March 2024

Meta's Response to the European Commission's Call for Contributions on Competition in Virtual Worlds

I. Introductory Remarks

Meta appreciates the opportunity to respond to the European Commission's call for contributions on competition in virtual worlds. At Meta, we are enthusiastic about the opportunities virtual worlds, or what we refer to as the 'metaverse', can bring to people, society, and the European economy. While the metaverse is only in its early stages of development, there is already a clear trend that it is spurring investments and innovation in Europe, also driven by European businesses who have a higher adoption rate in augmented/virtual reality than their US counterparts.[1]

In this contribution we first outline our view of the future of the metaverse—a highly dynamic and quickly evolving space. We see the metaverse as a technological advancement that has the potential to enrich human experiences and contact (rather than replacing those experiences). We also outline how our contributions to the metaverse are guided by four core values: (1) privacy, (2) safety and security, (3) economic opportunity, and (4) equity and inclusion.

We think the metaverse will eventually be delivered predominantly through virtual reality (VR), augmented reality (AR), and mixed reality (MR) devices. However, in the near and medium-term future, it will remain dependent on mobile ecosystems, which are where people are today, and will remain for the foreseeable future. Those ecosystems will remain crucial access points for consumers to experience immersive technologies and services. This level of control means that mobile ecosystem providers are able to set the pace of innovation and have an incentive to undermine competition in the metaverse - especially when it comes from third party players within their ecosystems. This submission outlines the key parameters of the dependency on mobile ecosystems and the potential risks emerging from it.

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[1] European Investment Bank (2022). "Digitalisation in Europe 2021-2022. Evidence from the EIB Investment Survey": https://www.eib.org/attachments/publications/digitalisation_in_europe_2021_2022_en.pdf

Meta hopes that this is the beginning of a more in-depth conversation and is looking forward to engaging further with the Commission on this topic.

II. The Metaverse is a Highly Dynamic and Quickly Evolving Space

A. Meta's Vision for the Metaverse

Our company is at the very start of its journey toward the metaverse. We are at the 'dial-up internet' stage of the metaverse and just as it was hard to imagine the internet of today back in the 1990s, it is hard to fully grasp what the metaverse will be a decade from now. The metaverse is fundamentally about finding ever more ways for the benefits of the online world to be felt in our daily lives - enriching our experiences, not replacing in-person contact. When it is impossible to be together in person, the metaverse will get us close to an in-person experience because interactions in the metaverse will feel more like those we have in our physical daily lives.

Because the metaverse is still in early development, these advancements will not happen overnight, but its potential impact on society is real. The mobile internet has already allowed people to work, learn and socialise in ways that are less limited by their physical location. The metaverse is going to take that even further. The potential societal benefits – particularly in areas such as education and healthcare – are vast, from helping medical students practise surgical techniques to bringing school lessons to life in exciting new ways. Because of these expected benefits, we are building the metaverse to be something that billions can benefit from - not just something for people who can afford the most expensive headsets or fastest internet.

When it comes to economic opportunities, the metaverse presents a new frontier for creators, businesses, developers, and users around the world. For example, there will be creators who make digital objects or offer services and experiences, such as musicians, actors, and theatres. The metaverse will enable businesses to provide enhanced training and educational opportunities to staff, where co-workers will be able to interact with 3D digital models and environments, as well as with colleagues, from disparate locations.

For developers, the metaverse will unlock numerous opportunities to create completely new types of experiences for consumers and better relationships with their customers. Ultimately, consumers will benefit by having access to immersive, new forms of content

and experiences to engage with. For example, they will also gain access to new technologies that will drive much more immersive telepresence. We believe this will enable broader access to education, training, and job opportunities.

Building for safety in the metaverse is Meta's priority and it will require cooperation across apps, platforms, and people within experiences. People will not want to spend time in metaverse experiences if they do not feel safe.

