



European Commission Call for Contributions on Competition in Virtual Worlds

Contribution by CREATE

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Competition and competition policy in virtual worlds has been on the Commission's radar for a few years now, and was particularly heightened after Meta revealed its plans to enter the space.¹ While virtual worlds have existed for more than a decade in their current form, the entry of big tech, the multi-product multi-service ecosystem developing around them, and the introduction of blockchain technology in some virtual worlds, all contribute to a competitively more complex environment.

We therefore welcome the Commission's request for comments to the virtual worlds consultation, and we are happy to highlight aspects of competition law and policy that we believe should receive attention. CREATE is the Centre for Regulation of the Creative Economy, based at the University of Glasgow. Its work and focus revolve around intellectual property, competition, information and technology law. More information can be found at <https://www.create.ac.uk/>.

¹ 'EU Antitrust Officials Worried About Metaverse Competition' (CPI, 24 October 2022); Stephanie Bodoni, 'EU Gears Up for Antitrust Abuses in the Metaverse' (Bloomberg, 2 March 2023).

1. What entry barriers or obstacles to growth do you observe or expect to materialise in Virtual World markets? Do they differ based on the maturity of the various markets?

We identify a number of entry or expansion barriers that will likely play an important role in virtual worlds. Many of them are familiar from digital markets, but we highlight them here because they have the potential to serve as even bigger obstacles, or they come with twists that are worth pointing out.

A. Infrastructure and Network Capacity

In the realm of virtual worlds, the essence of user experience relies on real-time, immersive interactions that demand seamless content delivery and interaction. The role of Content Delivery Networks (CDN) is becoming paramount,² which is critical in minimizing latency and ensuring high-resolution textures, as well as efficiently delivering interactive services to users worldwide.³ However, such high requirements for establishing a high-capacity CDN is a new entry barrier for SMEs, as it normally involves significant infrastructure and bandwidth supplies. For example, real-time data synchronization is one of a critical instance, ensuring that any interaction or change within the virtual environment is instantly reflected for all participants, further straining the CDN infrastructure. Moreover, in blockchain-based virtual worlds the challenge intensifies as these platforms also facilitate independent crypto transactions and encrypted data exchanges, adding another layer of data that requires robust CDN support.⁴ For new entrants, establishing or gaining access to such an advanced CDN setup poses a significant hurdle, both financially and technically, potentially limiting their ability to compete with established players who have already invested in scalable infrastructure and network capacity.

Such hurdles of infrastructure and network capacity are also embodied in the dimension of sensitive information processing. In the context of virtual worlds, the collection and processing of user data, especially biometric data is ubiquitous. For example, in environments like Apple's Vision Pro, a user's interaction with a virtual world relies heavily on tracking eye movements. This new form of virtual world and user interaction necessitates stringent Technical and Organizational Measures (TOMs) to safeguard personal data and privacy. In that context, the infrastructure must not only support the technical aspect of data capture, processing and

² Behrouz Zolfaghari and others, 'Content Delivery Networks: State of the Art, Trends, and Future Roadmap' (2021) 53 ACM Computing Surveys 1.

³ Jong-Moon Chung, 'Content Delivery Network (CDN) Technology' in Jong-Moon Chung, *Emerging Metaverse XR and Video Multimedia Technologies* (Apress 2023) <https://link.springer.com/10.1007/978-1-4842-8928-0_7> accessed 28 February 2024.

⁴ Hao Xu and others, 'Metaverse Native Communication: A Blockchain and Spectrum Prospective', 2022 IEEE International Conference on Communications Workshops (ICC Workshops) (IEEE 2022).

analysis but must also ensure its protection through encryption, secured data storage, and privacy-preserving processing in the whole lifecycle. For SMEs, the dual challenges can be daunting. The financial, technical, and legal complexities involved in establishing a compliant infrastructure establish a new entry barrier, potentially deterring new entrants from venturing into the virtual world industry. Such technical barriers also create potential challenges for new entrants, namely the regulatory costs involved for SMEs.

