Call for Input: Virtual Worlds and Generative AI

Vodafone comments

Virtual Worlds

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?

The successful development of markets of virtual worlds (VW) and virtual reality (VR) products and services will be contingent on two primary factors: i) on the supply side, the existence of a high capacity, virtualised 5G network capabilities necessary to carry the increased traffic loads which these services will generate, ii) on the demand side an open and competitive platform environment for the developers of applications and services utilising this technology. Bottlenecks on either side of the market could stymie the deployment and uptake of VW and VR technology.

Studies estimate the average VR Metaverse user requires five to 40 times more data than it takes to stream an HD video. These types of application also require low latency to function properly, which typically requires connectivity providers to make further network investment.

An evolution in video communication. For example, Google's Starline project facilitates conversations between 3D renderings of the participants. This has significantly higher data consumption than traditional video calls. A standard video call today requires around 2-5 Mbps; a Starline call even with advanced compression applied will consume between 30 – 100 Mbps (and we estimate between 85 – 110 without compression).

This is coupled with greater penetration of devices that are capable of receiving higher bandwidth content (e.g. 8K smart TVs and 5G enabled mobile handsets). These services will have an impact across both the fixed and mobile network.

It is also worth noting that many of these new services come with significant additional quality demands, (in particular low latency), which will require significant investment on the part of the connectivity provider.

To meet the additional traffic demand that VW and VR technology will introduce, Europe urgently need to establish an investment model for 5G telecommunications networks which is fair and future proof. Operators' ability to invest is heavily determined by the return on capital we can generate. Investment returns for the EU telecoms sector have been below the cost of capital (WACC) for over a decade. The low-returns environment limits significantly the industry's ability to invest at pace in the transformational technology. This situation arises

because, despite ever increasing capex spend, the available capex budget is largely devoted to maintaining existing services and revenue streams rather than transformational activity.

We believe a commercially negotiated solution with Large Traffic Generators is the optimal solution for ensuring European networks can deliver the necessary transformation to support the Digital Decade goals and a new wave of AR and VR applications. It requires a regulatory framework to address asymmetric bargaining, to ensure fair and equitable distribution of payments (including to smaller ISPs), to create legal certainty around scope (and exclusions) and to avoid circumvention. A regulatory model for direct payments to network operators from large traffic generators would oblige both parties to negotiate and conclude commercial agreements for the provision of its data conveyance service. This would be enhanced by a regulatory backstop of a dispute resolution mechanism if no commercial agreement can be reached.

2) What are the main drivers of competition for Virtual World platforms, enabling technologies of Virtual Worlds and/or services based on Virtual Worlds (e.g. access to data, own hardware or infrastructure, IP rights, control over connectivity, vertical integration, platform and payment fees)? Do you expect that to change and, if so, how?

As with the digital platforms ecosystem, the primary drivers of competition (and inversely the factors whose *absence* results in a lack of competition) can be reduced to *fairness* and *contestability*. Fairness in this sense can be understood as the ability for service providers dependant on large digital platforms to reach their end customers to retain a greater share of the surplus value created by the existence of their service on the platform controlled by the dominant firm (or *Digital Gatekeeper* in the language of the Digital Markets Act). Contestability can be understood as the possibility for market entry, and the ability to scale services in the market dominated by the digital platform provider, to the point where there is a genuine possibility of switching, or multi-homing.

We can expect many, if not all of these dynamics to be present in the market for VW and VR solutions, where a small number of large digital firms have already taken advantage of their scale and first mover advantage to occupy a strategically important, if not yet dominant position in the market (Meta and Apple for example both having launched a range of VW and VR products and services in the past two years). It will certainly be necessary to ensure that some of the pro-competitive interventions enacted via the DMA are carried over to VW markets, in particular the requirement to ensure access to and interoperability with key hardware and software features.

A particularly important feature of the VW marketplace will be the ability for network operators to negotiate directly with app developers, allowing them to take advantage of advances in virtualisation and network slicing (within the parameters of the EU's Open Internet regulation) to offer them guaranteed Quality of Service (QoS) and Quality of Experience (QoS). Not just an iterative improvement in network quality, this level of connectivity is prerequisite for a number of mobile VW applications and services, without which the consumer experience will

be so degraded, it is unlikely that mass demand will emerge in the new future.