In light of the above, our approach will be guided by the following priority areas where we aim to address hard questions head on:

1. **Privacy**. Building meaningful transparency and control into our products.
2. **Safety & Security**. Keeping people safe on our platforms, and giving them tools to take action or get help if they see or experience something they aren't comfortable with.
3. **Economic Opportunity**. Giving people choice and maintaining a thriving digital economy.
4. **Equity & Inclusion**. Ensuring these technologies are designed inclusively and in a way that's accessible.

To ensure this vision is achieved, open standards and strong competition are needed in the metaverse. Our 2023 report on 'The Metaverse and the Opportunity for the European Union' specifically highlights the importance of these factors for consumer benefits and choice in the metaverse: "*As the metaverse is built collaboratively, competition will be driven by increasing numbers of players developing services, products and experiences in an open ecosystem. This will increase choices and ensure that quality is maintained by shaping the rules collaboratively.*"[2]

B. Europe already is benefiting from investments and innovation

Like the internet, we firmly believe that the metaverse will not be built by one company. And whilst the metaverse is nascent and still in early development, the individual technologies that compose it are already spurring investment and innovation across the

[2] Meta (May 2023). "The Metaverse and the Opportunity for the European Union": http://research.facebook.com/file/622078826170189/Metaverse-Report-EU.pdf

EU benefiting a wide range of players along the value chain. Business adoption of VR and AR is higher in the EU (10%) than in the US (9%).[3]

The EU consumer and industry market for VR and AR reached an estimated €7 billion in 2021 and is projected to grow by 37% annually to €34 billion by 2026.[4] This value is comparable to the contribution of how broadband internet and smartphone technologies supported the development of today's European digital economy, which generated €187 billion in revenue throughout the EU economy in 2019 and contributed 0.4% to GDP.[5] Further, the market size and value of the AR/VR industry in Europe (including non-EU countries) could directly create employment for 440.000 to 860.000 people.[6]

C. The importance of a multi-stakeholder approach

As the technologies that make the metaverse continue to be developed, novel and unique issues may arise, just as in any other field. This underlines the importance of a robust and inclusive framework for dialogue, so that emerging issues can be discussed, existing regulatory principles applied, and gaps identified. Whether new regulation is necessary to address these potential new questions will need to be ascertained on a case-by-case basis, collaboratively and iteratively, and based on evidence.

The multi-stakeholder approach to the development of metaverse policy should not be limited to discussions on regulation. Stakeholders must also come together around other policy tools. The metaverse will reach its full potential only if built on appropriate technical standards and protocols empowering both businesses and people to seamlessly navigate and travel between multiple destinations and experiences, just like we can browse the internet today freely. Not every element of the metaverse needs to be, or will be, interoperable with others, but we should engage in multi-stakeholder discussions to

[3] European Investment Bank (2022). "Digitalisation in Europe 2021-2022. Evidence from the EIB Investment Survey": https://www.eib.org/attachments/publications/digitalisation_in_europe_2021_2022_en.pdf
[4] European Commission, Directorate-General for Communications Networks, Content and Technology, Vigkos, A., Bevacqua, D., Turturro, L. et al., VR/AR Industrial Coalition – Strategic paper, Publications Office of the European Union, 2022, https://data.europa.eu/doi/10.2759/197536; European Investment Bank (2021). "Digitalisation in Europe 2020–2021: Evidence From the EIB Investment Survey.": https://www.eib.org/attachments/efs/digitalisation_in_europe_2020_2021_en.pdf
[5] Deloitte (2020). "The App Economy in the European Union": https://actonline.org/wp-content/uploads/Deloitte-The-App-Economy-in-the-EU-2020.pdf
[6] Ecorys (2021). "XR and it potential for Europe": https://xreuropepotential.com/assets/pdf/ecorys-xr-2021-report.pdf

determine where interoperability matters to avoid the metaverse becoming fragmented and broken into silos. The development of technical standards in specific areas is therefore crucial to a baseline level of interoperability that mirrors the kind of open internet protocols we see in place today, lowering barriers to entry and facilitating market access by small firms and developers.

