



OPENVERSE Summit

**Open and Co-Created
Virtual Worlds for Europe**
September 10 | Brussels (Belgium)

open-verse.eu



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the European Union**



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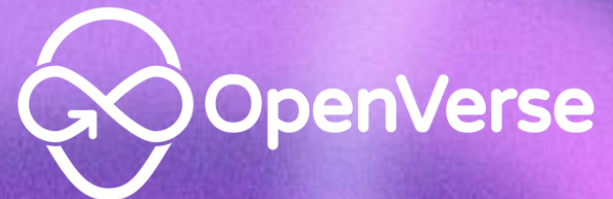


OPENVERSE Summit

Welcome from OPENVERSE
Project Coordinator



FRANCESCO MUREDDU
The Lisbon Council



From European strategy to a European virtual worlds ecosystem

OPENVERSE Summit “Open and Co-Created Virtual Worlds for Europe”, 10 September 2026, Brussels

Horizon Europe · Grant Agreement No. 101135701

What the EU strategy sets out, and what it leaves open

The 2023 Communication on Web 4.0 and virtual worlds, COM(2023) 442, sets out four pillars: skills, business, government and standards.

In December 2025 the Commission and the Virtual Worlds Association signed the European Partnership on Virtual Worlds, with 18 founding members.



What capacity does Europe need in order to act on the strategy, together, over time?

OPENVERSE was funded to work on this question.

Openness and human-centricity as design requirements

OPENVERSE defines both terms operationally, as properties that can be designed for and checked.



Openness: four requirements

- Interoperability and portability
- Fair access to markets and infrastructure
- Transparent governance of the rules
- Room for European SMEs and creators



Human-centricity: four requirements

- Accessibility and safety by design
- Privacy and protected identity
- Explainability and meaningful oversight
- Effective remedies when things go wrong

These eight requirements have to be specified alongside the technology.
Added afterwards, as a compliance check on a finished system, most of them cannot be met.

Five work strands, and what each produced

- 1 Observe** Technology watch, a taxonomy, market analysis and a mapping of national, EU and international initiatives, so that a fragmented landscape can be seen as a whole.
- 2 Anticipate** Foresight that explores plural futures and exposes the tensions Europe must manage: participation vs control, agency vs algorithmic influence, innovation vs equity, interoperability vs fragmentation.
- 3 Test** Co-creation workshops, behavioural studies in virtual environments and an industrial human-robot collaboration demonstrator, producing measured evidence on trust, privacy, identity and usability.
- 4 Translate** A collaborative roadmap with six policy recommendations, a strategic technological framework, governance and IPR models, standardisation contributions and policy briefs.
- 5 Connect** Two-way dialogue with SMEs, researchers, civil society, national initiatives, EU projects and standards communities.

Each strand produced deliverables that are going to be used outside the project.

What the Observatory holds, and who uses it

It brings technologies, actors, use cases, market signals, foresight scenarios, policy recommendations and standards into one structured and maintained collection.



For SMEs

Lower the cost of understanding an emerging market and finding partners and funding.



For policymakers

Structured evidence on trends, gaps and adoption barriers, rather than anecdote.



For innovators

Identify complementarities across initiatives and avoid duplicated effort.

The Observatory is what allows the roadmap to be updated

A roadmap starts ageing the day it is published. A maintained observatory shows what has changed since, which is what allows the recommendations to be re-tested rather than re-invented.

The OPENVERSE Roadmap feeds the Virtual Worlds SRIA

The OPENVERSE Roadmap sets out five pillars, ten key actions and six policy recommendations.

STATEMENT FROM THE SRIA SECRETARIAT

“The work carried out on the OpenVerse Roadmap is thorough and valuable particularly for the prioritization perspectives. We see clear benefits of building on this work and intend to leverage it as much as possible in the development of the Virtual Worlds SRIA.”

Secretariat, European Partnership on Virtual Worlds

Prioritisation method

The way the Roadmap ranks priorities will feed into SRIA chapters.

Evidence base

The Observatory can keep the underlying evidence current as the agenda is revised.

Community

The national initiatives OPENVERSE convened are now Partnership contacts.

EU strategy on Web 4.0 and virtual worlds (2023)



European Partnership on Virtual Worlds (2025)



OPENVERSE Roadmap, Observatory and community



Virtual Worlds SRIA and Horizon Europe calls from 2026

The results carry into two Horizon Europe projects

Both start on 1 September 2026 and both involve the Lisbon Council. Each takes a specific part of the OPENVERSE work forward.

● TWINE

Twin-based Web Interoperable Network for Engagement

Interoperable building blocks for open Web 4.0 and virtual worlds, tested with public authorities through three pilots (Rotterdam, Tampere, Flanders) converging in a federated demonstration. It serves the citiverse and public value niches the Roadmap prioritises.

HORIZON-CL4-2025-03-HUMAN-16 (RIA) · GA 101298722 · Coordinator: imec (SMIT, VUB) · Partners include OASC, Engineering, Future Insight, Rotterdam, Tampere, Digitaal Vlaanderen and the Lisbon Council · Open to Hop-on Facility partners

● LIL-ECHOES

Living Cultural Labs: Empowering Communities through Intercultural Encounters in Virtual Worlds

How XR and AI are changing the way people experience, perform and transmit culture, studied through Living Cultural Labs in public cultural spaces across Europe. Culture is one of the target sectors named in the recommendations.

HORIZON-CL2-2025-01-HERITAGE-05 (RIA) · GA 101287666 · Coordinator: Newcastle University · 16 partners in 8 countries, including the Lisbon Council and XR4Europe · EU contribution EUR 3.48 million · September 2026 to August 2030

How the work continues

The Virtual Worlds SRIA takes the recommendations to European agenda level. TWINE and LIL-ECHOES test two of them, public value niches and target sectors, with real users and real budgets.

The strategy set the direction. OPENVERSE supplied evidence, priorities and a community.

Observe · anticipate · test · translate into policy · connect across initiatives

- Results that continue to be used after the grant ends
- Demand and markets treated as the hard problem, not the technology
- European values written into design requirements, so that they can be checked in a system rather than asserted about it

The recommendations are already being taken up: the Virtual Worlds SRIA will feed on the Roadmap, and TWINE and LIL-ECHOES started on 1 September 2026.

Six policy recommendations from the Roadmap

Interoperability and trust by design run under all six as preconditions rather than as separate items.

1

Public value niches and areas of excellence

Niches with real demand pull and European strengths: manufacturing, healthcare, education, security, citiverse, culture and tourism.

2

Partnership financing

Instruments aimed at real value added, with middle-term return and scaling capacity, rather than one-off support.

3

Sovereignty and independence

Specific programmes with clear progression phases for European XR and virtual worlds capability.

4

AI as the enabling layer

Direct AI support at XR and virtual worlds for public value innovation and European areas of excellence.

5

Governance outreach

Negotiations and alliances that extend the reach of EU digital rules beyond the EU's own market.

6

Scenario-based preparation

Use the three scenarios to prepare for brain-computer interfaces, smart robotics and the footprint of generative AI.