B. Interface and controls

Interface differences can serve as a unique multihoming barrier on the supply side of virtual worlds. The interface controls how users interact with a device or digital service, such as augmented or virtual reality goggles that are a common complement to virtual worlds. These interfaces can process gestures, accessories, voice commands, visual aids etc. Because virtual worlds are more immersive than conventional digital services and apps, the interface and controls are also more complex and can serve as intermediary control points between services/apps and their users.

In conventional digital markets, developers can easily port their product, services and applications onto different platforms, since at the very least the way users interact with them remains similar across platforms. For example, apps both on the iPhone and on Android phones interact with users based on the same point-and-click gestures, and present themselves through the same interface, i.e. a phone's screen. In virtual worlds, interface and control options can be dramatically different.⁵ The same app can be presented as an immersive three-dimensional environment, or simply as a floating window, and this will depend on the device the user relies on to access the app. Interface controls in these two situations are very different, which requires developers to rebuild, or even reconceptualize their product and services from scratch, creating a significant barrier for expansion to competing platforms.

Moreover, even if a product's or service's presentation and structure is similar across platforms, differences in gesture controls can still raise barriers. This is because gestures are intricately tied to design; an app will be designed differently if the user needs to pinch or wave to control the same function. These differences are best exemplified in the design choices of Apple's Vision Pro goggles and other popular augmented and virtual reality devices, such as Meta's Quest goggles. Further, whilst such differences may be purely driven in the interest of designing the user experience, they may also be driven by necessity where exclusive intellectual property

⁵ See the early work of Meredith Bricken, 'Virtual Worlds: No Interface to Design' (1991) *Cyberspace: First Steps* 29.

rights subsist in elements of 'look and feel' user interfaces.⁶ We note that developers may be less inclined to develop products, services and apps for all popular competing virtual worlds if interface and control differences require them to reimagine their products.

C. Regulatory compliance

With the emergence of advanced technologies, various EU regulatory frameworks are expanding, some of which are capable to intervene in virtual world industry. This is likely to impose high regulatory compliance as entry barriers, especially for new entrants. For example, the GDPR sets stringent standards for personal data protection, under which the operators of virtual worlds must find appropriate lawful grounds for data processing, safeguard users' rights, and implement robust TOMs.⁷ However, as aforementioned, the operation of virtual worlds is established by the collecting and processing of personal and biometric data (e.g., facial recognition and eye movement tracking), which are integral for immersive experiences. In the context of the GDPR, these types of data are sensitive biometric data, which fall into the scope of special categories of personal data. (Art. 9 (1)). In this case, such data collection and processing should normally be prohibited, unless obtained with the explicit consent of the data subject. In the context of virtual worlds, obtaining individuals' explicit consent is difficult. As interfaces dramatically change across platforms, operators lack the necessary toolkits to effectively gather users' explicit consent.⁸ Moreover, the modality of explicit consent may also need to change in virtual worlds in order to accurately reflect the users' true will, given the broad scope of data types collected.

As a result, the general prohibition of processing biometric data could constrain the development of the virtual world industry in the EU, leading to substantial compliance costs. This hurdle is particularly prominent for new entrants and SMEs which do not have sufficient resources or finances to support a complete and costly regulatory compliance. As evidenced by Li *et al.*, tech giants have performed significantly better in employing professional legal compliance teams and conducting regulatory compliance precisely because they possess more financial resources to support this, compared to SMEs.⁹ There is no exception in virtual worlds industry.

⁶ See e.g., C-393/09 – BSA v Ministervo Kultury.

⁷ Art. 28 GDPR.

⁸ Lachlan Urquhart, Tom Lodge and Andy Crabtree, 'Demonstrably Doing Accountability in the Internet of Things' (2019) 27 International Journal of Law and Information Technology 1.

⁹ Wenlong Li and others, 'Mapping the Empirical Evidence of the GDPR (In-)Effectiveness: A Systematic Review' <<https://arxiv.org/abs/2310.16735>> accessed 28 February 2024.