To this end, Meta is already working with leading international organisations including the World Economic Forum, the OECD, the XR Association, and the Metaverse Standards Forum on their efforts to ensure the metaverse is built on such a foundation. Where industry participants come together to collaborate in open forums on standards development for new technologies and the future of the internet, we encourage policymakers to consider ways to support and embrace such standards.

A good example is the work of the Metaverse Standards Forum,[7] which provides a venue for cooperation between standards organisations and companies to foster the development of certain core technical interoperability standards for a more inclusive metaverse, and accelerate their development and deployment through pragmatic, action-based projects. Aligning any future policy initiatives with the work of such international, multi-stakeholder efforts around technical standards development is vital to ensure policies and regulations align with industry best practices and support responsible innovation globally.

Other examples include the French Metaverse Standardization Commission[8] launched by the AFNOR Group, the organisation in charge of coordinating leadership of the French standardisation system, in which Meta participates actively. Similarly, the World Economic Forum has announced a Defining and Building the Metaverse initiative[9] that brings together key stakeholders to develop a more interoperable and inclusive metaverse.

Meta participates in these initiatives to ensure the metaverse is built in a way that will translate positively into greater innovation and consumer choice.

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[7] The Metaverse Standards Forum: https://metaverse-standards.org/
[8] AFNOR Standardization Commission: https://www.afnor.org/en/news/afnor-metaverse-industry/
[9] WEF Defining and Building the Metaverse: https://initiatives.weforum.org/defining-and-building-the-metaverse/home

III. The Metaverse Depends on Mobile Ecosystems

We believe that, in time, new devices and platforms, such as VR/AR/MR devices could disrupt the existing paradigm of entrenched mobile ecosystems. The metaverse can be accessed from a range of devices, including smartphones, tablets, and desktop computers. Additional equipment can enhance a user's immersive experience - this includes not just VR devices, but also AR and MR devices. However, the ability of this new VR/AR/MR hardware to disrupt the pre-existing mobile ecosystems is still some time away. For the foreseeable future, growth and innovation in the metaverse is dependent on sufficient access to the existing mobile ecosystems.

Mobile devices play a critical role in the lives of EU citizens, providing access to a wide range of products, content and services from a device that can be carried in your pocket. Last year, mobile devices were used to connect to the internet by 9 out of 10 EU internet users.[10]

Smartphones can also be connected to, and have the ability to control, a wide range of other devices and technology such as VR, AR, and MR headsets and wearables, smart watches, smart TVs, smart speakers and other smart home devices - covering everything from lighting to vacuum cleaners. The connectivity between these devices and services serves to strengthen the functionality and value consumers derive from each.

Innovation, growth, and development of the metaverse will be dependent on those smartphones (and specifically the two major mobile ecosystems - iOS and Android) for the foreseeable future.

First, in the medium term, people are and will continue to predominantly access the metaverse via mobile devices. This situation reflects a range of factors: principally the large number of people who already have access to a mobile device and will therefore first access the metaverse from this device, as well as the current relative cost of AR/VR/MR hardware. These factors are explored in full below.

[10] Eurostat (December 2023), "Digital economy and society statistics - households and individuals": https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Digital_economy_and_society_statistics_-_households_and_individuals#Devices_used_to_connect_to_the_internet.

Second, the metaverse will depend on mobile ecosystems even for those who *have* adopted AR/VR/MR devices. As outlined further below, a good amount of AR/VR/MR hardware is currently reliant on mobile devices to deliver their full potential to consumers.

The delivery of the metaverse - whether that be on a mobile device or on an AR/VR/MR device - therefore requires effective access to a mobile device. This means the metaverse's future is tied to its ability to work seamlessly with the mobile ecosystems underpinning such devices. Put simply, innovation in the metaverse will continue to be dependent on mobile ecosystems for the foreseeable future.

