

## **XR Association response to European Commission’s call for contributions on competition in virtual worlds and generative AI (Transparency Register No.: 743246749855-04)**

March 11<sup>th</sup>, 2024

### **I. Introduction**

The XR Association (XRA) is a non-profit trade association representing companies across the immersive technology ecosystem including headset manufacturers, technology platforms, component and peripheral companies, enterprise solution providers, and corporate end-users. We are a global industry association, and our membership is diverse, ranging from small start-ups to large multinational companies.

XRA’s mission is to promote the responsible development and thoughtful advancement of XR technologies<sup>1</sup> that foster positive societal outcomes globally. To support this mission, we convene stakeholders, conduct research, develop best practices, and advocate on behalf of the XR industry. We work closely with academics, research institutions, privacy and safety consumer advocates, think tanks, scientists, and lawmakers in addition to industry representatives from across the spectrum. We value diverse perspectives and believe that if XR is to realize its promise as the next computing platform, all stakeholders must work together to learn from previous challenges and chart a path forward that supports innovation and the responsible development of virtual worlds.

XRA’s members are at the forefront of developing devices, platforms, products, and services for virtual worlds across consumer and industrial enterprise applications. Our members are driving innovation forward across a range of industries. XRA members are reimagining surgical navigation to improve patient care, training the next generation of professionals, preparing companies for the future of work, bringing history and science to life and increasing student engagement, driving efficiencies in manufacturing and improving safety, and so much more.

We firmly believe in the development of an open, safe, and people-empowering system of virtual worlds in line with our shared US-EU values of individual freedom, human dignity, and marketplace competition. We applaud the European Union’s leadership in developing a comprehensive vision for virtual worlds and were grateful for the opportunity to contribute XRA’s perspective on the EU’s strategy on Web 4.0 and virtual worlds.<sup>2</sup>

The European Commission is well-positioned to play a critical role in supporting innovation in immersive technologies which will help to grow the digital economy, contribute to the EU’s objectives under the Digital Decade program, and bolster the EU’s competitiveness globally. The EU is home to a growing XR industry and the bloc’s rich cultural landscape helps to create more diverse immersive experiences. The EU also is a world leader in governing technology and its

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<sup>1</sup> “XR” is an umbrella term for immersive and spatial computing that encompasses hardware, software, and services enabling virtual reality (VR), augmented reality (AR), and mixed reality (MR).

<sup>2</sup> XR Association, “XR ASSOCIATION RESPONDS TO EUROPEAN COMMISSION’S CALL FOR EVIDENCE ON VIRTUAL WORLDS,” May 2023. <https://xra.org/xr-association-responds-to-european-commissions-call-for-evidence-on-virtual-worlds/>

robust slate of existing legislation will apply to virtual worlds, as it does to other emerging technologies. Given the rapid pace of new legislation governing the tech sector, we encourage the Commission to focus on understanding how the existing legislation will work in practice.

Recognizing that virtual worlds are global in nature, we further encourage the EU to work with like-minded, democratic allies on matters related to governance of immersive technologies. Immersive technology is a powerful tool that can bridge geographical divides, expand market access, and give individuals new opportunities. To ensure that these benefits are accessible to all, free and fair competition in virtual world ecosystems will be essential. To that end, XRA is pleased to provide feedback on how the EU can create an environment that nurtures innovation, facilitates healthy competition, and ensures that individuals and businesses can fully realize the benefits of virtual worlds. This response will focus on drivers of competition for virtual worlds and the role open standards will play in the growth of virtual worlds.