**SESSION 1: Future
Scenarios and
Roadmap for Open
and Co-Created
Virtual Worlds at
Horizon 2030–2040**



GIANLUCA MISURACA
Inspiring Futures



PIERRE ROSSEL
Inspiring Futures



KATHRINE FREMMING
Khora



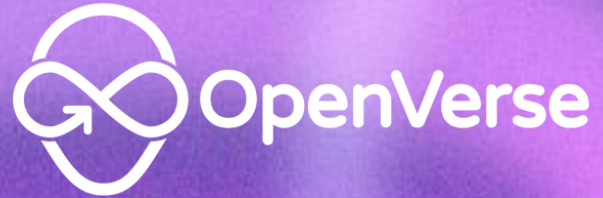
CAMILLE DONEGAN
Eimersive



PATRICIA PONS TOMÁS
ITI Valencia



MATTHIEU WORM
Virtual World Association



Roadmapping for Open and Co-created Virtual Worlds

*From Version 1.0 to a co-created **Version 2.0***

Pierre Rossel, Founder & President, Inspiring Futures

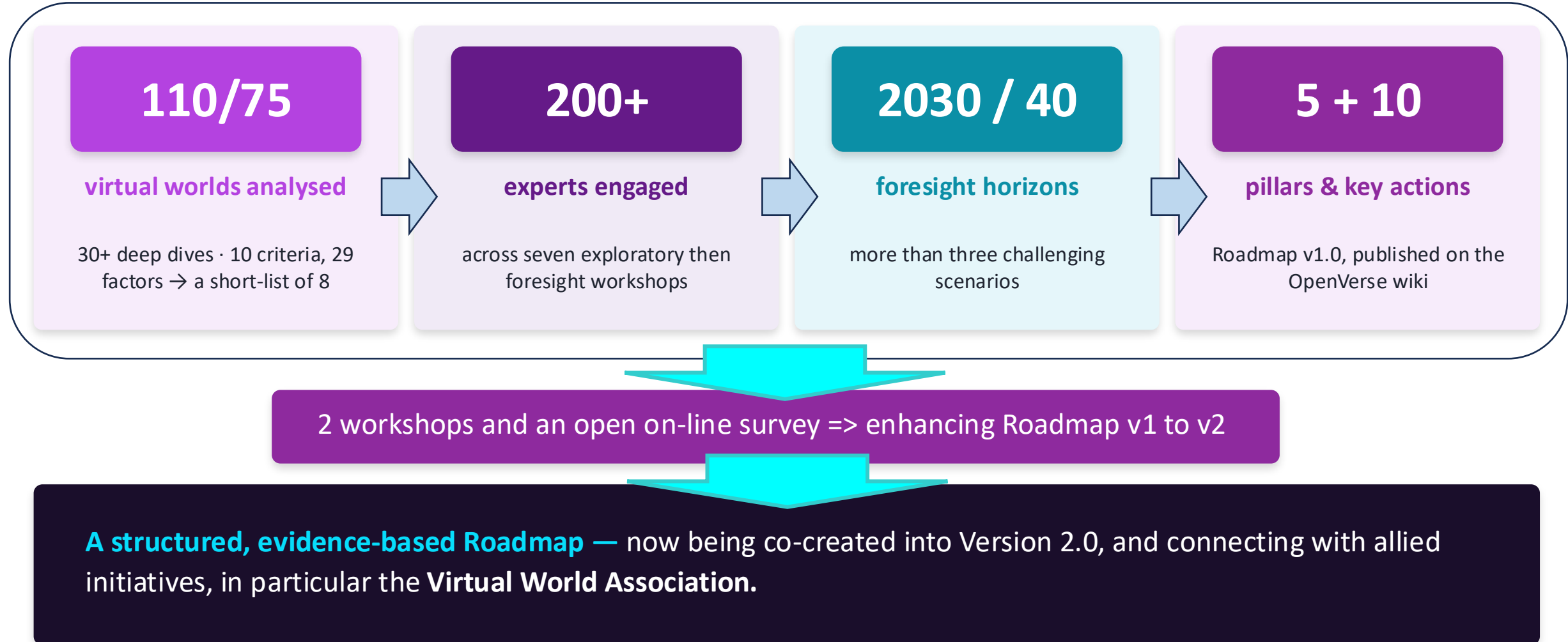
Gianluca Misuraca, Founder & Vice-President, Inspiring Futures

OPENVERSE Summit “Open and Co-Created Virtual Worlds for Europe”, Sept., 10, 2026, Brussels

Panel: “Future Scenarios and Roadmap for Open and Co-Created Virtual Worlds”

The underlying Knowledge Base to the Roadmap & Policy Recommendations

An EU-funded Roadmap towards a European future where virtual worlds & Web 4.0 reflect our values



Our OPENVERSE Roadmap built on a co-designed foresight process

Three resulting scenarios for futures of Virtual Worlds and Web.4.0 in the EU



The Architect's Dilemma
Developing our Ambidexterity



The Price of Remaining Human
Values will Eventually Make a Difference



Echoes of the Past
More of the Same, Please!

3 contrastive scenarios emphasizing the possibility of a governance grammar that is plural and evolving

The OPENVERSE roadmap v1.0 for open and co-created Virtual Worlds in a nutshell

Five pillars

(building on the EU strategy for Virtual Worlds and the Web4.0 of July 2023)

- Trust and Safety by Design
- Interoperability and Data-Readiness
- Skills, Financing Tools and SME Scale-up
- Science–Industry Testbeds and Sector Adoption
- Foresight-in-the-Loop



Ten key actions

Immediate & Urgent Priorities (2026–2028)

- Promote guiding ethical and health principles for well-being in virtual worlds
- Promote inspiring partnerships across sectors and borders
- Promote AI integration and the corresponding skill building for VW creativity
- Support, refurbish and inaugurate new forms of financing for VW creators

Medium-Term Deployments (2026–2032)

- Build skills for virtual worlds; make the EU a talent magnet
- Help the Cultural & Creative Industries (CCI) and test new business models
- Develop standards for open/interoperable virtual worlds_sandbox options
- Boost professional virtual worlds across sectors of excellence

Long-Term Scale-Out (2026–2035)

- Address sovereignty: promote champions; fight IPR theft, manipulation and misinformation
- Reduce the environmental footprint of XR/VW deployments

Enhancing this threshold with our July 2 workshop and an online Survey, including this Summit, to get:

A Roadmap v2.0, with clear lines of action, due prioritisation, policy recommendations and actionability check

This journey was also a confrontation with a fast-changing world

In the meantime (2024-2026):

- Some major US Virtual Worlds' players **shut down**
- **Meta lost dozens of billions dollars in its metaverse venture** (which will not be the next stage of the Internet, clearly)
- Non game and non event/socialising **Virtual Worlds, i.e., the ones with more professional/industrial objectives (B2B2C) never attained the same level of profitability**
- **Headsets plateau-ed** in the 100 million-or-so sale level, while smart glasses seem to play and replay the Groundhog' Day, again and again
- US and Asian players keep being dominant but **the Virtual Worlds' arena seems to have lost the interest of investors to the AI focus**, in a more complex and uncertain context than ever
- More important for European skills: **XR has not lost ground to VWs** as the persistent, 3D, avatar-based applications, **but on the contrary regained momentum**
- The big shift: markets are the missing middle (the hardest gap is not technology)

AI, the major game-changer in the landscape, including for XR/VWs

There can hardly be any creative solution, major breakthrough or effective market penetration without it

- Until 2023-24: **Discriminative AI** helped operators to optimise their client relationship with resource management, cutting-edge algorithmic attention, security supervision, ethical framing and anomaly detection
- Since 2023-24: **Generative AI** is helping creators for design, avatar management, scenarios, brand revamping, games, events, community communication, etc.
- **Now, in addition to these existing layers:**

Specialised Gen AI solutions, as well as agentic developments and embodiment of AI in vehicles, devices, infrastructures, will bring XR/VW to the next level

Outlining Policy Recommendations

1. **Concentrate on a) public value niches with real pull, and b) key areas of excellence**
 - **With partnerships** of diverse kinds and levels, including for skills and trusted data spaces
 - **Addressing key target industrial sectors**, e.g. manufacturing, healthcare, education & training, security & defence, concrete citiverse applications, culture and tourism
2. **Promote partnership financing aiming at real value added creation** - middle-term ROI/scaling capacity
3. **Boost sovereignty and independence** in XR/VW-related activities and applications through specific programmes and clear progression phases
4. **Focus on AI support to boost XR/VW for public value innovation** and in key EU areas of excellence
5. **Engage in negotiations and alliances to enhance the governance outreach** of the EU digital ecosystem
6. **Leverage our three scenarios to prepare for the next challenges** in an exacerbated global competition: e.g. Brain-Computer interfaces, Smart robotics, and the environmental pressure linked with Gen AI

Prioritisation rationale

A "multi-criteria game", building on 4 types of factors, to generate both:

