worlds, metaverse, web 4.0.

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Abstract page

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Internet-palvelut ovat kehittymässä kollaboratiivisiksi laajennetun todellisuuden ympäristöiksi, jotka tarjoavat entistä paremmat puitteet luovalle toiminnalle, jos sääntely- ja infrastruktuuriolosuhteet ovat oikeat. EU:n tekijänoikeuslainsäädäntö tarjoaa nk. ’metaversumiin’ osallistuville luovan työn tekijöille ja oikeudenhaltijoille kannustimia luoda, kuluttaa ja myydä digitaalisia tuotteita ja kokemuksia. Tekijänoikeussääntely muodostaa yhdessä teknologisen infrastruktuurin kanssa puitteet, joka voivat edistää eurooppalaista kulttuurituotantoa ja innovointia.

Tällaisen luovan ekosysteemin jäsentämiseen sovellettavat sääntelylähestymistavat voivat ottaa oppia menetelmistä, joita yritykset ovat käytännössä kokeilleet ja testanneet. Siksi yksityisiä sääntelyjärjestelmiä tarkastellaan sekä siltä kannalta, miten niitä pitäisi oikaista, että siltä kannalta missä ne ovat onnistuneet. Täten tietyt oikeudelliset lähestymistavat laajennetaan teoreettisista tyhjiöistään todellisuuteen ymmärtämällä niiden hyödyntäminen alustaliiketoimintamalleissa. Digitaalinen sammuminen, avoimet sisältöyhteisöt ja tietyt poikkeukset kuuluvat näin ollen periaatteisiin, jotka todetaan mahdollisesti hyödylliseksi, uudeksi *sui generis* -lainsäädännöksi. Niiden lisäksi myös lähestymistavat omaperäisyyteen ja tekijyyteen vaikuttavat luovuuden kannustimiin, mutta niiden todetaan olevan jo hyvin määritellyt. Lopulta tekijänoikeuslain käytännön tehokkuutta jalostetaan tunnistamalla tukiteknologioita, joiden tulee olla standardoitu.

Samalla tutkimus esittelee näkemyksiä kannustimien ja tekijänoikeuksien tilasta internetissä yleisemmin, paljastaen jännitteen sisältöteollisuuden tuottamien määrien ja yksittäisten tekijöiden tuottaman omaperäisyyden välillä, pyrkien löytämään sääntelyllisen tasapainon taloudellisen hyödyntämisen ja vapaan luomisen välillä. Koska tavoitteena on löytää parannuksia EU:n nykyiseen (digitaaliseen) tekijänoikeuslainsäädäntöön, on tarpeen arvioida myös verkkosisällön ekosysteemeihin yleisemmin liittyviä kysymyksiä. Erityisesti tarkastellaan käyttäjien luomaa sisältöä ("UGC"), koska sillä on kaikesta päätellen yhä suurempi merkitys Web 4.0 -alustan ekosysteemissä – se on myös esimerkillinen aihe, kun tutkitaan yksityisen taloudellisen keskittymisen vaikutuksia terveeseen luovaan ekosysteemiin.

Yksityisyrityksillä voi olla kyky rajoittaa sellaisen teknologian käyttöönottoa, joka tukisi tasapainoisen tekijänoikeusjärjestelmän toteuttamista. Oikeuksien hallintaa koskeva tietotekniikka ja lisensointiteknologia sekä niihin liittyvä transaktioteknologia, kuten henkilöllisyyden todentaminen, ovat ne välineet, jotka on standardoitava ja helpotettava, jotta esitetyt kannustinmekanismit olisivat käytännössä toteuttamiskelpoisia. Muuten idealistinen Web 4.0 uhkaa ajautua nykyistä internetiä muistuttavaan alustojen oligopoliaan.

Avainsanat: EU, tekijänoikeus, sääntely, käyttäjien luoma sisältö, UGC, avoin lähdekoodi, avoin sisältö, oikeuksien hallinta, lisensointi, RMI, yhteentoimivuus, standardit, digitaalinen sammuminen, poikkeukset, rajoitukset, kannustimet, lohkoketju, virtuaalimaailmat, metaversumi, web 4.0.

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List of Abbreviations

2D	Two-Dimensional
3D	Three-Dimensional
AI	Artificial Intelligence
AR	Augmented Reality
B2C	Business-to-Consumer
CAD	Computer-Aided Design
CC	Creative Commons
CDSM	Directive for Copyright in the Digital Single Market
CJEU	Court of Justice of the European Union
CMO	Collective Management Organization
C:S	Cities: Skylines
DBD	Database Directive
DLT	Distributed Ledger Technology
DSM	Digital Single Market
EC	European Commission
ECS	European Copyright Society
eIDAS	Regulation for Electronic Identification and Trust Services
E&L	Exceptions and limitations
EULA	End-User License Agreement
GPU	Graphical Processing Unit
GRD	Global Rights Database
InfoSoc	Directive for Copyright in the Information Society
IPFS	Interplanetary File System (protocol)
IPR	Intellectual Property Rights
MTL	Multi-Territorial License
NFT	Non-Fungible Token
OCSSP	Online Content-Sharing Service Provider
P2P	Peer-to-Peer
PaaS	Product-as-a-Service
RAC	Rules-as-Code
R&D	Research and Development
RMI	Rights Management Information

SaaS	Software-as-a-Service
SDK	Software Development Kit
SME	Small and Medium-sized Enterprise
TDM	Text and Data Mining
TPM	Technological Protection Measures
ToS	Terms of Service
UGC	User-Generated Content
VR	Virtual Reality
XAI	Explainable Artificial Intelligence
XR	Extended Reality

1 Introduction

Hype has surrounded the emerging metaverse due to Facebook's announced rebranding as Meta in 2021. Beyond the hype, a legally uncertain reality is emerging on a number of regulatory fronts, most importantly Intellectual Property Law, Privacy, and Competition Law. If the modern on-demand streaming business model and the economically concentrated platform economy have sprouted constitutional and legal challenges, then so too will boundaryless creative metaverses. While much of the buzz around 'The Metaverse' is hype - and therefore characterized by speculation - the *trend* is clear, nonetheless: As the cross-jurisdictional digital creative space acquires direct economic links to real world economy, the intellectual property rights in all the creations made within metaverses are becoming a pecuniary concern, and relevant rules of copyright law need to be re-examined starting from fundamental justifications.

Intellectual property law issues abound in creative metaverses as they do on the internet in general, with a few novel issues. Given the choice to imagine anything, many would choose to plagiarize pre-existing designs and registered brands,[1] which is not a particularly novel issue by itself, but in addition, the protection of creations that exist purely inside metaverses may be notably difficult to enforce. Users are creating large amounts of content across the vast realm of thousands of non-interoperable metaverse apps, servers and experiences.[2] Albeit expression is technically constrained by code and interfaces, and organizationally delineated by platformization of the creative ecosystem, considerable room for creativity still exists and creators can co-operate and contribute to virtual innovation, design, arts and crafts. The creative design of works with hundreds of co-authors, works that replicate physical world architecture, works that are built off pre-existing protected IP held by large content industries, or functional CAD works implementable in the physical world may become much more common on the metaverse than they have so far been on the internet.

The widening and deepening of the system of metaverses will extend and intensify already existing legal challenges within the internet. First, some issues concern accessibility and inclusiveness of individual creators vis-à-vis platforms – the collaboration and interoperability between various digital user-generated content ('UGC') and platform-curated

[1] Lloyd, Anthony – Buchan, Jessie – Lau, Edmond 2022, pp. 3–4.
[2] Roblox and VR Chat are some great examples of entertainment, while Nvidia Omniverse is an example of an industrial type Metaverse.

industry content, causing copyright issues. In the second place, new issues are also emerging concerning the IPRs in the technological architecture of metaverses, e.g. underlying software code, interface design, and telecom networks – perhaps most importantly, advanced copyright transactions and related identity authentication infrastructure, and their standardization. Moreover, in the third place, concentrations of combined informational and economic power – marketing, data, and network effects – may intensify as the metaverse platform services industry and large content industries gather more intellectual property assets by direct ownership or exploitative license of various copyright content. Growing informational power concentrations are a concern ultimately linking the presently discussed copyright issues to competition law concerns discussed elsewhere.[3]

This is taking place in a complex global environment, in an IP law ecosystem that defies jurisdictional boundaries. Therefore, validity, enforcement, and fragmentation of rights by territory and substance are some of the *prima facie* challenges that are encountered, especially if metaverses remain decentralized. The still existing territorial fault lines between copyright systems of different jurisdictions are leading to a situation, in which company policies codified in private regulatory regimes are the *de facto* primary regulator of global metaverses, whereas the jurisdiction most capable of affecting those companies may have the best chance at having their regulation apply throughout metaverses that are in global use.

The interplay between content creators and metaverse companies is the making of private regulatory models such as Terms & Conditions.[4] Other examples are codes of conduct by industry groups, contractual agreements between undertakings, private certification schemes, private enforcement mechanisms such as the International Chamber of Commerce, and industry-led standard setting organizations. In the context of copyright law, examples of private regulatory models include UGC copyright terms in metaverse platform EULAs, content identification and filtering procedures, copyright licensing and royalty collection mechanisms, and standards of technology.

The Web 4.0[5] conception of metaverses further includes the emergence of a distributed ledger ('DLT')-based system for rights management and transactions, which poses its own novel

[3] Tuomas Mylly 2009, p 2.
[4] Thomas Riis 2016, p 2.
[5] COM(2023) 442/final (Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, An EU initiative on Web 4.0 and virtual worlds : a head start in the next technological transition).

issues with regards to e.g. authenticity of creator identities, rights attribution, and new licensing models based on blockchain and smart contracts. The metaverse ultimately fosters novel creative ecosystems, which are challenging the basic justifications behind the copyright regime, as creative incentives are affected and auratic incentives may triumph. Moreover, the concepts of authorship and originality may encounter some challenges in light of incentivization and platform interoperability. Also, digital exhaustion arises as an issue as the ecosystem teeters between a service-based communicative *versus* a sales-based distributive one. All the above elements warrant an overview of how metaverses are defined, in the first place, then prognosing the emerging copyright law environment in light of its justifications, describing private regulatory models' terms as is, and discovering some copyright issues as questions of "code is law", where rights management technology has such a drastic impact on copyright issues that the laws impacting said technologies have a copyright dimension.

Thus, the aim of this thesis is describing the emerging metaverse, analyzing copyright justifications and relevant principles in light of the emerging metaverse, and examining and analyzing existing and emerging private regulatory regimes as they affect copyright justifications and are controlled by copyright principles. Finally, the impact of distributed transactions technology on copyright principles and incentives is shown. The impact and potential for science consists of building a more systemic conceptual framework that can potentially help regulators adjust policy, innovators explore the metaverse for their endeavors, and shed light on a rather obscure and hype-laden area to enable further sociolegal research. Thus, to deliver on that promise, the present paper answers the following research question: *Which principles and justifications of EU copyright law are impacted specifically by the emerging metaverse economy, and can EU copyright law still regulate the emerging creative ecosystem in line with its goals?*

2 Methodology

The methodology is technologically informed sociolegal literature & business model research and analysis, which is primarily descriptive analysis, while by necessity engaging in prognostics, and secondarily producing some policy recommendations. In carrying out said method, an approach of Law & Technology is assumed in the first place, and Law & Economics is utilized for support. The approaches are used to examine current European Copyright Law considering specific challenges posed by the metaverse, and specifically, its creative ecosystem. In-depth inspection of certain aspects of the metaverse, both technologic and socioeconomic, is necessary to conceptualize the specific issues posed by factual circumstances of the metaverse that collide with copyright law principles and justifications.

A Law & Technology approach is important for the reason that "code is law" internationally, and also the vice versa is becoming true: law is becoming code. Since code is the primary organizing infrastructure in the digital sphere, Law & Technology is the most practical way to look at legal issues on the digital metaverse. "Law is code" is conversely becoming true as the goal of a connective "semantic web"[6][7] is extending into statutory law databases such as Finlex, and as certain scholars are calling for Rules-as-Code ('RAC').[8] As shall be elaborated, law is code *inter alia* as premade machine-readable copyright license templates.

A Law & Economy approach supports the technologically informed legal approach, because copyright justifications are discussed. Incentives form the basis behind many affected copyright principles, and therefore, economy is employed briefly by reference to e.g. transaction costs, incentives theory, and the service and platform economies. If copyright is justified by the necessity to structure a copyright market and facilitate incentives for maximal creativity, then any analysis of impact by legal principles ought to be brought back to their justification. Otherwise, there is a risk that copyright is advanced merely for the sake of copyright itself, in a theoretical vacuum devoid of well-rooted purpose.

[6] COM(2023) 442/final, p. 32.
[7] Thibault Schrepel 2021, p 32.
[8] Thibault Schrepel 2021, p 45; see also Andrew Mowbray – Philip Chung – Graham Greenleaf 2023.

3 The Metaverse

3.1 The Web 4.0 Convergence of Digital Technologies

> "In its current meaning, metaverse generally refers to the concept of a highly immersive virtual world where people gather to socialize, play, and work."[9]

> "Web 4.0 is the expected fourth generation of the World Wide Web. Using advanced artificial and ambient intelligence, the internet of things, trusted blockchain transactions, virtual worlds and XR capabilities, digital and real objects and environments are fully integrated and communicate with each other, enabling truly intuitive, immersive experiences, seamlessly blending the physical and digital worlds."[10]

Throughout the internet, the terms "metaverse" and "web 3.0" exist as diffuse buzzwords for a variety of products and services, while the term Web 4.0 has gained traction at least in official EU documents to refer to a fully implemented metaverse.[11] Discussions are saturated with different versions of the concept of metaverse, as its nature evolves along with a rapidly growing market, expected to reach over $800 billion in valuation by 2028.[12] Subsequently, enterprise competition for consumer and investor attention has made the term unstable, broad, and ambiguous. Nonetheless, the EC has provided a factual definition behind the hype, which can be refined by reference to a further definition given by Acceleration Studies Foundation.[13]

The concept of Web 4.0[14] as employed by the European Union to characterize the metaverse includes virtual collaborative creative ecosystems, interoperable AR/VR platforms, resultant pervasive XR industry and design, AI technologies, and blockchain methods of value organization. The metaverse assumes connections to real world economies through blockchain in addition to conventional means. Blockchain can be characterized as a new **"**organizing paradigm for discovery, valuation, and transfer of all quanta of anything."[15] It is not only for cryptocurrency, because second generation (henceforth '2nd gen') blockchains were developed to store any kinds of data on the chain in the form of Tokens. Similarly to how the TCP/IP protocol enabled a new layer of information infrastructure on the internet,

[9] What is the 'metaverse'? 2021.
[10] COM(2023) 442/final, pp. 1 – 2.
[11] COM(2023) 442/final, p. 32.
[12] Metaverse Market Global Industry Assessment & Forecast 2021.
[13] John Smart 2007
[14] COM(2023) 442/final, p. 32.
[15] Melanie Swan 2015, Preface

2nd gen blockchain enables a new layer of transaction infrastructure on the internet.[16] Therefore, novel blockchain-enabled transaction types – especially Non-Fungible Tokens (henceforth 'NFTs') and smart contracts – form one of the starting points of metaverse copyright issues, albeit it is only indirectly connected to Copyright Law.

In general terms, then, the metaverse is a plethora of participatory virtual worlds networked with each other and the physical world, transacting through blockchain and non-blockchain systems connected to real economies. The converging physical and virtual worlds facilitate interplay of the physical world with virtual realities to enable new modes of creation and transfer of value. It includes not only VR worlds, but broader experiences in extended reality ('XR') technologies. Comprised of shared 3D spaces and 3D overlays on physical spaces, the network adds immersion to the current internet while also tying it closer together with the physical world. Many of the novel applications enabled by metaverse are based on its immersivity. While the most notable characteristic is immersion, which can enhance value generation, VR immersion is not the be-all-end-all, because the concept denotes an interface for the physical world and cyberspace to integrate by association.

3.2 On a Spectrum of Immersion and Real-World Association

The word "*meta*" denotes the network's transcendent nature, as it exists both beyond the physical world as a self-referential[17] virtual universe and simultaneously in parallel as a realm *intertwined with* the physical world. In other words, the metaverse is a network of immersive digital interfaces integrating ("associating") cyberspace with the physical world. Respectively, its degree of immersivity and its degree of association are best described on a spectrum.

In 2007, the Acceleration Studies Foundation created a comprehensive roadmap[18] of the future metaverse and formulated a spectrum for analyzing potential scenarios on two continua. The continua range from *augmentation* to *simulation* on a spectrum of immersivity, depending on the interface technology used. On a spectrum of association, the continua range from *intimate* to *external*, going from focusing on a digital self in imagined worlds on the intimate end, to focusing on the physical outside world on the external end of association.

[16] Alexander Savelyev 2017, p. 3.
[17] What is the 'metaverse'? 2021.
[18] John Smart 2007

The more intimate the association, the more escapist the metaverse is, whereas an external association integrates its users to the real world instead. On the spectrum, four scenarios can thus be constructed: Augmented Reality ('AR'), Lifelogging (future vlogging), Mirror Worlds (*i.e.* digital twins), and Virtual Worlds ('VR').[19] All together they are can also be conceptualized as Extended Reality ('XR')

Let us elaborate on the abovementioned four metaverse scenarios as they were described in the 2007 Metaverse Roadmap of the Acceleration Studies Foundation. Low-immersion scenarios are those where physical reality becomes digitally augmented ("pervasive"). Externally associating AR overlays of information integrated with the physical environment can equip the space we inhabit with e.g. pervasive programming, pervasive design, pervasive gaming, and other pervasive overlays for an XR physical environment. In turn, intimately associating Lifelogging will enable a new method of communication as a social medium that records a person's life, capable of deeper than before biometrics logging as well as first-person point-of-views of the individual.

Conversely, in high-immersion scenarios, virtual space becomes physically persistent as VR. Externally associating Mirror Worlds can comprise digital twins of cities, factories, buildings, transportation networks, objects, people, and nearly anything else given sufficient sensors and data analysis capacities. Physical counterparts, as integrated with their cyberspace digital twins, can be associated with actions in cyberspace. Conversely, non-external intimately associating VR worlds tend to be escapist by nature, and they are what most people imagine when hearing about the metaverse. Therein, avatars in imaginary digital environments engage in social, design, and entertainment activities, such as Meta's Horizon Worlds, VR Chat or VR videogames.

Ultimately, the metaverse is a *fusion of both augmentation and simulation*, and it can be experienced as either.[20] Despite that, there is still a common misconception that metaverse is only VR entertainment. Nonetheless, competing platforms will presumably take turns attempting all the four approaches mentioned above. Therefore, it is reasonable to assume that the future metaverse will eventually be decided by consumers voting with their wallets. Utility, ease of use, and general attitudes toward escapism are the three decisive factors that will popularize certain metaverse applications over others. Which application type becomes

[19] John Smart 2007, p. 5.
[20] John Smart 2007, p. 5.

the next *modus operandi* for society *in lieu* of web2/3 social media will have crucial implications for how innovation is conducted thereafter.

3.3 Practical and Legal Implications

The metaverse has utility beyond the virtual world as it can create and transfer novel inventions, works, labor, social relationships, and commerce into the physical world.[21] Moreover, as the network of XR worlds converges with e.g. 3D printing, AI, autonomous industries, advanced user interfaces, and remote-controlled robotics, the concept begins to denote an advanced interface between physical production, intellectual creation, and their creators and labor. This is called the *Industrial Metaverse,* and its importance will presumably match or surpass that of a purely fulfillment-driven VR metaverse.

As the Industrial Metaverse would derive considerable synergy benefits from cross-organizational and cross-sectoral, multi-profession collaboration in XR environments, its success depends not only on advancements in interfaces, AI, robotics, bandwidth and computing capacity, but crucially also on standards and regulations that enable e.g. collaborative CAD across organizations and even hybrid work across many industrial plants simultaneously.[22] This would have grave implications on the ratio of labor *versus* energy intensity in many industries; fewer workers but more energy required. Provided sufficient energy efficiency and green energy, autonomous facilities and multi-facility control systems can potentially make industry more efficient and thereby more sustainable[23]. This is but one of the reasons why interoperability is often considered the primary crux of e.g. potential metaverse regulation to be proposed by the European Commission ('EC').[24]

Similarly to industry in an Industrial Metaverse, also cultural creativity, design endeavors, and other technological innovation can benefit from an advanced XR overlay and limitless collaborative virtual experimentation spaces with users from around the world – the *Interoperable Exchanges* metaverse.[25] Instead of simultaneous multi-facility control systems for factories, there can now similarly be common experimentation spaces for the creative ideas of technology and design-oriented minds to join together and innovate collaboratively.

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[21] Herman Narula 2022, pp. 126 – 127.
[22] Karoliina Salminen – Susanna Aromaa 2023, pp. 5-9.
[23] Karoliina Salminen et al. 2022, pp. 8-11
[24] COM(2023) 442/final, pp. 4 & 11.
[25] Herman Narula 2022, p. 129.

