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OPEN LETTER

Connecting Europe's XR Ecosystem: XR5.0 and XR2Industry Join Forces

[version 1; peer review: 1 approved with reservations]

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v1 **First published:** 29 Jul 2026, **6**:266
https://doi.org/10.12688/openreseurope.23743.1
Latest published: 29 Jul 2026, **6**:266
https://doi.org/10.12688/openreseurope.23743.1

Abstract

This blog presents ongoing collaboration between the Horizon Europe projects XR5.0 and XR2Industry. The objective of this collaboration is to ensure interoperability and alignment of XR5.0 technologies with emerging European XR infrastructures, supporting a sustainable and connected XR ecosystem for Industry 5.0.

The two projects have initiated technical exchanges to explore integration opportunities between their platforms. Discussions have covered system architectures, XR platform services, device and content management approaches, and potential interoperability aspects such as metadata alignment, secure integration, and federated XR content sharing. XR5.0 has presented key technologies, including human-centric digital twins (Clawdite platform), XR training components, and generative AI services, to assess their potential relevance within the EU XR Platform.

The collaboration focuses on identifying complementary capabilities and defining pathways for future technical alignment through joint workshops and continued exploration of interoperability approaches.

Plain Language summary

This article describes collaboration between two European research projects, XR5.0 and XR2Industry, which are working together to improve how immersive technologies such as Augmented and Virtual Reality (XR) can be used in industry.

The goal of this collaboration is to connect XR5.0 technologies with a shared European XR platform developed by XR2Industry. This is important because it helps ensure that XR tools created in research projects can work together, be reused in different industries, and continue to be useful after the projects end.

The two projects are exploring how their systems can interact and

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1. **James Birt**, Standards Australia (Ringgold ID: 374121), Sydney, Australia

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complement each other. This includes sharing information about their software architectures, discussing how XR content can be managed and exchanged, and identifying ways to improve compatibility between systems. XR5.0 has also presented several technologies, such as digital human models, XR-based training tools, and artificial intelligence services that can support workers in industrial environments.

By working together, the projects aim to create more connected and user-friendly XR solutions that can support workers in areas such as training, safety, and complex industrial tasks. This collaboration also helps move towards a stronger European XR ecosystem where different technologies can work together rather than remain isolated.

Overall, the work contributes to making advanced XR technologies more accessible, reusable, and useful for real-world industrial applications across Europe.

Keywords
Extended Reality (XR); Industry 5.0; interoperability; digital twins; Generative AI; XR platforms; Horizon Europe; industrial XR; human-centric systems

HE This article is included in the Horizon Europe gateway.

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Author roles: Tousert N: Conceptualization, Investigation, Project Administration, Visualization, Writing – Original Draft Preparation, Writing – Review & Editing

Competing interests: No competing interests were disclosed.

Grant information: This project has received funding from the European Union's Horizon Europe research and innovation programme (Grant Agreement No. 101135209) (Human-Centric AI-Enabled Extended Reality Applications for the Industry 5.0 Era [XR5.0]). This work also relates to activities conducted within the XR2Industry project funded under the Horizon Europe programme (Grant Agreement No. 101135547).
The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

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How to cite this article: Tousert N. **Connecting Europe's XR Ecosystem: XR5.0 and XR2Industry Join Forces [version 1; peer review: 1 approved with reservations]** Open Research Europe 2026, **6**:266 https://doi.org/10.12688/openreseurope.23743.1

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Extended Reality (XR) is transforming industrial environments,[1–3] making them more human-centric, adaptive, and intelligent. For XR innovations to reach their full potential in Industry 5.0, they must interoperate across European platforms rather than remain confined to individual projects.

Within the Horizon Europe project XR5.0, Task 2.6 focuses on *Integration with the EU XR Platform.* The goal is to ensure that XR5.0 technologies can connect with shared European infrastructures and contribute to a sustainable, interoperable XR ecosystem. To this end, XR5.0 identified XR2Industry,[6] which develops the EU XR Platform, as a key partner for collaboration.