Additionally, the requirements set forth by the GDPR for the identification of data controllers and processors, along with the exercise of data subject rights, also represent significant compliance challenges that can act as barriers for new entrants. This burden is exacerbated in the virtual world. In the context of virtual worlds, identifying the roles of data controller or processor can become challenging due to the decentralised and multifaceted nature of these platforms. With the emergence of virtual worlds based on blockchain or other decentralized architectures, it has become more challenging for operators to ensure legal compliance, where the networks distribute these functions across multiple nodes.¹⁰ This makes it challenging to pinpoint a specific data controller or processor,¹¹ as each node in the network could potentially fulfil these roles depending on the architecture and governance of the blockchain. For new entrants utilizing blockchain technology in virtual worlds, this presents a unique challenge in ensuring GDPR compliance, as the regulation presupposes the ability to clearly assign these roles. A similar situation exists for the exercise of the right to be forgotten (data erasure). It requires that the platform can not only delete a user's account but also any shared data across the whole network stored or processed by third parties.¹² Moreover, the interconnected nature of virtual worlds means that user data might be replicated or used in ways that are not immediately obvious, complicating compliance efforts. As a result, new entrants must meticulously map out their data processing activities to accurately assign these roles and responsibilities, a process that requires a clear understanding of GDPR requirements and potentially significant legal consultation costs.

D. Accounts and profiles

A common switching and multihoming barrier in conventional online platforms has been the requirement to set up new accounts and profiles for every service.¹³ In some cases, the barrier was very low, because setting up a new account and profile was easy to do (e.g., email account). In other cases, barriers were higher because user profiles were more developed. This would be the case of social networks and music streaming apps, etc., since on such applications and services, historical user activity, preferences, and content, go deeper and are therefore harder to replicate on a rival application service.

¹⁰ Xu and others (n 4).

¹¹ Jiahong Chen and others, 'Who Is Responsible for Data Processing in Smart Homes? Reconsidering Joint Controllership and the Household Exemption' [2020] International Data Privacy Law 1.

¹² Zihao Li and others, 'Recordism: A Social-Scientific Prospect of Blockchain from Social, Legal, Financial, and Technological Perspectives' <<http://arxiv.org/abs/2204.00823>>.

¹³ See Aleksandra Gebicka and Andreas Heinemann, 'Social Media and Competition Law' (2014) 37 World Competition 149.

In virtual worlds, it is likely that profiles and accounts will serve as even higher switching and multihoming barrier, since virtual world profiles are more comprehensive, integrated, and world-specific. In some cases, user profiles on virtual worlds encompass highly developed and detailed avatars, transactional and economic activity, usage history, statistics, and ranks, which may be difficult or even impossible to transfer or duplicate in another world. In the most developed virtual worlds that encompass mini economies, such as those built on token ecosystems,¹⁴ users may be even further entrenched, because their incentives for participation are tied to ownership of the native token, which can be used for governance or investments as well, on top of unlocking other functionalities of the virtual world.¹⁵ Whilst the exodus of players from Blizzard's *World of Warcraft* in 2021 in response to a controversial lawsuit¹⁶ suggested that virtual world users were more portable between worlds than previously expected, the typical number of live players per month has since stabilised to pre-2021 levels, suggesting only a temporal effect.¹⁷

These multihoming barriers are bolstered not just technically, but also *legally* by intellectual property law. In particular, user lock-in has been compounded by judicial decisions which have limited the doctrine of exhaustion as applied to 'complex' subject-matter, including games and virtual worlds. The exhaustion doctrine normally enforces a legal limitation on the degree to which a rightsholder (of a virtual world or otherwise) can control the distribution of their work – in essence, the default rules of intellectual property law would suggest that, post-sale, a rightsholder could not prevent a user from re-selling or transferring their copy of that work. However, the nature of virtual worlds, being both immaterial, and account and/or server based, has been a significant persuasive factor in limiting the application of this doctrine, in effect, enabling perpetual control of an account: in a virtual world, nothing is 'sold' (whether because the account is on the conditions of a licence, or if the account has been acquired for free), meaning nothing can be 'owned', and thus nothing can be legally transferred.¹⁸ Even where courts have found in favour of allowing the transfer of works or objects *associated* with an account (e.g., of games tied to a Steam account), they have never obliged the owner of a virtual world to

¹⁴ Tascha Tse, 'Public Blockchains Are the New National Economies of the Metaverse' (Wired, 9 February 2022).