To take that even further, the ideas curated therein, whether as 3D models or technical CAD files, could potentially be integrated into the physical world via 3D printing and other autonomous industry systems. Considering the above, then, just like in the Industrial Metaverse, in the Innovative Metaverse too there is a grave need for interoperability[26] of the creative intangibles - Intellectual Property Law with minimum friction.

An ambitious internet overhaul such as the metaverse faces challenges to both adoption and development. Some of the challenges to mainstream adoption include internet connection speeds of consumers, lack of standardization, safe methods of payment, large size of hardware, and inadequate accuracy of sensors. In turn, some of the current challenges to development are extremely high development costs, limitations in data storage and connection bandwidth, elevated electricity consumption, slow return of interest, scarcity of talent, cybersecurity threats, complexity of IP laws, and difficulty of content licensing.[27] While synergy benefits are envisioned, they are difficult to realize by non-interoperable solutions by Big Tech giants, which may stand in the way of a well-incentivized creative ecosystem.

Some of the most important legal implications to Intellectual Property concern copyright, since in a metaverse, users can create and share their own digital assets, which may infringe on the intellectual property rights of others. As a result, there may be a need for clearer rules around the ownership and use of intellectual property in virtual environments to address the complexity of IP laws and difficulty of content licensing. Such IPR complexities cause transaction costs, legal uncertainty, and enforcement difficulties. Complexities include, among others, copyright fragmentation by territorial boundaries as well as the cumulative fragmentation of the bundle of rights itself; Territorial fragmentation further "multiplies the spliceable substance" of the rights bundle, complicating licensing.[28] Ensuing rights clearance difficulties pose frictions to developing digital content for metaverses due to loss of value from enforcement failure, increased legal uncertainty, and transaction costs; Even on the current internet, the process is already cumbersome in terms of the initial rights holder identification, the ensuing rights clearance, and the eventual remuneration. A maximally

[26] Sophie Goossens et al. 2021, p. 11.
[27] Metaverse – The Latest Buzzword 2022.
[28] Balázs Bodó – Daniel Gervais – João Quintais 2018, pp. 320-322.

beneficial cross-border metaverse may therefore necessitate even further harmonization of the EU copyright regime, and further global harmonization as well.

A maximally beneficial metaverse is one that enables *valuable exchange* of intangibles.[29] To that end, there need to be clear ways to create, store, quantify and exchange ideas, objects, and experiences. That may take both blockchain-style mechanisms as well as corresponding regulation, like was explained above, as the interoperable exchanges' infrastructure depends on storage and transfer of value through means such as more advanced machine readable licensing models and DLT records of rights management information.[30] These transaction methods and their legal dimensions are discussed in section 5. However, the legal status of NFTs, for example, is still legally unclear.[31] Despite being a matter of contract law or even securities law, it has serious implications for copyright law. NFTs are proliferating as a means of transferring content and in some cases seemingly transferring even the copyright to content.

As NFTs and smart contracts tie into the Web 4.0 ecosystem, copyright licensing may undergo dramatic changes. Blockchain can potentially enable a new Rights Management Information ('RMI') architecture for data and licensing – a Global Rights Database ('GRD') with a focus on metadata and creator identity. For example, RMI can be incrementally gathered transaction-by-transaction and recorded on the distributed ledger to slowly build a globally distributed license exchange. Such a GRD can lower transaction cost levels for creators as well as enable independent new metaverse platforms to emerge. While independent metaverse platforms can democratize society and encourage creativity, blockchain can also bring new efficiencies for incumbent platforms and big IP holders, such as CMOs, by introducing private permissioned blockchains, which enable internal rights management that is scalable onto global consortia level once combined with global standards.[32] A blockchain mechanism may also help to converge the virtual with the physical reality further by enabling a bridge to be built to the real world, where real world structures can recognize the merit and meaning of the virtual world and integrate it.[33]

[29] Herman Narula, 2022, pp. 132-133.
[30] Herman Narula, 2022, p. 135.
[31] COM(2023) 442/final, p. 80.
[32] Jeremy Silver 2016, p. 57.
[33] Herman Narula 2022, p. 153.

3.4 Copyright Implications

Generally speaking, copyright on the metaverse consists of two broad categories of subject matter:[34] 1) The architecture of metaverses (software underpinning the platforms), and 2) the works and other content placed on metaverse platforms, whether user generated content, AI content or developer content. Content copyright shall be the focus of the present paper.

Metaverse specific content copyright issues encompass questions about incentives, originality, authorship, moral rights, exceptions and limitations, licenses, transfer, technology neutrality, formalities, communication, distribution, exhaustion, and rights attribution. The current myriad of copyright law is a product of the economics of the analogue world, where the rights in a work needed to be sliced into parts corresponding to function, territory and sub-agreement. The sub-division of the "basic master rights" in publishing, recording and performance into various fragments for radio broadcast, TV, on-demand, on-line, stream and download across territories and entities has resulted in a great number of rights owners – especially in the realm of music – who hold fragments of the master right.[35] Fragmentation presents an issue, for which technology may be the best solution.

Fragmentation of copyright into 176 distinct national copyrights poses a challenge to adopting blockchain for the licensing of "international" copyrights, but simultaneously, distributed RMI and licensing may be the solution to fragmentation. Though copyright law is international to some degree, the rights themselves are not. A creation is given protection in each country according to that jurisdiction's rules on e.g. originality. Territorial fragmentation also multiplies the spliceable substance of the right: e.g. the right to translate can be licensed in each jurisdiction individually. Each national rights bundle may differ from another in terms of its scope and duration, and each fragment in each bundle can be independently transferred or licensed on varying terms. In the European Union, copyright has been harmonized much further than internationally, and therefore, the EU benefits from legal certainty and protectability of Union-wide rights based on unified authorship and originality standards, among other things. In that sense, the EU is positioned to show the way to the rest of the world, and pave way for a regulatory approach to copyright that involves regulatory technology.

[34] COM(2023) 442/final, p. 79.
[35] Jeremy Silver 2016, p 50.

The order of issues addressed by the present paper is as follows:

First, in section 4.1 there will be an inspection into the justifications of copyright. Next, section 4.2. looks at authorship and originality in the context of the metaverse, as it relates to incentives and the evolving role of copyright on the metaverse (section 4.3.). Related to the role of copyright on the metaverse, the section also examines aura manufacture as a new copyright function, which challenges the traditional justification of copyright as an incentive to creativity.

Section 4.4 then looks at the EU digital copyright policy, with a particular focus on the CDSM Directive[36]. In particular, copyright contract provisions and exceptions and limitations ('E&Ls') are examined. E&Ls play a role in the European analogy to the US "fair use" doctrine, which determines the creative leeway left for users within the copyright bundle rights in the absence of a license to said rights.

However, the metaverse being a cross-jurisdictional digital platform driven ecosystem, it is necessary to look at online platforms' private regulatory regimes, which will shape the true creative leeway left for users. Examined in section 4.5, Private regulatory regimes are an important conveyor of norms for structuring copyright ecosystems on the metaverse, and their substance affects incentives by providing or restricting incentives via secondary rights through terms and conditions that deviate from default primary rights of copyright. As such, private regulatory regimes are currently an enabler and disabler of open content cultures.

Section 5 will examine digital exhaustion as it relates to Web 4.0 technology (section 5.1.), and open DLT-based RMI database infrastructure (section 5.2.) in conjunction with licensing technology (5.3.). Incentivizing creative metaverse ecosystems rely on cultivating interoperable digital content and its cross-platform usability, which is enabled by open access through a commons-based approach and an eased process of licensing. Licensing is dependent on the availability of RMI about who holds which rights and what terms apply and where. Web 4.0 Metaverse will to some degree be integrated with Blockchain, so NFTs and smart contracts come to play a role.

[36] Directive (EU) 2019/790 of the European Parliament and of the Council of 17 April 2019 on copyright and related rights in the Digital Single Market and amending Directives 96/9/EC and 2001/29/EC. Adopted 17.5.2019.

4 The Metaverse Thrives on Copyrighted UGC

4.1 The Metaverse Threat to a Justified Copyright Law System

4.1.1 The Internet Threat Hijacking Digital Copyright

Copyright territoriality used to be based on the preservation of national sovereignty, in order to reflect local values and economic interests through IP policy.[37] Even today, copyright in the EU is still mainly a bundle of different national copyrights, although deeper harmonization has been on the way since the 2010 Digital Agenda[38]. With the emergence of new communication technologies,[39] and particularly with the convergence of information society services toward a metaverse, the economic rationale is shifting to the favour of deterritorialization. Works become ubiquitous at once and business models rely on their proliferation, making their low-friction cross-border recognition and protection a far more valuable goal economically and culturally.

The proliferation of works is moreover a question of incentives. The initial rationale behind copyright policy stemmed from investments by publishers of printed books, which is why copyright policy sought to incentivize large rights holders by ensuring their investments could be recouped. However, it has been argued that the emphasis of the incentive rationale is shifting toward individual online creators, instead. This author focused rationale has further split in two, as the first rationale is a personality focused one, which is the primary approach in continental civil law systems, while the second rationale is focused on fruits of the author's labor typical to common law systems.[40] The approach to authorship has interesting repercussions on incentives, as will be examined in section 4.2.

In the United States, the legal philosophical justification behind the copyright regime has its foundations in Jeremy Bentham's ideas about copyright utilitarianism, which has been repeated in consequent theories and laws. The US copyright is purely utilitarian and lacks a natural rights conception of copyright, arguably because the US developed around industry and economy, being mainly an importer of culture. However, as the US eventually shifted to

[37] Päivi Hutukka 2023, p 1050
[38] COM/2010/0245 final (Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, A Digital Agenda for Europe)
[39] Päivi Hutukka 2023, p 1051
[40] Päivi Hutukka 2023, pp. 1049 – 1050.

become a major exporter of IP involving products, such as film, music, software, and technology, its copyright regime is being pushed by rights holders to become more akin to a European type of natural rights approach. It has been argued in the US that if copyright eventually shifts to become a natural right with intrinsic value, then more vigilant policy is needed to keep fulfilling utilitarian goals and avoid treating copyright as the goal in itself. Arguably, purely natural right conceptions of copyright have the risk of supporting a "second enclosure movement"[41] of the intangible commons in the digital sphere, titled by J. Boyle the "Internet Threat",[42] meaning large rights holders see the advancing internet as a threat to their intermediary role,[43] and thus attempt to prevent technological development in reproduction technologies, and restrain the emergence of open-access culture.

In contrast to the US, European culture and economy relied more on the export of artistic and cultural products, meaning there was more of an interest in Europe to protect the exporting producers of works by natural rights.[44] This approach is focused on the personality of the author, which led to the birth of moral rights; In the European Union, copyright is a natural right that flows from an author's personality, associating authorship with inalienable moral rights in addition to economic rights. If the abovementioned Internet Threat analysis holds true, then EU copyright policy needs to be extra vigilant to keep in mind justifications behind copyright, because otherwise, the EU approach of treating copyright as a natural right might make copyright the intrinsic goal in itself, supporting values that enable large rights holders to lobby for stricter rights and more protection. Making copyright the intrinsic goal could be detrimental to innumerable other societal goals within the ambits of technology development, innovation, and progress of society and economy in general.

4.1.2 The Metaverse Threat: Balancing Exploitation and Incentivization

In both systems mentioned above, copyright is fundamentally regarded as a special social contract granting a temporary privilege to enable the recouping of investment in creative endeavors, as it is assumed that less works would be produced if investments could not be recouped. However, more recently, the function of copyright has transformed into a tool for controlling access to creative content, instead of only incentivizing creativity.[45] Authors want

[41] James Boyle 2008, p. 42.
[42] James Boyle 2008, p. 54.
[43] James Boyle 2008, p. 56.
[44] Päivi Hutukka 2023, p. 1067.
[45] Radim Polcák 2020, p. 78.

their works to be consumed by as many people as possible, publishers require users/consumers to generate revenue, and content platforms need content for user presence that generates ad revenue**.** Copyright and licensing policies that prevent content access and works creation result in a market failure[46] of that ecosystem. For example, Article 17 CDSM risked leading to further market concentration in favor of large rightholders and to the detriment of individual creators, unless mandatory exceptions were carved out.[47] Similarly, for the metaverse, new copyright exceptions may have to be introduced in order to maintain a justified copyright regime countering the large rightholder strive against the perceived "Internet Threat."

Creative goods rely on accessible pre-existing works to build on, which forms a paradox with the assumption that investments can be recouped only if free-riding is excluded.[48] On the digital metaverse, works are information goods, which are akin to public goods in that they are non-rival and usually also non-excludable.[49] Non-rival goods are intangibles, so they can be multiplied *ad infinitum* and enjoyed by anyone without hindering the enjoyment of others of the same good. Subsequently, they are non-excludable in the sense that their enjoyment can practically be nigh impossible to prevent (due to internet ubiquity and easy proliferation of content), albeit DRM measures do aim to exclude, nonetheless.

The artificial scarcity created by copyright and DRM access control creates barriers stifling free creativity and challenging the justification of copyright as an incentive to create, instead prioritizing economic exploitation and enabling concentration in the hands of big rightholders. The prioritization of economic exploitation is a result of the fact that remunerative incentives facilitate *quantity,* which may only subsequently result in originality, since originality cannot be directly incentivized monetarily.[50] Novel originality stems most often from individuals' projects motivated primarily by passion and popular exposure. That is reflected in the fact that copyright systems end up prioritizing organizational production of quantities for financial gain, while in the EU providing moral rights for creators. The very concepts of originality, authorship, and moral rights imply those incentives in the way they relate to the idea-expression dichotomy.

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[46] Balázs Bodó – Daniel Gervais – João Quintais 2018, p. 332.
[47] Martin Senftleben et al. 2018, pp. 3 – 5.
[48] Volker Grassmuck 2011, p. 21.
[49] Eberhard Becker et al. 2003, p 23
[50] Katharina Laske – Marina Schröder 2016, pp 19 & 20

4.2 Originality and Authorship on the Metaverse

4.2.1 The Effect of Authorship on Incentives

The way authorship and originality are conceptualized has an effect on incentives, and incentive type has an effect on originality. Considering the idea-expression dichotomy, originality is required of the expression of an idea, and not of the idea itself, meaning that copyright "originality" is not for innovation *per se* – i.e. it does not directly incentivize novelty – it incentivizes *variety*. Moreover, European originality is legally rooted in authorship. Specifically, continental European copyright thus incentivizes a variety of embodiments of the personalities of creators. Some of those various embodiments happen to become truly novel in originality, but such originality is not directly incentivized.

Authorship is tied to originality, i.e. protectability depends on an original expression of the personality of an author. In *Painer*[51], the CJEU discussed the legal standard of originality being a question of the author's choices and personality as it manifests in "original" expression – i.e. a work that "reflects the author's personality". This characteristically European connection between the author's personality and their work is at the heart of the concept of moral rights, meaning moral rights are a reflection of individual innovative creativity being incentivized by *popular exposure* instead of only remuneration. Remuneration cannot directly incentivize creative talent, but moral rights can encourage its realization as passion projects. Moral rights are not a direct incentive, but they are a guarantee of integrity to those motivated by exposure.

According to the CJEU in *Infopaq*[52], "author's own intellectual creation" applies to all work categories, so it applies to content components and content arrangements on the metaverse. According to the CJEU in *Brompton*[53], someone's own intellectual creation is one made by "free and creative choices". Instead of technical originality considerations, it is required to find a "personal touch" that expresses an author's personality. Hence, the issue to discuss is the degree to which a metaverse ecosystem with its platform limitations, specifications, and overall community, influence creative choices so as to affect one's freedom of choice and

[51] Case C-145/10 *Painer*, ECLI:EU:C:2011:798
[52] Case C-5/08 *Infopaq*, ECLI:EU:C:2009:465
[53] Case C-833/18 *Brompton*, ECLI:EU:C:2020:461

shape intellectual creation to deviate from one's own "personal touch" corrupting the creation's reflection of one's personality.

4.2.2 How is Originality Constrained by the Metaverse?

The originality requirement can be fulfilled by works on the metaverse, although it is entirely infrastructurally limited, necessitating further elaboration of originality requirements in environments dictated by code. Additionally, it is also a collection of stratified digital spaces, which stratification by platformization creates spheres of private governance and organizational hierarchy, where content governance and authorship may clash.

In *Cofemel*[54], the CJEU confirmed that the standard of originality is the same for all work categories, by which standard all work categories are not protected the same, since some are more functional than original. The harmonized standard for originality of expression as an author's own intellectual creation was clarified in *Painer*, *InfoPaq*, and *Brompton* as a matter of the extent of creative freedom a creator has to make choices that reflect their personality onto a work. In practice, expressive freedom can be limited by infrastructural and functional demands. Infrastructural limits are set by technical limitations of the mediums for channeling creativity and by design limitations of the tools of creation, while functional limits ensue when functional works are required to meet certain practical specifications. In *Cofemel* judgement paragraphs 32–34, the CJEU elaborated the originality standard on part of functional designs to also qualify partly as copyright works to the extent such an element, which is considered a free intellectual expression of personality, can be *identified* with sufficient precision and objectivity, meaning no element of subjective aesthetics may be considered. The extent to which a functionally determined creation on the metaverse may be considered sufficiently original for copyright will depend on precise and objective identification of such an expression of personality.

In practice, metaverse content for a variety of purposes will chiefly be crafted within/onto digital platforms built on an infrastructure of computer code, which places restraints on the extent of possible authorial creative expression: Some creative choices will inevitably be infrastructurally constrained by the code, not chosen by the user of the creative platform.[55] In turn, functional requirements may necessitate creative choices on the metaverse if content is

[54] Case C-683/17 *Cofemel*, ECLI:EU:C:2019:721
[55] Mikko Antikainen 2021, p. 141.

crafted to achieve a practical purpose involving technical specifications. However, a distinction must be made between the arrangement of different pre-existing components to build a creative whole, and the creation of the individual components.

The CJEU, in *Nintendo v. PC Box*[56] distinguished graphic and sound elements as independent subject matter of their own creative value, the expression of which is never constrained by underlying programmatic infrastructure. In paragraph 23 of the judgement, the CJEU noted video games as complex subject matter, which is comprised of original elements that are composed into a complete whole, protectable both individually and together as a whole. In the context of the metaverse, arrangements of content are a slightly more ambiguous issue in terms of originality, than the originality of individual singular components of content. Indeed, independent components of content such as 3D assets modeled on Blender qualify as independent works in their own right and are considered separate subject matter from the infrastructurally pre-determined methods of arrangement of that content inside metaverse platforms. Metaverse platforms come to dictate in various ways the possible arrangement of the whole of individual components of UGC.

Regarding the creative leeway in arrangements of virtual components, a great example is the creator economy in Colossal Order's city-builder simulation *Cities: Skylines* ('C:S'). The simulation's unity-based engine, at launch, involved tremendous restrictions on the possible arrangements of e.g. roads, parks, lots adjacent to those roads, and types and styles of buildings or facilities that could become constructed on those lots. Such restrictions were established due to development choices to produce tools that were not too intricate so as to compromise the engine's integrity, the simulation's game mechanics (i.e. its purpose), or its user experience; So as to refine the simulation's level of complexity without breaking the engine or the experience. Due to resultant foundational engine- and simulation-level infrastructural constraints, at launch, different users' cities more or less resembled one another. Given that on the metaverse there will be analogous technical restraints, there would then be very little creative leeway to qualify works for copyright protection on metaverse platforms unless platform maturation enables increasing tool intricacy and asset variety.

The C:S community had the freedom to invent and implement new tools, refine existing ones, and create more original independent assets through using modding tools and mediums such

[56] Case C-355/12 *Nintendo v. PC Box*, ECLI:EU:C:2014L25

as Unity SDK, Blender, and Steam Workshop. Consequently, as the C:S user-base grew and its creator economy matured, its users gained more and more freedom to flesh out their personalized visions of a city with maximal creative liberties and minimal engine-breaking bug risks. The result was astoundingly boundless creativity in digital urban planning[57] that has led to viable urban designs and artworks resembling architecture but functionally unconstrained by laws of physics. For example, one user designed a carbon negative far-future utopia implementing real life sustainability principles with imaginative sci-fi elements, and another an almost 1:1 digital twin of present-day Pittsburg for real life transportation improvements planning, among other designs between and beyond the two.

Nonetheless, every simulation engine has its limits, and so hundreds of modded tools and assets downloaded into the simulation would eventually always break it. Furthermore, the Steam Workshop, for example, will never offer a truly boundless variety of assets and mods simply due to finite creator resources and finite available server storage space – a limitation of data centralization on one hand, but also a limitation of the laws of physics on another; Cyberspace always resides on finite physical resources, i.e. hard drives. Besides the availability of storage space, also e.g. GPU technology dictates limits to rendering, thus necessitating a maximum level of polygonal detail that is possible for each 3D asset, which eventually limits the available range of distinct configurations of detail. Practically, creative leeway is still immense, but technically speaking, virtual worlds on the metaverse or otherwise, which are limited by engine capacity and general computational bandwidth, always pose some *infrastructural limits* to the degree of expressive freedom of their users.