## **II. How virtual worlds can contribute to security, economic growth, and benefit society**

We are in the midst of the Fourth Industrial Revolution where technology will blur the lines between the physical, digital, and biological spheres.<sup>3</sup> Immersive and spatial computing technologies will transform the way we work, learn, play, and deliver essential human services. XR technology is and will continue to be a significant driver of economic growth. McKinsey & Company forecasts that virtual worlds “may generate up to \$5 trillion in impact by 2030—equivalent to the size of the world’s third-largest economy today, Japan” and that “[it] is shaping up to be the biggest new growth opportunity for several industries in the coming decade, given its potential to enable new business models, products, and services, and act as an engagement channel for both business-to-consumer and business-to-business purposes.”<sup>4</sup>

The European Commission has recognized the importance of immersive technologies to its wider economic security objectives through the Economic Security Strategy. The Commission has prioritized the promotion of and investment in critical technologies like VR noting that these technologies will help future-proof Europe, enhance competitiveness, and make the European economy more resilient, independent, and secure.<sup>5</sup> The XR Association whole-heartedly agrees with the Commission on the essential role immersive technologies play in economic and national security. Below we outline some of the ways XR is already benefiting society and contributing to economic growth and security.

***Manufacturing:*** Immersive technologies are revolutionizing the manufacturing sector by enhancing design, production, and training processes. For example, Airbus, utilizes VR and AR for complex aircraft assembly and maintenance tasks, reducing errors and improving efficiency.<sup>6</sup> These technologies enable virtual prototyping, allowing manufacturers to test and refine designs

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<sup>3</sup> World Economic Forum, “The Fourth Industrial Revolution: what it means, how to respond,” January 2026. <https://www.weforum.org/agenda/2016/01/the-fourth-industrial-revolution-what-it-means-and-how-to-respond/>

<sup>4</sup> McKinsey & Company, “Value creation in the metaverse,” June 2022. <https://www.mckinsey.com/~media/mckinsey/business%20functions/marketing%20and%20sales/our%20insights/value%20creation%20in%20the%20metaverse/Value-creation-in-the-metaverse.pdf>

<sup>5</sup> European Commission Strategic Technologies for Europe Platform, “Target investment areas” [https://commission.europa.eu/strategy-and-policy/eu-budget/strategic-technologies-europe-platform/target-investment-areas\\_en](https://commission.europa.eu/strategy-and-policy/eu-budget/strategic-technologies-europe-platform/target-investment-areas_en)

<sup>6</sup> Airbus, “Mixed reality to meet future challenges,” June 2023. <https://www.airbus.com/en/newsroom/stories/2023-06-mixed-reality-to-meet-future-challenges>

without the need for costly physical models and significantly accelerating product development and reducing waste. BMW was the first vehicle manufacturer in the world to use technology from the gaming industry – Unreal Engine – to transform vehicle design and use VR headsets to visualize vehicle functions and new interior concepts.<sup>7</sup> Digital twins have significantly improved manufacturing by reducing errors, optimizing the production process, and identifying preventative maintenance needs for equipment. For example, use of digital twins at the Siemens Electronics Works Amberg has reduced the time cycle to produce key components for its Simatic controller.<sup>8</sup>

*Education:* In education, XR technologies are transforming learning experiences, making them more interactive, engaging, and accessible. Companies like Vienna-based GoStudent are partnering with headset manufacturers like Meta to revolutionize language learning in VR.<sup>9</sup> These immersive experiences enhance students' understanding of complex subjects by providing a visual and interactive dimension that traditional methods lack. They also enable virtual field trips and simulations, giving students access to experiences and locations that would be otherwise unreachable, thereby democratizing and enriching education.

*Training:* XR is a powerful tool for workforce development, offering immersive training that replicates real-world scenarios. Human Partner, for example, a leading advisory and training company based in Poland used HTC's VR headsets for workforce training, providing hands-on real-life experiences that kept workers more engaged and improved knowledge retention.<sup>10</sup> XR also facilitates remote learning, expanding access to training programs and contributing to workforce flexibility and adaptability which is essential to strengthening the competitiveness of the EU's current and future workforce. This approach to training is not only cost-effective but also safer. XR allows workers to acquire and refine skills without the risks associated with on-the-job training, making XR particularly well-suited for high-risk jobs. For instance, Saab AB works with the Finnish headset manufacturer, Varjo, to develop VR training solutions for fighter pilots allowing pilots to train for a wide range of high-risk maneuvers safely and accurately.<sup>11</sup> Varjo has also partnered with Wärtsilä, a marine solutions business based in Finland, to train seafarers on navigation, cargo handling, engine room maintenance, and ship operations.<sup>12</sup>