- Economic development objectives
- European values

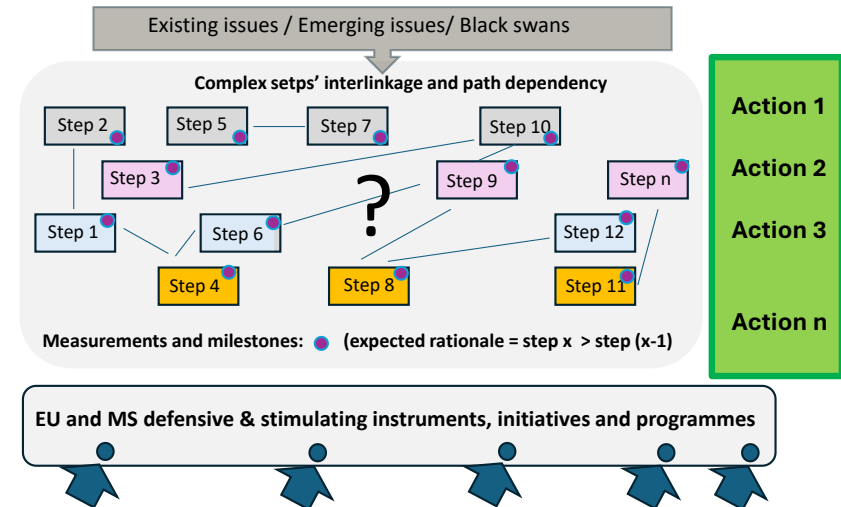
- ✓ A consistent prioritisation capacity
- ✓ An policy enactability-check support

The ambidexterity scenario
channeling characteristics



Framing the Roadmap's steps to be **progression-minded** and its constructive factors **efficiently synergetic**

- Technologies
- Standards
- Products/app
- Markets
- Competences
- Research

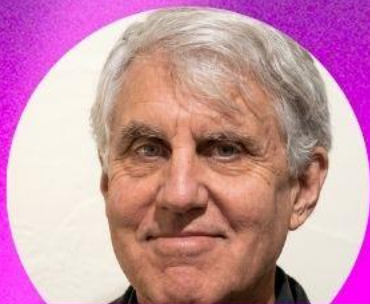


Like in a deep learning algorithmic rationale (e.g. with the help of the Decathlon metaphor), putting weights on factors and modifying them until the targeted result is near

Our OPENVERSE Roadmap v2 needs to be a living legacy

With our Summit set of experts, the room and key questions to address, let's co-design the Roadmap v2 for European virtual worlds and Web 4.0

The floor is yours!



JOHN FAVARO
Trust-IT Services



CHRISTOPH RUNDE
Virtual Dimension Center



ALINA KADLUBSKY
Open AR Cloud Europe



LUIS BRAVO MARTINS
XRSI Europe

SESSION 2: Virtual Worlds standardisation



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Standards Related Assets and Legacy

John Favaro

Trust-IT

The OpenVerse Standardisation Task

A task was dedicated to pursuing standardisation related activities that could support and feed into the most important OpenVerse assets



Observatory



Technology Framework



Roadmap

To ensure a stable, sustainable OpenVerse legacy in standards work

Key Liaisons – Stakeholders

EU Projects



Digital Twin

Smart Cities

Initiatives



3GPP

Organisations



International
Telecommunication
Union (ITU)



I E T F®

Internet Engineering Task
Force



The StandICT.eu Technical Working Group

EU Projects



Digital Twin

Smart Cities



Observatory Access

EU Projects



Digital Twin

Smart Cities



OpenVerse

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Home

XR & Metaverse Standards Register

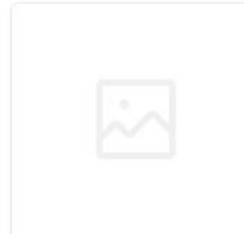
The embedded XR & Metaverse Standards Register here below is courtesy of [VDC - Virtual Dimension Center](#)

XR | Metaverse | Virtual Worlds Standards Register > full register view

This XR and Metaverse Standards Register is the worldwide largest, publicly-acce ... [More](#)

data set type ▾ status (of... ▾ (standards) organisation ▾ Technology ▾ Application Field ▾ Industry / Vertical ▾ More

Filter Sort Gallery ▾ Q

 DIF VS JSON Verifiable Credentials JSON Schema Specification specification published / active publishing date unclear	 ISO/IEC 18013-5 Personal Identification - ISO-compliant driving licence - Part 5: Mobile driving licence (mDL) application standard (official) published / active 2021	 ISO 32007 Document management - Portable Document Format - RichMedia annotations conforming to gITF assets specification published / active 2024	 IEC TC 100 TA 19 VR AR for Education Ad Hoc Group working group published / active 2017	 DIF EDV Encrypted Data Vaults (Archived) specification withdrawn / closed 2022
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Airtable

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The Ethics of Synthetic Presence

*Lessons from XR+AI Shared
Environments when three EU
projects and outcomes join forces*

Alina Kadlubsky

University of Applied Sciences Virtual Technologies Department,
Open AR Cloud Europe gUG



3 COMPLEMENTARY EU PROJECT LENSES



Codes of conduct, evaluation infrastructure, comparability, and legal gap analysis for XR development.



Privacy/ethics guidance for real XR deployments over-reliance, auditability, bystanders, AI-in-XR concerns.



Iterative, relational ethics-by-design: Family, Community, World six principles, not a perfectionist checklist.



Scan to access project outcome
including first universal Code of Conduct
for immersive technologies



Funded by
the European Union



Scan to access project outcome



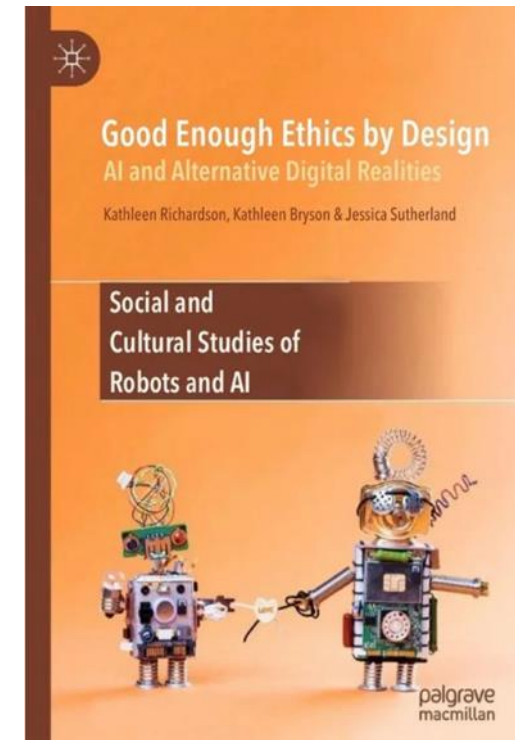
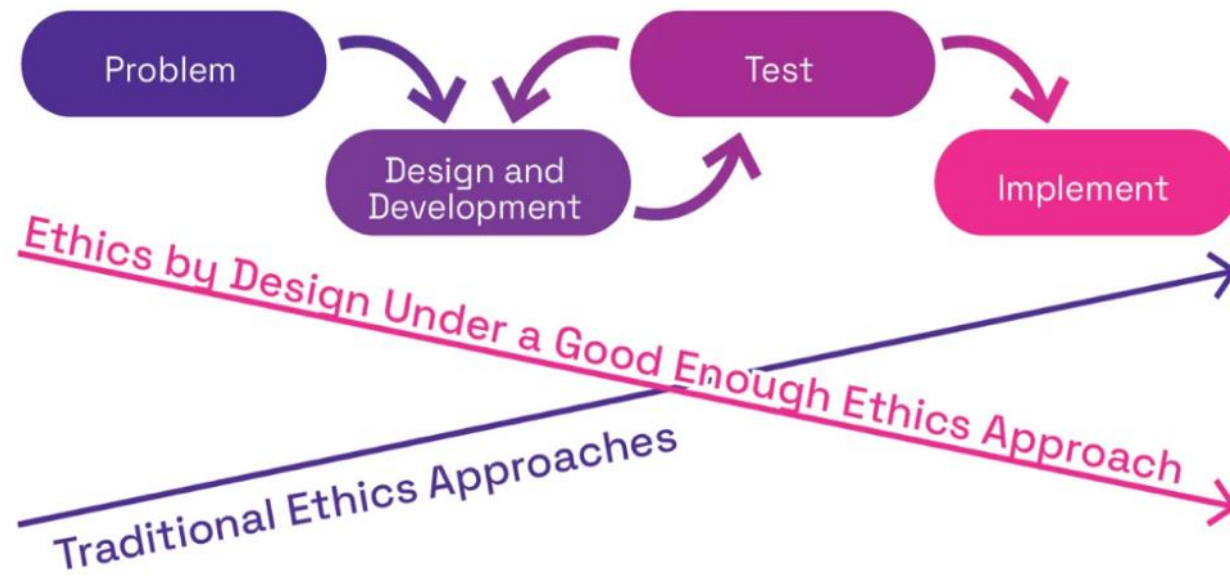
Funded by
the European Union