4.2.3 Where Originality and Company Policy Clash

The C:S example makes it evident that company policies, which freely permit modifications and grant adjacent access to open-source code of the simulation can over time generate mature ecosystems that attract more and more users. Through this process of maturation of community and infrastructure, initially rigid platforms can incrementally develop toward a higher level of intricacy and flexibility allowing a considerable extent of freedom to cultivate original expression protectable by copyright. The downside is a potential loss of control over copyright, which in terms of moral rights implicates risk to integrity of the work by socially harmful modders. That risk is often combatted by terms in EULAs condemning harmful UGC

[57] See for example: Best Cities of 2022 with Joy Builds Cities I 8 Years of Cities: Skylines 2023.

similarly to CC licenses, though libel law may be another option to address the same problem.[58] However, in the present example, UGC cannot be used commercially.

So, on the one hand, company policy grants the freedom to access and modify the source code, and on the other hand, company policy may seemingly also dictate who is considered the owner of resultant works, if the work is by terms and conditions claimed to be usable only for non-commercial purposes.[59] However – and this is important also for rights ownership and management – the role of independent modders is increasingly causal to enabling those original (but spin-off) creations the further such community maturation progresses. Therefore, the further a platform matures by community endeavor, e.g. modding, the less the platform company's user agreement terms should justifiably be able to limit the usage of the works for commercial purposes or to claim resultant works into their bundle of exclusivity by EULA – even if the license to use the platform is conditional on users licensing their UGC to the platform. When a metaverse service permits a freedom to mod and grants open access to source-code, they do so by license such as the one examined in the previous section.

Concluding the present subsection, as copyright protects expressions of personality, it incentivizes variety, i.e. increases the pure quantity of different expressions, and it also ends up incentivizing novelty and real originality indirectly by two means: First, the entities systematically producing large quantities of works may once in a while stumble upon truly original ideas by simply repeating different expressions enough times; Second, independently of said entities focusing on quantity, individual downstream creators can take that variety and base their own original works upon them to a degree. Particularly on the metaverse, the extent of such continued downstream creation is highly dictated by functional and infrastructural limitations, where platform maturation is important for allowing sufficient technical freedom for originality, though based on protected IP and dictated by company terms and conditions. Furthermore, in order to maximize *individuals'* engagement in *original creativity*, remunerative incentives seem to perform a secondary incentive role that is mostly directed at mass-production businesses, while open collaborative ecosystem synergies are actually the primary incentive driving passionate original creators. Hence, alongside remunerative incentives, authorship connected to personality grants moral rights as a

[58] Volker Grassmuck 2011, p. 31.
[59] See: Paradox Interactive – User Agreement 2023, section 5. Users are granted the right to create UGC based on brand IP, as long as it is for non-commercial purposes – But at what point is UGC considered so original as to not be thus claimed as IP of the service provider.

guarantee of integrity for popular exposure, which operates as an indirect incentive to individual creators. The continental European approach therefore seems to be well suited for a UGC driven Web 4.0 creative ecosystem. Moreover, as the continental European copyright system incentivizes a variety of embodiments of the personality of an author, it is particularly suited for new functions on the metaverse, such as aura manufacture, which is an emerging copyright function connected to authorship that will be examined next.

4.3 The Evolution of Copyright Practices on the Metaverse

4.3.1 Pecuniary and Non-pecuniary Incentives in Open Content Ecosystems

4.3.1.1 Open Content Cultures as Low-IP Environments

The metaverse is an interconnected and collaborative content production and consumption system, which can therefore benefit from a strong open content culture for novelty. In fact, the EC has invested in the Next Generation Internet initiative,[60] which funds a creative digital commons through investments in a broad range of innovative practical solutions.[61] Creative commons and open innovation as well as related technologies are some of the aims the fund seeks to foster by investment.[62] In what form may open content emerge on the Metaverse, and what effect would it have on proliferation of creativity?

The conventional open content model of copyright is somewhat property-free in terms of function and outcomes, although technically such a model is based on property rights shifted via copyright contract law by accommodating open use through free licenses. In other words, the open content model simply shifts the emphasis from primary rights toward secondary rights, which grant freedoms divergent from the default property rights. The alternative option would be to recreate the entire copyright as a much more limited primary rights bundle with a much shorter term, which is not the approach examined in the present paper. Instead, licensing and exceptions are looked at for their benefits to an open ecosystem.

A concrete example of an ecosystem benefitting from open copyright is that of circular economy. It has been argued that a digital circular economy can be facilitated by access to necessary data and knowledge to take on repairing, refurbishing and other circular activities

[60] COM(2023) 442/final, p. 9.
[61] The NGI Initiative: An Internet of Trust.
[62] NGI Open Calls.

independently. In practice, that would necessitate open-source materials of protected matter,[63] facilitated e.g. through open licenses which could enable the sharing of 3D printing CAD files for repairing objects at home. Consequently, metaverse 3D assets useful for the digital circular economy can be designed in open Industrial Metaverse platforms for CAD, for example. But setting aside matters of convergence toward the physical world, even purely inside the abstract metaverse, an open content culture would be beneficial, provided the failings of the current open culture system (power concentrations and license dependence) are corrected.

The facilitation of an open content culture is possible, first, by restricting dominant platforms' power by some added rights to individuals. In the second place, open creativity can be enhanced by allowing businesses to engage in voluntary relinquishment of certain rights, and third, by having a better technological infrastructure for various kinds of licensing and RMI in order to ensure more individuals have ease of access to such licensing solutions. The present section shall dig deeper into the abovementioned ideas by looking into knowledge commons and open content cultures in the context of the metaverse.

The concept of a knowledge commons is similar to public domain, but different as a community of peer-producers that is accessible only by reciprocity inside said community. The peer producers share a willingness to contribute, based on their quest for social standing, recognition, and other values such as passion, learning, support, and synergy. The intrinsic and indirect instrumental value from unstifled sharing thus weighs more to these communities than exclusion for direct economic gain.[64] Knowledge commons are essentially no-IP or low-IP environments, emerging particularly in creative internet communities that thrive on freedom by lack of rules, and further embraced by some industries that use low-IP to gain benefits from UGC, such as for example free marketing or style proliferation in culinary and fashion sectors on the one hand,[65] or copyleft in crowd-sourcing software development on the other. Interestingly, especially in digital content industries, the Terms of Service of big right holders are expressly facilitating, by encouragement, the setting up of low-IP environments for those same indirect benefits of free marketing and style proliferation. It would be a false dichotomy to state that enterprises seek to primarily maximize profits by excluding all free-riding, while "indies" always thrive on sharing-is-caring communities. The increasingly

[63] Maria Montagnani 2023, pp. 1009–1012.
[64] Volker Grassmuck 2011, pp. 24 & 27.
[65] Christopher Sprigman 2017, p. 249.

common practices of copyright relinquishment are serving producers, holders, and users alike, which may evidence the fact that copyright law is failing certain societal needs in the digital sphere,[66] though on the other hand, it also evidences the fact that freedom of contract exists for good reason, as it enables agreements to meet specific demands.

4.3.1.2 Low-IP Environments for Creativity: Interaction with Transactions Infrastructure

No-IP & low-IP environments of copyright relinquishment seem to fulfil a need, which the distinctly different high-copyright environments fail to meet. Communities' usefulness seems to be the intrinsic value of free community as a medium and a forum for synergies in works proliferation, sharing, and showcasing. A free community stands in some contrast to copyright, because copyright instead aims to create a stratification of intellectual efforts for structuring a market of intangibles – it facilitates a market, but in so-doing it simultaneously segregates communities by their intellectual production and exploitation capacity. Incidentally, strict property causes communities' usefulness to suffer by negating some of their useful functions, unless regained by copyright relinquishment. As an alternative to copyright relinquishment, community functions can be recouped into the stratified market system also by way of increased copyright awareness and minimized friction in licensing.

Since copyright stratifies communities for establishing a market, and it does so by structuring society along individual and organizational differences in cognitive production and exploitation *capacity*, it must follow that harm can be remedied by addressing lack of copyright awareness[67] and by minimizing *transaction costs*[68], ultimately democratizing capacity. That way, those who desire to take a part of their work from the commons to proprietary development can do so with ease, increasing mobility. Thus, knowledge commons functions can be effectively integrated to the IP market and copyright law, when individuals of different capacities are equitably able to participate in the market. Near zero-friction licensing is a complicated proposition that is further examined in section 5, and one that may be particularly possible on the metaverse thanks to it being completely online, pervasive, and semantic. Finally, it is unlikely that even advanced (utopian) licensing systems and perfect states of awareness would ever completely eliminate no- & low-IP environments,

[66] Caterina Sganga 2024, p. 1.
[67] Caterina Sganga 2024, p. 1.
[68] A regulatory and technological challenge, which is elaborated in section 5 on rights management.

nor should they, because knowledge commons will always have a valuable role to play in free creativity when building new works on top of the old.

Both an open content approach and an evolved licensing landscape can play a role in taking creativity and innovation on the metaverse to a higher level; Both an accessible proprietary transactions infrastructure *and* free communities are needed. Knowledge commons will presumably play a role in the formation of close-knit online communities of creators, where monetary transactions would be considered a faux pas and unconstrained sharing is the most attractive option. However, the more knowledge communities are formed, and the bigger and more complex they become, the more need there may be for a transactional framework between participants crossing community boundaries, conflicting in personal interests, or wanting to participate on the market otherwise.

4.3.1.3 Two Types of Incentives Produce Two Types of Symbiotic *Creative Ecosystems*

From an incentives perspective, on one side, open source ecosystems facilitate creative communities the production capacity of which surpass proprietary ecosystems in sectors that most benefit from free reproduction of similar works, novelty generation by unconstrained engagement, and community trendsetting & free marketing. Those communities' works are in rapid flux, and the pace of innovation more chaotic, as new trends and techniques come to dominate the free-flowing creative ecosystem, which stands in contrast to what happens in proprietary copyright ecosystems. On the other side, strictly copyright protected works facilitate more unchanging communities with restricted ecosystems for creativity, and an industrial production model for works which form the basis of said communities. The works therein follow more organizational norms (terms and conditions), honoring preset aesthetic styles producing some recognizable iconography. The second type of creative ecosystem (brand community) can mature into the first type (open source) to the extent forgone by ToS.

Those creative ecosystems have an almost cyclic symbiosis: In the first order, as proprietary copyright ecosystems incentivize a more centrally controlled and cultivated ecosystem of works of an enduring style – unchanging brands and franchises – then more loyal communities (e.g. fandoms) form around those brands, reproducing its symbols exactly, depending on the terms and conditions chosen by company policy. Then, in the second order, an inverse correlation emerges between the *loyalty* of a brand's following and the extent to which usage of its copyright was *restricted* by terms and conditions; A strong brand is carefully curated by business utilizing proprietary copyright, until its iconography reaches

popularity in society, at which point community wishes to organize around its icons and reproduce them, leading the copyright holder to allow reproduction and forgo their exclusive rights to the extent necessary to maintain a loyal tributary community, leading toward open source to some extent.

It has been argued that online communities are so deeply mediated and influenced by graphical elements and interfaces of their online environment, that copyright inadvertently enables prevention or control of online community formation by prevention of the usage of icons that those communities' existence relies on.[69] As communities desire to reproduce the icons of their shared passion, social conflict may potentially erupt between proprietary copyright holders and the online society at large, producing increasing amounts of copyright infringement, met by copyright relinquishment or stricter protection.

Fanfic and cosplay are two current examples of said communities, which by company policy are often granted a low-IP community status, i.e. the freedom to reproduce copyrighted works in non-commercial capacity by the terms and conditions of their franchises.[70] Although, some companies suppress those communities instead,[71] mainly due to a threat of losing copyright control financially. Threat to moral integrity is usually protected by moral rights and condemned by EULAs or other licenses.[72]

4.3.1.4 A Creative Metaverse Requires a Novel Sui Generis *Exception?*

Pastiche, parody, and quotation may to some extent form exceptions that metaverse community-building can rely on. However, in cases where exceptions and limitations do not apply, large rightsholders can theoretically still suppress community formation & survival. Considering modern society is more and more technologically mediated by brands operating digitally, and the trend is set to continue, business ToS bear increasing control over the formation and survival of creative communities and dictate their ability to mature.

Therefore, improving the rights of individual creators within communities and ensuring an innovatively (not only quantitatively) creative metaverse may require the regulator to create new exceptions and limitations in the digital sphere, approaching them from a community

[69] Dan Burk 2012, p. 7.
[70] Christopher Sprigman 2017, p. 253.
[71] Dan Burk 2012, p. 8.
[72] Volker Grassmuck 2011, p. 31.

formation point of view. However, as discussed above, in reality the *n*-order consequences of copyright protection on digital communities seems to entail the *eventual voluntary relinquishment* of protection for the benefit of community, even in the absence of regulation mandating such an exception. That voluntary relinquishment of mere reproduction rights, on the other hand, may only serve as evidence to the legislator of the desirability for a copyright term reduction, or rather for an exception limiting exclusive reproduction rights in certain community formation situations which foster creativity. Such a group-based rule can be combined with a general "transformative use" type exception, which is more permissive in case of identifiable creative communities, and also has a stricter general scope applicable to all regardless of their presence in an online community. The transformative use exception allows creators engaged in communities mediated by private regulatory regimes to have legal certainty that their creations based on existing protected IP can be developed and commercialized despite being clearly connected to protected IP and bearing resemblance by its elements.

4.3.2 Manufacture of Aura *versus* Incentivization of Creativity

As the metaverse becomes reality, community formation and the *modus operandi* of creative ecosystems will evolve due to immersivity and pervasiveness of graphics and experience, which leads to enhanced attention and data capture. Specifically, seamless transfer of data to users, and from users back to data again, by current business practices results in facilitating a deeper attention economy. The metaverse is a culmination of the constant innovation of attention allocation and data capture technologies, presumably leading to the proliferation of entire *experiences* as a new form of economically significant copyright protected content,[73] which could also be described as a form of "aura".[74] Aura is a concept denoting the experience of authenticity or uniqueness surrounding a work, i.e. the whole experience around content as corroborated by IP rights of authors and places.

An aura manufacturing attention economy subsequently challenges the traditional justification for copyright as an incentive, because copyright instead shifts into a tool for manufacturing aura to structure markets and communities. The consumption of auratic experiences will dwarf in importance any individual pieces of content, because the

[73] Ignas Kalpokas – Julija Kalpokiene 2023, p. 16.
[74] Stefan Bechtold – Christopher Sprigman 2023, p. 291.

competition for dominance between metaverse platforms and the players therein will be a competition for the most total immersion,[75] or rather a competition for segmentation of audiences for pervasive attention capture. The manufacture of aura relies on reproductions of authored works, which are then used to build a sense of belonging and authenticity of the original,[76] making authorship and moral rights increasingly important concepts in the metaverse.

Community formation by reproductions of the works of beloved brands will likely become a method for manufacturing aura. By that method, aura is crowd-sourced from passionate fans for free, as long as they reproduce works precisely enough for brand recognition, and non-commercially, so as to not risk business interests of the copyright holder. This economic calculus may sound unfair, but it has a modicum of balance in the broader system of incentives, where engagement with pre-existing IP for company benefit may enable individual creators to fulfil their passion and gain exposure, and eventually come up with original and novel ideas to be monetized by other means.

Considering the ecosystem's reliance on both attention-capturing experience and brand IP enforcement, there is an incentive for businesses to create their own platforms or instill their own clearly delineated auratic spaces within third-party platforms. This creates potential issues with IP inside IP, where the boundaries of use between platform, UGC and professionally created works of different rights holders become blurred – something that can be addressed by stricter technical boundaries, advanced licensing technologies, clearer regulation and clearer terms and conditions. Particularly where UGC begins to form truly original expressions of personality and authorship separable from its root IP, as potentially may happen when crowd-sourcing aura, advanced RMI and licensing infrastructure will enable legal certainty as to which rights are whose and provide a means to commercialize one's copyright if so desired. Copyright rules for authorship and originality thus come to regulate much of the IP extent of aura manufacture (supported by related technology), as authorial narratives tie a work, its copies, and the wider brand to a renowned creative mind – either a person or a community or organization. Thus, the narrative distinguishes and elevates an object, but its claims depend on copyright law. The more complex a creative ecosystem, the more there may be competing claims in narratives of distinct (or overlapping) auras

[75] Ignas Kalpokas – Julija Kalpokiene 2023, p. 17.
[76] Walter Benjamin 1936, p. 3.

persisting on the metaverse platforms. This emphasizes the importance of correct rights allocation by author identification and enforcement of claims legitimacy.

Moreover, the goal of copyright evolves further toward that of market differentiation and commodity framing – a use-case, which IP has always had, but the importance of which gets emphasized. Subsequently, in the worst-case scenario, creativity may dwindle: Incentives are affected, since novel creations may be overlooked if their creators fail to frame it efficiently to compete for relevance and attention, or if original works are not attributed to the correct creators. Simultaneously, the meaningful production of competitive aura may become expensive, presumably because there is no maximum cap to how much relevance a work can strategically claim when given enough resources. Nonetheless, a general total cap may emerge, as it has been argued that distinction may become so typical that it becomes diluted noise,[77] reaching a "congestion threshold",[78] which could ultimately turn to favor indie creators with novel approaches to resources and community: It would begin to favor distinct ways of distinction itself.

Specifically, aura can be manufactured by four methods, i.e. technical reproduction methods, social norms, community building, and business & legal strategy. Each of the four methods leverage IP protection to varying degrees.[79] Community building has already been extensively touched upon here as it relates to copyright administration by private regulatory regimes curating low-IP environments inside high-IP brands for the formation of loyal tributary communities, including questions of copyright contract law and particularly EULAs. Distinct ways of distinction, in turn, can emerge between different social networks.

Social norms evolve with societal attitudes, as alternative approaches to social structures, networks and distinction therein are employed by, for example, indie creators leveraging open-source communities, indigenous groups, or even spiritual groups to bolster their auratic narratives individually and increasingly frequently *together* as well. The sense of an authentic cultural artifact can be manufactured around mass produced copies of works,[80] which may or may not be original in the sense of copyright law, giving copyright laws – authorship and

[77] Barton Beebe 2010, pp. 809 & 814.
[78] Stefan Bechtold – Christopher Sprigman 2023, p. 299.
[79] Stefan Bechtold – Christopher Sprigman 2023, p. 292.
[80] Stefan Bechtold – Christopher Sprigman 2023, p. 299.

originality rules, and moral rights in particular – the power to have a say in the social networks of the auratic metaverse by regulating its "constructed authenticity"[81].

Technical reproduction methods on the metaverse surpass those in the physical world, incentivizing businesses to employ TPMs as well as terms and conditions to manage their copyrights. It may even bring about an enclosure movement as some rights holders attempt to gain perfect control over copyrights in order to combat the internet risk of zero-cost copying.[82] Thus, content industry monopolies may be able to prevent such technologies from being effectively adopted. Interlocking business and legal strategies are the corporate method to manufacture aura, and they often leverage open-content community approaches coupled with IP strategy to minimize the Internet Threat. Consequently, private regulatory regimes shape creative ecosystems, affecting e.g. incentives by methods chosen by company policy as will be examined in section 4.5. Attempted restrictions of open DLT-based RMI and licensing technologies could end up defining the copyright system in favor of large rights holders while hindering technological development.

One facet of such technology is NFTs, which are pointers of authenticity perfectly suited for production of aura by extending authorial originality to mass produced copies and connected works. Therefore, the copyright rules of (co-)authorship are important in conjunction with paracopyright rules regulating NFTs. Legally tethering certain rights to NFTs may depend on perceiving NFTs as legal instruments capable of acting as vehicles akin to legal contracts, which for now is not the case in EU, because NFTs are considered digital carriers with merely evidentiary value.[83] From a prognostics standpoint, however, even if pure smart contracts are never considered to tether to property rights in the works they point at, the creation of smart *legal* contracts will nonetheless remain a possibility; Albeit, as infrastructure, natural language legal contracts are less efficient than pure code, maintaining friction and transaction costs in the creative ecosystem. It may be that more advanced online identity authentication technology is needed before NFTs can be considered legally valid instruments tethering to rights, which will require forgoing the anonymity of blockchain.

By guiding the utilization of NFTs, policymakers may curb the increasing power of large content industries focused on distributing artificially scarce auratic copy & paste works. In

[81] Jillian Cavanaugh & Shalini Shankar 2023, p. 51.
[82] Dan Burk 2012, p. 61.
[83] COM(2023) 442/final, p. 80.

turn, large rights holders may attempt to restrict open and distributed copyright management infrastructures, such as more advanced smart contracts or public databases, from emerging in the mainstream, because those would create an ecosystem circumventing large rights holders and convening individual creators directly.