Why integration matters

Linking XR5.0 with the EU XR Platform offers multiple benefits:

- **Ecosystem compatibility**: XR5.0 solutions can be adopted beyond initial pilots, facilitating wider industrial uptake.[1,2]
- **Standards and interoperability**: Alignment with European standards for XR and Industry 5.0 ensures smoother future deployments.[1–3]
- **Access to shared resources**: XR5.0 components (including AI services, digital twins, and training modules) can leverage datasets and services from the EU XR Platform.[6]
- **Sustainability**: Integration enables XR5.0 solutions to evolve within a broader framework, remaining relevant and supported after the project concludes.[1,2]

Building collaboration

Collaboration began with joint technical exchanges. XR5.0 presented its system architecture, pilot scenarios, and technologies, while XR2Industry shared their platform architecture, work package timelines, and development approach.[6] Technical documentation was exchanged through open repositories to support deeper exploration. Figure 1 illustrates the integration architecture between XR5.0 and the XR2Industry EU XR Platform.

Subsequent sessions delved into platform specifics. XR2Industry showcased device management, content management, and activity management modules, along with a vision for an open and fair XR content ecosystem. Potential collaboration areas were discussed, including device interoperability, shared content repositories, and metadata approaches for XR assets.

XR5.0 outlined high-level architecture, pilot setups, and potential integration pathways. Internal reviews explored exposing XR5.0 modules and APIs, aligning security frameworks, leveraging XR5.0 Generative AI tools, and incorporating feedback from XR2Industry on deployment considerations.

Showcasing XR5.0 technologies

XR5.0 presented three key technologies:

- Clawdite platform: Enables human-centric digital twins representing workers' traits, behaviours, and contexts. Within XR5.0, Clawdite generates realistic worker models for XR applications, supporting personalization and metrics such as fatigue or cognitive load. Selected functional modules are being explored for integration into the EU XR Platform.[7]
- XR Training Plugin: The runtime component of the XR5.0 training platform, enabling operators to access, render, and interact with immersive training programs on XR devices.[4]
- Generative AI services: Customised large language model agents provide context-aware support for industrial XR scenarios, including training and operational guidance.[5]

These demonstrations established a foundation for identifying integration opportunities between the two projects' tools.

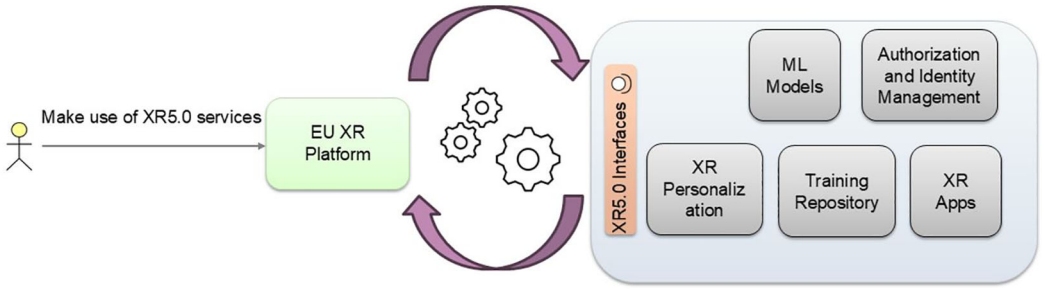

Figure 1. XR5.0 and XR2Industry integration architecture.

Next steps

Planned activities include:

1. **Joint workshops on authoring and training tools**: XR5.0 and XR2Industry will demonstrate their respective tools and explore complementary approaches for creating and sharing XR scenarios.

2. **Hands-on Clawdite sessions**: XR5.0 will deploy instances of Clawdite for XR2Industry partners to explore its functionality and evaluate integration options.

3. **Metadata exploration**: XR5.0 and XR2Industry partners are exchanging ideas on XR asset metadata to better understand potential interoperability approaches.