¹⁵ See e.g., the Cardano ecosystem which includes a token, a governance structure, a virtual world, and a platform to develop applications. Users can be embedded into the entire ecosystem and their membership if facilitated through ownership of ADA, the native currency.

¹⁶ <https://www.theguardian.com/technology/2021/aug/08/activision-blizzard-lawsuit-women-sexual-harassment>

¹⁷ <https://activeplayer.io/world-of-warcraft/>.

¹⁸ See e.g., TGI UFC v Valve; Landgericht Berlin 15 O 56/13 (Steam Accounts); and, C-263/18 – Tom Kabinet.

meaningfully facilitate an infrastructure to enable this (e.g., through the introduction of a digital marketplace).

We also note that the relationship between competition and intellectual property law is often facilitated by contract, namely private ordering mechanisms such as terms of service or end user licence agreements, whose acceptance is often mandatory to those users wishing to participate in that virtual world. The conditions stipulated in these agreements preventing the transferability of accounts have been persuasive to courts in concluding that these can be a precondition of lawful access (*C-263/18 – Tom Kabinet*), which can be unilaterally withdrawn or modified by a rightsholder. The extent to which contract can extend rightsholder control over user behaviour beyond the original remit of the default rules of intellectual property is thus increasing, and should be interrogated, particularly where this impacts the governance of social and democratic activities within a virtual world.¹⁹

As the recent decision of *Valve v Commission* suggests, the commercial interests of the owners of virtual worlds should not be irrelevant in our assessment, but clarity is needed on how the behaviours surrounding the leverage of intellectual property rights can restrict competition. Indeed, where virtual worlds are concerned, competition and intellectual property are not necessarily in conflict; rather, the competition issues raised by the conflicting interpretations of issues such as exhaustion should steer lawmakers to a more consistent, and competitive, treatment of rightsholder control over user accounts.

Joint response

4. Do you expect existing market power to be translated into market power in Virtual World markets?

9. Do you expect the emergence of new business models and technologies to trigger the need to adapt certain EU legal antitrust concepts?

A. Ecosystem analysis and architectural power as enhancements to understanding market power in virtual worlds

We comment here on the role of market shares, market definition, ecosystem definition and architectural power in assessing market power in virtual worlds. In decentralized virtual worlds,

¹⁹ Amy Thomas, 'A Question of (e)Sports: An Answer from Copyright' (2020) 15 *Journal of Intellectual Property Law & Practice* 960.

the traditional metrics for assessing market power, such as antitrust markets and market shares, might not fully and accurately capture the dynamics of influence and market power due to the unique nature of decentralized architecture. The decentralized nature of a virtual world indicates that their ability to influence or control the whole market might not be directly tied to a single market or their market share within. Rather, market power could be demonstrated by the control of what can collectively be called governance, which can include critical infrastructure, protocols, or consensus mechanisms, irrespective of conventional market share metrics.

The analysis of market power in virtual worlds will likely benefit from treating virtual worlds as ecosystems, and making the ecosystem the unit of analysis for competition law investigations and analysis, where this is warranted, as opposed to the traditional market definition. The main two limitations of relying on defined markets is that markets are treated in isolation from other markets, or at best are connected in rigid ways, such as aftermarket, and that they rely on substitutability to establish their boundaries.²⁰ While this approach works for most economic segments, virtual worlds generate value by having users combine products and services from different markets that exist in diagonal cooperative interdependent relationships, such that the design of products and services in each of them cannot be treated in isolation and changes in one affects the others.²¹ There are strong bi-directional feedback effects between services, applications, and devices in virtual worlds creating interdependencies between the markets for each. When economic activity is structured this way, ecosystems rather than markets, may be in a better position to capture the competitive dynamics characterizing such economic segments as virtual worlds.

A key difficulty of transitioning from market to ecosystem analysis has been that competition investigations were confined within a market definition, and the nebulous concept of ecosystems was difficult to delineate. In other words, market definition has traditionally been the first step, upon which other competitively relevant conditions were measured and assessed, such as market shares, market power, and anticompetitive effects, and without concrete methods to delineate ecosystems, there is no end to where a competition law investigation could be focused. At the same time, because economic segments and activity in ecosystems are

²⁰ Bruno Carballa-Smithowski and others, 'When "the" Market Loses Its Relevance: An Empirical Analysis of Demand-Side Linkages in Platform Ecosystems' [2021] European Commission, Joint Research Centre (Seville site).