Summa summarum, copyright policy as it evolves with the Metaverse can dictate whether:[84] 1) Copyright monopolies become broader, stricter, or last for longer than is necessary to encourage creativity; 2) Overly broad rights may hinder community formation and creative functions; 3) Copyright use (and access) restrictions discourage individual follow-up innovation beyond mere crowd-sourcing of aura; 4) Industrial power concentrations and auratic dominance lead to decreased welfare and unfair competition; 5) Network effects cause the market to adopt inefficient Metaverse infrastructure technologies and miss adopting more advanced technologies; 6) Rights holders gain overbearing direct control over technology outside their copyright monopoly, such as reproduction, access, RMI, or licensing technology. In fact, the EC has recognized that large entities may contribute to a closed ecosystem and create entry barriers to metaverses – two issues that are a question of standards and interoperability, respectively.[85] Not only copyright law, but *open standards* in technology are required to support an open creative ecosystem. An open creative ecosystem with incentives in balance ought to be the focus of European Union digital copyright law and policy, which is examined next, followed by private regulatory regimes in the context of the Metaverse.

4.4 EU Digital Copyright Rules

4.4.1 Prior to the CDSM Directive

The 2001 Directive on copyright in the information society ('InfoSoc Directive')[86] intended to align EU legislation with international law, strengthen IP protection faced with technology developments, reduce the existing disparities between member states' domestic legal systems, and ensure an adequate remuneration and compensation of authors and performers. The Directive was successful inter alia in introducing the three-step test into MS legal systems, defining IPR throughout the EU in broad terms, and endorsing Technological Protection

[84] James Boyle 2008, p. 68.
[85] COM(2023) 442/final, p. 11
[86] Directive 2001/29/EC of the European Parliament and of the Council of 22 May 2001 on the harmonisation of certain aspects of copyright and related rights in the information society. Adopted 22.6.2001.

Measures (TPMs) for enforcement. TPMs have become a rather important component of private regulatory models, but not fully to the extent envisaged by InfoSoc, which arguably relied on TPMs too much and therefore has been left lacking proper enforcement mechanisms, although the enforcement issue has been somewhat remedied by subsequent regulations.[87]

The InfoSoc Directive introduced no mandatory exceptions or limitations, and exceptions could be restricted by contract. Accordingly, as elaborated in Recital 45, the Directive seems to even encourage the contractual overriding of copyright exceptions insofar as exceptions might otherwise prevent "fair compensation for the right-holders insofar as permitted by national law".[88] A legally uncertain area of InfoSoc are uses and creations that are transformative enough to not conflict or compete with the normal exploitation of the work though they would formally fall under an exclusive right. Transformative use is not a harmonized or unified type of exception in the EU, where some Member States prohibit it and others protect it, so there might be a need to introduce a clear exception for it in the future.[89] The CDSM Art. 17(7) attempted harmonizing a transformative use-type exception, but only insofar as certain types of e.g. quotation, parody, and pastiche are concerned.

The 2014 CMO Directive[90] created governance, financial management and transparency rules for CMOs. The CMO Directive applies different rules to licensing entities on the same market and reserves the management of certain rights to CMOs. The functioning of CMOs has an impact on proliferation of creativity, as it bolsters incentives by supporting rights clearance and subsequent remuneration to authors. As the metaverse materializes, technological tools may, over time, take over the functions of CMOs, provided technology is not restricted by monopolistic power. Prior to elaborating on those tools in section 5, the present section shall first examine CDSM Directive provisions and certain private regulatory regimes.

[87] Stephane Reynolds et al. 2015, pp. 13 – 14.
[88] Stephane Reynolds et al. 2015, p. 79.
[89] Caterina Sganga 2023b, p. 1414.
[90] Directive 2014/26/EU of the European Parliament and of the Council of 26 February 2014 on collective management of copyright and related rights and multi-territorial licensing of rights in musical works for online use in the internal market Text with EEA relevance. Adopted 20.3.2014.

4.4.2 The CDSM Directive, Rights, and Incentives

The 2019 Directive for Copyright in the Digital Single Market ('The CDSM Directive') produced mandatory exceptions leading to a degree of EU copyright unification and thereby overcoming some issues with territoriality and fragmentation.[91] In the first place, the CDSM provides exceptions and limitations ('E&Ls') for TDM, cultural heritage preservation, and digital education in Articles 3–7. Out of the introduced exceptions, TDM and digital education have a foreseeably important role on the Metaverse.

The exceptions and limitations for Text and Data Mining ('TDM') – i.e. data mining in particular – likely will have an essential importance in the Metaverse ecosystem, which will generate huge amounts of data. Such data can be used to develop platforms, conduct research, and create novel innovations. In particular, TDM is necessary for compiling requisite datasets to train Artificial Intelligence applications, because training any type of machine learning AI model requires the copying of content, much of which is copyright protected. The use of AI is presumed to continue on the Metaverse, where its training and deployment is necessary for the creation of a data capture environment and a subsequent auratic attention economy as mentioned above.

Exceptions and limitations for TDM were introduced in Articles 3 and 4 CDSM Directive. Article 3 CDSM introduces a mandatory exception for TDM for research purposes, which cannot be overridden by contract. Its imperative nature is a policy choice to ensure unimpeded scientific research, whereas otherwise contractual terms would be free to emphasize stricter economic rights.[92] By default, Article 4 CDSM allows data mining for general purpose AI training, but conversely paragraph 3 of the article provides for an opt-out of the general limitation. Considering the EU Treaty goals that strive to make data and technology fairly accessible to foster market pluralism and inclusiveness to empower competitive AI business models, the Article 4(3) opt-out provision may prevent achieving the goal of open access,[93] and again favor large enterprises which can afford to pay for training data, while putting European small and medium-sized developers, commercial research laboratories and innovators at a competitive disadvantage. Nonetheless, public sector bodies are restricted in their freedom to exercise the Article 4(3) opt-out of the TDM exception,

[91] Caterina Sganga 2023b, p. 1410.
[92] Martin Kretschmer – Thomas Margoni – Pinar Oruç 2024, pp. 16 – 17.
[93] Caterina Sganga 2023b, p. 1414.

since the Open Data Directive[94] ensures a right to re-use public sector information, including e.g. research data for commercial data analysis.[95]

The metaverse incorporates functions for teaching purposes in immersive experiential environments. Article 5 CDSM Directive provides a mandatory exception or limitation to the rights of reproduction and communication to the public of works for digital and cross-border teaching activities, which have the sole purpose of non-commercial illustration for teaching and goes only as far as is necessary for that purpose. Furthermore, Article 5(3)(a) InfoSoc and Articles 6(2)(b) and 9(b) Database Directive provided exceptions for teaching activities including digital teaching, but those provisions were not harmonized throughout Member States, unlike the DSM. Where mandatory E&Ls have not been introduced by law, it is possible by parties to negotiate a contractual authorization, i.e. individual, public, or collective licenses.[96]

Beyond E&Ls, the DSM also provided licensing and exceptions schemes (Articles 8–14) by *inter alia* introducing extended collective licensing into EU law (Article 12). Extended collective licensing is introduced to further strengthen CMOs' mandate over the licensing of copyright works, which are not made under exploitation contracts and which are difficult to identify for rights clearance (recital 45). Extended collective licensing is made to increase the utilization of works and enable collective bargaining for structuring the market efficiently and fairly, which is beneficial to both the public and the creator, as it arguably addresses the balance of bargaining powers. An alternative method for increasing utilization of works will be presented in section 5.

Importantly, the Directive also stipulated the attribution of direct liability to online content-service providers for infringing content posted by their users, together with complementary preventive content-filtering obligations (Article 17) and complemented by a *mandatory* exception for e.g. quotation, parody, and pastiche in Art. 17(7) and a complaint redress mechanism in Art. 17(9). Finally, the DSM introduced copyright contract law provisions that addressed the lack of power balance between authors and publishers by supporting authors' bargaining power with provisions for mandatory remuneration (Article 18), obligatory

[94] Directive (EU) 2019/1024 of the European Parliament and of the Council of 20 June 2019 on open data and the re-use of public sector information. Adopted 26.6.2019.
[95] Jean-Paul Triaille – Jérôme de Meeus d'Argenteuil – Amélie de Francquen 2014, p. 24.
[96] Martin Kretschmer – Thomas Margoni – Pinar Oruç 2024, p. 16.

transparency (Article 19), contract adjustment (Article 20), alternative dispute resolution (Article 21), and right of revocation (Article 22).

On the one hand, in the absence of an *enforceable* Law of Property in the digital domain, fundamental rights could not be protected, and innovation would not be incentivized.[97] On the other hand, copyright law needs to be in balance, because too strict or out-of-balance property rights tend to restrict freedom in competition and creativity, and thus have a net-negative impact on welfare. The European Commission was aware of the importance of such a balance, as reflected in the EC's communications leading up to the CDSM. The CDSM Directive's goals are based on the 2010 Digital Agenda for Europe[98] and the 2015 DSM Strategy[99]. The 2015 DSM Strategy laid down actionable provisions categorized in three pillars that evidence the European Union's copyright policy goals, including the incentivization of creativity in the digital sphere. Pillar One is the general goal of achieving better access to digital goods and services for both consumers and businesses. Pillar Two, in turn, called for the creation of conditions that enable flourishing digital networks and services; More specifically, the Commission called for e.g. regulatory support for content services to ensure the conditions for innovation, investment, fair competition, and a level playing field. Pillar Three, finally, envisioned maximizing the digital economy's growth potential.

Based on Pillars Two and Three in particular, the goal was to incentivize creativity and ensure its conditions with concern for balance to ensure fair competition and a level playing field. The strategy directly addressed incentives, calling for a guarantee to fair remuneration of creators to encourage content generation, while calling maximizing content offering and opening up opportunities for content creators by unspecified incentives to create and invest while allowing cross-border transmission and consumption.[100] Moreover, the DSM strategy's plan for ensuring the conditions for creativity required addressing territoriality and rights clearance difficulties, improving legal certainty, having an effective and balanced civil enforcement system, and clarifying intermediary responsibilities.[101] To varying degrees, the

[97] Till Kreutzer 2012, p. 113.
[98] COM/2010/0245 final (Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, A Digital Agenda for Europe)
[99] COM/2015/0192 final (Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, A Digital Single Market Strategy for Europe)
[100] COM/2015/0192 final, p. 7.
[101] COM/2015/0192 final, p. 7.

CDSM achieved those goals, particularly clarifying intermediary responsibilities. Rights clearance was addressed by extended collective licensing in the first place, increasing the power of CMOs to support authors hidden behind communication bottlenecks lacking bargaining power. Thus, legal instruments of the *analogue* era are effectively utilized.

Notably, the CDSM Directive did not include any significant positive rights to UGC creators, but only to authors in exclusive exploitation contracts. The most remarkable positive right granted to UGC creators is Article 17(7) provided together with OCSSPs' liability provisions, mandating an exception to copyrighted elements licensed by rightholders to the platform for use in quotation, criticism, and review, as well as for caricature, parody, and pastiche by users – ensuring a level of harmonization for increased legal certainty throughout the EU. In conjunction, paragraph 9 mandates complaint and redress mechanisms on a per-platform basis, intended to provide a forum of appeal against overzealous rightholders, delegating to platforms some power of adjudication over matters of infringement and rights protection. Arguably, however, a platforms' position between public and business pressures is not conducive to practices of due process or fairness, because of their resource pressure driven cost-benefit calculus yielding decisions that aim to simply minimize costs through risk mitigation.[102] An issue, that is difficult to check against due to the inherent lack of transparency present in private enterprises.[103] Combined legislative corrections and executive policies (regarding technology) are required on the EU level to address the issue.

It seems the primary goal of the CDSM Directive was to close the "value gap"[104] – the difference between total profit achieved by intermediaries compared to the profit shared with rightholders, and that shared nominally with authors. Not only Article 17, but also the copyright contract provisions in Articles 18–22 directly support this goal. The Article 17 intermediary obligations for licensing and content filtering supposedly intended to address the balance, but in practice it may shift the balance slightly more in favor of the big commercial publishers best equipped to engage and bargain in content moderation mechanisms, while giving less benefit to small businesses, authors, and users of platforms. Whether the copyright contract provisions in Articles 18–22 produce equitable results in closing the value-gap vis-à-vis authors is mostly lacking in data,[105] but fortunately some

[102] Thomas Riis 2016, pp. 243–245.
[103] Thomas Riis 2016, p. 242.
[104] Enrico Bonadio – Nicola Lucchi – Giuseppe Mazziotti 2022, pp. 1180 – 1181.
[105] Caterina Sganga 2023b, p. 1414.

insight has been produced within the ReCreating Europe project,[106] showing individual creators are still rather disenfranchised; Since most creators on the internet are not in direct exploitation contracts, the provision has a limited effect on digital copyright.

While the InfoSoc Directive, the CMO Directive and the CDSM Directive have led toward deeper harmonization, there are still issues with fragmentation that are harming legal certainty, cross-border exchange, the four freedoms and the overall copyright balance.[107] Overall, the current copyright system primarily rewards economic investment, and in so doing, it protects distribution channels and business models of corporations, which already control vast amounts of works. Accordingly, the core of IP law is on protecting economic rights against infringement, which remains an important priority of the EC with regards to Web 4.0 metaverses.[108] The calculus seems intentional and carefully considered – and not only by lobbies, but in theory as well. Monetary incentives are highly effective at increasing the *quantity* of works in the first place, and rather ineffective at incentivizing originality, meaning remuneration may increase originality at most indirectly as a byproduct of quantity.[109] The entities best equipped to produce mere quantities of any product are business organizations.

The democratic potential of remunerative copyright to facilitate pluralism, entrepreneurial freedom, and cultural expression is limited in practice,[110] and any such inequity is presumably an effect of the utilitarian philosophy behind EU copyright law, seeking to maximize growth and investment using creativity and large-scale dissemination as a means to that end, while using "creator incentives" as a politically acceptable euphemism for more remuneration to large publishers. In response, the CJEU could have an important role to play, as it can e.g. define *de minimis* usages that cut the scope of economic rights instead of carving limitations into legislation; Such was the case in e.g. *Svensson*, where hyperlinking was not considered communication to the public, because it lacked a new public.[111] Furthermore, the CJEU or another *sui generis* public international adjudicator in the future

[106] Study develops comprehensive mapping and assessment of digital copyright law 2024.
[107] Caterina Sganga 2023b, p. 1412.
[108] COM(2023) 442/final, p. 11.
[109] Katarina Laske – Marina Schröder 2016, pp. 19 – 20.
[110] Tuomas Mylly 2009, p. 340-341.
[111] Peter Mezei 2022, p. 1017.

may have to guarantee the legitimacy and interoperability of UGC treatment and creator rights protection, and e.g. guarantee a transparent process of appeal.

The more open, freer, and cheaper the ecosystem is, the more illicit content there will be, and thus the *more control will be assumed* by large rightholders in the absence of well-defined mandatory exceptions and limitations.[112] Ever stricter protection, as examined above, is a product of said control. Thus, the "Internet Threat" has already manifested itself, and it will similarly present a risk on the metaverse, where it will be addressed by profit-seeking business. The extent of this reality can be discovered by examining the copyright provisions in various platform Terms of Service, which in many cases evidence business models that lead to inequitable copyright results between large rights holders and individual creators.

4.5 Private Regulatory Regimes: What Befalls the Metaverse? Recouping Lessons Back into Regulation

> "Different applicable rulesets in a knowledge society are formed by two major forces: the pressure of public policy protection as enunciated by the State and commercial efficiency as pursued by private actors."[113]

On the metaverse, one way commercial efficiency is sought by private actors is through subjecting digital property to various terms and conditions of service, which are private regulatory regimes governed by copyright, contract, and consumer-protection laws. The property thus regulated by the private regulatory regime is any virtual item, avatar or piece of content either generated on the platform internally or uploaded on the platform from outside. Digital assets are subject to the same copyright laws as a physical product would be, however, secondary rights in copyright can be quite freely facilitated contractually by terms and conditions, which is where private regulatory regimes begin to imply mandatory rules of public copyright law.[114] Private regulatory regimes, i.e. EULAs, Terms of Service, and other contractual arrangements horizontally or vertically, thereby come to regulate a distinct sphere of copyright matters outside domestic legal ordering.

Thus, domestic legislation is complemented by a global law production phenomenon independent of nation states. The phenomenon comprises rules detached from national law, akin to medieval *Lex Mercatoria*. The user driven process results in various private

[112] James Boyle 2008, p. 80.
[113] Thomas Riis 2016, p. 10.
[114] Dirk Auer – Geoffrey Manne 2023, p. 7.

international legal models, leading to fragmentation of the law.[115] Simultaneously, the general internationalization of public regulation produces further deterritorialization, transnationalism, state decline, and the proliferation of global networks of spread-out normativity.[116] While the process results in a muddled legal environment, it also results in corporatism with consequences for fundamental rights and equality, and ultimately for democracy in general. In the online copyright economy, this means disproportionately strong bargaining power of large online platforms and content industries over independent or isolated content creators.[117]

The private law production process happens unequally across different businesses and countries. Firstly, on the side of businesses, there are substantial fixed costs involved in the creation of new private regulatory models, because they tend to require a team of lawyers and consultants. Some private regulatory models require an institutional set-up and are therefore even more costly to initiate (e.g. copyright collecting societies). Conversely, other types of private regulatory models do not require an institutional set-up, and thus involve no additional costs, but are usually costly nonetheless (e.g. pure contractual arrangements).[118] For this reason, the proliferation of global networks of spread-out normativity is driven most by big businesses with the most resources. Secondly, on the side of countries, the legal systems of certain jurisdictions gain prevalence over other jurisdictions. This is because private regulatory regimes are often drafted to comply with the jurisdiction of the country where the business is situated – most often the United States – causing private international law issues and maintaining the status quos of large technology companies even despite regulatory changes in the EU.[119]

In the context of content moderation systems, platformization and concentration has been linked to imbalance in decision-making power and inequality of rights between large right holders and ordinary user creators.[120] This trend is not in concordance with European Union policy objectives and is also costly on the platforms themselves[121]. However, it has been further argued in the context of content moderation that law is not the determining factor in

[115] Thomas Riis 2016, p. 3.
[116] Thomas Schultz 2008, p. 801.
[117] Enrico Bonadio – Nicola Lucchi – Giuseppe Mazziotti 2022, p. 1181.
[118] Thomas Riis 2016, p. 15.
[119] Caterina Sganga 2023a, p. 623.
[120] João Quintais et al. 2022, p. 286.
[121] João Quintais et al. 2022, p. 287.

the evolution of platforms' copyright content moderation structures, but instead their trajectories are more dependent on platform size, type of content, as well as economic and governance models of the company.[122]

Large technology companies – both the existing ones which will to some extent dominate the metaverse and those which have not yet emerged but will assume similar characteristics – maintain their policies by way of Terms of Service ('ToS') and End-User Licensing Agreements ('EULAs'), with which they considerably regulate their own liabilities and their users' rights. Research conducted for the ReCreating Europe project has shown that OCSSPs use private regulation to strengthen their own positions in the "balancing game" against user rights, while furthermore prioritizing ownership-based user rights above other user rights, effectively placing rights holders at the top of the hierarchy. However, fortunately there is nuance in the rights balances observed in different types of service providers; UGC-reliant platforms (e.g. conventional social media) afford greater rights to their users than do platforms, where business models are more reliant on professionally curated licensed content. Moreover, UGC-heavy services can regulate their own terms more flexibly, whereas licensed content -reliant services need to observe copyright law more strictly. Also, competition was found to have an effect, so that user rights may be strengthened in order to overbid the services of other providers and increase one's own competitiveness.[123]

Business models and competition pressures dictate the form of private regulatory models, but EU copyright legislation still struggles to have an impact on US-based platforms' terms. The ReCreating Europe project assessed private regulatory models through a classification into four business model categories:[124] Hosting services offering both UGC and professional licensed content; Streaming services offering primarily only professional licensed content; Social media services offering UGC only; Online marketplaces "selling" both professional content as well as UGC.