A key bottleneck in the VW marketplace is likely to be the device operating system, as has been witnessed with the mobile digital ecosystem over the past 20 years. These issues are being remedied to some extent with the introduction of access and interoperability obligations under the DMA on designated Core Platform Services (iOS and Android) however it is imperative that these rules are dynamically applied, and regularly reviewed to ensure that new use cases and core platform services such as VW and VW are properly captured.

6) Do you expect the technology incorporated into Virtual World platforms, enabling technologies of Virtual Worlds and services based on Virtual Worlds to be based mostly on open standards and/or protocols agreed through standard-setting organisations, industry associations or groups of companies, or rather the use of proprietary technology?

In order for the Virtual words/platform to fully unleash it's potential it should be based on open and standardized protocols agreed, as this will enable the interoperability between ecosystems /platforms and content providers which is key to make the virtual experiences run smoothly.

Generative AI

1) What are the main components (i.e., inputs) necessary to build, train, deploy and distribute generative AI systems? Please explain the importance of these components

1. **Hardware infrastructure and GPUs** to train and run the Large Language Model. The strategy of many companies seeking to harness the power of GenAI is to leverage the hardware infrastructure of hyperscalers (e.g., Google, Microsoft, etc.) which buys GPUs from their main vendors (e.g. nVidia) or develop internally (e.g. Google). A possible drawback of this approach is that the market must be kept open and balanced in this field (both for GPUs vendors and hyperscalers adopters) to avoid specific entities monopolising all GenAI capabilities controlling this founding component of the GenAI stack. See also answer to next question.

2. **GenAI Development environments**, including devops capability, orchestration, etc. Many vendors are offering these environments being them hyperscalers (e.g. Google, Microsoft, AWS), SW players (e.g. Salesforce, Service Now) and open-source providers. Therefore, this does not seem a critical component from a competitive point of view.

3. **GenAI Applications**. Also in this area, the amount of players is so wide that there does not seem to be immediate risk of anti-competitive behaviour.

4. **Connectivity**. The GenAI capabilities of the hyperscalers are offered on Cloud, the usage of GenAI applications is often cloud-based. While not being connectivity a topic

specifically related to GenAI, still cloud-neutrality should be ensured to avoid bandwidth bottlenecks and political/financial constraints to connect to GenAI resources and services.

2) What are the main barriers to entry and expansion for the provision, distribution or integration of generative AI systems and/or components, including AI models? Please indicate to which components they relate.

Generative AI systems are extremely expensive to develop and run, requiring large amounts of computing capacity, with high ongoing input costs. This amounts to a significant barrier to entry for smaller firms, without access to funding or capital markets and creates a market dynamic which is highly prone to concentration in the hands of the one or two technology firms able to run GenAI systems as a "loss leader" until such a time as they have captured the market and are able to raise prices.

Other barriers to integration and interoperability could be geopolitical, considering the current positioning on advanced technologies taken by USA and China (e.g., for GPUs production and distribution, cloud connectivity, access to information, etc.)

4) Which competition issues will likely emerge for the provision, distribution or integration of generative AI systems and/or components, including AI models? Please indicate to which components they relate.

GenAI, like previous forms of cutting-edge technology, could soon assume a central, underpinning role for a variety of technology processes and systems. Access to GenAI would therefore constitute an essential input factor or facility for firms to effectively digitises their operations, creating an bottleneck or unavoidable trading partner dynamic for those firms developing and supplying GenAI tools. Competition issues could easily emerge if those firms were to engage in unfair or anticompetitive conduct, such as bunding or typing of service, refusal to deal or introduction of unfair or discriminatory terms of service.

5) How will generative AI systems and/or components, including AI models likely be monetised, and which components will likely capture most of this monetization?

While being a rapidly evolving landscape difficult to be forecasted, the currently foreseeable main ways of monetizing GenAI are: generated efficiencies in company processes and operations, increased revenues and lower churn in companies' customers due to better / more personalised customer experience, better customer value management and lead generation, producing increased amount of sale, new AI products (both as privacy compliant resale of data, and as data-enabled optimisation services provided to third parties).

6) Do open-source generative AI systems and/or components, including AI models compete effectively with proprietary AI generative systems and/or components? Please elaborate on

your answer.