²¹ Michael G Jacobides, Carmelo Cennamo and Annabelle Gawer, 'Externalities and Complementarities in Platforms and Ecosystems: From Structural Solutions to Endogenous Failures' (2024) 53 Research Policy 104906.

interdependent, investigators also needed a way to describe the type of market power that emerges from such structures.

Fortunately, new research is starting to address these gaps allowing ecosystems to develop real analytical power and utility in markets such as virtual worlds. We now have multiple ways to determine which products and services should be included in virtual worlds, whether the exercise is to map out the virtual worlds industry (as for example in a market inquiry similar to what the Commission's now scrapped New Competition Tool would require), or to map out a specific virtual world built around a central sponsor or operator (for example Roblox, Decentraland etc).²² These include hierarchical and K-mean clustering, factor analysis, snowball selection process, and mixes thereof such as an approach that combines clustering with network complementarities.²³

We also have a better understanding of market power in ecosystems and how it can escape the common dualistic distinction between power to raise prices and power to exclude competitors. Crucially, a new form of market power is architectural power which consists of the ability to shape the market around the dominant firm so that it can perpetuate its market power.²⁴ The Commission has already included ecosystem market definition in the new Market Definition Guidelines, so we urge it to also modernise its market power approach to ecosystems to more fully capture competitive forces in virtual worlds, since they are often structured as ecosystems.

A. Role of governance in market power. A market for governance. Abuse of governance.

Governance of virtual worlds can be vested in a corporation (e.g. Meta's metaverse) or it can be distributed if the virtual world is decentralised. Whoever controls governance can control the virtual world, because control over the rules of interaction and the underlying protocols essentially determines how the virtual world operates, the mechanics of transactions and the criteria for participation.²⁵ The role of governance is to set the rules that regulate the working-together of stakeholder groups and their members, as well as codify the operation of products, services, and application of the decentralized economy.²⁶ For example, entities that control a

²² Konstantinos Stylianou and Bruno Carballa Smichowski, "Market Definition in Ecosystems"

²³ Ibid.

²⁴ Ioannis Lianos and Bruno Carballa-Smichowski. 'A Coat of Many Colours—New Concepts and Metrics of Economic Power in Competition Law and Economics' (2022) 18 *Journal of Competition Law & Economics* 795.

²⁵ Roman Beck, Christoph Müller-Bloch, and John Leslie King. 'Governance in the Blockchain Economy: A Framework and Research Agenda' (2018) 19 *Journal of the Association for Information Systems* 1.

²⁶ Yan Chen, Jack I. Richter, and Pankaj C. Patel. 'Decentralized Governance of Digital Platforms' (2021) 47 *Journal of Management* 1305.

significant portion of the network's consensus mechanism, such as major mining pools in proof-of-work (PoW) systems or large stakeholders in proof-of-stake (PoS) systems, can wield disproportionate influence.²⁷ This form of control can be more consequential than mere market shares, as it could grant the ability to govern the rules of interaction, transaction validation, and even the evolution of the virtual world itself. Such control could enable entities to exert market power by influencing or dominating the economic and operational parameters of the virtual environment, potentially sidelining traditional competition metrics.

Governance is an expression of architectural power, which was discussed earlier in our ecosystem analysis. Because the governance process is distinct from the products, applications, and services they shape, governance can be thought to exist in a market of its own. When a product or service is governed in a way to monopolize the market, the decision-making process of governance is one thing, and the conduct that results from the decision-making is another. These two 'markets' are intertwined and can take different forms:

- The undertaking abuses its dominance in the governance market to acquire, maintain or enhance power in the blockchain product or service market.
- The undertaking engages in anticompetitive conduct in the governance market, in which it is *not* dominant, in order to maintain or enhance its power in the blockchain product or service market, in which it is dominant.
- The undertaking engages in anticompetitive conduct in the governance market, in which it is *not* dominant, in order to enhance its power in that same market.