*Healthcare:* In healthcare, immersive technologies are enhancing patient care and medical training. Surgeons can use VR simulations for pre-operative planning and practice providing a risk-free environment for medical professionals to hone their skills. AR applications, like those

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<sup>7</sup> BMW AG, "A new take on vehicle development," August 2022. <https://www.bmw.com/en/events/nextgen/global-collaboration.html>

<sup>8</sup> Siemens, "Digital transformation: Leading by example."

<https://www.siemens.com/global/en/company/stories/industry/electronics-digitalenterprise-futuretechnologies.html>

<sup>9</sup> GoStudent, "GoStudent's Bold Leap into Virtual Reality, Redefining Language Learning for a New Generation," June 2023. <https://www.gostudent.org/en/press-releases/gostudent-vr:-gostudent%27s-bold-leap-into-virtual-reality-redefining-language-learning-for-a-new-generation>

<sup>10</sup> VIVE Business, "Human Partner Transforms Retail Staff Training for Leroy Merlin with VR Simulations Powered by HTC VIVE." <https://business.vive.com/eu/stories/human-partner-transforms-retail-staff-training-for-leroy-merlin-with-vr-simulations-powered-by-htc-vive/>

<sup>11</sup> Varjo, "Fighter pilots can now see every detail, near and far, in VR" and <https://varjo.com/testimonial/with-vr-1-pilots-can-train-with-perfect-vision-tobias-olsson/> "Saab and Varjo bring virtual reality to flight simulators" <https://varjo.com/company-news/saab-and-varjo-bring-virtual-reality-to-flight-simulators/>

<sup>12</sup> Varjo, "How Wärtsilä Revolutionizes Maritime training with Varjo XR Technology." <https://varjo.com/case-studies/how-wartsila-revolutionizes-maritime-training-with-varjos-xr-technology/>

developed by Philips, assist surgeons during procedures by overlaying critical information onto their field of view, increasing precision and reducing surgery times.<sup>13</sup> Furthermore, VR is being used for patient rehabilitation and mental health therapy, offering innovative treatment options.<sup>14</sup>

*Sustainability:* XR technologies offer innovative solutions for environmental education and management. For instance, the UN Environment Programme partnered with Sony to create immersive experiences that illustrate the impacts of climate change, fostering a deeper understanding and engagement with environmental issues.<sup>15</sup> Researchers at the University of Bern have shown that VR experiences are more likely to lead to attitude change.<sup>16</sup> VR and AR can also aid in sustainable urban planning and renewable energy management, allowing for efficient simulation and optimization of resources. These applications not only educate but also empower businesses and policymakers to make informed decisions, aligning with Europe's commitment to sustainability and environmental preservation.

### III. The importance of robust competition as a driver of innovation

The European Union already possesses a robust regulatory toolkit and is well-equipped to address the evolving landscape of immersive technologies. XRA strongly agrees with the Commission and European Parliament that existing laws and regulations apply to virtual worlds. Similarly, we agree on the need to assess the effectiveness of existing regulations in governing virtual worlds, before moving to technology-specific regulation.

A robust and competitive environment is essential for the full potential of immersive technologies to be realized and their benefits fully harnessed. Healthy competition fosters innovation, drives quality improvements, and accelerates the adoption of XR technologies across various sectors. This competitive landscape is crucial for stimulating creative solutions and ensuring that immersive technologies deliver maximum value to European businesses and society at large. Below we outline the key enablers that contribute to a competitive environment for XR that supports innovation:

*Good Regulatory Practices:* Businesses rely on predictable and streamlined regulatory frameworks to make key investment decisions. Regulatory uncertainty can create the perception of risk and reduce investment, which can be particularly detrimental for nascent industries like XR. Jurisdictions that create a regulatory environment that is not overly burdensome also provide a strong foundation for the future-planning needed for investors.<sup>17</sup> These factors are necessary for competition and innovation in virtual worlds. The European Union has a comprehensive