Hosting services, such as e.g. YouTube or Twitch, tend to have both UGC and licensed content, to which they provide access in accordance with the right of making available to the public, while their business model is mainly based on the advertisement connected with widespread communication of content and interaction with audiences. To capture as great of

[122] João Quintais et al. 2022, p. 289.
[123] Caterina Sganga 2023a, pp. 622 – 623.
[124] Caterina Sganga 2023a, p. 585.

an audience as possible, accessibility is maximized by being free-of-charge and open. Consequently, technological restrictions are more limited and instead access is broadened by e.g. offline access and downloads.[125] However, beyond the typical right of personal non-commercial access to view, listen or display content as granted by most hosting services, their ToS and EULAs have vastly different terms for different parties. UGC is usually required to respect third parties' IPRs[126] and to not violate community guidelines, while otherwise, the rights granted to UGC creators are very narrowly construed and need to be inferred from the rights that are granted to the platform: They are ambiguous and not clearly communicated to UGC creators. The license granted to the platform – i.e. the license applicable to UGC – is usually very broadly construed to encompass royalty-free and worldwide sublicensable rights to reproduce and distribute content, and even modify content (potentially conflicting with moral rights), while guaranteeing other users of the platforms the entitlement to e.g. reproduce, distribute, modify, perform, display, and communicate the UGC.[127] Meanwhile, similarly extensive licenses *cannot* be found regarding professional content, which tend to be individually licensed outside the general EULAs, and instead employ much stricter default restrictions to users' rights to reproduce and distribute, for example.[128] Finally, hosting services unanimously declare amendments to the terms and conditions, which users will need to implicitly accept in most cases, and certain platforms may even retain possession of the content and maintain their right to distribute and reproduce UGC even after license termination by the user or the platform.[129]

Streaming services, such as Netflix, have a business model reliant on professional licensed content, and consequently they disable or limit the uploading of UGC. Although UGC is rarely involved, sometimes it is featured, and in those cases the license granted to the platform is equally extensive as the licenses for hosting services, permitting nearly everything to the platform and granting nearly nothing to the creator.[130] Access to streaming services is neither free nor open, and requires registration and monthly payments, which is reflected in the end-user license terms as rather strict limitations. Streaming services' technological restrictions tend to be strict, applying e.g. territorial limitations and portability restrictions,[131]

[125] Caterina Sganga 2023a, p. 589.
[126] Caterina Sganga 2023a, p. 587.
[127] Caterina Sganga 2023a, p. 587.
[128] Caterina Sganga 2023a, p. 586.
[129] Caterina Sganga 2023a, p. 588.
[130] Caterina Sganga 2023a, p. 592.
[131] Caterina Sganga 2023a, p. 592-593.

even though in the EU the Cross-border Portability Regulation[132] prohibits contractual terms, which try to restrict cross-border portability. Overall, licenses tend to be personal, non-commercial, non-transferable, limited, non-exclusive, and non-sublicensable, with e.g. Netflix even expressly stating that no ownership over works is transferred by the purchase of a license.[133]

All platforms do not unambiguously clarify to users the nature of their property right, and some even misguide users to think they are buying ownership rights instead of licenses. Such is the case with some online marketplaces, in particular. For example, Google Play Store employs terms such as "purchase", "buy" and "sale contract", and then proceeds to use convoluted language to reduce the "purchase" to a limited access right license instead.[134] The marketplaces usually grant personal and non-commercial, non-exclusive and non-transferable *access rights* to works, and for example Steam which sells video games, prevents the reverse engineering and usage of source code, as well as resale.[135] In fact, secondary dissemination is generally excluded by all conventional marketplaces.[136] Meanwhile, marketplaces rely on UGC, and subsequently, their terms & conditions require broad rights and entitlements over UGC for the benefit of platforms, granting no repayments to creators, stipulating strict terms on modification and termination, and providing underdeveloped complaint-and-redress mechanisms, which together result in asymmetric rights between the platform, creators, and professional sellers.[137]

Social media service ToS have plenty of flexibility regarding UGC, because they rely on UGC to a crucial extent. What is particularly special about social media terms and conditions is that *secondary dissemination* is of utmost importance, and all UGC is therefore subject to broad rights and entitlements to the platform by terms and conditions, by which broad re-use rights are extended to all users of the platform. No ownership interests are transferred, and the platform cannot allow any party to acquire any interests in the UGC, and therefore secondary dissemination by EULA is strictly limited to *reproductions* of intangible postings, not to acquisitions of copyright protected works.[138] Due to advanced interfaces, social media

[132] Regulation (EU) 2017/1128 of the European Parliament and of the Council of 14 June 2017 on cross-border portability of online content services in the internal market. Adopted 30.6.2017.
[133] Caterina Sganga 2023a, p. 591.
[134] Caterina Sganga 2023a, p. 596.
[135] Caterina Sganga 2023a, p. 596.
[136] Caterina Sganga 2023a, p. 598.
[137] Caterina Sganga 2023a, p. 599.
[138] Caterina Sganga 2023a, p. 602.

platforms are particularly prone to a "code is law" approach, wherein freedoms are strictly rooted as functionalities by code, and hence user rights are delusive.[139] So, while online marketplaces had a delusive user rights framework by subtle misdirection, in contrast, social media services are an example of delusive user rights by strict limitation through program architecture.

Alongside more straightforward content hosting, particularly marketplaces and social media services give interesting insight into the business models that will dominate the metaverse. In fact, rather than mere sales platforms, many *online marketplaces* are actually content hosting and social media services with built-in UGC creation, VR, and marketplace functions, hence coming the closest to full-fledged metaverse platforms. Steam, Origin, Battle.net and Roblox, for example, are beginning to resemble metaverses as platforms where all conventional functionalities converge toward virtual worlds. The leading platform, Steam, has even incorporated VR & AR interfaces. However, even Steam is still distinct from a metaverse on certain other accounts.

The business models of other online services represent further functionalities of Metaverses. The *Unreal Engine Marketplace* is a marketplace for the "distribution" of e.g. 3D and 2D graphical assets, sound files, animations, and engine frameworks ('code plugins') for use in fields such as video games, architecture, automotive industry, fashion, training and simulation. *Paradox Interactive* administers a certain creator ecosystem together with *Steam Workshop*, which handles the "distribution" of e.g. assets, code plugins ('mods'), and maps for the city simulator *Cities: Skylines* specifically, which represents a narrow creative sandbox. In turn, *Roblox* represents a broad creative sandbox.

The Unreal Engine Marketplace Distribution Agreement, administered by Epic Games, sets out the terms and conditions of UGC put on sale through the marketplace. The buyer of UGC gets very extensive rights to do as they please – commercially and otherwise; The seller of UGC hands via Epic Games to the buyer all rights of the copyright bundle non-exclusively, except moral rights which are not addressed by the Distribution Agreement. The seller grants a license to Epic Games to grant buyers a non-exclusive but perpetual and worldwide license to "download, use, copy, post, modify, promote, license, sell, publicly perform, publicly display, digitally perform, distribute or transmit the content for personal, promotional, and/or

[139] Caterina Sganga 2023a, p. 603.

commercial purposes".[140] These extensive rights granted to buyers are effectively similar to *sales.* The sales-like nature of distribution is further bolstered by the fact the license to buyers is perpetual, and cannot end even by termination, after which Epic Games keeps copies of the UGC in perpetuity to guarantee buyers re-access to their previously bought copies of the UGC at any time in the future.[141] The first-place license granted to Epic Games is a non-exclusive, non-sublicensable and non-transferable one,[142] meaning that the platform acts as a marketplace only, without hindering creators' ability to profit off their UGC by other means or other platforms. Different from conventional online marketplaces "selling" e.g. software or multimedia products, the rights granted by digital content marketplaces such as Unreal Engine Marketplace are near equivalent to actual distribution, though the mode of transaction is still through license, which provides for digital exhaustion by its own terms, among other ownership-type rights. However, no actual ownership right, title, or any interest in the IP is transferred by the license beyond terms that effectuate a marketplace and said licenses to buyers.[143]

The Paradox Interactive User Agreement makes it clear the services are licensed and made available – not sold – and therefore, the right to use the city simulator *Cities: Skylines* ('C:S') as a narrow creative sandbox is by personal, limited, non-transferable, revocable, and non-exclusive license for non-commercial use, unless specifically agreed otherwise between Paradox and the user.[144] The UGC for C:S is characterized by a right to create, enjoy, and make publicly available UGC for non-commercial purposes, subject to typical do-no-harm terms.[145] The UGC right only covers components that are original and do not incorporate IP held by Paradox or others.[146] This UGC must be provided for free and be freely available without paywalls, though donations can be collected on the side.[147] Interestingly, the license a UGC creator grants to Paradox is a *very extensive* one: "non-exclusive, royalty-free, sublicensable, irrevocable, and perpetual right to use, reproduce, modify, create derivative works from, distribute, transmit, broadcast, otherwise communicate, publicly display, publicly perform and otherwise commercialize or exploit [the] UGC in any manner or form

[140] The Unreal Engine Marketplace Distribution Agreement, 1(b)
[141] The Unreal Engine Marketplace Distribution Agreement, 6(d)
[142] The Unreal Engine Marketplace Distribution Agreement, 1(a)
[143] The Unreal Engine Marketplace Distribution Agreement, 2(a)
[144] Paradox Interactive – User Agreement 2023, section 1 paras. 1 & 2
[145] Paradox Interactive – User Agreement 2023, section 5 para. 1
[146] Paradox Interactive – User Agreement 2023, section 5 para. 4
[147] Paradox Interactive – User Agreement 2023, section 5 para. 6

and in any medium or forum, whether now known or later devised without attribution or compensation to you or any third party", which right will survive termination of the Agreement.[148] In other words, despite non-exclusivity, Paradox lays claim to rights closely resembling *ownership de facto*, without claiming ownership *de iure*, as it is still only a license. Content generated specifically for C:S could therefore be sold on e.g. the Unreal Engine Marketplace for profit, but it cannot be used for direct profit in conjunction with Paradox's services such as C:S gameplay as a narrow creative sandbox.

Beyond Paradox, the C:S creator ecosystem is effectuated via *Steam Workshop* by Valve, which in the first place claims a worldwide, sublicensable, and non-exclusive license to reproduce, modify, transcode, distribute, and publicly communicate the UGC for purposes of incorporation into workshop enabled applications and promotion of the Steam platform.[149] Thus, at first, it seems like Valve lays no claim to UGC beyond its role as an interface for sharing UGC and the promotion of said role. However, depending on terms set by the Workshop-enabled application, such as the terms set by Paradox for C:S, the workshop terms may be changed beyond mere making available of UGC for free, by inter alia enabling revenue sharing in the sale of UGC subscriptions for a fee.[150]

Furthermore, Valve or the application developer may modify UGC in order to optimize it for the application or for the Steam interface, and because Valve and Paradox are by license also entitled to make derivative works under the right to modify and then *own* those derivative works, therefore, by modification of UGC for optimization, Valve may proceed to profit commercially from said modifications by licensing them onward,[151] without needing to pay compensation to the creator.[152] This combined with the near-ownership extent of rights Paradox claims in UGC created for its services means both companies can utilize UGC for their profit to the widest extent possible, and may claim ownership to derivative works as modified from UGC for interoperability purposes, effectively meaning the creator might lose control over a creation in practice, though de iure the creator still controls its copyright in a strict sense.

[148] Paradox Interactive – User Agreement 2023, section 5 para. 5
[149] Steam Subscriber Agreement 2024, 6.A. para. 2
[150] Steam Subscriber Agreement 2024, 6.B. para. 4
[151] Steam Subscriber Agreement 2024, 6.A. para. 2
[152] Steam Subscriber Agreement 2024, 6.B. para. 6

Hence, narrow creative sandboxes administered by multiple large corporate co-affiliates make for creator ecosystems that are not very conducive to creativity on a metaverse, if the aim is to encourage creativity by economic incentives. Nonetheless, as elaborated elsewhere in the present paper, creatives need not create for money, when they are motivated by passion or reputation. An efficient balance is needed for maximizing creativity, and a great example of such a balance can be found in the next example.

By contrast to narrow creative sandboxes, in a broad creative sandbox administered by one company only – *Roblox*, for example – the business model is focused on maximizing the creation of UGC through remuneration and exposure as combined incentives, with a mechanism bridging the two. The flip side of said business models is that the platform is incentivized to keep said content and transactions within its own internal ecosystem and prevent it from spreading to other platforms, even if the copyright to UGC remains with the Creator[153]. In Roblox, users need to buy an in-game currency (Robux) to buy individual pieces of content or alternatively use fiat currency to subscribe to UGC,[154] and they can later resell or trade certain content.[155]

Interestingly, the individual creators who are likelier to create individual pieces of content will therefore be remunerated in Robux, whereas the subscription-based UGC in practice often requires a larger developer team, and thus in reality, the direct monetary incentive likely goes to teams while individual users are likelier to remain in the sphere of in-game currency, without the ability to profit in real life unless they qualify for the so-called "DevEx". By this, the ToS is presumably attempting to find a balance between pecuniary and non-pecuniary incentives, and thus maximize creativity while limiting payouts to creators. Despite this aim, and despite the tendency for corporate creativity to seek remuneration, and personal passion creativity to seek exposure, the Roblox ToS treat both consumer-generated and business-generated content as UGC on rather equal terms *de iure*. However, while the ToS do not *expressly* place businesses above individual user creators, it does nevertheless lay rather favorable rules for those able to produce more extensive content and those who are publishers

[153] Roblox Terms of Use 2024, Creator Terms section 2 (b) (i)
[154] Roblox Terms of Use 2024, User Terms section 4 (a) & (b)
[155] Roblox Terms of Use 2024, User Terms section 4 (c) & (d)

of pre-existing IPs[156] for example, which in practice gives businesses stronger rights and opportunities for profit-making.

Regardless, Roblox seems to attempt facilitating a leveled hierarchy between businesses and users, where users can utilize the same remuneration opportunities granted for businesses if they can provide content on a similar scale. The ToS even introduces a group-system[157] to encourage ex-tempore emergence of user groups to create more expansive and profitable UGC rivalling businesses. Respectively, an important part of the Roblox creator economy is the opportunity to earn real money, which depends on fulfilling so-called "DevEx Eligibility Requirements" entailing e.g. the requirement to have a large enough amount of in-game currency.[158] There are no separate requirements for individuals and businesses to receive real life payments; They merely need to be significant enough to qualify as developers, the attainment of which is supported by Roblox ToS primarily through the group system.

A broad creative sandbox seems to differ from a narrow one insofar as it grants user-creators *more* rights and opportunities than the examined narrow sandbox would. The broad creative sandboxes are ones designed to maximize UGC instead of premade content, whereas a narrow one attempts to have more of a monopoly on content. Therefore, the core of the broad sandbox ToS is focused on having an effective and balanced incentives framework and clearly organized economics[159], while a narrow creative sandbox is more focused on securing its own IPRs and business freedoms. Although since the broad sandbox relies on maximizing UGC, it might want the UGC to remain inside the platform to some degree, and not leak out to other platforms. User developers are essentially shaped into outsourced contractors similar to e.g. food couriers in the gig-economy, as technical limitations of the interface have them *de facto* working for Roblox, but without an exploitation contract; UGC made with the internal Studio software is made directly onto Roblox servers and also require the client to access.

Moreover, buyers of content cannot take the content out of the platform to be shared across other platforms, since there is no such technical interoperability built in as part of the client. Accordingly, the Roblox User Terms stipulates UGC generated for the platform to be "non-

[156] E.g. Roblox Terms of Use 2024, Creator Terms section 2(b)(ii) para. 2
[157] Roblox Terms of Use 2024, Creator Terms section 3
[158] Developer Exchange Terms of Use 2023, section 2
[159] Roblox Terms of Use 2024, Creator Terms section 4

proprietary"[160] content, presumably meaning that they are not obliged to guarantee buyers' or creators' property rights through transfers outside the platform, as the interface of Roblox does not make it possible. On another note, Roblox does not have a revenue-sharing system for Groups of Creators, unlike e.g. Steam Workshop does. Such a system would strengthen the incentive framework by increasing legal certainty in revenue sharing. Despite these points of possible critique, the Roblox ecosystem has discovered many elements that fairly and effectively incentivize individual creators, reflecting the journey of original creativity from a spark of passion and a quest for exposure up to striving for remuneration later. It provides mechanisms for the steps on said journey, such as the group mechanism and a fluid developer exchange system that can accommodate individual creators *after* their stroke of original genius has been realized as popular exposure, which reflects the fact that remunerative incentives are only effective for increasing quantity, while originality stems from non-remunerative self-realization, which does not benefit from remuneration in its inception. It is possible that a team at Roblox has studied incentives theory, because such systems most likely would not emerge by coincidence.

Summa summarum, the private regulatory regimes reflect a Product-as-a-Service ('PaaS') online economy to the point that some licenses even misguide their users to imagine they are *buying a work*, when in reality they are merely getting a limited and terminable license with restricted uses. Such is the case with Steam Store, for example. Furthermore, it appears that only by enough bargaining power (i.e. money) will a participant gain access to said Product-as-a-Service economy, because user-creators' UGC instead has a status more resembling public domain, at least as long as that domain remains inside the platform and during the existence of the license; Platforms can modify, distribute, reproduce, and otherwise use UGC for commercial purposes as they please, while other users often seem to be prevented from commercialization, though they may nonetheless non-commercially distribute, modify, and reproduce content as per the license. UGC-based social media platforms attempt to maximize secondary dissemination for their own gain, while simultaneously restricting other rights to said UGC, and restricting remuneration. This balance (or lack thereof) is also reflected in the IP enforcement systems of OCSSPs, which are geared toward professional rightholders with bargaining power, while UGC creators are less equipped to take advantage of those same systems.

[160] Roblox Terms of Use 2024, User Terms section 6 (b) para. 3

Accordingly, the innovation incentivization structures established in private regulatory regimes most often entail remuneration-based incentives for companies and professional developers wielding creativity by *quantity*, and entail non-monetary incentives for individual users who wield *original* creativity. The examined platforms allowing practicable monetary remuneration to individual creators were The Unreal Engine Marketplace, Steam Workshop in developer-enabled special cases, and Roblox where any creator can become significant enough to qualify for the Developer Exchange after gaining enough exposure. It is noteworthy that The Unreal Engine Marketplace is aimed at (professional) developers, while in Roblox one needs to rival professional developers in relevance to qualify for developer exchange. Therefore, it is not just any user creator who may be remunerated, but instead it is mostly *developers* who benefit the most from remunerative incentives. The Unreal Engine Marketplace presented an example of a system where any creator can profit based on prices set by the creator themself, while Steam Workshop's strength is the payment sharing system useful for collaborative works (though it can be disabled by service providers, and mostly the Workshop lacks remuneration), whereas Roblox presented a group system and a Developer Exchange system that supports creators' journey to developers for remuneration should they so desire.

Those three creative ecosystems each possess characteristics relevant for metaverse that public copyright regulation may want to strengthen – even mandate – across the board instead of leaving it up to private regulatory regimes to achieve. That could entail, firstly, regulation mandating platforms to insert terms in their EULAs that permit such mechanisms, and then supporting the emergence of such mechanisms as interoperable technologies similar to the World Wide Web by standardizing technology and preventing monopoly restrictions of technologies. Moreover, secondly it could entail mandating a clearer harmonized exception for creative communities' formation and activities, embodying principles of open content culture, and thus increasing legal certainty regarding the freedom to build *upon* copyright-protected content of dominant content industry companies and even commercialize it.

Whether the payment sharing for collaborations, grouping system, and remuneration mechanisms can be achieved throughout a multitude of metaverse platforms depends on interoperability; Specifically, the ease and interoperability of an open and public RMI database and accessible direct licensing throughout the metaverse. If blockchain is used, metaverse applications can enable exchanges akin to the DevEx of Roblox by facilitating a currency exchange from native platform currencies to real life fiat currencies.

5 Rights Management & Licensing

5.1 Digital Exhaustion and Technology Shaping Copyright Markets

5.1.1 The Maximal Utilization of UGC

Beside e.g. extended collective licensing, increased utilization of UGC works can be achieved by rights management and licensing technologies. Clearly, the EC has recognized the need for such solutions, as it called for a virtual worlds toolbox, which covers the use of digital identity and wallet solutions for authentication and virtual transactions in e.g. copyright and intellectual property,[161] while generally stating that the CDSM will continue to apply to Metaverses.[162] Direct access points into the market that are available for user creators, combined with *digital exhaustion* rules, have the power to shape the copyright works economy by enabling access to enjoy more works and ease of producing and licensing.

The EU's regulatory approach to digital exhaustion has considerable power to structure first-sale marketplaces for digital assets, exchanges, and secondary markets. The exhaustion doctrine is currently debated regarding the differences between physical and digital goods, making it a topical issue in the context of metaverse copyright issues. Digital exhaustion together with infrastructure for RMI, transfers, and licensing determine whether works are distributed or communicated, and whether/how the rights are licensed or transferred.

5.1.2 Digital Exhaustion and Technology: Distribution *versus* Communication

EU Member States follow a regional exhaustion regime, according to which a work can be sold anywhere within the region triggering the regional exhaustion of said work according to the rules of the InfoSoc Directive. This limitation doctrine only concerns sales of works incorporated in a tangible article (InfoSoc recital 23), while "supply through online services" does not exhaust distribution rights; Every online service performs in fact an act of communication, unlike sales of IP incorporated in a material medium (Database Directive recital 33), which cause exhaustion upon first lawful distribution.[163]

[161] COM(2023) 442/final, p. 7.
[162] COM(2023) 442/final, p. 5.
[163] Case 78-70 Deutsche Grammophon; Case 341/87 Patricia, ECLI:EU:C:1989:30

To elaborate, Article 3(3) of the InfoSoc appears to reject the applicability of the principle of digital exhaustion to digital content, such as e-books (*Tom Kabinet*)[164] or other unspecified digital content, by limiting the principle of exhaustion to only apply to distribution rights, i.e. exhaustion by first sale. Specifically, Article 4(2) of the InfoSoc in conjunction with Recitals 28 and 29 states that distribution rights concern only IP incorporated onto a tangible medium, an "item of goods", which is why exhaustion "does not arise in the case of services and on-line services in particular". Conversely however, in its ruling in *UsedSoft*[165] the CJEU extended the principle of digital exhaustion to apply to intangible copies of software. However, that ruling does not apply beyond software, because it was based on Art. 4(2) of the Software Directive, which is a *lex specialis* regime taking priority over InfoSoc in the context of software only (*UsedSoft* para. 56).