Scan to access project outcome



Funded by
the European Union



The S.E.E. Stack

Synthetic – Evaluation – in – Ethics by Design



Synthetic (Perception)

connects to

What the system changes in what users sense – see, hear, feel.



Evaluation (Governance)

connects to

How the experience is checked, compared, and audited.



Ethics by Design (Team Process)

How teams make “good enough” guardrails during design.

From Failure Modes to Minimal Responses

Table 1, each S.E.E. layer paired with its practical anchor

 S — Synthetic	Hidden filtering, over-reliance, subtle nudges, divergent realities	THEIAXR Disclose active filters; flag synthetic cues
 E — Evaluation	Ethics stays vague; no common benchmark; hard to compare systems	XR4Human Show how contested interactions can be compared or audited
 E — Ethics by Design	Checklist overload; “ethics washing”; no feasible routine	SHARESPACE GEE Assign responsibility across team; revisit value tensions each stage

APPLYING S.E.E. QUICK 6 QUESTION TEST

Six questions, usable in, at any production stage

1

What is AI changing experience right now?
(vision / audio / haptics / biometrics / inference)

4

Do co-present users have the same perception of their surrounding?
(If not or altered, is the difference shown, or are they being notified?)

2

Can users tell it is happening?
(clear signals, not hidden)

5

What is logged/auditable?
(so issues are checked later)

3

Can users control it?
(pause / reduce / revert; baseline mode)

6

Who is responsible/accountable across the experience?
(designer/artist? Developer? AI tool? Platform policy? User/user generated content?)

THE S.E.E RESPONSE



Synthetic (Perception)

disclose/indicate active filters;
provide inspect and “baseline” modes.



Evaluation (Governance)

Ensure audit logs or reviewable
system states for contested interactions.



Ethics by Design

agree guardrails even in early
developmental stages with considerations
of micro- and macro societal effects, e.g.,
no hidden steering in collaboration mode;
parity cues always on; informed opt-in for
adaptive prompts).

KEY TAKE AWAYS

- 1 **AI–XR ethics is about perception and control, not only privacy.**
- 2 **Shared XR needs parity and transparency — users should know when their experiences diverge.**
- 3 **S.E.E. makes ethics routine: Synthetic Perception, Evaluation & Governance, Ethics-by-Design.**
- 4 **Synthesising project frameworks works in practice — combined anchors are more workable and accountable.**



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XRSI Europe

Building Trust in Virtual Worlds

Luis Bravo Martins

Vice-President, XRSI Europe



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XRSI EU

XR Safety Initiative - Europe

What is XRSI – Europe?





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RAISE Council

**Responsible Advertising for
Immersive Spaces and Environments**

The standards haven't caught up. Let's build a better future for immersive advertising.

RAISE Council is building the global standard for responsible advertising in immersive and AI-generated spaces and we need your voice in the room.

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FOCUS AREAS

Six reports. One body of knowledge.

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**Consumer Experience &
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**Safety & Regulatory
Perspectives**



**Brand, Agency & Industry
Adoption**



**Platforms & AdTech
Infrastructure**



Creators & Cultural Dynamics



Technology & Future Systems



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Know more at www.xrssi.eu

What are the standardization stakeholder groups working on?



- 🕸 There are numerous Virtual Worlds active standardisation stakeholder groups related to:
- 🕸 **STANDARDIZATION GAPS**
- 🕸 **STRUCTURAL ISSUES OF THE INTERNATIONAL STANDARDIZATION SYSTEM**
- 🕸 **TOP TEN RECOMMENDATIONS TO STRENGTHEN AND ENFORCE EUROPEAN STANDARDS**
- 🕸 Now let's hear your opinions about priorities!



OPENVERSE Summit

Virtual Worlds Standardisation

*Landscape
Current Developments
Recommendations*

Prof. Dr.-Ing. Dipl.-Kfm. Christoph Runde

VIRTUAL DIMENSION CENTER



Type A liaison



Chair „NA 043-01-24 AA Metaverse und Extended Reality“



Chair „Technical Working Group Virtual Worlds“



Coc-chair „Metaverse Ecosystem Working Group“

In-depth analysis of Virtual Worlds Standardisation: The ViWISSO Project



Contracting authority EU Commission / EISMEA SMP-STAND-2024-ESOS-01-IBA	Lead & coordinator ETSI ISG ARF · STF 686 Project no. 101196203	Experts Christine Perey Christoph Runde	Duration 13 mo. 2024–2025
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Methodology

Desk research 912 standards · 354 TRs 71 landscape studies AI-assisted analysis	Expert interviews 19 structured interviews 9 standardisation · 6 vendors 6 consortia · 5 researchers	Stakeholder survey Open public call for input SMEs · academia · EU projects Industry consortia · associations
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3 reports:



GR ARF 010 Standards Landscape Report 912 standards · 8 domains 179 SDOs · 388 WGs PUBLIC	GR ARF 011 Recommendations Report 814 gaps · 549 deficits 10 recommendations RESTRICTED · not public	GR ARF 012 Executive Summary All key results consolidated Free download · etsi.org PUBLIC
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No deficit

The XR industry has no standards deficit — it has a coordination deficit.

912 standards analysed · 814 gaps identified. The problem is not scarcity — it is fragmentation across 179 SDOs with no shared view and no coordination.

EU chance

Europe has a strategic opportunity in Virtual Worlds standardisation.

EU values — openness, interoperability, data protection, human control — are precisely the principles on which robust XR standards must be built. Shape the technology.

Act now

You can act today — three concrete steps.

Use the Standards Register · participate in standardisation bodies · demand standards compliance in your procurement decisions.

Free downloads:

GR ARF 010 Landscape Report (public)
GR ARF 012 Executive Summary (public)

Standards Register:

vdc-fellbach.de

Contact:

Prof. Dr.-Ing. Christoph Runde
runde@vdc-fellbach.de

standards classification starting point: 8 existing XR/MV/VW schemes



31 topics
mainly technologies,
applications and
fundamentals



8 Domains
technologies,
society, economy



EUOS VW domains (from 8th call)
very diverse, ICT domains, 32
EUOS Topics: mainly
technologies, but also health,
smart cities, IT applications



8 profiles
technologies



**Industries and
applications**
▪ 45 verticals according to
NACE code and cross-
sectoral application
classes



4 areas
▪ no discrete relation to
Virtual Worlds, key
enablers, 5G, society,
digital single market



**MSF Taxonomy
(still early draft)**
<https://docs.google.com/document/d/17VKTOaKLfQ57gX5hp7sRQ7GZSxHx-kib4XXcx7Sv4EA/edit?tab=t.0#heading=h.734r1egno3f7>