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<sup>13</sup> BioSpace, "Philips expands Augmented Reality Surgical Navigation – ClarifEye – to two new international sites with successful clinical outcomes," December 2021. <https://www.biospace.com/article/releases/philips-expands-augmented-reality-surgical-navigation-clarifeye-to-two-new-international-sites-with-successful-clinical-outcomes/>

<sup>14</sup> Directorate-General for Communications Networks, Content and Technology (European Commission) and Visionary Analytics, "Extended Reality: Opportunities, Success Stories and Challenges (Health and Education)," February 2023. <https://op.europa.eu/en/publication-detail/-/publication/f242f605-a82e-11ed-b508-01aa75ed71a1>

<sup>15</sup> UN Environment Programme, "Experience your carbon footprint in VR," June 2020. <https://www.unep.org/news-and-stories/story/experience-your-carbon-footprint-vr>

<sup>16</sup> Frontiers in Virtual Reality, "Increasing awareness of climate change with immersive virtual reality" Vol. 4 February 2023. <https://www.frontiersin.org/articles/10.3389/frvir.2023.897034/full>

<sup>17</sup> Pew Trusts, "Improved Business Regulation Systems Can Benefit State Economies," May 2023. <https://www.pewtrusts.org/en/research-and-analysis/articles/2023/05/22/improved-business-regulation-systems-can-benefit-state-economies>

regulatory system governing virtual worlds already in place thanks to the General Data Protection Regulation, the Digital Services Act, the Digital Markets Act, and soon the AI Act. As implementation of this legislation continues, it is essential that the EU seeks consistency and avoids conflicting requirements between new laws which could impact compliance obligations for SMEs in the XR industry.

*Intellectual Property Protection:* The protection of intellectual property (IP) is another important aspect of predictable legal frameworks. XRA agrees with the European Parliament that the existing body of EU IP law applies to virtual worlds.<sup>18</sup> Strong, non-discriminatory IP protections are essential to prevent fraud, counterfeiting, and piracy, while safeguarding the integrity of novel XR innovations. Such robust IP frameworks ensure that investments in developing these cutting-edge technologies are secure, which in turn would incentivize further investment in the EU market. It is crucial for the European Union to collaborate with like-minded partners globally to support fair and open trade relationships, reinforcing a mutual commitment to upholding strong IP standards.

*Digital Literacy:* To effectively bridge the digital divide, strategic investment in virtual worlds education will be paramount. As technological advancements continue, the costs associated with XR hardware are expected to decrease, making these cutting-edge tools more affordable and accessible to a broader audience. However, to truly capitalize on this potential, both government and the private sector must commit to investing in digital literacy. This approach will not only ensure wider access to XR technologies but also empower individuals with the skills and knowledge needed to utilize these tools effectively, thereby fostering an inclusive digital future and strengthening the resilience of Europe's workforce.

*Workforce:* For the immersive technology sector to flourish, it is essential to cultivate a robust skills and talent pipeline. This necessitates significant investment from the government in educating and training future engineers, designers, and creators of virtual worlds. Prioritizing access to comprehensive STEM education, particularly ensuring that underrepresented groups are not left behind, is crucial. Collaborating closely with the XR industry is equally important to align educational programs with the evolving needs of the job market, ensuring that students acquire skills that are directly relevant and valuable in this dynamic field.

*Global Cooperation:* Ensuring regulatory coherence and alignment will be crucial as virtual worlds expand global market access for a wide range of goods and services. This is especially important for SMEs venturing into novel products and services that wish to access new customers across borders. Overly burdensome compliance regimes or substantial regulatory differences between key markets can disproportionately challenge smaller companies, hindering their ability to compete effectively in the XR landscape. Therefore, the EU should seek to partner with like-minded governments to develop global frameworks that nurture innovation in virtual worlds. Collaboration with international partners is essential to support Europe's competitiveness in virtual worlds. Fostering a governance environment that is conducive to innovation and fair competition will support SMEs' growth and participation in the global XR marketplace.