On opposing note, the CJEU in *Tom Kabinet* decided instead that e-books are not covered by digital exhaustion under InfoSoc Art. 4(2), arguing on the basis of authors' appropriate remuneration being threatened by a parallel second-hand market (para. 58). The circumstances in *Tom Kabinet* and *UsedSoft* are nearly identical, with the only noteworthy difference being the subject matter categories of the works, and yet the cases were treated differently. The differential treatment of the two subject matters is due to there existing a *lex specialis* regime for software and none for e-books, by reason of which software was treated like goods and e-books akin to services.[166] Additionally, one particular feature of software is the fact that it is always digital and installed as copied files on the computer, regardless of whether it was sold on a CD or downloaded on the internet. Therefore, the software can in both cases be reproduced the same, despite the means of its transfer. That stands in contrast to e-books – files which can be copied digitally with considerable ease unlike copying a physical book. Additionally, it is peculiar the Court argued its decision on the basis that software businesses obtain appropriate remuneration from first sales alone (*UsedSoft* paras. 62-63), and that authors do not.[167] Though not expressly stated, economic consequences of functionally non-equivalent transmission may be behind the differential treatment.

So, on the one hand, according to the CJEU in *Tom Kabinet* paragraph 48 a high level of protection for authors is simply made a priority in the preambles of InfoSoc, and it reflects

[164] Case C-263/18 Tom Kabinet, ECLI:EU:C:2019:1111; Nils Rauer – Diana Ettig 2015, p. 713.
[165] Case C-128/11 UsedSoft, ECLI:EU:C:2012:407
[166] Simon Geiregat 2021, p. 1222.
[167] Simon Geiregat 2021, p. 1218.

long-standing European cultural values. On the other hand, however, there is the question of functional equivalence of transmission modalities differing between subject matter categories. The first sales of different digital asset categories may not be functionally equivalent to transmission by their respective material mediums, and those functional differences in transmission may cause differential economic consequences.

In *UsedSoft* paragraph 57 referring to the preambles of the Software Directive, the CJEU gives a reminder as intended by legislators that even "intangible" computer programs are indeed materially incorporated. Programs are incorporated into server hardware, which is material, and as long as the previous copy is rendered unusable upon resale (*UsedSoft* paragraph 70), then even online transmission is regarded functionally equivalent to the supply of a material medium (*UsedSoft* paragraph 61). Ergo, by the same logic and in the spirit of the principle of technology neutrality, other similarly equivalent digital assets should also be considered materially incorporated on hard drives and their digital transfer modalities functionally equivalent to their own respective material medium,[168] and therefore be treated the same as software, meaning that exhaustion should apply. However, despite the finding in *UsedSoft*, e-book distribution was still not considered exhaustible in *Tom Kabinet*, but why?

It seems likely digital exhaustion was precluded in *Tom Kabinet* due to non-equivalence between books' material medium *vis-à-vis* their digital medium. Presumably, intangible goods are treated differently due to being easily reproductible, causing the so-called double-spending problem[169], where copies of the intangible goods are made and sold multiple times while the original copy is retained. Making copies and retaining them is considered a near-inevitability.[170]

In the EU, such inevitable replication would go beyond distribution, infringing on the rights of reproduction and communication. Since the purpose of exhaustion is to limit any restriction of distribution to a level that is necessary to safeguard specific IP subject matter (*UsedSoft* paragraphs 62 & 63), then if digital exhaustion instead introduces the added risk of secondary markets being saturated with wrongfully reproduced copies, it defeats the purpose of exhaustion. In that case, digital exhaustion cannot assuredly leave enough safeguards, particularly if it is "inevitable" that secondary markets would at each resale entail the creation

[168] Lothar Determann 2017, p. 229.
[169] Anna Bigda-Wójcik 2023, p. 814.
[170] Anna Bigda-Wójcik 2023, p. 815.

of subsequent copies without deletion of previous copies. Although the online modes of transmission of *software* specifically may be functionally equivalent to software's material medium – i.e. downloading digital files *versus* digital files on a CD – the online transmission of other types of digital works is not functionally equivalent in all IP subject matter categories. For example, e-books are drastically different in the physical and digital realms, and therefore their transmission differs in function.[171] Thus, it seems the Court may have combined the doctrine of technological neutrality with a teleological interpretation of exhaustion to check whether the purpose of exhaustion is defeated in case of different transmission modalities of the same subject matter.

Unlike purely digital software, digitized versions of analogue media exist in conjunction with their physical analogue versions. Physical goods degrade and are difficult to copy, while digital copies do not degrade and can be copied *ad infinitum*. A book, for example, exists as a purely corporeal object, with which its electronic version is not functionally equivalent in transmission because of reproduction difficulty differing between physical and digital copies. Conversely, a digital asset that was created solely for the metaverse may have no physical counterpart of that same specific IP subject matter, and therefore its distribution can be exhausted without it amounting to *added risk* in comparison to its material transmission. That similarity in the modalities of purely digital subject matter makes its transmission functionally equivalent to transmission over material medium, and consequently there is no added economic risk.

In the future, such a technology neutrality approach may yield a broader concept of tangibles, which applies to certain purely digital subject matters in exhaustion questions. Arguably, the CJEU in *UsedSoft* may have paved the way for extending exhaustion principles beyond software, or at least has considered such future extension by arguing technology neutrality, which is a broadly applicable principle. This would make *Tom Kabinet* a case that further defines the contours of the broad definition of tangibles by ruling out certain subject matters with a test to see whether appropriate remuneration is impacted by digital transmission different from physical. It remains to be seen whether the broad interpretation of the concept of "tangibles" will eventually translate into extending digital exhaustion to metaverse digital goods in the spirit of technology neutrality. Based on the above analysis, metaverse digital works may be subject to digital exhaustion as long as they have no purely analogue

[171] Christina Angelopoulos 2020, p. 228.

counterparts and they can be subject to sales as items of good. On that vein, NFTs have the potential to affect the perception of a sale of an item of good, and moreover, they can affect the consequences of digital exhaustion.

Digital exhaustion rules can sometimes result in "unreasonable consequences"[172] of the kind evidenced in the software sector. Software commerce has to an extent shifted away from conventional sales to alternative models that do not entail sales and exhaustion, such as software-as-a-service ('SaaS') business models. Moreover, commercial contractual practices may also change so that license terms, such as those in company Terms of Use, no longer grant reproduction rights to buyers voluntarily,[173] although EU regulation already mandates reproduction rights to consumers to the degree those are required to enjoy the product. While in theory, exhaustion should improve affordability and availability of copyrighted works,[174] in reality, and particularly in the digitally enabled domains, exhaustion merely forces commerce to orient into a PaaS business model, which is able to circumvent secondary market emergence entirely by drafting transfers instead as individual licenses or EULAs and not as sales agreements.[175]

The exhaustion doctrine did not have such disruptive power in the analogue world, where the only way to maximize profits was by selling physical copies anyway, whether or not that meant giving up distribution rights. Conversely, with the advent of instant telecommunications, products can now be served as services instead, if sales would lead to undesirable commercial consequences. Simple sales of products are no longer needed for profits maximization, and wide-ranging PaaS business models may be becoming reality faster the more we limit the distribution rights of rights holders. Perpetual rent through subscriptions to various services reduces the economic prospects of consumers, while increasing economic concentration in large businesses. By contrast, individual ownership of digital assets would be able to pay itself back to individuals and society through resales and increased innovation.

Consider the following effects on creative ecosystems. The metaverse changes the substance of the work to some degree; An interoperable platforms infrastructure makes a work more

[172] Lothar Determann 2017, p. 231.
[173] Lothar Determann 2017, pp. 227 – 228.
[174] Aaron Perzanowski – Jason Schultz 2011, p. 6.
[175] Aaron Perzanowski – Jason Schultz 2011, p. 14

pervasive in terms of where, how, and for what purpose it can be accessed and exploited, which is based on communication. Simultaneously, a broader Web 4.0 blockchain ecosystem on the metaverse can facilitate marketplaces for transfers of durable copies of a work, which is based on distribution. Consequently, the balance between communication and distribution depends on the ensuing balance between on-demand infrastructure on the one hand, and sales transactions infrastructure on the other. Arguably, a communications-based ecosystem – i.e. a PaaS business environment – is a hindrance to innovation, because it limits the space left for start-ups' novel business models or products to enter the market.[176] Importantly, it also prevents user innovation, because it would require either technical and commercial experimentation on owned copies,[177] or unusually lenient license terms.

Thus, by encouraging the distribution of digital assets on the metaverse, it is possible to bolster a stronger sales market adjacent to a services market, restraining PaaS inasmuch as is necessary to keep the market diversified and keep innovation afloat. To achieve said goal, a *conventional* exhaustion doctrine without supporting measures may never be the optimal solution for metaverse digital assets, but instead, a blockchain infrastructure for sales and the facilitation of royalties to rights holders from subsequent re-sales ought to be considered for its encouraging effect on distribution, facilitating secondary markets and ultimately incentivizing innovation. It would be useful to have such infrastructure in order to curtail some of the negative collateral effects that exhaustion may cause as it encourages PaaS business models.

That is why a distribution infrastructure is necessary together with a *sui generis* digital exhaustion doctrine for the metaverse. The Resale Right Directive[178] (according to its recitals 32 – 36) already introduces a framework for resale royalties, but its material scope is currently not extensive enough to apply.[179] In principle, digital exhaustion promotes platform competition by reducing consumer lock-in,[180] but only if combined with a resale royalties infrastructure, because otherwise business models shift and secondary markets will not materialize.

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[176] Peter Mezei 2022, p. 2.
[177] Aaron Perzanowski – Jason Schultz 2011, p. 10
[178] Directive 2001/84/EC of the European Parliament and of the Council of 27 September 2001 on the resale right for the benefit of the author of an original work of art. Adopted 13.10.2001.
[179] Anna Bigda-Wójcik 2023, p. 819.
[180] Aaron Perzanowski – Jason Schultz 2011, p. 12.

A transactional infrastructure for distributing metaverse assets could be facilitated in the form of NFTs.[181] That is if NFTs can be considered to transfer ownership in the EU, as they do in Singapore[182] and the UK[183], but that debate is still ongoing. NFTs as transactional vehicles allow digital exhaustion of distribution to coexist with companies' business incentives by enabling a resale royalties infrastructure to combine with identity authentication infrastructure[184]. A finite number of unique and rivalrous NFTs can be minted and then sold on a per-item basis, introducing scarcity by transfers of non-duplicable assets, making NFT transfers closer to distribution than communication,[185] and similar to sales of tangibles.

Summa summarum, in view of long-standing European cultural values as codified into the EU copyright regime, individual creators on the metaverse are likely to receive a high level of protection in the future, barring exhaustion from applying to metaverse content, similarly to the doctrine on e-books. However, a broad definition of tangibles may arise based on further legislation or technology neutrality, which could result in digital exhaustion for purely digital subject matter categories, as incorporated on physical hardware server architecture or CDs – i.e. if the subject matter does not have a functionally nonequivalent analog form existing within parallel physical secondary markets. Ultimately, if digital exhaustion does emerge for those certain digital subject matter categories, then it may result in PaaS business models becoming the modus operandi of commercial metaverse ecosystems, while individuals' P2P ecosystems would likely remain conventionally transactional. If NFTs proliferate, however, it would facilitate royalties infrastructure for resales and create scarcity barring illicit reproduction, thereby incentivizing commercial sales over PaaS even despite exhaustion, as companies could then profit on secondary markets with little risk of illicit reproduction, shifting its risk-to-benefit ratio.

Metaverse marketplaces will presumably be functionally equivalent to other online marketplaces, but eventually they may instead become functionally equivalent to physical marketplaces once (NFT) infrastructure enables scarcity, which blocks the free reproduction of subject matter, shifting the economic equivalence between copies that exist in the physical *versus* the digital realms. It would seem, in conclusion, that it is crucial to enable scarcity,

[181] Anna Bigda-Wójcik 2023, p. 815.
[182] Janesh s/o Rajkumar v Unknown Person ("Chefpierre") [2022] SGHC 264
[183] Osbourne v Persons Unknown and Ozone [2022] EWHC 1021
[184] For example, MetaMask offers authoritative identity authentication for Blockchain.
[185] Anna Bigda-Wójcik 2023, pp. 816 – 817.

and arguably also to enable royalties for certain metaverse copyright subject matters, if one wishes to have a *distributive* ecosystem for both B2C and P2P that maximizes innovation. For that, an open and accessible DLT-based RMI database and transactions infrastructure can prove useful.

Therefore, the examination of copyright incentives in the metaverse warrants a deeper look into blockchain and NFTs to discuss its implications for rights management in general, digital exhaustion included. This includes issues on databases, licensing, royalties, and artificial scarcity, as well as transparency, redundancy, immutability, and disintermediation.

5.2 Distributed Ledger Technology-Based RMI Infrastructure

5.2.1 Paracopyright Characteristics of DLT-Based RMI Databases

"Paracopyright" is a term that has in the past been employed in the US in discussing digital copyright provisions, and in particular the effects of the then-proposed Digital Millenium Copyright Act on US copyright fair use. Paracopyright is legislation designed to supplement or override provisions of primary copyright law, and as such, through its impact on copyright ecosystems it relates to copyright law on a fundamental level.[186] For example, what may impact the development of blockchain, and which also have a paracopyright dimension, are rules concerning technological protection measures (TPMs) and Rights Management Information (RMI) – jointly referred to as Digital Rights Management (DRM). Those are technologies which can restrict acts performed in respect of copies and electronic information on ownership and terms attached to a work. Currently, RMI is often maintained by CMOs,[187] so legislation impacting CMOs has an effect on RMI and vice versa. Paracopyright laws that end up supplementing or overriding copyright legislation in the digital sphere, such as rules on TPMs and RMI, smart contracts, or blockchain governance, therefore need to be carefully weighed in terms of their impact on copyright legislation and its outcomes. RMI is one area,[188] where "code is law"[189] and thus law may subvert or strengthen code, which can in turn reinforce or undermine Copyright regulation.[190]

[186] Peter Jaszi 1998, p. 74.
[187] Balázs Bodó – Daniel Gervais – João Quintais 2018, p. 313.
[188] Balázs Bodó – Daniel Gervais – João Quintais 2018, p. 328.
[189] Lawrence Lessig 1999, p. 21.
[190] Michèle Finck 2018, p. 39.

In connection with Web 4.0 metaverses, the EC is studying blockchain as a tool for collaboration and identifying e.g. legal barriers to its uptake.[191] The metaverse is a culmination of virtual/physical convergence, and blockchain technology is considered an important part of the metaverse ecosystem in so far as it directly connects digital economies to real finance, converging the virtual and the physical worlds economically. Blockchain is implicated in the EU's primary copyright law regime regulating e.g. transparency obligations and digital exhaustion, which are principles impacted by blockchain. However, blockchain causes unique copyright issues mainly in terms of secondary rules of copyright, i.e. licensing, and paracopyright rules, e.g. rules for NFT tethering or digital rights management. The precise technical characteristics of blockchain, which have a copyright dimension that may be affected by non-copyright relevant regulation, are as follows.

Transparency in a blockchain-based metaverse ecosystem comes from its technical nature as a distributed ledger that is public and temper-proof, and thereby auditable. The distribution of data results in database *redundancy,* which means the same data is scattered on numerous devices lowering the need for consultations among members, potentially improving organizational coordination of the data, but also causing scalability issues[192] and inefficiencies in public networks. Such a redundant database cannot be maliciously or erroneously taken offline or modified because every user holds a copy, although mere distribution is insufficient to guarantee security; Complete *immutability* is enabled as built-in integrity by cryptographically securing data blocks into chronological chains of entries linked by hashes. Finally, *disintermediation* of transactions is achievable due to the ensuing "trustless" nature of blockchain architecture – trustless, since authentication is conducted by technical protocol distributed across end-user devices – forgoing to some extent the need for relying on centralized servers and trusted mediators.

Each of those four characteristics – transparency, redundancy, immutability, and disintermediation – have an impact on the Web 4.0 metaverse ecosystem as they pertain to certain primary or secondary rules of copyright. Transparency has an impact on the EU's transparency obligations as well as an impact on enforcement and licensing; Redundancy has an impact on RMI validity causing conflicting claims; Immutability has an impact on dispute settlement or resolution of conflicting claims; Disintermediation has an impact on transaction

[191] COM(2023) 442/final, p. 11.
[192] Jean-Philippe Vergne 2020, pp. 11 – 12.

costs and governing organizations associated with managing, licensing, and transferring copyright subject matter.

5.2.1.1 Transparency: Improving Remunerative Processes in Copyright

> "Lack of transparency is itself a feature of copyright law, either intentionally or unintentionally, because of the no-formalities rule combined with a low threshold for eligibility leading to invisibility to third parties"[193]

Transparency fills an important role as it supports the goals of copyright law, because in its absence creator remuneration as an incentive is weakened, at least when exploitation contracts in matured commercial organizational structures are concerned. Article 19 of the CDSM Directive obliges Member States to ensure authors a "high level of transparency", which is deemed to have been proportionately and effectively met when paragraph 1 requirements are met; The rule only obliges the provision of information on work exploitation, revenue generation, and due remuneration to be provided once a year. For one, the wording does not require a transparency of certain deals, such as for example trades of stocks between CMOs and streaming platforms, which may be conducted in order to circumvent transparency obligations and thus avoid having to share all revenues with authors.

Transparency can be enhanced beyond the CDSM Directive requirements by using blockchain to manage copyright in metaverses, but transparency in metaverse content management depends on interoperability between blockchains and metaverse platforms, as well as cultivation of more open commercial practices. Blockchain may provide greater transparency for authors and performers in particular, ensuring that revenues are directed to the correct party.[194]

5.2.1.2 Redundancy: Weak Copyright Claim Validity?

As a redundant database, a public blockchain is redundant also in terms of data input power, so on the flipside of its strength in crowdsourcing lies its weakness of lacking data validity. Technically, any user can input *any* data on the chain, e.g. wrongful claims to copyright, which are then immediately replicated in all end points. Although, on the one hand, decentralized redundant networks are resilient to external shocks and manipulation while

[193] Alexander Savelyev 2017, p. 5.
[194] Marcus O'Dair et al. 2016, p. 12.

being highly efficient when information is dispersed widely,[195] such as in online content metadata, on the other hand, they still involve one key inefficiency; Public distribution is inefficient where information is processed for *authoritative purposes*, such as claims of intellectual property rights. To guarantee IPR claim validity on a public blockchain and thus maximize the efficiency of distributed RMI infrastructure, an incremental and authenticating approach is required.

Rather than taking on the extremely laborious one-off task of creating a centralized RMI database, the more cost-effective and tamper-proof way is the incremental population of metadata on a blockchain once content is made available or as each transaction takes place,[196] on an individual creator basis. First of all, such an incremental approach enables a database to be cost efficiently compiled through crowdsourcing even in the absence of cooperation of major RMI holders, which are typically disincentivized from openly sharing RMI.[197] In the second place, each individual author transaction or publication is an opportunity for simultaneous authentication of the author's identity. An identity authentication protocol combined with dispute resolution and other means of verifying attributions would help to allocate the correct claims to their rightful holders and ensure a higher level of RMI validity. Verification will require third party dispute-settlement instruments, particularly at first,[198] before the public RMI data pool grows large enough to validate against in integrated dispute resolution.[199]

On the same vein, there is in fact already a Global Rights Database ('GRD') getting populated incrementally, though centrally, by YouTube with its *ContentID* system, where daily contributions of metadata by IP rights-holders refine the system's ability to identify and validate claims to content for take-down requests and revenue sharing.[200] The fact it exists is some proof of concept for similar systems to emerge in DLT powered Web 4.0 metaverse ecosystems. The key difference is that YouTube is a centralized platform with a central database for conventional audiovisual content, whereas the metaverse is conceptualized as a plethora of XR platforms networked in a distributed pattern instead. A distributed metaverse

[195] Jean-Philippe Vergne 2020, p. 7.
[196] Jeremy Silver 2016, p. 52.
[197] Balázs Bodó – Daniel Gervais – João Quintais 2018, p. 328.
[198] Balázs Bodó – Daniel Gervais – João Quintais 2018, p. 328.
[199] Jeremy Silver 2016, pp. 47 – 48.
[200] Jeremy Silver 2016, p. 53.

benefits from a distributed RMI database in order to avoid monopolistic biases in rights management.