A. How is the metaverse dependent on mobile ecosystems?

The development of the metaverse relies on mobile ecosystems in at least three ways, each of which is considered in turn below.

i) The install base of mobile devices

The overwhelming majority of consumers are currently accessing virtual worlds using their mobile devices. This situation - which is not expected to change in the foreseeable future - reflects the following factors:

a. The sheer number of mobile device users means that the most viable way to scale the metaverse and introduce large numbers of people to virtual worlds is to do so via their mobile device. On major metaverse platforms, the lion's share of people are accessing content using their mobile devices.[11] For example, publicly reported data shows that (as of 2022), 78% of Roblox players were accessing the platform on their mobile device,[12] and on Rec Room only 9 million of its 60 million players were using VR hardware.[13]

b. AR/VR/MR hardware remains costly for many, especially given the younger age of many of those interested in the metaverse. Given the ubiquity of smartphones and the current dependency of AR/VR/MR hardware on them, mobile devices will continue to reign supreme.

[11] See, e.g., Ben Lang, Road to VR (April 2022), "Virtual Social Platform 'Rec Room' Hits 3 Million Monthly Active VR Users": https://www.roadtovr.com/rec-room-monthly-active-vr-users-3-million-peak/

[12] Roblox's 2022 Annual Report, page 85, "Breakdown of Our Users": https://s27.q4cdn.com/984876518/files/doc_financials/2022/ar/roblox_2023-proxy-and-2022-annual-report_web-ready.pdf

[13] Dean Takahashi, VentureBeat (March 2023), "How Rec Room looks at the metaverse opportunity": https://venturebeat.com/games/how-rec-room-looks-at-the-metaverse-opportunity/

While Meta's own offering, Horizon Worlds, began as a VR experience, Meta has recently begun to expand it to other devices, including mobile and web.

Horizon Worlds is an immersive social platform where players move and interact with each other in various worlds that host events, games, and social activities. Content experiences are created by both Meta and users, using system tools. It originally launched in December 2021 to users of Meta's VR headsets.

In September 2023, Meta announced that it had started to roll out Horizon Worlds on mobile and the web.[14] This means that iOS and Android users are now able to access Horizon Worlds within the Meta Quest app on their phones. This approach reflects Meta's belief that there should be multiple entry points to the metaverse, and bringing Horizon Worlds to both mobile and web means more people will be introduced to the experience. Indeed, continuing to improve the mobile version of Horizon Worlds is one of Meta's key priorities for the year ahead.

ii) The limited hardware capabilities of lightweight AR/MR devices

For those accessing the metaverse using lightweight AR/MR hardware such as smart glasses, a dependency on mobile ecosystems will persist for the foreseeable future. One reason for this is that a significant amount of AR/MR hardware is not yet technologically independent of mobile devices: it relies on them to fill current technological gaps.

That is because lightweight AR/MR hardware currently has smaller batteries, weaker processor chips, and more limited wireless connectivity than a smartphone. While Meta and others are making enormous investments to address these challenges, doing so successfully will require great technological advancements that are still years away.

The principal way for more lightweight AR/MR hardware to tackle this challenge in the interim is to access key mobile device functionalities. For example, this could allow the AR/MR hardware to share the mobile device's connection without having to access the internet independently. This saves power by lessening the computing power required. If mobile ecosystem owners reserve access to key mobile device functionality for their own products, they alone will determine the pace of innovation and control these emerging spaces, likely resulting in reduced competition.

It is also important to note that a more immersive metaverse will most likely only gain scale if it is available on devices with lightweight form factors, which is why the current

[14] See Meta's announcement here:
https://www.meta.com/en-gb/blog/quest/horizon-worlds-web-mobile-social-vr-free/

dependence of AR/MR hardware is an important factor in the adoption of the metaverse more generally.

iii) Access to key mobile ecosystem APIs

The metaverse requires access to key mobile APIs in order to provide services to users. This applies to both: (1) software developed for people accessing the metaverse only on mobile devices; and (2) hardware and software developed for people accessing the metaverse on AR/MR/VR hardware.

APIs are used by developers to extend the capabilities of their apps by incorporating additional features and functionalities. For example, a developer can choose to integrate social media sharing, location-based services or payment gateways. Developers can also use APIs to access the different hardware features of mobile devices, such as the camera, GPS, and microphone. By enabling these features, developers can make the most of a mobile device's capabilities and provide a rich, immersive user experience. This is incredibly important in the metaverse, and especially so when being accessed on a 2D mobile device.