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<sup>18</sup> European Parliament resolution, "policy implications of the development of virtual worlds – civil, company, commercial and intellectual property law issues," January 2024. [https://www.europarl.europa.eu/doceo/document/TA-9-2024-0029\\_EN.html](https://www.europarl.europa.eu/doceo/document/TA-9-2024-0029_EN.html)

#### IV. Opportunities and challenges of openness and standardization in virtual worlds

The XR Association firmly believes in the principle of "openness" in virtual worlds as a fundamental catalyst for healthy competition and market growth. The concept of openness in virtual environments goes beyond mere technological interoperability; it embodies the creation of inclusive, participatory platforms where barriers to entry are minimized, fostering a diverse ecosystem of manufacturers, developers, content creators, and users. In these open virtual spaces, competition thrives on the quality of content, innovation, and user engagement that virtual worlds can provide. This not only accelerates technological advancement and creative expression but also ensures that the market remains dynamic and responsive to the evolving needs and preferences of users. An open approach to virtual worlds aligns with the European Union's commitment to fostering digital markets that are competitive, fair, and inclusive, promoting a rich landscape of opportunities for both businesses and consumers.

Furthermore, openness in virtual worlds can be instrumental in catalyzing cross-industry collaboration and cross-sectoral competition, essential for addressing the complex challenges of our digital age. Collaborative environments where knowledge, resources, and best practices are shared can pave the way for groundbreaking solutions. This not only enriches the virtual world ecosystem but also contributes to the broader socio-economic objectives of the European Union, such as digital literacy, innovation-driven employment, and completing the digital single market.

However, it is important to recognize that open standards and protocols in virtual worlds must be considered in the context of whether that application of XR is conducive to open protocols and has a business model that supports interoperability. Maximum interoperability may not be appropriate to all applications of virtual worlds and in some cases may create risks to businesses and individuals. Recent work done by XRA can shed light on this matter.

Last year, XRA completed a special project – the Future of XR Advisory Council<sup>19</sup> – which gathered experts from academia, civil society, and industry to tackle some of the toughest and most important policy questions attending XR development and adoption. The Council convened working groups on Norms and Behavior in Immersive Spaces, Safety and Well-Being for Youth, Privacy as an Element of Trust, Respect and Diversity in the Workplace, and Interoperability. This year-long project culminated in the publication of a white paper titled, "Charting the Future of Immersive Technology: Transforming Work, Education, Health, and Entertainment."<sup>20</sup> As noted in the white paper, the Working Group on Interoperability found:

*"The notion of what might constitute maximum interoperability is difficult to define, particularly because the topography of the metaverse has yet to be mapped, and many features have not yet been built or conceived of. There is a popular view of the metaverse in which maximum interoperability is represented as an openness of worlds in which the movement of people and data is unrestricted. However, there is not yet a consensus on how open immersive worlds should*

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<sup>19</sup> XRA, The Future of XR Advisory Council."

[https://xra.org/xrac/#:~:text=The%20Future%20of%20XR%20Advisory%20Council%20\(XRAC\)%2C%20is%20an,work%20of%20the%20XR%20Association.](https://xra.org/xrac/#:~:text=The%20Future%20of%20XR%20Advisory%20Council%20(XRAC)%2C%20is%20an,work%20of%20the%20XR%20Association.)

<sup>20</sup> XRA, "Charting the Future of Immersive Technology: Transforming Work, Education, Health, and Entertainment," February 15, 2024. <https://xra.org/wp-content/uploads/2024/02/XRAC-White-Paper-Media-Copy.pdf>

*operate. While open-world interoperability is seen as ideal in many sectors, there will likely be many instances in which a platform, engine, or service may need, want, or be expected to have total control over access to data on its platform, such as for healthcare, financial services, or other sensitive sectors. Indeed, most immersive platforms are unlikely to operate on the extremes of open and closed. Instead, there will likely be a spectrum of openness and interoperability — from full horizontal inter-platform interoperability to in-platform vertical interoperability — that platforms, engines, and services will rely on.”<sup>21</sup>*

Below we highlight some of the insights from XRA’s Future of XR Advisory Council process and discuss the need to balance the benefits of open standards and protocols with some of the challenges.