Against this backdrop of increasing IP monopolization, blockchain can play a democratizing role in validating RMI claims on the metaverse, but for that purpose, it needs to be able to identify & verify the individual creator, the details of the work/contribution, and eligibility and status for collecting royalties. Because IP rights ownership, territorial definitions and contributor authenticity can often be ambiguous matters, some conventional CMO mechanisms of review, reporting and analytics would possibly have to be introduced on blockchain to determine validity.[201]

Summa summarum, there is an issue with "dirty data" on redundant database networks, meaning that anyone could technically enter false information into the database. Identities and data verification would be important to resolve the issue. Beside the problem of data validation, the sheer volume of data is another practical issue, as is conflict resolution in the face of database *immutability*.

5.2.1.3 Immutability: Against Copyright Conflict Resolution?

The immutability of blockchain has often been noted as a challenge to fixing entries recorded on the chain, e.g. for the purpose of resolving disputes over identity and contributions. It has been argued that strictly immutable blockchains are unlikely to coexist with the law, because they are incapable of absorbing mandates by the law. However, blockchains are not entirely immutable in reality, as a chain is only unilaterally immutable.[202] Thus it is possible to judicially intervene *ex post* in the chronology of a chain, although potentially at a high cost.[203]

Ex-post methods of correction comprise "law is code" approaches, which allow exceptions to immutability when necessary while preserving immutability as a principle.[204] One method to amend an "immutable" ledger *ex-post* is if a court can mandate a majority of validators to validate blocks for a reversal or correction of states. Another method of ex-post amendment is through facilitation of public or private smart contracts templates for various pre-set types

[201] Jeremy Silver 2016, pp. 44 – 45.
[202] Thibault Schrepel 2021, p. 16.
[203] Michèle Finck 2018, p. 30.
[204] Thibault Schrepel 2021, p. 47.

of transactions, which can correspond to legal effects, and then forcing said smart contracts to run between the parties; Additionally, public smart contract templates can also facilitate ex-ante compliance-by-design.[205] Furthermore, kill switches for stopping smart contracts can be included in their code.[206]

5.2.1.4 Disintermediation: Lower Transaction Costs for Low-Friction Creativity

In addition to transparency, redundancy, and immutability, blockchain can impact the metaverse ecosystem by disintermediation,[207] an organizational shift toward infrastructure that lowers friction.[208] Previously outsourced administration and organization of rights management are integrated into the infrastructure and distributed between primary users as automatic functions, lowering transaction costs and risks.[209] Ultimately, disintermediation can have a positive effect on democracy by removing the need for exclusive control by large businesses, rights holders, and online platforms over licensing, thus spreading out power concentrations.[210]

On that vein, creators may be able to replace blanket licensing systems with their own individually granted licensing terms, enabling creators' control over terms of use, potentially altering those terms and payments in creators' favor.[211] However, CMOs may still play an important role in e.g. handling negotiation, dispute resolution and data verification, and with those included, blanket licenses may in some instances be the most efficient and easiest way to have one's works published; Complete independence with zero middlemen may not only be impractical, but also undesirable, so valuable intermediaries will likely remain. Importantly, an effective and frictionless way to bypass middlemen and gateways would still exist for those who prefer it, maximizing *remunerative* incentives by providing more options for those who need them. A higher degree of control can also help maximize *non-remunerative* incentives by enabling creators to input open-content terms, akin to e.g. CC-licenses, in individualized direct licenses on a use-case basis, while simultaneously having e.g. micropayment terms in direct licenses for some other use-case.

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[205] Thibault Schrepel 2021, p. 46.
[206] Thibault Schrepel 2021, p. 38.
[207] Alexander Savelyev 2017, pp. 3 – 4.
[208] Balázs Bodó – Daniel Gervais – João Quintais 2018, p. 330.
[209] Alexander Savelyev 2017, pp. 3 – 4.
[210] Balázs Bodó – Daniel Gervais – João Quintais 2018, p. 330.
[211] Marcus O'Dair et al. 2016, p. 16.

Lowered transaction costs enable micropayments and *direct licensing* of works, for example, which can be very useful where rights holders have expressly opted out of the general TDM exception in Article 4(3) DSM Directive.[212] The "micrometering" of content can offer an economically efficient infrastructure for micro-uses of works to license works individually or collectively as data for the training of AI machine learning models. Subsequently, with such *micropayments*, a low friction database spanning millions of works could offer automatic individual consideration to the authors of works used for training or otherwise.[213] Additionally, many metaverse functions comprise of persistent content hosting accessible on demand, akin to streaming services, which are creative ecosystems that have experienced increased creative incentives from direct remuneration to creators in the form of tips or payments for extra services.

5.2.2 Claims Validity Depends on Identity Authentication

Transitioning to an entirely digitized world is complex and requires "total digital transformation and integration."[214] Reliable new transactions infrastructure necessitates reliable digital identity authentication for authoritative rights allocation by valid attribution of contributions and tracking successive valid transactions, without which there can be no legal effects.[215] A DLT-based transactions infrastructure necessitates complementary identity authentication technology for establishing, validating and tracking unique identities, transactions, and perhaps, also online reputations that could affect the available license/contract terms,[216] which requires some degree of centralized governance. Correctly allocating copyright claims to their rightful holders, together with enforcing legitimate claims, is a precondition for the emergence of 1) an auratic attention economy of authentic authorial narratives, 2) an efficiently incentivized (co-)creative ecosystem, and 3) a functioning smart contract-based transactions infrastructure, tethering actual rights to mere NFTs.

[212] Martin Kretschmer – Thomas Margoni – Pinar Oruç 2024, pp. 16 – 17.
[213] Martin Kretschmer – Thomas Margoni – Pinar Oruç 2024, pp. 16 – 17.
[214] Jeremy Silver 2016, p. 4.
[215] An EU initiative on Web 4.0 and virtual worlds : a head start in the next technological transition, p 82
[216] Jeremy Silver 2016, p. 4

The regulatory basis is being laid down, as the EU is working on defining and standardizing digital identity & e-citizenship infrastructure through its EU Digital ID Regulation,[217] the purpose of which is to enable EU citizens control over their personal data, but which also comes with implications for transactions infrastructure as a form of identity authentication usable across private and public services. The proposed digital identity wallet utilizes already existing "trust technology" facilitated by the eIDAS Regulation.[218] Regardless of the technical form of said trust services, centrally administered identity authentication can perfectly complement an open DLT-based RMI database by lending authority to claims and transactions.

Online identity authentication technology would mostly negate the anonymity and privacy benefits of blockchain and trade it for decreased friction and transaction costs in increasingly complex creative ecosystems. For one, a benefit is that co-authorial creations building upon works collaboratively made by vast numbers of collaborators are brought to the ambit of remunerative incentives and direct licensing; Theoretically, automatic and equitable instantaneous micro-payments can be made to *every* collaborator, no matter how many. Legally, rights-clearance in multi-collaborator joint works is tremendously eased by an open RMI-database where every collaborator is immediately reachable, and most useful would be a system of consent-by-default unless expressly opted out of by some majority of collaborators on a per-work basis. Technically, however, the question of bandwidth and interoperability still remains, which is ultimately reliant on free and fair competition of technologies, technology standards, and R&D.

5.2.3 Low-Friction Copyright Needs Interoperability & Standards

The facilitation of a functioning distributed RMI database requires compatibility between various blockchains storing metadata and necessitates those blockchains' interoperability with metaverse platforms. Therefore, standardization of data collection and data reconciliation[219] infrastructure is a paracopyright issue, which can supplement or override the functions or goals of copyright law. In particular, a lack of interoperability can override

[217] Proposal for a Regulation of the European Parliament and of the Council amending Regulation (EU) No 910/2014 as regards establishing a framework for a European Digital Identity.
[218] Regulation (EU) No 910/2014 of the European Parliament and of the Council of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC. Adopted 28.8.2014.
[219] Marcus O'Dair et al. 2016, p. 18.

accessibility and transparency effects of blockchain, without which a useful distributed RMI infrastructure cannot emerge to help bypass international copyright's structural complexity, leaving metaverse ecosystems costly high-friction environments that necessitate a centralized solution for coordination. Particularly, the infrastructure of an interoperable codec, such as the proposed .bc container, for example, is of high relevance as it mediates the storage of metadata on chain; Codecs facilitate machine-readability and thus link to smart contracts and ultimately integrate RMI database metadata into a metaverse copyright ecosystem.

Ultimately, the standardization of distributed RMI infrastructure can over time result in standardization of commercial licenses and democratize licensor-licensee relationships,[220] bringing about a cross-jurisdictional global Creative Commons-esque standardized framework for terms and conditions for the digital licensing of works.[221] Although digital copyright licenses are often formulated so as to escape the realm of Lex Contractus, contract law issues may nonetheless have a bearing on secondary copyright rules, namely licenses, either because the license is conveyed as part of a contract or if mutual obligations are inserted into the license.[222] This holds true even for so-called smart contracts, which are neither smart nor contracts, but are implicated since they are often conveyed as parts of actual contracts, known then as smart *legal* contracts (more in section 5.2.).

Therefore, the standardization of infrastructure built for contracting also begins to exert a paracopyright effect. Dispute resolution, remedies, and identification of parties are already – or more-so need to be in the future – *infrastructurally* virtually facilitated legal matters relevant for copyright license issues, which may supplement or override functions of copyright law. Thus, if said infrastructure is not legally well effectuated, i.e. standardized to some degree, it may end up posing obstacles to a maximally useful cross-border digital copyright ecosystem.

[220] Balázs Bodó – Daniel Gervais – João Quintais 2018, pp. 330 – 331.
[221] Balázs Bodó – Daniel Gervais – João Quintais 2018, p. 316.
[222] Herkko Hietanen 2007, p. 8.

5.3 The Database Itself

5.3.1 Incremental Compilation Without Database Right

The *sui generis* database right provided by the EU's Database Directive ('DBD')[223] protects the content of databases from substantial extraction or reuse, while normal copyright protects the structure of databases. The sui generis database right applies when a substantial investment has been made in order to obtain, verify, or present the database content. Article 3 DBD would not protect the structure of a blockchain database, because such *copyright* protection would require an original arrangement or selection of structure, while the arrangement of a blockchain will be dictated purely by the order of transactions of its distributed userbase, reflecting no original selection of any kind as regards the arrangement itself.

As regards the sui generis right itself in Article 7 DBD – although it is outside the realm of copyright and thus, strictly speaking, outside the scope of this paper as its own *sui generis* IP right – it is nonetheless likely that a blockchain RMI database would, at least seemingly, meet the required "substantial investment" requirement particularly regarding the presentation of its content. The arduous task of verifying RMI metadata *validity* on a comprehensive DLT database would also likely involve a highly substantial investment, and so may the acts involved in obtaining comprehensive metadata. Whether such a database would be protected by copyright or not would have severe repercussions for the command and control over aspects of the metaverse creations ecosystem, potentially causing power concentration in the hands of the entities that funded the database and thereby assumed the investment risk seeking to reap returns.

On the same vein, however, it is not unlikely that a blockchain RMI database is curated on the side of another task as a spin-off database, which would be excluded[224] from database protection. In fact, such incremental spin-off curation may be desirable or even necessary, because of the immense investments required to carry through with the compilation of a comprehensive RMI database: a task essentially similar but even more burdensome than building the so-called "Global Repertoire Database" for music rights – a task that seems to

[223] Directive 96/9/EC of the European Parliament and of the Council of 11 March 1996 on the legal protection of databases. Adopted 27.3.1996.
[224] Case C-203/02 The British Horseracing Board and Others, ECLI:EU:C:2004:695

have failed as participating undertakings realize the amount of investment, and then begin to conflict with each other on who shall control the database.[225] Therefore, since the major players are not willing to make the investment without ascertained returns, a database is likelier to arise incrementally by the population of metadata on public transparent blockchains over time, on the side of "smart contract" transaction events. The entirety of such a database would not be owned by anyone. What are the technological conditions for the emergence of such a legal reality?

A permissionless, open and accessible, public blockchain as a central repository for all copyright can be used to store copyrights information to enable interoperability, increase transparency and lower transaction costs**.** A comprehensive copyright RMI database is prohibitively expensive on traditional first generation blockchain, but it is potentially possible on 2nd gen blockchain similar to the Interplanetary File System (IPFS) protocol.[226] Because blockchain is simultaneously both a database and a network, information on the blockchain can be updated instantly and automatically, with the same data being open and accessible to all users rather than being siloed in discrete databases.[227]

To achieve the interoperability, transparency, and transaction costs benefits, the blockchain copyright repository would need to be publicly accessible and open to facilitate direct recording of works and metadata from authors, and to fulfil its informative function toward third parties. Transparent RMI on works' legal status and exploitation furthermore facilitates remuneration for usage while also streamlining remuneration processes by eventually disintermediating the process.[228] A disintermediated creator-audience economy running on a peer-to-peer file sharing economy may however run into problems with copyright law, which in the past has not adjusted to open decentralized systems. [229]

5.3.2 Copyright Formalities – Rights Registration on the Database?

Article 5(2) of the Berne Convention[230] is interpreted to prohibit copyright-specific *government-imposed* formalities. In general, voluntary formalities, such as those for Creative Commons licenses, are not prohibited under Article 5(2) Berne Convention, because such

[225] Jeremy Silver 2016, p. 51.
[226] Danny Friedmann 2022, p. 17.
[227] Marcus O'Dair et al. 2016, p. 9.
[228] Alexander Savelyev 2017, p. 5.
[229] Balázs Bodó – Daniel Gervais – João Quintais 2018, p. 318.
[230] Berne Convention for the Protection of Literary and Artistic Works (as amended on September 28, 1979)

formalities are taken as a way for authors to instruct platforms on whether their works can be used in ways that differ from statutory exceptions and limitations.[231] Therefore, systems that enable exploitation are not prohibited formalities in the meaning of Article 5(2).[232] In addition to voluntary formalities, a DLT-based RMI database can be compilated incrementally and automatically from open blockchain transaction records, necessitating no registration formality whatsoever even of a voluntary kind, albeit such a "passive registry" lacks authoritativeness. An active registry ensures authoritativeness by authenticating identities and attaching them with accounts, which then facilitate rights transactions, amounting to a *de facto* registration formality,[233] though not a mandatory one.

The voluntary registration of works on a blockchain RMI repository seems to be a variant of "new-style formalities"[234], which are used to establish a link between works, their creators, and rights holders, including the labeling of digital metadata and the recording of RMI onto digital repositories. Blockchain is unlikely to violate the Berne convention prohibition on formalities, as the current practice of joining CMOs is already similar in restrictiveness.[235] Nevertheless, in the context of renewing digital copyright, it has been proposed that copyright formalities should in fact be *imposed* by governments to enhance legal certainty, facilitate licensing, and broaden the public domain.[236] Also on the metaverse, mandatory formalities may help achieve a freer flow of content, improve rights clearance, and improve legal certainty concerning copyright claims together with a blockchain RMI database.

In fact, during its DSM Strategy setting, the European Commission together with the European Copyright Society have considered mandatory formalities, and come to the conclusion that to some extent it would be beneficial, though strictly contrary to the Berne Convention. The ECS was also concerned that artists and creators would face an unnecessary hurdle, whereas content industries would be able to clear the hurdle with relative ease. Nonetheless, the ECS advocated for publicity of transfers of copyright, e.g. by mandatory recording of rights transfers in a public registry, which could serve the function of improving

[231] Danny Friedmann 2022, 18.
[232] Balázs Bodó – Daniel Gervais – João Quintais 2018, p. 325.
[233] Balázs Bodó – Daniel Gervais – João Quintais 2018, pp. 324-325.
[234] Stef van Gompel 2013, p. 1435.
[235] Balázs Bodó – Daniel Gervais – João Quintais 2018, p. 325
[236] Stef van Gompel 2010, p. 13

certainty and rights clearance in increasingly complex digital domains without being a condition for enforceability *per se,* and would thus not violate international law.[237]

In conclusion, the no-formalities rule means that state-imposed requirement to register authors as a condition for enforceability is not feasible, although arguably a formality requirement might enhance legal certainty, licensing and the public domain. That could in turn provide a solution to issues that may proliferate due to the complexity of a creative metaverse ecosystem. Either way, voluntary formalities are not prohibited, and non-mandatory recording of authenticated works on a public blockchain database is considered a voluntary new-style formality, while even mandatory recording of transfers can be considered in light of international law.

5.4 Licensing on the Metaverse

5.4.1 Direct Licensing

Arguably, the more efficient licensing infrastructure is, the more likely a transaction is to occur.[238] DLT-based RMI database with advanced licensing technology may enable cheaper identification of rights holders and direct rights clearance, supported by more fitting regulation. Consequently, individual and direct licensing (e.g. micro-licensing) would eventually become the most efficient practice, if authors are able to use a public database of RMI comprising all creations on the metaverse. By directly licensing via an *open* distributed database, measurable transparency benefits would enable blockchain to make a notable difference in fair remuneration to creators; Without a publicly open database, such technology would just be yet another alternative payments channel.[239] Furthermore, by so-called smart contracts, direct licensing could to some extent be automated to lower transaction costs even further.[240]

Eventually, blockchain may open up uses currently licensed through statutory or compulsory licenses and collective rights management schemes to direct licensing, e.g. by smart contracts. Blockchain could negate the conditions that originally led to adopting compulsory licensing regimes, perhaps rendering the legal instrument obsolete. Compulsory licensing was

[237] Lionel Bently et al. 2023, p. 7 – 8.
[238] Jeremy Silver 2016, p. 50.
[239] Balázs Bodó – Daniel Gervais – João Quintais 2018, p. 329.
[240] Balázs Bodó – Daniel Gervais – João Quintais 2018, p. 330.

made to address issues such as refusal to deal, inadequate supply, public interest, or transactions costs that prevented exact monitoring of mass use and consequently prevented individual licensing. However, now blockchain is conversely lowering the respective transaction costs enough to permit exact monitoring of mass use and allow for individual licensing. However, DLT-based rights management may simply operate within existing compulsory licensing schemes without any need to cancel them.[241] If instances of micro-licensing proliferate, and the overall number of licenses explodes, then in the context of the metaverse, issues will arise particularly regarding the CDSM Directive's right of revocation.

Article 22 of the CDSM Directive mandates a right of revocation of exclusive licenses, meaning the licensor can revoke a license if the licensee does not exploit the rights, which have not been granted to any other party – the provision makes exclusive rights "use-it-or-lose-it" rights. However, there is arguably a lack of understanding what sufficient exploitation means in the digital context.[242] On the metaverse, as digital content is presumably going to be persistently accessible even if it is not expressly used, does such persistent online availability amount to sufficient exploitation? It has been argued that it does not – that instead of mere availability, there should be continuous promotion of licensed works to the public's attention, in addition to findability of the work.[243] That is indeed the domestic approach in many Member States, such as Finland and the Netherlands.

However, continuous exploitation by e.g. promotion can be a resource demanding task, which in practice might be easier to perform by large licensees while small licensees such as individuals, small platforms, and SMEs in general might be at a relative risk of not meeting sufficient promotion requirements. The rule may negatively impact legal certainty and subsequently the plurality of metaverse content offerings or experiences, and concentrate licenses and power in the hands of large enterprises. Moreover, according to Art. 22(5), MSs can provide that only collective bargaining agreements can derogate from the revocation mechanism, which can be interpreted as protecting individual creators against the unfair standard contractual terms of a powerful licensee, but by granting CMOs instead the bargaining power to forgo revocation, which could be beneficial to creators individually. The rule is a balancer of bargaining powers, and simultaneously an entrenching of a business-legal status quo. Although the paragraph 5 opt-out rule is not a mandatory exception, and thus

[241] Balázs Bodó – Daniel Gervais – João Quintais 2018 pp. 329 – 330.
[242] Martin Kretschmer 2024, p. 23.
[243] Martin Kretschmer 2024, p. 24.

it might not be implemented throughout all Member States, such a rule might condense bargaining power to CMOs and complicate pan-territorial direct individual licensing of the kind made feasible by technological advances.

Article 22 seems to continue the CDSM tendency to seemingly protect authors while, in practice, also condensing power in the hands of large content industries. Perhaps there should be a distinction between SME and large business licensees, where e.g. very small enterprises and individuals were under a less stringent mandatory exploitation requirement. Such a rule could be supported by facilitating technology for direct licensing practices, by which licensors are able to define precise exploitation requirements in terms that are tailored to different licensee categories.