For those who are entering the metaverse using an AR/MR/VR device, it is just as critical that both the hardware itself and any software developed to run on the hardware are able to access key mobile APIs. To give just two examples:

a. Users may wish to cast videos they have on their mobile device onto their headset, for a more immersive experience. This will require the headset having access to a mobile API;

b. Users of AR/MR/VR hardware who are on the move and wish to continue an experience in the metaverse on their mobile device will want to pick up where they left off. It is important that the software running on both their AR/MR/VR headset and their mobile device can easily sync in the background, without the user having to manually synchronise their data on their headset with their mobile device. This, too, will require access to a mobile API.

While these are just two examples, the impact of mobile APIs is wide ranging and without them, a user's experience and security in the metaverse will be dramatically impaired.

B. What are the risks that this dependency creates?

The upshot of these dependencies is that a significant amount of the innovation and new entry that could be promoted in the metaverse effectively needs permission from the mobile ecosystem owners. This takes the form of several specific risks.

i) The rules are set by the mobile ecosystems

The development of AR/MR/VR hardware and software - including software developed for 2D mobile metaverse apps - is at risk as a result of the rules imposed by the owners of the mobile ecosystems.

As regards software, developers are reliant on the app review processes of the ecosystem owner. For example, Apple's App Store Review Guidelines set out the relevant rules that must be followed in order to distribute an app on the Apple App Store.[15] Apple has the ability to change these rules without notice and to interpret areas of ambiguity as it sees fit. This uncertainty can create a challenge for those wishing to invest in the metaverse.

ii) Mobile ecosystem providers favour their own services

A risk that follows on from mobile ecosystems' ability to impose their own rules is that mobile device providers who decide to provide their own competing AR/MR/VR offering have an incentive to favour their own services and products.

This phenomenon is not unique to the metaverse. The control yielded by mobile ecosystems, by virtue of such widespread adoption of their devices, has created a situation in which mobile ecosystems can leverage their position to exclude rivals in a range of markets.

For example, as noted by the UK Competition and Markets Authority, Apple's control over its mobile ecosystem allows it to influence competition in downstream app markets throughout the entire process of app development and distribution.[16] It has achieved this by preventing other app stores from being accessed on Apple devices,[17] and only making iOS available on Apple devices.[18]

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[15] For further details, see here: https://developer.apple.com/app-store/review/guidelines/.
[16] CMA Mobile Ecosystems Market Study, Final Report, paragraph 6.260: https://assets.publishing.service.gov.uk/media/63f61bc0d3bf7f62e8c34a02/Mobile_Ecosystems_Final_Report_amended_2.pdf
[17] Ibid., paragraph 2.22.
[18] Ibid., paragraph 3.15.

As things stand, mobile ecosystems would be able to achieve the same effect vis-à-vis the metaverse. They could choose to provide access to key mobile APIs only to their own AR/MR/VR hardware or software, instead of providing open access to these APIs to all players in the metaverse. As a consequence, consumers would be prevented from accessing the full capabilities of the metaverse *unless* they buy further into the mobile ecosystem and purchase a device manufactured by the same company.

There is further scope for mobile ecosystems to favour their own services in light of their ability to set the rules dictating the terms on which third parties can access them (see above). For example, the ability of mobile ecosystems to implement onerous app review rules means that they effectively have the ability to control the content and functionality of apps to be distributed on their devices. Were they looking to protect their own metaverse offering, this could result in mobile ecosystems interpreting app review rules more stringently to prevent third parties from mounting strong competition via their own metaverse app.

Mobile ecosystems favouring their own products and services stifle true innovation and competition on the merits in the metaverse.

iii) Mobile ecosystems slow (and potentially block) innovation

Even where a mobile device provider is not offering a competing AR/MR/VR service, it has the ability to stall developments in the metaverse: the centrality of mobile ecosystems means they could slow (or even potentially block) innovation.

Because the metaverse is currently reliant on mobile ecosystems to provide various functionalities, it is not possible for third-party developers to overtake the mobile ecosystem and provide new and compelling user propositions.