### **Benefits**

- *Lowering Barriers to Entry:* Openness and industry-led standardization in immersive technologies can create fertile ground for innovation by lowering entry barriers for new players and enabling a broader community of developers to contribute. This “democratization” of technology development leads to a diverse array of content and applications, driving technological advancements and creative solutions. Additionally, open, international, and voluntary standardization in virtual world ecosystems can reduce fragmentation. The early days of the internet offer a precedent. The adoption of standardized communication protocols like TCP/IP and HTML played a pivotal role in its explosive growth. These standards allowed for the development of a vast array of services and applications, propelling innovation and competition.
- *Interoperability & User Engagement:* Industry-led standardization can facilitate interoperability among different systems and platforms, enhancing user experience by allowing seamless integration and interaction between various services and applications. Interoperability can encourage a user-centric ecosystem, focused on providing value and quality experiences to retain and attract users. Fortnite's success in implementing cross-platform gaming serves as a prime example of this benefit. By allowing players on different gaming consoles, PCs, and mobile devices to interact and compete in a shared virtual environment, Fortnite drastically expanded its user base and set a new industry standard for multiplayer experiences. This move not only intensified competition among game developers to provide seamless cross-platform experiences but also demonstrated the potential of standardization in enhancing user engagement and satisfaction in gaming environments.
- *Scalability:* Regional standardization could negatively impact small and medium European companies in the XR industry by increasing trade barriers. However, voluntary, international, and consensus-based standardization can reduce complexity and lead to economies of scale, reducing costs for manufacturers and, subsequently, for consumers. This cost reduction can make immersive technologies more accessible which is essential for closing the digital divide, expanding market potential, and fueling healthy competition among XR providers.

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<sup>21</sup> *Ibid.*

## **Challenges**

- *Downward Pressure on Innovation:* While in some instances standardization can foster a level playing field, overly rigid or premature standards might stifle innovation. Companies might be less inclined to invest in novel technologies if they believe the future market will be dominated by standardized products that don't reward proprietary advancements. In the early days of video gaming, proprietary systems were the norm, and this led to significant innovation as companies sought to distinguish their consoles and games.
- *Complexity Amid Rapid Technological Advancements:* Establishing and governing standards, especially in a fast-evolving field like immersive technologies, can be complex. It requires consensus among diverse global stakeholders with potentially conflicting interests, and the rapid pace of technological change can make established standards quickly obsolete. Therefore, it is important for the EU to work with the experts in the XR industry, as well as international partners, to support voluntary standards and protocols that do not hinder innovation and avoid market fragmentation.
- *Intellectual Property:* The level of interoperability and ability to use open standards will necessarily be informed by the important role intellectual property rights play in the development of new products and services. In some instances, openness can lead to conflicts over intellectual property rights protection and monetization models. Companies investing in virtual worlds development may seek to protect their investments through proprietary systems, as openness might erode competitive advantage and revenue streams. Virtual worlds may have layers of creator rights that are embedded in the immersive environment, governed by real-world intellectual property laws, or both. For example, a virtual world may have both content and digital assets generated by users, as well as established real-world brand assets, available for purchase. Depending on the creator and/or the rules established by the hosting platform, accessing or transferring such objects to other immersive environments may be prohibited, restricted to certain geographies, circumstances, or platforms, or fully allowed.

While innovation and robust competition are vital, there are many reasons why products and services might or might not be interoperable. These reasons can include product usability, user needs, intellectual property law, privacy, security, and building sustainable business models. In addition to weighing these benefits and challenges, it is also important for the Commission to consider the important role industry associations, standards development organizations, and other multi-stakeholder entities play in establishing standards.

