



Charting the Future of XR in the European Union: Trends, Research Priorities, and Collaborative Opportunities

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Abstract. Extended reality (XR) is emerging as a disruptor in several sectors of industry academia and society in general. In the European space, specifically, institutional and grassroots initiatives start formulating an ecosystem that can develop and proliferate the impact of immersive XR based virtual worlds. The European Union is embracing this disruptive technology with legislative, infrastructural and financial support. However, the inherent issues of this volatile, new technology are still present. Fragmentation, high technical overheads, digital literacy gaps, lack of standards and silos of knowledge and entrepreneurial activity prevent the widening of proliferation of the XR ecosystem. This panel aims to bring together XR experts, policymakers, researchers, and industry leaders from across the European Union to discuss the latest trends in immersive technologies (XR), identify critical areas for research, and explore opportunities for collaborative projects that address real-world needs. Through this dialogue we expect a fertile cross-pollination between industry and academia formulating partnerships for future XR activities and innovation. Thus, this panel aims to serve as a platform for aligning efforts and resources to maximize the impact of XR innovations across sectors such as education, healthcare, manufacturing, and entertainment.

Keywords: Virtual Reality, Extended Reality, Augmented Reality, Mixed Reality, European Union, Virtual Worlds, Disruptive Technologies.

1 Introduction

Virtual, mixed and augmented reality (collectively called eXtended Reality – XR) are the most prominent disruptive technologies apart from AI. Offering unprecedented immersion and the capacity for really transformative experiences, they can innovate at every facet of human activity. Virtual worlds, visualized through XR have the potential to network diverse communities in education, work, or recreation, activities.

Virtual worlds' worldwide market is expected to rise from EUR 27 billion in 2022 to over EUR 800 billion by 2030. [1]. For particular sectors, like the automobile sector, the estimates show a climb from EUR 1.9 billion in 2022 to EUR 16.5 billion by 2030 [2]. Important building components of virtual worlds are XR technologies like augmented reality (AR) and virtual reality (VR). With an expected 860 000 new jobs linked to XR in Europe by 2025 [3], the evolution of these technologies will have major positive impact for the employment of EU and world intellectual capital. "Virtual worlds provide unparalleled prospects in a variety of societal domains, including improved health care, more engaging education and training, new forms of interpersonal contact and cooperation, and immersive cultural experiences [4].

For European industry, academia and society at large, virtual worlds emerge as a crucial component of Europe's Digital Decade, aiming to impact the way people live, work, create and share content, as well as the way businesses operate, innovate, produce and interact with customers [5-8].

The expansion of applications for virtual worlds presents numerous opportunities for European businesses to create products, services, and high-value content tailored to diverse user needs, while leveraging innovative business models. Virtual worlds in video games offer environments where millions of individuals can generate and monetize content, as well as engage in significant interactions [1].

2 Aim and scope of the panel

As the borders between research and enterprise become blurred, identifying collaboration opportunities within the European innovation space becomes essential. Cross-sectoral challenges, structural barriers and the volatility of the XR technological ecosystem create a complex environment for both new and established actors. From anatomy to ophthalmology, healthcare, for example, is becoming a hotbed for creative disruption with XR technologies [9]. It is characteristic that the VR/AR coalition in its support statement for the EU VR/AR ecosystem puts forward key actions to address these barriers. Standardization, interoperability, cross-sectoral dialogue and de-fragmentation of the sector are 4 of the eleven in total action points of this support statement [10].

In that environment, we want to kick-off a discussion between recognized stakeholders and newcomers in the XR development community. The final aim of this endeavor would be to break barriers and create opportunities for collaboration and growth of XR as an immersive learning modality.

3 Session Details

This panel aims to bring together XR experts, policymakers, researchers, and industry leaders from across the European Union to discuss the latest trends in immersive technologies (XR), identify critical areas for research, and explore opportunities for collaborative projects that address real-world needs.

Format of the panel: Online

Structure of the panel:

- Introduction (10 minutes): Brief overview of the EU's XR landscape, presented by the moderator.
- Panel Discussion (50 minutes): Panelists discuss key questions:
 - What are the most significant trends in XR in the EU today?
 - Where should research focus to address gaps and challenges?
 - How can we foster collaboration between academia, industry, and policymakers?
- Q&A (20 minutes): Attendees pose questions to panelists.
- Concluding remarks (10 minutes): Bringing together the panelists' key points and providing a jumping off point for networking and collaborative projects.

Panelists: We are aiming at distinguished panelists from both academia and industry, coordinators and participants in flagship EU XR projects as well as researchers and SME stakeholders. The final list of panelists is to be determined.

Through this dialogue we expect a fertile cross-pollination between industry and academia formulating partnerships for future XR activities and innovation. This panel will serve as a platform to align efforts and resources to maximize the impact of XR innovations across sectors such as education, healthcare, manufacturing, and entertainment.

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