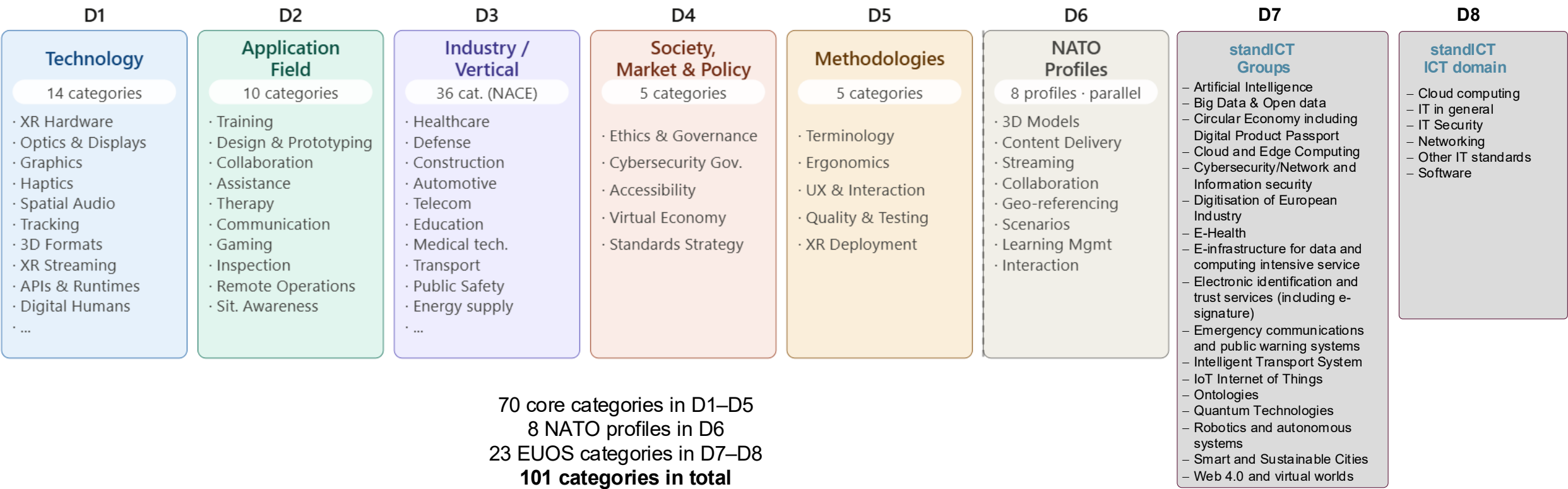
XRSI Anatomy of the Metaverse:
6 layers
▪ use case
▪ commerce
▪ connect
▪ create
▪ infrastructure
other

Each existing scheme covers valuable aspects, but none provides a comprehensive, operational and extensible classification for the entire XR and Virtual Worlds standards landscape

Our new classification system: 5 dimensions D1 to D5

User-specific adaptations (parallel schemes)

- D6 for NATO
- D7, D8 for the European Observatory for ICT Standardisation (EUOS)



The XR | Metaverse | Virtual Worlds Standards Register: Your Practical Tool

World's largest curated collection of XR & Virtual Worlds standards with 2.500 records:

- 163 standards organization (SDOs)
- 416 standardization working groups
- 752 official Standards
- 275 industry Standards
- 310 Specifications
- 314 Recommendations / Guidelines
- 156 Technical Reports
- 112 other document types

Example queries:

- show published standards for avatars
- show working groups on displays
- show ASTM publications
- show documents, orgs and WGs on “ethics”
- show current standardization projects of China (MIIT)
- ...

The screenshot displays the 'Public Register Interface' in 'Full register view'. It features a search bar with filters for 'data set type' (standard (official), standard (industry)), 'Technology is' (XR Streaming & Media Transport), and 'Application Field is' (Collaboration & Telepresence). A dropdown menu for 'Technology is' is open, showing options like 'XR Streaming & Media Transport', 'APIs, Runtimes & Software', 'Digital Humans & Avatars', 'Reality Capture & Digital Content', 'Protocols & Interoperability', 'Network & Cloud Infrastructure', and 'Digital Identity & Credentials'. Below the filters, a grid of standard entries is visible, including ITU-T H.430.1, ITU-T H.430.2, 3GPP Media Capture and Streams Recommendation, SISO STD-017-2022, 3GPP - 26.143, SISO STD-023-2024, IEEE-P1857-14, and ITU-T-Y-ICN-ARM. Each entry shows the title, description, and status (e.g., recommendation/guideline, published / active).



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Thank you for your attention



„Without standards, there can be no improvement.“

Ōno Taiichi

(* 29 February 1912 in Manchuria; † 28 May 1990) was the inventor of the Toyota production system. He developed today's basic logistics methods, the Kanban system and just-in-time production, between 1950 and 1982. The Japanese management concept Kaizen is also based on his ideas.

OpenVerse Roadmap Priorities for a European Standards Strategy OPENVERSE Summit

- 🔗 **Human-centric interoperability progress:** identity portability, consented data portability and usage control across platforms, even if not yet mainstream, may be significantly improved upon.
- 🔗 **Safety, trust and integrity:** content moderation signals, provenance and authenticity, algorithmic transparency hooks must be mitigated with due audits and enforcement, as already deploying.
- 🔗 **Technology standards:** made better known, understood, tested and taken up by the variety of European makers.
- 🔗 **Data space integration:** alignment with Dataspace Protocol and relevant ISO/IEC efforts to ensure discoverability, policy-constrained exchange and audit trails.
- 🔗 **Open source:** Open source is not a magic formula but a compatibility journey between implementations and certain standard profiles to support European digital autonomy while enabling global interoperability.
- 🔗 **Sovereignty:** no standard can be strictly (and only) European, outside of regulatory measures as they are being deployed, but which in their own terms force certain standards progress faster than others.

SESSION 3: OPENVERSE legacy



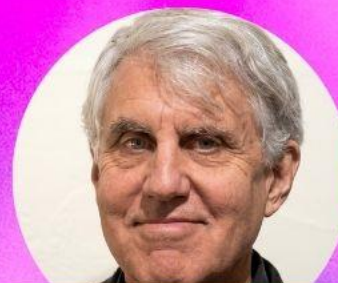
LAPO FIORETTI
IDC



FRANCESCO PANELLA
Martel Innovate



ILARIA MARIANI
Politecnico di Milano



JOHN FAVARO
Trust-IT Services



LUKASZ PORWOL
University of Galway,
Insight Centre

Today's Agenda



- *OPENVERSE Assets and Legacy*
- *OPENVERSE Methodology: Toolkit + Handbook*
- *OPENVERSE Observatory*
- *OPENVERSE Collective Intelligence Wiki*
- *Technological Framework & Graph-RAG for Governance & IPR Intelligence*
- *Q&A*



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OPENVERSE Assets and Legacy

OpenVerse Value Proposition



Working together to advance the European Virtual Worlds vision

WHAT OPENVERSE BRINGS



Research & foresight

Applied research and policy foresight for the Virtual Worlds vision.



Proven methodologies

Co-creation methodology, tools and demonstration experience.



European platform & expert community

A live platform connecting organisations and experts across Europe.

VALUE FOR VW ECOSYSTEM



Accelerate Adoption

Validated use cases and methodologies speed the move from pilot to deployment.



Reduced Fragmentation

A shared taxonomy, standards and roadmap align stakeholders around one direction.



Trusted Foundations

Governance, IPR and standards work build the trust the ecosystem needs to scale sustainably.

HOW YOU CAN LEVERAGE



Join the Network

Connect with organisations and experts across Europe via the Observatory.



Apply the Assets

Put the methodology, taxonomy and governance tools to work in your projects.