## **Role of Industry Fora**

Although the immersive technology sector is still nascent, the industry is thinking ahead on these issues, and we encourage the Commission to recognize and support the important work already being done in international, multi-stakeholder fora. For instance, the Metaverse Standards Forum (MSF), of which XRA and many of our member companies are a part of, has convened over

2,000 entities (standards organizations, private companies, civil society, etc.) from around the world to “foster the development of interoperability standards for an open and inclusive metaverse, and accelerate their development and deployment through pragmatic, action-based projects.”<sup>22</sup> MSF has active working groups on privacy, cybersecurity, and identity; 3D web interoperability; real/virtual world integration; 3D asset interoperability; digital asset management; network requirements; interoperable characters/avatars; and digital fashion. The critical work done in these working groups will help lay the foundation for the responsible development of protocols and standards that facilitate openness in virtual worlds.

Similarly, AFNOR has begun investigating the role of standards in XR. The organization launched a standardization commission to draft voluntary standards for metaverse interoperability.<sup>23</sup> The Institute of Electrical and Electronics Engineers (IEEE) – an international professional association for electronics engineering, electrical engineering, and other related disciplines – is also taking a leading role in developing best practices that will inform the development of business models, products, and services in virtual worlds.<sup>24</sup> The IEEE Standards Association has many projects underway aimed at standards development for immersive technologies covering ethics, governance, interoperability, and more.<sup>25</sup>

Leadership of the private sector in standardizing and developing protocols for immersive technology is important because XR companies are at the forefront of technological innovation. They have the resources, expertise, and direct market insight needed to drive effective voluntary standards that are both practical and forward-looking. For example, the Connectivity Standards Alliance (backed by Siemens, Google, Ikea, and Samsung among others) developed Matter<sup>26</sup>, the smart home interoperability protocol, which will help simplify the development of smart home products while increasing compatibility for consumers. The industry-led standard allows for cross-platform smart home devices, mobile apps, and cloud services, and has helped to create a more unified and user-friendly smart home ecosystem. Similarly, the success of the Wi-Fi Alliance, a private sector consortium, in standardizing Wi-Fi technology, demonstrates the effectiveness of industry-led initiatives.<sup>27</sup> They quickly adapted to changing technologies and user needs, a flexibility often challenging in government-led standardization processes. The private sector's involvement ensures that standards keep pace with rapid technological advancements. In the fast-evolving field of virtual worlds, outmoded and government-led standards could hinder progress and adoption.

Furthermore, industry-led standardization encourages global consistency. The immersive technology market is inherently global, and standards developed through international, private

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<sup>22</sup> Metaverse Standards Forum, “Building an Open Metaverse.” <https://metaverse-standards.org/>

<sup>23</sup> AFNOR Groupe, “AFNOR mobilizes the metaverse industry to find direction,” March 2023. <https://www.afnor.org/en/news/afnor-metaverse-industry/>

<sup>24</sup> IEEE Metaverse Initiative’s mission statement is “to promote the seamless integration of the digital and physical worlds through the Metaverse, unlocking new opportunities for individuals and industries in their academic, personal, professional, and social lives. We are committed to achieving this by establishing standards, fostering collaboration, and promoting open data with the ultimate goal of overcoming economic, ethical, and technological challenges. Our vision is to create an accessible, inclusive, and transformative Metaverse that empowers people from all walks of life to connect, learn, and thrive.” Available at <https://metaversereality.ieee.org/about>

<sup>25</sup> IEEE SA Metaverse Congress, “Related Standards & Projects.” <https://metaverse.ieee.org/>

<sup>26</sup> Connectivity Standards Alliance, Building the Foundation and Future of the IoT.” <https://csa-iot.org/>

<sup>27</sup> WiFi Alliance, “Who We Are: History.” <https://www.wi-fi.org/who-we-are/history>

sector-led collaboration help to foster compatibility and interoperability worldwide. This global approach is vital for the seamless functioning and widespread adoption of immersive technologies.