The efforts of developers of AR glasses have been hindered by the lack of any participation from mobile ecosystem providers. For example, third parties' AR glasses do not seamlessly connect to a user's mobile device and cannot provide the kind of connectivity that people are looking for. If they are not able to offer an intuitive and useful user experience, these products will struggle to gain traction.

Even for those users who have adopted AR/MR/VR hardware, it could be that new and exciting technologies remain unavailable if mobile devices decide not to support these innovations. For example, a new game in the metaverse may try to offer unparalleled graphics but find that it is not feasible to offer this if a mobile device is prevented from providing the level of computational processing power this requires, either for the game

to run on the mobile device in its own right or when the mobile device is acting as the computational offload for a mixed reality wearable. That could particularly be the case for lightweight AR/MR hardware that by its physical nature is more reliant on seamless connectivity with phone devices (as discussed above).

Mobile ecosystems hold the keys to unlocking the potential of the metaverse. The risk of this is that they therefore set the pace of progress and may prevent consumers from accessing ground-breaking technological developments.

iv) Slowing the metaverse delays and erodes competition to the dominance of entrenched mobile ecosystems

We described above how, in our vision, the metaverse will provide a new alternative platform for businesses and customers to meet and transact. In time, the metaverse or similar platforms could challenge the entrenched mobile ecosystems as "gatekeeper" between all business and user interactions. However, the very firms threatened by that competition - mobile ecosystem owners - are those in a position to stifle that competition.

By hindering the development of the metaverse, mobile device providers could prevent potential competitors from providing spatial computing experiences that would otherwise loosen the hold the mobile ecosystems currently have on consumers.

For example, were a third-party developer able to offer consumers experiences in the metaverse that introduce a layer between the mobile device and its operating system, then the dominant operating system would lose some of its importance to those consumers. Ensuring that these layers of experience are able to flourish is critical to eroding the control that the mobile ecosystems benefit from.

This could be as simple as allowing metaverse apps to be downloaded directly from the developer or from separate app stores not controlled by the mobile ecosystems, through to mandating equivalent interoperability between smartphone functionalities and third-party AR/MR/VR hardware, instead of a select mix of APIs hand-picked by the mobile ecosystems.

Without these opportunities, potential competition to the dominant mobile ecosystems will be thwarted, in the same way that other previous technologies have been thwarted in trying to compete with these dominant ecosystems. The metaverse offers the opportunity for this vicious cycle to be broken and for a more open model to be built for

the spatial computing era, one in which competition and innovation are allowed to flourish.

IV. Final Remarks

The metaverse and immersive technologies are a significant opportunity for social and economic progress in the EU and have the potential to spur innovation in Europe. They hold huge promise, both in terms of technological innovation and unparalleled user experiences. And while those technologies are only very nascent, they are already spurring investment and innovation across the EU, not least because European businesses are among the most enthusiastic adopters globally.

However, a key risk that could undermine this vision is the metaverse's dependence on mobile ecosystems for the foreseeable future. Whether people are accessing the metaverse on their mobile device in 2D form or via new AR/MR/VR hardware, this dependency threatens the success and vitality of a metaverse where competition and innovation thrive. As things stand - and until mobile ecosystems are replaced by other platforms - mobile ecosystems are able to set the pace of innovation and have an incentive to favour their own services and products in the metaverse.

Given the extent of the mobile ecosystems' current control, a truly competitive metaverse where third parties are not constrained by the mobile ecosystems and receive fair treatment may only be achieved through regulatory enforcement and action. While Meta is already working through multi-stakeholder processes to ensure that competition drives innovation in this space, this needs to go hand-in-hand with appropriate regulatory oversight where necessary.

In this respect, Meta notes that the implementation of the DMA in the EU - assuming proper compliance from mobile ecosystem gatekeepers - is integral to certain parts of this vision, such as access to certain smartphone software and hardware functionalities. Meta welcomes the opportunity to assist the Commission in exploring the future vision for the metaverse and what it will take to get there.