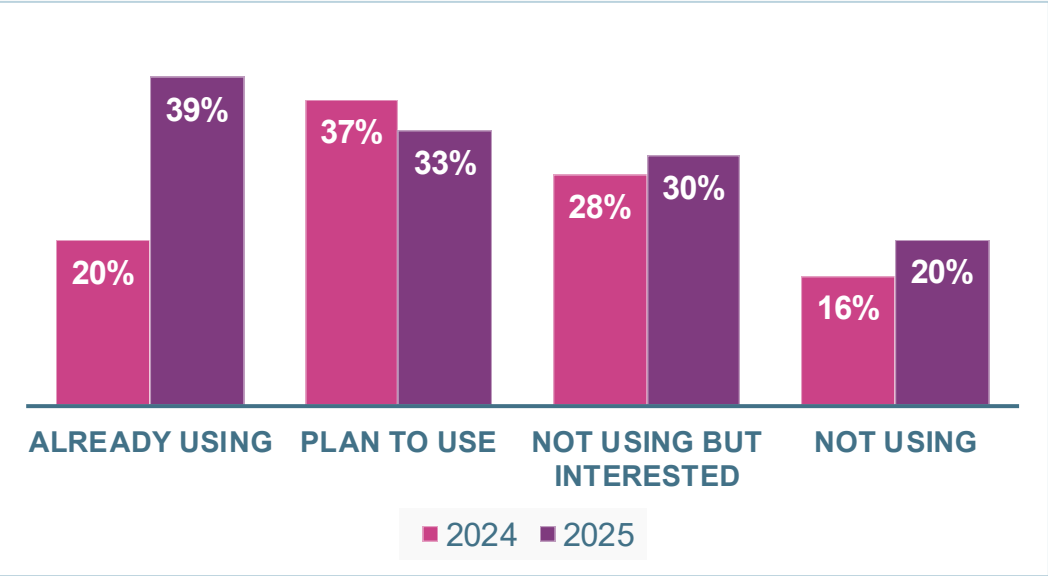


Follow the Roadmap

Track upcoming priorities, milestones and Partnership activities as the ecosystem evolves.

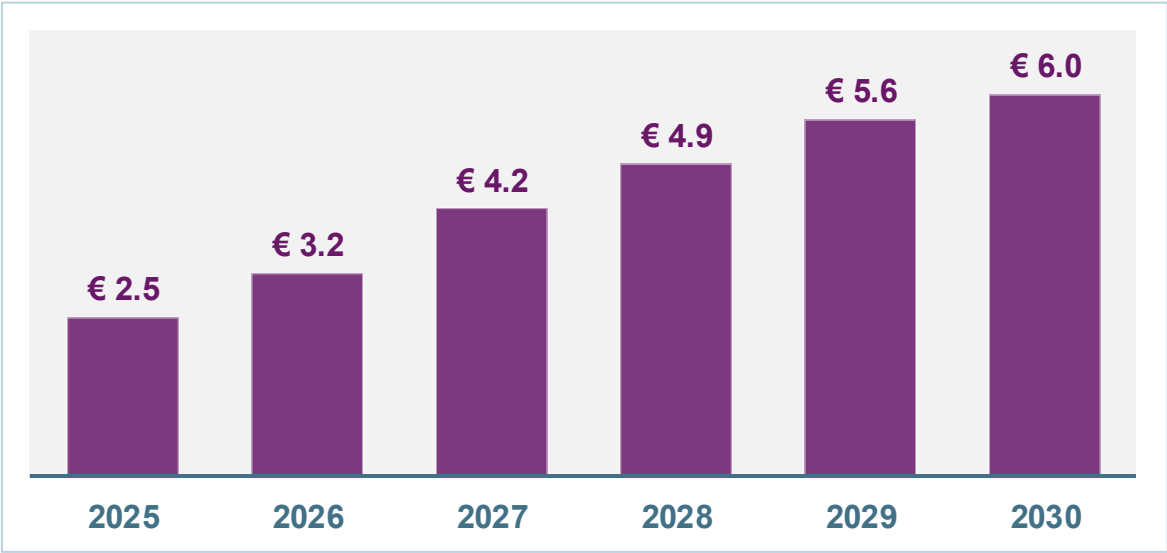
European Virtual Worlds: From Adoption to Scale

Virtual Worlds Market Adoption by European Companies



Source: IDC, 2025

Investment Growth Spending



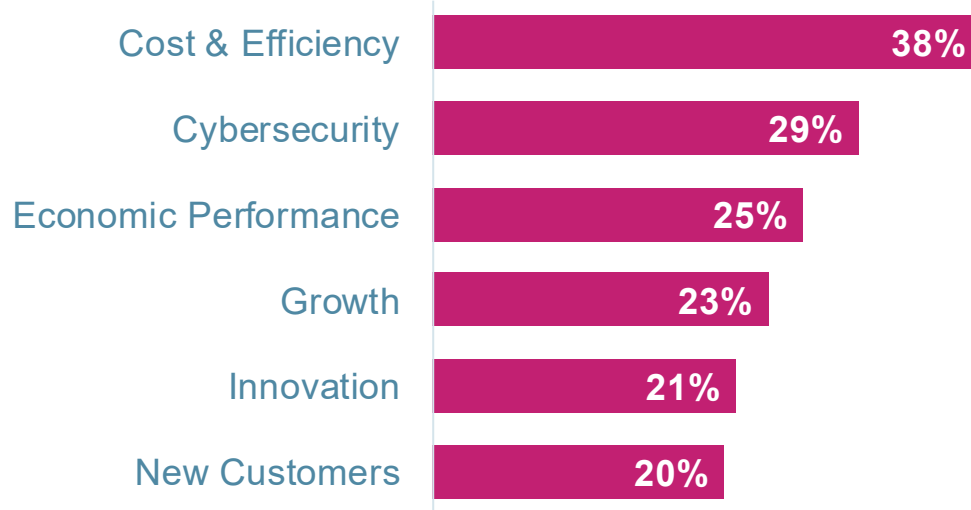
Source: IDC, 2025

€400M+

Planned EU Commitment: €200M in Horizon Europe funding (2025–2027), matched by at least €200M from Virtual Worlds Association members through 2030.

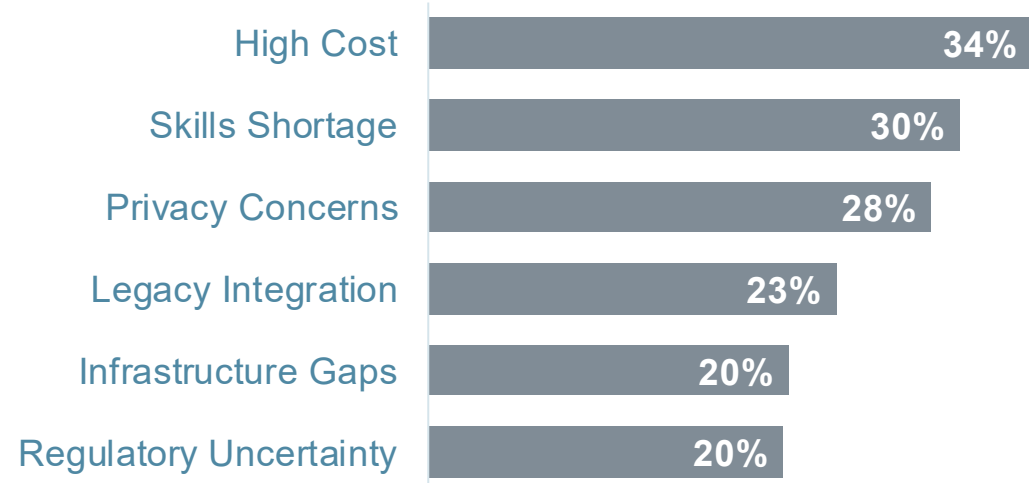
Key Drivers & Challenges to Adoption

What Drives Adoption



Source: IDC, 2025

What Stops Adoption



Source: IDC, 2025

Key drivers & challenges: cost & efficiency (38%) and cybersecurity (29%) pull adoption forward, while high cost (34%) and skills shortages (30%) hold it back.

What users want

Training and upskilling programs top the list of support organisations want to accelerate adoption, ahead of financial incentives and cloud-based access.