Generative AI will be incorporated into growing number of products for a growing number of use cases and products of all price ranges, also low-price ones. This will for sure end up in open-source generative AI to be built in growing number of Products and as such in competition between closed- and open-source models. Such products could easily fall into scope of Cyber Resilience Act (CRA) for Products with digital Elements. The CRA outlines detailed requirements for use of any type of open-source software built in such products, which also includes all types of open-source generative AI and other AI systems, whereas the AI Act does also set requirements to open-source AI but limited to high-risk AI systems only. This bears a risk to everybody (incl. Vodafone) bringing to market products that include open-source AI (low- and high-risk ones) and are subject to CRA regulations because the CRA regulations does not cover specific aspects of open-source AI systems like AI Act does (i.e. how to handle training data). Some manufacturers and distributers may see such risk as a reason stepping back from use of open-source AI systems in favour for more clearly regulated closed-source ones.

9) Do the vertically integrated companies, which provide several components along the value chain of generative AI systems (including user facing applications and plug-ins), enjoy an advantage compared to other companies? Please elaborate on your answer.

Yes, this is a clear and present risk in the market for GenAI technology, with two firms occupying such a large share of the market. These companies operate vertically integrated technology supply chains, from hardware to software to consumer applications and services, and are in a position to move quickly to integrate GenAI tools into these supply chains, making it difficult for third-parties to gain market entry and compete.

10) What is the rationale of the investments and/or acquisitions of large companies in small providers of generative AI systems and/or components, including AI models? How will they affect competition?

As with previous cycles of technology innovation, there is a significant risk of large firms seeking to exploit their scale and large capital reserves by buying up potential future competitors before they have an opportunity to scale and compete. The subsequent impact on competition in the market can be very damaging, with long terms effects of higher prices, less choice for consumers and businesses. We believe that regulators should watch the development of this market carefully to identify and where necessary intervene to prevent such practices. Such predatory activities do need to be distinguished of course from genuine investment and R&D on the part of large technology firms, which can be necessary to support the growth of early stage start-ups and, carefully overseen, do not pose any significant risks to competition.

11) Do you expect the emergence of generative AI systems and/or components, including AI models to trigger the need to adapt EU legal antitrust concepts?

Notification of mergers in the AI space

A22 EUMR has been expanded so that transactions that do not meet the EUMR or Member State notification thresholds can still be referred to the EU Commission. Similarly, Art 14 of the DMA requires designates gatekeepers to inform the EU Commission of concentrations in the digital sector.

However, a lacuna may still exist and transactions in the AI space may not need to be notified to the EU Commission where Article 14 of the DMA is not met, or where national competition authorities are not aware of or choose not to refer a transaction to the EU Commission.

Greater clarity needs to be provided by the EU Commission, either by way of an update to the DMA, the EUMR, or additional Article 22 guidance specific to the AI sector.

The DMA

As noted above, certain antitrust issues that may arise in the AI space will be remedied to some extent with the introduction of access and interoperability obligations under the DMA on designated Core Platform Services. However, the DMA may not be well-equipped to deal with products that are required for companies to participate in the AI space, but are not one of the ten core platform services listed in the DMA. An expansion of this list, or a mechanism to expand this list based on the discretion of the EU Commission, should be considered.

Other tools

More broadly: (i) the EU Commission will need to ensure that it has the tools to maintain visibility over, and to intervene in, markets adjacent to the AI sector if necessary to prevent competition harm in the AI market; and (ii) the EU Commission will also need to ensure that it has the tools to assess possible A101 abuses, examples could be partnerships with two strong players, or where dominant upstream players enter into contracts with smaller downstream players with insufficient bargaining power.

12) Do you expect the emergence of generative AI systems to trigger the need to adapt EU antitrust investigation tools and practices?

Existing legislation such as Articles 101 and 102 of the TFEU and the DMA will be useful tools through which possible contraventions of competition law by providers of AI systems can be assessed. However, many of the theories of harm that the EU Commission will be dealing with will be novel and the initial investigations will likely be longer while the regulator "upskills" in these new areas. Given the dynamism of the GenAI and Virtual Worlds markets, however, it is crucial that antitrust intervention is quick. This may entail the greater use of interim measures. Such interventions will need to integrate antitrust considerations both traditional and novel, including for example evolving environmental sustainability considerations (given the huge

energy consumption required to sustain competing firms and models in Virtual Worlds and GenAI markets).