4. **Generative AI opportunities**: XR2Industry's upcoming third Open Call for industrial pilots may allow selected projects to leverage XR5.0's GenAI tools.[5,6]

Towards a connected XR ecosystem

The XR5.0–XR2Industry collaboration illustrates a broader shift in European research: moving from isolated project outputs to interconnected digital ecosystems.[1,2] By aligning technologies, sharing expertise, and exploring integration pathways, the projects are helping build a cohesive European XR landscape, ensuring that XR innovations scale, interoperate, and deliver long-term value to industry and society.

As both consortia continue their efforts, they provide a model for collaborative innovation, demonstrating how European research projects can advance human-centric, interoperable, and sustainable XR solutions.[1–3]

Ethics and consent

Ethical approval and consent were not required for this study.

Disclaimer

The views expressed in this article are those of the author. Publication in Open Research Europe does not imply endorsement by the European Commission.

Data availability

No underlying data are associated with this article.

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Open Peer Review

Current Peer Review Status: ?

Version 1

Reviewer Report 08 August 2026

https://doi.org/10.21956/openreseurope.25705.r78477

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James Birt
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Thank you for the opportunity to review this Open Letter. The proposed collaboration is timely and worthwhile, although at times the article reads more as a project update than an Open Letter intended to engage the wider research community.

The rationale is understandable, but the interoperability challenge could be explained more clearly, perhaps through a practical example that shows whether the main barriers concern metadata, APIs, asset formats, security, governance, or device compatibility. The author should also clarify the intended audience and what they would like readers to take from, or contribute to, the letter. Referring to the article as a blog in the abstract could also be reconsidered.

The discussion would benefit from some acknowledgement of the practical challenges associated with integration, particularly privacy, cybersecurity, intellectual property, worker data, platform governance and long-term maintenance. This would provide a more balanced account without detracting from the value of the collaboration.

The current references also require some revision. Reference 4 in the manuscript is seminal within XR research but does not support the specific description of the XR Training Plugin, while Reference 5 appears too general for the claims concerning customised LLM agents and their possible use through an XR2Industry Open Call. More directly relevant evidence is available in Oliveira et al. (2026) on the XR5.0 Training Platform, Belfadel et al. (2026) on industrial XR interoperability and standardisation, Fang et al. (2026) on LLM-enabled industrial mixed reality, and Gaffinet et al. (2025) on human digital twins. Claims specifically concerning the Open Call should be supported by the relevant XR2Industry project documentation or deliverables.

The letter should also distinguish more clearly between existing technologies, completed integration work, activities currently being explored and future possibilities. Figure 1 should indicate whether it represents an implemented architecture or a proposed model, while the next steps would be more useful with some indication of expected outputs, measures of success and how other projects or researchers might engage.

Overall, this is a valuable initiative and a useful collaboration to bring to the wider community. I would support approval following revision to clarify the purpose, strengthen the supporting evidence and more clearly establish the status of the proposed integration.

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Is the rationale for the Open Letter provided in sufficient detail? (Please consider whether existing challenges in the field are outlined clearly and whether the purpose of the letter is explained)

Partly

Does the article adequately reference differing views and opinions?

No

Are all factual statements correct, and are statements and arguments made adequately supported by citations?

Partly

Is the Open Letter written in accessible language? (Please consider whether all subject-specific terms, concepts and abbreviations are explained)

Partly

Where applicable, are recommendations and next steps explained clearly for others to follow? (Please consider whether others in the research community would be able to implement guidelines or recommendations and/or constructively engage in the debate)

Partly

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: My research focuses on extended reality, immersive technologies and human–computer interaction, with particular interests in the design and application of XR, generative AI and digital twins across industry, education and simulation. I also work in international standards development for immersive technologies, particularly interoperability, privacy, safety, human-centred design and responsible technology adoption, with a broader focus on translating emerging XR and AI systems from research into sustainable real-world applications.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.