OpenVerse Assets — By Category

PLATFORMS & TOOLS

2 OpenVerse Observatory

300+ entries · 200+ registered experts ·
75+ matchmaking conversations since
Feb 2026

7 Collective Intelligence Wiki

Live at wiki.open-verse.eu —
centralises EU-funded VW research,
publications, software

8 Graph RAG Model

AI-powered knowledge graph —
context-aware querying of GDPR, DSA,
AI Act requirements

STRATEGIC INTELLIGENCE

3 OpenVerse Roadmap

5 pillars · 10 Key Actions · 3 scenarios
for 2030/2040

4 Technology Foresight + Governance

Regulatory baseline (GDPR, DSA,
DGA, AI Act) · governance model
across 5 dimensions

9 Technology Framework

Reference framework: XR, AI,
Blockchain, Connectivity, Data Spaces,
Cloud, Digital Twins, Identity

METHODOLOGY

1 Co-Creation Methodology

48 tools · Double Diamond process ·
Wiki-hosted toolkit (Handbook)-hosted
toolkit (Handbook)

5 Demonstration Case (VW- Enabled Robotics)

53 SME respondents across 17
countries + 27-participant controlled
trial

6 Exploratory Study

101 participants · 4 conditions — trust
& governance signals in real VW
platforms

COMMUNITY

10 Network of Stakeholders

80+ organisations — researchers,
industry, SMEs, policymakers —
available for transition into the VWA
ecosystem



OPENVERSE
Summit

Co-Creation Methodology



OpenVerse

OPEN AND CO-CREATED
VIRTUAL WORLDS FOR EUROPE

Setting the ground

Toolkit & Handbook development pathway



01 SCOPE & MAP

existing co-creation toolkits
110 toolkits scoped;
167 tools selected



02 EVALUATE

against criteria:
Collaboration, Immersivity,
Adaptability to VWs,
Roleplay /Simulation Fit



03 CLUSTER

against the Double Diamond
phases



04 OPERATIONALISE

the co-creation Toolkit
(from Figma to Wiki)



05 GUIDE & ADAPT

Handbook with guidelines
and ready-to-use,
adaptable tools



Fortnite

Primarily a third-person battle royale shooter, Fortnite also includes a Creative mode where players design and share their own games and experiences. The platform fosters social play with voice and messaging across teams of up to four players.



Arthur

Designed for enterprise collaboration, Arthur enables organizations to meet and work together in virtual reality. It offers flexible, infinite office spaces accessible from anywhere, boosting productivity with a suite of digital tools.



EngageVR

EngageVR is a versatile virtual reality platform designed for education, training, and corporate events. It enables organizations to create immersive meetings, workshops, and presentations with interactive 3D environments.



VRChat

An immersive social VR platform where users embody custom avatars to play games, socialize, and create content. With a vibrant global community of creators and entertainers, VRChat allows for shared experiences and user-generated worlds.



Resonite

Resonite is a virtual platform focused on immersive music and live events, allowing artists and fans to connect in interactive digital spaces.



Spatial

Spatial is a 3D platform and free online gaming space where creators and brands build and share interactive environments.



RecRoom

A cross-platform, massively multiplayer online VR game with a built-in creation system. Users explore millions of player-made rooms, socialize, and design their own virtual inventions.



Sansar

A creative playground for virtual explorers, Sansar lets users build and share interactive 3D spaces with detailed avatars featuring facial and body animations.

Identifying the Virtual Worlds

VWs covering various purposes

- Creating
- Working
- Learning
- Socialising
- Transactions
- Entertaining
- Service exploitation

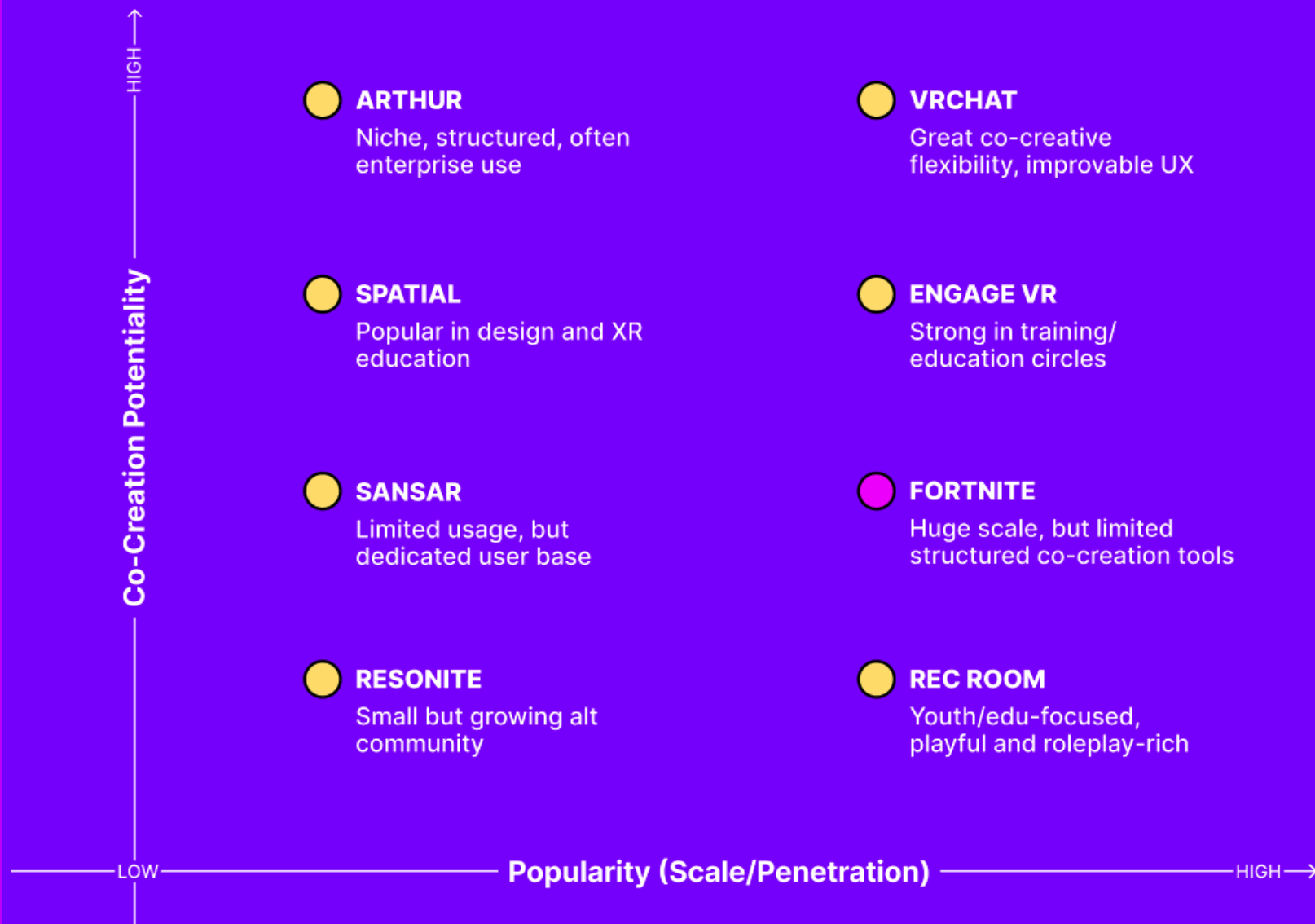
5 US + 3 EU = 8 VWs

	Creating	Working	Learning	Socialising	Transactions	Entertaining	Service exploitation
Engage VR Ireland							
Arthur Germany							
Resonite Czech							
Spatial US							
Rec Room US							
VRChat US							
Sansar US							
Fortnite US							

Commentary

- Fortnite = huge absolute audience, but mostly centered around gameplay, not co-design.
- Arthur, Spatial, Engage = not big in numbers, but excellent penetration in their target fields (enterprise, design/art, education).
- Resonite and Rec Room = niche but deeply embedded in youth/alt or creator communities.
- Sansar = high visual fidelity, but poor engagement metrics — limited popularity.

