

Comments to the European Commission’s Call for Contributions on the Topic of “Competition in Virtual Worlds and Generative AI”

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11 March 2024

We appreciate the opportunity to contribute to the two calls for contributions regarding *Competition in Virtual Worlds and Generative AI*.² We applaud the dialogue and want to emphasize that we believe more multidisciplinary research is needed to inform digital economy competition policy, and indeed, all regulatory domains. In the following, we offer a few brief comments on some of the pressing and critical issues policymakers need to address when designing appropriate guardrails for our digital economy future.

Despite the global frenzy about generative AI (GenAI) and the extent to which it has overshadowed the metaverse discussion, GenAI is a key technology for driving Smart-X applications (with X standing for health, factories, logistics, etc.), augmented and virtual reality applications (including digital twins) and, more generally, visions of the future Web 4.0 and virtual worlds. GenAI and virtual worlds are inextricably bound to co-evolve through multiple innovation feedback loops.

The vision for the future virtual worlds is based on a concatenation of overlapping visions for Web 3.0 and 4.0, each of which are moving targets. The path toward those visions is path dependent but uncertain, and adjustments in the chosen paths should be expected in order to respond to the uncertain forces of technological progress, market and value chain evolution, and policy reforms. As of today, the techno-economic solutions and conditions necessary to enable Web 3.0 aspirational capabilities to be realized in any meaningful, practical sense do not exist. For example, the Web 3.0 aspiration for individual user “*empowerment... to control and realise the economic value of their data... etc.*”³ is a lofty goal that is not yet realized anywhere. Even if one accepts that the basic legislative structures are in place, the institutional capabilities, core technical infrastructures, and the other resources needed by individuals and firms to implement those Web 3.0 aspirational capabilities to assert individual agency (choice) and self-determination do not exist or are certainly not generally available.

¹ We make these comments as individuals, and our views do not necessarily reflect the views of our home institutions or any other institution.

² We find it interesting that there are two rather than a single call, since in our view we do not believe the future of either can be successfully understood in isolation. However, we regard it as promising that the two calls are issued jointly. See https://ec.europa.eu/commission/presscorner/detail/en/IP_24_85.

³ EC (2023). Communication on an EU initiative on Web 4.0 and virtual worlds: a head start in the next technological transition. *COM(2023) 442/final*, European Commission (EC), Strasbourg, 11 July 2023, available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52023DC0442> (at p. 1).

In short, many of the core technologies that need to coalesce (such as AI, 6G, Smart Contracts) to enable our digital future are still evolving and far from finished visions/products. Whereas the future is based on visions of 6G and AI powered ecosystems, their core developments are not well-integrated.

Hence, while we support this dual call for contributions, we believe it is premature to attempt more than to initiate a multidisciplinary dialogue to build a shared vision of the emerging landscape. It is certainly premature to forecast outcomes. We see multiple reasons for this, including the following:

It is not clear that today's incumbents leading the charge for future digital platforms and the "Metaverse" will dominate in the future. However, premature, misguided regulation could make that more likely, as well as retard the likelihood that beneficial virtual world technologies will be deployed, and most importantly, that end-user agency will be expressible.

There will not (and should not) be a single architecture for virtual world platforms. These will be an overlay on top of the fabric of future 6G infrastructure, and that will not be and should not be a single, uniform fabric, but rather something more akin to the Internet – a fabric of interconnected and partially overlapping networks, a “network of networks,” or in virtual world terms, “platforms of platforms.” It seems likely that there will be a tree-branch structure with ecosystems of virtual worlds evolving that are not perfectly substitutable but only partially. The forces of (dynamic) competition will be mediated, in part, by the extent to which these evolving ecosystems are substitutable. This should be true at all core layers including basic infrastructure, applications, and user communities. In architectural and technical terms, it will depend on the degrees of interoperability and the capabilities to decompose the complex components and reconfigure them in novel mix-and-match combinations. Those opportunities will be jointly determined by the technology, instantiated in standards and system architectures, as well as by the evolving structure of firms and industry value chains, which are rendered more dynamic and fluid as a result of information technologies and the globalization it enables.

Core competition issues will likely be related to:

- 1) **Ensuring shared access to bottlenecks (if that cannot be avoided, either because of winner-take-all or natural monopoly).** Natural monopoly situations arise when the costs of a single facility significantly dominate multiple facilities (e.g., last-mile conduit). However, winner-take-all economics can result in single-provider scenarios even when competition could have been feasible and efficient. It would be ideal if there were at least a duopoly or contestability for every resource, but that may not be technically or economically feasible, and when it is not, then it needs regulation.⁴
- 2) **Enabling ecosystem switching (interoperability).** We expect that there will not be a complete mix-and-match of all system components (where the system is the final product for the B2C value chain but could also be recursive for B2B intermediate good products),

⁴ See, for example, Lehr, W.H. & Sicker, D. (2018). Telecom Déjà Vu: A Model for Sharing in the Broadband Internet. *TPRC 46: The 46th Research Conference on Communication, Information and Internet Policy*, available at: <http://dx.doi.org/10.2139/ssrn.3142172>.

but it should be possible for customers to switch to other systems, with most important being B2C options to enable end-user choice and agency.

- 3) **Facilitating system viability (coordination).** There is a potential that the desired future (one “aspired to” – see earlier discussion) does not exist because of coordination failure. That could happen for lots of reasons (e.g., prisoner’s dilemma, incomplete contracts, asymmetric information and lemons problems, etc.), including one or more essential component(s) being public goods. Government subsidies or other interventions may be needed to address such coordination problems.

We frame these as core competition issues that arise from what economists identify as market failures that motivate government corrective interventions. The *first* corresponds to situations where competition is not feasible, and market power is a serious threat – the most common and focal concern of regulation and antitrust policy. The *second* focuses on a key enabler of contestability and dynamic competition. A key risk to address is the risk of lock-in or irreversible choices that make it difficult for individuals and collectives to move to (alternative) better solutions for technology, market outcomes, or public policies. The *third* focuses on the myriad coordination failures that can arise even when no market power or lock-in is yet relevant. These failures can arise as a consequence of failures of trust, which are often a direct result of asymmetric and imperfect information. In our fast-moving, fluid world of digital technologies, the future, which is inherently uncertain, arrives faster, and so “unknown unknowns” as well as “known unknowns” intermingle with the asymmetric dispersion of insights. This is why it is so important to build a measurement ecosystem that allows good data to be collected and shared to build toward consensus visions of both our areas for agreement and disagreement. The risk of bad data and noise, whether malicious or a byproduct of collective ignorance, poses a serious threat to a sound dialog.

As markets/technology moves faster and control capabilities become more agile, it becomes increasingly important to be able to rapidly decide how to adapt and act on those decisions; but as path dependency is unavoidable, forecasting into the uncertain future will also become more important.⁵

⁵ For more details, see, for example, Frias, Z., Lehr, W.H., Stocker, V., and Mendo, L. (2023). Measuring NextGen Mobile Broadband: Challenges and Research Agenda for Policymaking. *32nd European International Telecommunications Society Conference*, available at <https://www.econstor.eu/handle/10419/277959> and Lehr, W.H., and Stocker, V (2024). AI Regulation and 6G: The Measurement Ecosystem Challenge, In: Dynamics of Generative AI (ed. Thibault Schrepel & Volker Stocker), *Network Law Review*, available at: <https://www.networklawreview.org/lehr-stocker-generative-ai/>.