Competition law may already have the tools to deal with such inter-linked markets (through the TetraPak cases),²⁸ but it is essential that one recognizes the existence of the governance market as separate to be able to detect how undertakings can leverage their power between that market and a secondary market.

B. Application of DMA

Virtual worlds can include services that resemble gatekeepers, and so the application of DMA should be examined in this context. Virtual world sponsors may compel users to purchase specific services or products by bundling them with "essential" virtual world hardware or software features/services, or they may enter into exclusive deals with downstream third-party

²⁷ Li(n 12).

²⁸ Case C-333/94 P, Tetra Pak International SA v Commission. See also Case T-83/91, Tetra Pak International SA v Commission.

providers of virtual world services. Such behaviour could harm competition by reducing end-user choice and by restricting access to their platform for other business users or competitors.²⁹

The DMA may become applicable in such contexts if the relevant conditions for designation of relevant core (virtual world) platform services (CMS) are met.³⁰ Consequently, these CMS and their respective gatekeepers would need to comply with distribution, bundling and interoperability of virtual world services. This includes the requirement to allow providers of virtual world services, as well as business users, free of charge interoperability with a gatekeeper's operating system. This ensures it will be developed and structured under the virtual world's technology and technical means, accessing the same features as the gatekeeper's services and hardware. Further, if virtual world undertakings replicate the acquisition spree we have seen in digital markets,³¹ Article 14 of the DMA may become relevant, which extends control over concentration between players in digital markets. Furthermore, the European Commission may issue guidance regarding the application of Article 22 of the Merger Regulation, addressing potential interactions of the concept of 'killer acquisitions' within the digital market, including references to the virtual world platform.

7. Which data monetisation models do you expect to be most relevant for the development of Virtual World markets in the next five to ten years?

A. Tokenomics will need to be integrated in competition economics in virtual world markets

Some novel products and services in virtual world can be built upon the blockchain, taking advantage of its cryptographic capabilities, decentralised ownership and transparent features.³² Such products and services can leverage the capabilities of blockchain technology to create self-sustaining ecosystems, including immersive virtual experiences and value generation venue. It can be anticipated that virtual worlds could introduce their native cryptocurrencies or tokens, serving multiple purposes such as facilitating transactions within the virtual world,

²⁹ Antonio Lopes dos Santos, 'Roaming the Metaverse under a Digital Market Lens' <<https://whatnext.law/2023/03/09/roaming-the-metaverse-under-a-digital-market-lens/>>.

³⁰ *ibid.*

³¹ Anselm Küsters, Matthias Kullas, Patrick Stockebrandt, 'EU-Metaverse Strategy: WEB 4.0 & Virtual Worlds' <https://www.cep.eu/fileadmin/user_upload/cep.eu/Analysen/COM_2023_442_Virtual_Worlds/cepPolicyBrief_EU-Metaverse_Strategy_WEB_4.0___Virtual_Worlds_COM_2023__442_Long_Version.pdf>.

³² Hao Xu and others, 'deController: A Web3 Native Cyberspace Infrastructure Perspective' (2023) 61 IEEE Communications Magazine 68.

governance through DAOs (Decentralized Autonomous Organizations), or incentivizing user participation and content creation. Such tokens can be traded on external cryptocurrency exchanges, providing a bridge between the virtual economy and the real-world financial system. Such tokens are also vital for the whole ecosystem of a blockchain native virtual world, where it could underpin the transaction of virtual items (such as avatars, costumes, digital land, and other unique assets). This ecosystem also has some extra-territorial effect by leveraging virtual world native cryptocurrencies to attract user participation. In other words, even individuals who are not participating in the virtual world can still benefit financially through activities such as trading and mining cryptocurrencies associated with the virtual world.

The integration of tokens into virtual worlds calls for an appreciation of the effects of tokenomics. One important implication of tokenomics is that they facilitate bootstrapping of new networks. A common problem in networks is that they may fail to reach a socially beneficial equilibrium of adoption because they face coordination problems, namely users taking individualized decisions to not adopt the product or service, even though if they all adopted it, it would be beneficial for all. Tokens solve that early problem by promising appreciation of value once the product or service is more widely adopted, ensuring commitment of future access to the product or service, and often governance rights.³³ Operators of decentralized virtual worlds can promote user participation by sharing power through token-based voting, maintenance of systems, mining cryptocurrency, moderation, and governance of the virtual world community. Such encouragement could tie users as stakeholders to align the interests of the whole community.