Technically, exploitation requirements can be numerically quantified for a software program to compute, and their performance tracked in a fully digital domain by virtual oracles, which means that smart contracts can be utilized in license exploitation requirements. Overall, smart contracts can enable transactions where institutional trust or human trust are missing, subsequently reducing transaction costs, counterparty risk and interpretative uncertainty.[244]

5.4.2 Compliance in Rapid Proliferation of Direct Licenses

Second generation blockchains evolved beyond mere cryptocurrencies by introducing the Solidity programming language and gaining the capacity to store on the chain tokens and transactions representing anything from domain names and identity records to social welfare payments and bank accounts. More importantly, they can also store executable software in the form of bytecode, which enables network nodes to autonomously act on any asset tokens stored on the blockchain – i.e. smart contracts.[245] In other words, a smart contract is a piece of code that runs and executes transactions based on computer programmed pre-agreed rules, which derive from clauses in a contract,[246] and therefore, smart contracts cannot be qualified as contracts in the legal sense, but are instead machine-readable infrastructure for executing legal effects that benefit from the tamper-proof nature of blockchain.[247]

[244] Martin Kretschmer 2024, p. 25.
[245] Balázs Bodó – Daniel Gervais – João Quintais 2018, pp. 312 & 315.
[246] Jeremy Silver 2016, p. 14.
[247] Michèle Finck 2018, p. 25.

By combining the abovementioned open blockchain copyright repository with automatic smart contract code applied for licensing, the result is low-friction infrastructure for cross-border transactions transcending national boundaries. A standardized global self-enforcing licensing infrastructure might, on the one hand, make collective rights management and compulsory licensing costlier.[248] On the other hand, it can reduce the costs of direct licensing, enabling large amounts of direct licenses from authors to users no matter how small each use is. For example, creators could *ex ante* specify in the repository all the terms they agree to in licensing their work, and a smart contract can automatically run on the blockchain answering all licensing requests which fit those pre-determined criteria.[249] Such *micro-licenses* to tiny uses for tiny sums[250] and automatic instantaneous royalties administration between co-authors may form the backbone of metaverse creator ecosystems, and its unhindered emergence requires copyright law to grant individual users the leeway to transact freely, while ensuring the power of platform owners is limited in dictating rights to the UGC hosted on their platforms. Regulation, however, would struggle to control such a copyright ecosystem.

Currently, the UGC on a platform is licensed according to EULA terms, which apply to UGC in ways specified by the platform, where the platform is responsible for complying with legislation. The typical platform EULA claims a non-exclusive license to uploaded UGC, so technically there is nothing preventing automatic licenses from being granted simultaneously for some other different uses. However, that is where the crux of the issue resides; It is challenging to map smart contracts onto individual uses, and anyway, regulation cannot easily define exactly which uses of a work require a license, while regulation also struggles to limit smart contracts being programmed with extreme levels of exclusivity and to control smart contracts' adherence to exceptions & limitations.[251] Programmed transactions can force licenses for uses that require no license by law, by selling licenses for uses falling under E&Ls, or in general if the program's terms exceed the scope of the legal copyright bundle by including in its transaction rights it claims to hold, but which are not part of the bundle under another jurisdiction or any jurisdiction. Methods of control can be envisioned, but their execution by governments may be impossible in some cases though practicable in others.

[248] Balázs Bodó – Daniel Gervais – João Quintais 2018, p. 331.
[249] Jeremy Silver 2016, p. 14.
[250] Jeremy Silver 2016, abstract.
[251] Balázs Bodó – Daniel Gervais – João Quintais 2018, p. 333.

For example, where smart contract enabled uses conflict with territorial exceptions or limitations, a court could impose remedies like the circumvention of DRM or the reduction of due payments.[252] However, considering the likely proliferation of micro-licensing, and the number of possible smart contract licenses in general, cases would abound and their sheer number would make case-by-base interventions by courts in general an expensive endeavor, raising transaction costs for parties or overburdening the judicial system. Governing bodies would have to be equipped with software tools powerful and frictionless enough to address illegitimate claims on an *immutable*, rapidly burgeoning and shifting micro-licensing ecosystem – AI tools and blockchain "backdoor" guidance systems akin to so-called "forks" may be required. Solutions built into the infrastructure from the ground up may be the only feasible way to achieve that. Another way to control the practicable capacity of technology to transact on its own, and between other applications, is by *imposing standards* that demand interoperability for certain legitimate functions, while not creating standards encouraging functions that have no legal basis to become transactions in the first place, decreasing their de facto emergence.

Global licensing standards arising from smart contracts-based automated licensing are therefore an interesting potential feature of the copyright problematics of the metaverse. Different brands of globally standardized license types may emerge – and importantly, their emergence may be *aided* – similar to how CC licenses became the global standard for machine- and human-readable licenses combining software code with legal clauses.[253] Because CC's starting point is a commons-based approach to forgoing rights that would be reserved by default, new types of standardized license solutions are likely to emerge. Many of them are likely to be commercial arrangements, and some of them may even implement the logical elements of financial instruments, such as super distribution effects due to creator equity.[254] Differences in culture between the financial sector and the music sector have been noted, but the overall metaverse creator ecosystem that goes far beyond the conventional music scene is much likelier to embrace new business models and create new standardized licenses. There is both the necessity and the incentive to create standard automated licensing models, which are compliant-by-design while still providing sufficient leeway for novel business models and freedom of contract. Some limits are already posed by how computer

[252] Balázs Bodó – Daniel Gervais – João Quintais 2018, p. 323.
[253] Balázs Bodó – Daniel Gervais – João Quintais 2018, pp. 330 – 331.
[254] Jeremy Silver 2016, p. 30.

code is works, what it can and what it cannot automatically sense and/or execute, while another boundary to an open distributed blockchain licensing ecosystem is the legally dubious nature of the tools it is built upon.

5.4.3 The Operationalization of Rules-as-Code

While smart contracts are "agreements implemented via software"[255], their actual legal effect tends to be ambiguous. Admittedly, a transfer by smart contract code over blockchain does transfer something *de facto*, but not *de iure,* necessarily. Although a person might intend to transfer ownership over a work when transferring a token representing a copyright claim, the law may require something more, like a written instrument.[256] Can smart contracts be infused into written instruments then?

Let us first consider whether legal clauses can even be programmatically expressed. In order to be executable by software, legal terms would need to be represented in formal logic, either directly in Boolean logic or as formal semantics. Such so-called operational logic is anything that can in the end be executed as Boolean values – i.e. True or False; *If one then this, else if zero then that.* The most obvious example of Boolean logic in a legal context are clauses in financial contracts dealing with e.g. payments amounts calculation and payment dates,[257] which are directly quantifiable elements. Thus, can legal rules – particularly copyright rules and terms – be translated into Boolean values?

On the one hand, European Continental civil law systems' rules are relatively well suited for adapting to formal semantics, since civil law systems' codes of law are diligently defined compared to the more open-ended common law systems, such as the US or even China. Nonetheless, and particularly when it comes to contractual license terms or statutory L&Es, such legal rules and clauses are inevitably encountered that are nearly impossible to represent in a non-ambiguous machine-readable way, either because of their purely subjective nature[258] or due to a lack of authoritative case examples that could otherwise be used as training data to teach their meaning to AI machine learning models.

[255] Marcus O'Dair et al. 2016, p. 6.
[256] Balázs Bodó – Daniel Gervais – João Quintais 2018, p. 322.
[257] Linklaters Whitepaper: Smart Contracts and Distributed Ledger – A Legal Perspective 2017, p. 11.
[258] Linklaters Whitepaper: Smart Contracts and Distributed Ledger – A Legal Perspective 2017, p. 12.

Many legal concepts cannot be readily expressed in the Boolean computing logic executable by a smart contract. In fact, most legal terms are not intended to follow formal logic, and many legal terms are intentionally created sufficiently ambiguous to enable flexible rules able to adapt to the flux and complexity of factual reality. For example, good faith and reasonability requirements are open-ended on purpose, and so are fairness requirements such as in the Article 5(3)(d) InfoSoc exception for purposeful quotation.

Quantifiability would produce inflexibility, negating the benefits of flexible rules, in practice perhaps necessitating two concurrent legal realities to exist simultaneously; Cyberspace law dealing purely in Booleans, and real-world law leaving a degree of ambiguity, and some mechanism to translate one to the other *ad hoc*. In the realm of copyright, for example the act of telling apart which uses qualify for exceptions and limitations might at first seem like a clear-cut issue, and indeed, at its core that distinction is fundamentally Boolean: Machine learning systems can be trained to tell apart the works that copy from those works that quote for criticism or parody. There is a threshold, and the computer is shown through hundreds of thousands of case examples where that threshold lies so it can delineate *true* from *false*. However, a rule such as the temporary reproduction exception, for example, (Article 5 InfoSoc) is not quite as Boolean any longer when it calls for a three-step test where the rather ambiguous thresholds of "certain special cases", "do not conflict with a normal exploitation of the work or other subject-matter", and "unreasonable prejudice to the legitimate interests of the right holder" need to be considered and finally balanced together.

Considering the above, it seems smart contracts must, in many copyright contract situations, be infused with written language agreements, which is indeed possible to do. Smart *legal* contracts are natural language legal instruments infused[259] with smart contracts' operational logic and are meant to address the abovementioned shortcomings of smart contracts. A smart legal contract based metaverse ecosystem would not remove the need to rely on legal institutions, because in addition to ex-post enforcement due to e.g. conflicting claims from bad data,[260] there would also be the need to regulate more *ex-ante* – the "smart contract

[259] Current programming languages are mostly not designed for legal drafting and are not intuitively suited for creating smart legal contracts. However, some high-level programming languages such as Python and Solidity have the most potential for adaptation to legal use. The higher the level of a programming language, the better it can be adapted for ambiguous legal terminology, as built-in functions can be programmed to represent complex clauses. See Linklaters Whitepaper: Smart Contracts and Distributed Ledger – A Legal Perspective 2017, p. 15.

[260] Marcus O'Dair et al. 2016, p. 19.

paradox"[261] – as was envisioned above with the global ad hoc cyberspace adjudicator translating ambiguity into Booleans and back again in some situations.

5.5 Explainable AI in Rules-as-Code

As part of *ex-ante* regulation, also a type of operationalization of pre-existing laws – i.e. giving them machine-readable semantic form, which can be accessed by blockchain oracles – may be necessary so that the automatic elements of smart legal contracts at least become more *explainable,* as they could refer to the law by running checks, as a precondition before being triggered. Explainability helps make sense of a complex system if it performs unpredictably or seemingly conflicts with the law. This principle of Explainable AI ('XAI') can also help prevent "Rules as Code" ('RAC') from becoming monopolized by either governments or Big Business, as it makes audits and human oversight possible, increasing transparency, traceability and accountability among other things.[262] Moreover, since explainability helps identify and define smart contract behaviors that are legally wrongful, it can support an ex-post "law is code" approach for smart contract "kill switches"[263] if one is someday adopted.

The role that RAC plays relating to the database is one of automation and auditability of the database system and licenses, because rules-as-code support the formulation of smart legal contracts and the traceability of smart contract transactions down to the very letter of statutory law. Explanations are an essential feature of the legal domain due to inherent demands present in legal reasoning, and due to the right of and explanation.[264] On a related note, there is in fact already a proposed initiative called *CopyrightLY* that aims to use semantic data to integrate off-chain copyright metadata with on-chain smart contracts hosting content and licensing terms,[265] so some versions of the same basic idea are being developed already.

A rule-based RAC legal system requires a set of rules, a fact base, and an interpreter engine.[266] While the rules are operationalized laws of the legislature, the fact base would have to consist of related sources of fact organized into a (relational) database, where the inference

[261] Thibault Schrepel 2021, p. 44.
[262] Andrew Mowbray – Philip Chung – Graham Greenleaf 2023, p. 19.
[263] Thibault Schrepel 2021, p. 45.
[264] Karen McGregor Richmond et al. 2023, p. 12.
[265] Roberto Garcia et al. 2024, p. 6.
[266] Karen McGregor Richmond et al. 2023, pp. 14 – 15.

engine (an AI model) is trained to the correct logic to match rules to facts. To effectuate such a system, it may be required to A) clarify the meaning of ambiguous rules, and B) build large datasets of factual cases. With the support of a distributed and incrementally populating RMI database, rules and relations to facts may be inferred from such a database with the initial help of a judiciary or other governing bodies' endeavor of applying rules manually, provided those rules can be mandated on the chain. Such an endeavor would over time compile case law, which means a legal case-based RAC system could technically be used on the database itself.[267] Regarding e.g. ambiguous terms in copyright licenses, as well as ambiguous rules of law, an argument-based legal reasoning system could theoretically be utilized, if one is trained to use arguments and counter-arguments as defeaters to find the most probably correct answer in the face of uncertainty.[268]

In addition to licenses, RMI databases and semantic regulation (RAC) can moreover support metaverse copyright enforcement, particularly when it comes to automatic content recognition tools. In fact, scholars mainly associate RMI protection with technological protection measures ('TPM'), and the reason is that RMI has so far mainly been utilized by the TPMs of copyright maximalists, especially OCSSPs and rights holders, to impose restrictions and block access to works.[269] Therefore, if the metaverse indeed becomes the next iteration of the internet, and power begins to concentrate in the hands of a few platforms the same way it does on the current internet, auditable XAI can support the transparency of TPMs, helping prevent RAC from becoming monopolized, and helping ensure that metaverse users' fundamental right to property (i.e. intellectual property) and freedom of expression remain guaranteed without overenforcement encroaching upon it.

That is how private regulatory regimes, comprehensive RMI databases and smart contract licenses, as well as RAC copyright laws can come together as factors that eventually shape the metaverse ecosystem. As briefly just mentioned, copyright enforcement is another factor, the effectivity and *legitimacy* of which is greatly determined by platform policy, access to RMI, and TPMs – while XAI & RAC together can explain copyright moderation actions by reference to copyright contract licenses and statutory copyright law.

[267] Karen McGregor Richmond et al. 2023, pp. 16 – 17.
[268] Karen McGregor Richmond et al. 2023, pp. 15 – 16.
[269] Jhonny Cadavid 2023, p. 1182.

6 Conclusion

The metaverse is a plethora of participatory virtual worlds networked with each other and the physical world, transacting through blockchain and non-blockchain systems connected to real economies. The converging physical and virtual worlds, and converging digital services, facilitate deeper interaction of the physical world with virtual realities and enable new modes of creation and transfer of value. A metaverse enabling the efficient exchange of intangibles and ideas would maximize the potential of such a collaborative environment. The industries have realized that potential and are developing closed and permissioned Industrial Metaverses for R&D as well as remote plant management, for example. At the same time, the idea of a public entertainment metaverse is being sold to consumers. By contrast, a maximally beneficial metaverse for society would rather entail a creative metaverse for the public, that makes a separation from merely escapist entertainment.

To enable a creative metaverse, regulation has to foster an open content ecosystem by maximizing secondary dissemination of copyright works. Simultaneously, the open content ecosystem ought to be in balance with an appropriate level of economic incentives. For that purpose, an additional legal exception has to be created, which creates legal certainty to creative communities engaged in purposeful innovation building on top of pre-existing IP – works and brands – which is the dominant force structuring today's communities, creative communities included. The reason is rooted in incentives and other justifications of copyright.

The perceived Internet Threat incentivizes metaverse content industries and large rights holders to utilize the remunerative incentive justification of copyright to strengthen their grip on IP for maximal economic exploitation, while at the same time *de facto* hindering creativity by restricting the spin-off creativity of users based on their works. This weakens copyright's justification. In reality, the copying of protected works within creative communities for inspired creativity and community formation rituals does not challenge the economic exploitation capacity of the content industries, as reflected in their tendency by terms and conditions to relinquish protection to a narrow degree, as far as non-commercial fandoms and the like are concerned. Open access cultures serve the purpose of maximizing creativity with the aid of moral rights as guarantors of integrity of popular exposure, which is the strongest incentive to innovative creation driven by passion.

A new *sui generis* exception would solidify the requirement for large industries to limit their exclusive economic exploitation, increasing the legal certainty of user content creators in their endeavors, which are initially motivated by passion and exposure, but deserve economic reward if the exception allows them to monetize their own spins on said IP. That is not in defense of blatant copying, if a normal level of original expression of personality is required when *monetizing* said creations, even if the initial reproduction has exceptionally low originality requirements.

Regulation impacts terms and conditions, which impact communities and modes of creation, which uses technology, which is affected by regulation. Aside from the direct regulation of copyright law matters by way of a sui generis exception, also technology has a paracopyright dimension, by which the copyright ecosystem is also governed. The CDSM Directive, EULAs, and technology were thus examined, and particularly private regulatory regimes yielded interesting insight into approaches, which the regulator can also utilize in future laws. Further regulatory techniques can thus be discovered from the private regulatory regimes. The innovation incentivization structures established in private regulatory regimes most often entail remuneration-based incentives for companies and professional developers, while only few of them provide access to remuneration for creators of UGC, instead providing only exposure – but exceptions exist.

Metaverse services often include characteristics of both online marketplace and social media with added content hosting, developer tools, and VR compatibility. Certain such business models have already produced private regulatory regimes, which possess characteristics the legislator ought to incorporate as regulation. Chief among those were payment sharing for collaborations, grouping systems, and mechanisms for remuneration of user creators who have gained exposure. However, platformization poses technical limits to ensuring those positive rights. Therefore, whether those systems can be achieved throughout a multitude of metaverse platforms depends not only on regulation, but also on technical interoperability; Specifically, the ease and interoperability of an open and public RMI database and accessible direct licensing throughout the metaverse. If blockchain is used, metaverse applications can enable exchanges akin to the DevEx of Roblox by facilitating a currency exchange from native platform currencies to real life fiat currencies.

Overall, the current creative ecosystem favors certain big actors, and an economic exploitation mode of production, which potentially evolves copyright use into auratic

manufacture instead of works production. Copyright is used more for market differentiation and commodity framing to enable economic exploitation, where authorship and moral rights become a method for aura. On the plus side, the aura manufacture use-case for authorship may boost the capacity of moral rights to act as an incentive to popular exposure, encouraging original creativity. Nevertheless, a shift of overall copyright practice toward auratic manufacture is bound to shift commercial enterprise resources from IP strategies for creativity toward IP strategies for marketing.

The auratic economy poses the issue of even further economic power concentration. The congestion threshold of aura poses a natural limit to how many enterprises can claim distinctiveness before oversaturation dilutes the space; Big players can hold significant aura even in a congested attention economy, though indies can claim subcultural clout through non-proprietary aura on alternative platforms more as the mainstream proprietary system evolves. Challenges face those proprietary content SMEs, which are not big enough to compete in a congested aural attention economy, nor indie enough to partake in subculture.

The maximization of creativity in metaverses is possible by empowering individual creators and SMEs more than before. While the regulatory facilitation of select open-content spaces is one side of said empowerment, further creativity can be achieved by accessible advanced licensing infrastructure and advanced open RMI databases semantically connected to licensing infrastructure. Thus, direct licensing and RMI technology can act as a great equalizer of the copyright industry akin to how 3D printing technology is bringing manufacturing capacity to households. The regulator needs to remain wary of industry attempts to regulate technology and the Internet Threat, while guaranteeing interoperable and authoritative identity authentication technology, encouraging voluntary formalities and automatic registration, defining standards for RMI reconciliation technology, clarifying the status of NFTs as legal instruments, supporting an interoperable codec, operationalizing copyright rules by formal semantics, and drafting e.g. compliance-by-design smart contracts templates for direct licensing of copyright. Rules-as-Code approaches would prioritize technologization of regulation over regulation of technology in order to guarantee a justified, equitable, and productive copyright economy.

Moreover, digital exhaustion is a powerful regulatory tool to structure a distributive market maximizing creativity, instead of a communications and marketing based economy for maximal economic exploitation. However, digital exhaustion can only achieve its goals when

combined with technology enabling royalties for distribution, which are necessary to disincentivize a mere Product-as-a-Service economy. Therefore, metaverse assets ought to be subject to both an NFT royalties technology and *sui generis* digital exhaustion regime based on technology neutrality as with the treatment of software.

Alas, *which principles and justifications of EU copyright law are impacted specifically by the emerging metaverse economy, and can EU copyright law still regulate the emerging creative ecosystem in line with its goals?* In conclusion, the provisions of the CDSM Directive provide positive rights to creators in exploitation contracts only, while only a few broadly defined negative rights are granted to creators of UGC more generally. The metaverse, as a continuation of current platform economics of production fostering UGC, therefore, mostly escapes the copyright-contract tools provided by the CDSM Directive and may require *sui generis* regulation particularly for a new mandatory exception for transformative use and open creative communities. It is precisely in the ambit of exceptions and limitations, therefore, that the current EU copyright law regime falls short when considering Web 4.0 from a foundational justifications perspective. On another note, current EU authorship and originality rules are highly effective even in the context of Web 4.0, due to moral rights serving as the basis for balanced incentives. However, personality integrity in popular exposure (by moral rights) is only one side of a fair and functioning copyright system, which needs to be bolstered by direct remuneration based incentives. To that end, new regulation must be supported by semantic operationalization of rules as code, standardization of transactional technologies for RMI and licensing, and a vigilant approach to large monopolies' attempts at restricting emerging technologies. Additionally, a *lex specialis* digital exhaustion regime supports a well incentivized *innovative* UGC-based ecosystem by fostering distribution instead of communication, granting the prerequisite rights for follow-on innovation based on *ownership* of content.