We encourage the Commission to support international, industry-led, and consensus-based standards development initiatives. International collaboration and participation will strengthen the development of market-driven standards that reflect consumer and business needs. Voluntary, industry-led standards can help reduce barriers to trade, nurture innovation and strengthen global marketplace competitiveness. Consequently, international standards will strengthen European companies' competitiveness and provide greater opportunities in new markets.

## **V. Future outlook and recommendations**

The immersive technology industry is growing, and new entrants are rapidly entering the market. The European Commission's strategy on Web 4.0 and virtual worlds states that the global market of virtual worlds is estimated to reach €800 billion by 2030.<sup>28</sup> Research conducted by XRA and Ecorys found that the European VR and AR industry is expected to reach create employment for some 440,000 to 860,000 people by 2025.<sup>29</sup>

XR technology has the power to deliver real, tangible benefits to businesses and consumers throughout Europe and indeed globally. To ensure these benefits can be realized, the XR sector must be allowed to innovate and test new business models, products, and services. An environment that facilitates innovation will allow the European XR sector to adapt quickly to new trends, user feedback, and technological advancements, ensuring they remain competitive, resilient, and relevant on the global stage. This adaptability is particularly important in the realm of virtual worlds, where user expectations and technological capabilities are constantly changing. By supporting innovative business models, policymakers and industry leaders can ensure a dynamic, competitive environment that fuels continuous improvement, enhances user experiences, and drives economic growth.

XRA strongly agrees with the European Commission that healthy and fair competition in virtual worlds will help drive innovation in immersive technologies. At this early stage in the XR industry's development, European companies would benefit most from ensuring they have a nurturing environment in which to grow. We encourage the Commission to focus on supporting research and development, developing a skilled talent pipeline, and creating a regulatory environment that is predictable and not overly burdensome. Thoughtful and deliberate consideration, in partnership with industry, will be needed to ensure this next generation of immersive technologies thrive in Europe.

Working closely with global allies is also key and will help ensure that any governance approach is harmonized and effective, safeguarding the XR industry's growth potential while maintaining fair competition. This approach will prevent stifling innovation, allowing the EU to remain a

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<sup>28</sup> European Commission, "An EU initiative on virtual worlds: a head start in the next technological transition," July 2023. <https://digital-strategy.ec.europa.eu/en/library/eu-initiative-virtual-worlds-head-start-next-technological-transition>

<sup>29</sup> Ecorys, "XR and its potential for Europe," April 2021. <https://xreuropepotential.com/assets/pdf/ecorys-xr-2021-report.pdf>

competitive player in immersive technologies on the global market. By aligning governance policies with key international partners and supporting voluntary, industry-led standards, the EU can facilitate easier market entry for its companies, reducing the complexity and costs associated with navigating disparate regulatory landscapes.

Moreover, these partnerships foster a global marketplace that encourages innovation and competition, benefiting consumers and businesses alike. An open, internationally-coordinated approach to governance of virtual worlds can lead to the establishment of global standards, enhancing interoperability and user experience across platforms. This not only opens new markets and opportunities for EU companies but also attracts foreign investment, bolstering the EU's position as a leader in immersive technologies.

Collaboration with allies also offers an opportunity to share best practices, insights, and innovations, ensuring that the EU remains at the forefront of technological and regulatory developments in this rapidly evolving sector. This cooperative approach is key to creating a vibrant, competitive, and sustainable virtual world ecosystem, driving economic growth and securing the EU's competitive edge in the global digital economy.

## **VI. Conclusion**

The XR Association shares the European Commission's commitment to the development of virtual worlds in a way that is rules-based, strengthens marketplace competition, and supports innovation that benefits individuals, businesses, and society. Our vision for the future of XR is one of openness and global opportunity. As an organization that represents the full spectrum of contributors to the XR industry – both small and large – we appreciate the opportunity to provide feedback on this important topic. XRA looks forward to working with the Commission going forward to ensure XR's positive impact on society.