Moreover, tokenomics are intricately intertwined with governance since governance is often exercised through tokens. Therefore, the rules that determine the supply, distribution, and value of tokens also determine governance rights and constraints, and through them the competitive positioning of the relevant products and services. For example, a deflationary supply schedule of a given token can be indicative of entrenched power of existing or early token holders, since new tokens are generated at a slower pace making it harder to amass enough governance power as a late comer.

³³ Yannis Bakos and Hanna Halaburda, 'Overcoming the Coordination Problem in New Marketplaces via Cryptographic Tokens' (2022) 33 *Information Systems Research* 1368; Michael Sockin and Wei Xiong, 'Decentralization through Tokenization' (2023) 78 *The Journal of Finance* 247.

8. What potential competition issues are most likely to emerge in Virtual World markets?

We comment below on an issue that is fundamental to competition law and may be the source of debate in virtual worlds.

A. Which actors does competition law apply to in virtual worlds?

We wish to comment on a potentially overlooked issue that might become tricky in virtual worlds, namely the definition of undertakings. Undertakings are the actors to which competition law applies, and so determining which actors are undertakings delineates the personal scope of competition law on virtual worlds.

Some virtual worlds, particularly those that employ decentralized technologies, such as blockchain and distributed ledgers, are underpinned by a system of social production and governance. This raises the question of whether the actors participating in the generation and governance of such virtual worlds can also be considered undertakings for the purposes of competition law.

Undertakings are defined as any entity that engages in economic activity, regardless of its structure and financing.³⁴ In turn, economic activity consists in the offering of product or services in the market under conditions of competition whether actual or potential.³⁵ Under that broad definition any virtual world actor that contributes in the world's generation and governance can be considered an undertaking, because both the generation of the virtual world, for example, by developing code, or running a node, and its governance, for example, by staking assets, and/or otherwise voting, constitute services towards the virtual world and its other users. Without any other qualification, this could potentially catch any virtual world user, even though minimally involved in its generation and governance.

Clearly, this outcome would be untenable. In the context of social production economic activities, the answer should not depend only on the nature of the activity, but also on the degree to which an actor engages in it. In other words a difference in degree can become a difference in kind. Relevant factors that should be considered here are: a) degree of activity, b) organization, c) risk, and d) commerciality.³⁶ Degree of activity means the amount and frequency

³⁴ Case C-41/90, Höfner and Elser v Macrotron GmbH.

³⁵ Case C-475/99, Firma Ambulanz Glöckner v Landkreis Südwestpfalz.

³⁶ These are helpfully discussed in HMRC's taxation guidance on cryptoassets. See, e.g., HMRC, Policy Paper Cryptoassets: Tax for Individuals, 20 December 2019, available at <https://www.gov.uk/government/publications/tax-on-cryptoassets/cryptoassets-for-individuals>. See also IRS, Internal Revenue Bulletin: 2014-16, 14 April 2014, available at <https://www.irs.gov/irb/2014->

of the activity carried out; organization relates to the structure that has been set up (material or immaterial) to support the activity; risk relates to the degree to which the actor risks losing any investments (material or immaterial) going into the activity, and commerciality relates to whether the actor performs the activity with the intention of doing it on a commercial basis and with a view to the realization of profit.

These elements are to be considered together, as they act complementarily to each other. Under those circumstances, a “shop” owner in a virtual world can well constitute an undertaking, but an amateur user who occasionally sells an NFT in a virtual world might not. Similarly, a committed protocol developer that works on a blockchain virtual world’s consensus mechanism may qualify as an undertaking, even if the virtual world may not be owned by a single entity for which the developer works, or even for an undertaking whose business activity is to develop consensus protocols.

¹⁶ IRB#NOT-2014-21. See also HMRC, Policy Paper Cryptoassets: Tax for Businesses, 20 December 2019, available at <https://www.gov.uk/government/publications/tax-on-cryptoassets/cryptoassets-tax-for-businesses>.