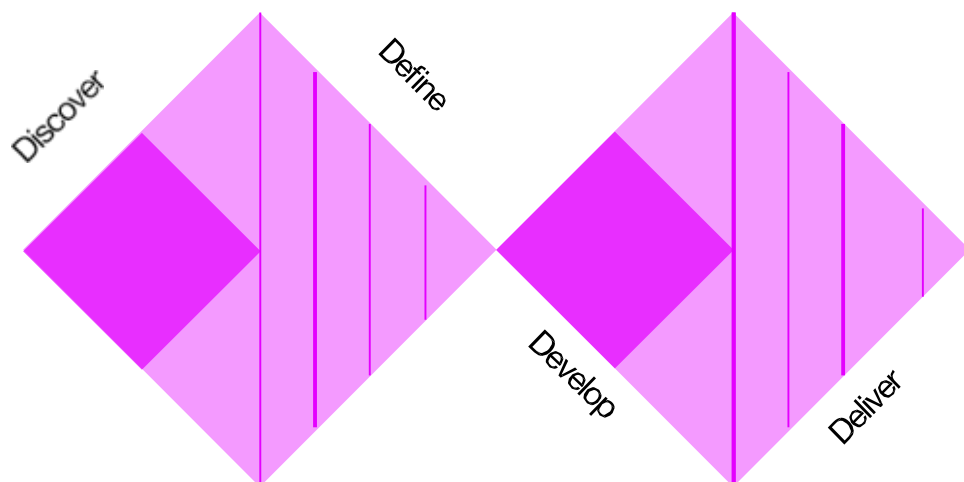
- Absolute popularity: large, mainstream user base
- Targeted popularity: smaller but deeply engaged niche audience



DOUBLE DIAMOND

Double Diamond

Design Council (2005)



DISCOVER

Conduct research and gather insights to deeply understand the problem space and uncover user needs and opportunities.

DEFINE

Analyze and synthesize the research findings to clearly articulate the core problem and create a focused design brief.

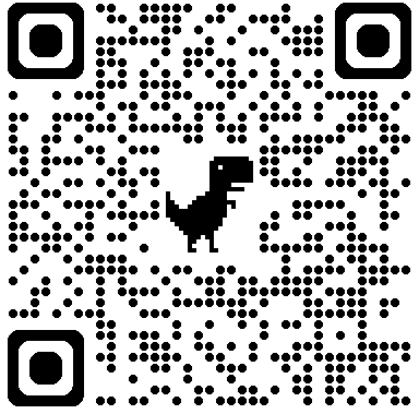
DEVELOP

Generate a range of ideas, build prototypes, and test solutions through iterative cycles to refine concepts.

DELIVER

Finalize the best solution, implement it, and prepare for launch while continuously testing and improving to ensure effectiveness.

TOOLKIT



Tool card Tool card H...



Tool card Tool card H...



Tool card Tool card H...



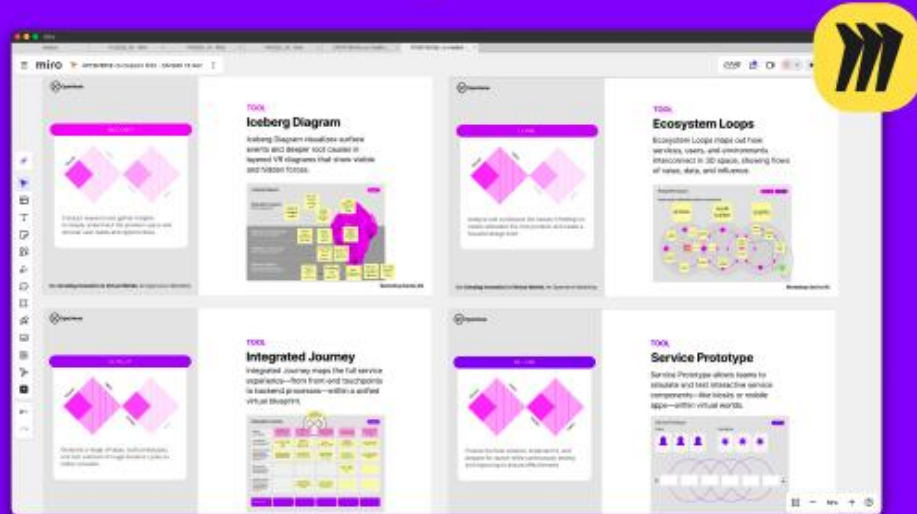
Tool card Tool card H...



The OPENVERSE co-creation toolkit moves **from traditional collaborative platforms** like Miro/whiteboards **to embedding co-design by enacting/performing it within immersive VWs.**

While 2D environments support structured discussion and mapping, VWs enable participants to act through avatars, navigate spatial scenarios, and test ideas experientially.

This shift enhances engagement, experience, and shared decision-making.



The Handbook. How to make a co-creation activity



The OPENVERSE Handbook translates the Toolkit and workshop experimentation into a structured methodology articulated in six operational phases guiding co-creation in Virtual Worlds:

- 1 **Defining the aim** – Clarifying objectives and innovation goals.
- 2 **Selecting the Virtual World** – Choosing the most suitable immersive environment.
- 3 **Selecting and engaging participants** – Recruiting and onboarding diverse stakeholders.
- 4 **Planning the co-creation**– Structuring activities using a selection of the 48 curated tools, included or rebuilt in the VW selected.
- 5 **Executing the co-creation** – Facilitating and documenting immersive co-creation sessions.
- 6 **Sharing results and sustaining engagement** – Disseminating outcomes and maintaining community involvement.

Together, these six phases provide a replicable yet adaptable framework for **organising and scaling** co-creation processes in immersive environments.

A mixed reality repository of use cases

15 open-source use cases as co-creation journeys serving as an inspiration for how **co-creation tools can be translating into operational VW-based prototypes**

Home

Virtual Worlds for Co-Creation: 15 Use Cases

Fifteen ways to imagine, prototype and test ideas together, before they exist in the real world.

This collection brings together fifteen use cases exploring how virtual worlds can support co-creation across radically different domains, from civic engagement and urban regeneration to fashion, cultural heritage, music and museum design. Each use case reinterprets established co-design methods for an immersive setting, showing how discovery, definition, development and delivery activities change when stakeholders share a persistent, embodied, three-dimensional space rather than a meeting room or a screen.

Every use case documents a real platform choice, from Fortnite to Resonite to Spatial, together with the specific methods adapted for it. Explore the bubbles below to explore each one in detail, or use it as inspiration for designing your own collaborative virtual environment.



Use Case Landscape

Click the inner dots to learn more about each use case



X-axis: ease of use for co-creation | Inner dots: individual use cases

● Basic use-cases ● Extended use-cases

Takeaways

VALIDATION OF SKILLS

Skills requirements identified through the co-creation activities performed resulted **appropriate, relevant, and accurately specified.**

ACTIVITY FRAMING AND TIME STRUCTURING

VWs users tend to spontaneously **take control** and start building artefacts or environments. This can shift attention away from the intended objectives.

ROLE OF MODERATION

VWs users and other engaged participants emphasised the **importance of being guided by a moderator** to effectively navigate the co-creation activities.

WORLD PREPARATION

Co-creation in VWs require **prior preparation.** Rebuilding the co-creation tools directly in the VW reduces cognitive dispersion, and enables participants to be focused.

PLATFORM AFFORDANCES
MATTER, BUT NOT DECISIVELY

COMMUNITY CREATIVITY
OUTWEIGHS TECH MATURITY

RE-CENTERING CO-CREATION
ON COMMUNITY FEATURES

IN-PLATFORM DESIGN
SUPPORTS BUT CANNOT
SUBSTITUTE CREATIVE AGENCY



OPENVERSE
Summit

OPENVERSE
Observatory

Observatory Overview

400+ ENTRIES IN THE OBSERVATORY



250+ Companies



EU-funded XR/VW projects



100+ National initiatives



30 Regulatory sandbox use cases



30 Virtual Worlds



XR Standards registry (via VDC / StandICT)



Technology radar & XR taxonomy



Roadmap for Open and Co-created Virtual Worlds
(coming soon)



15 Virtual world co-creation use cases

Companies and Organisations in the Observatory

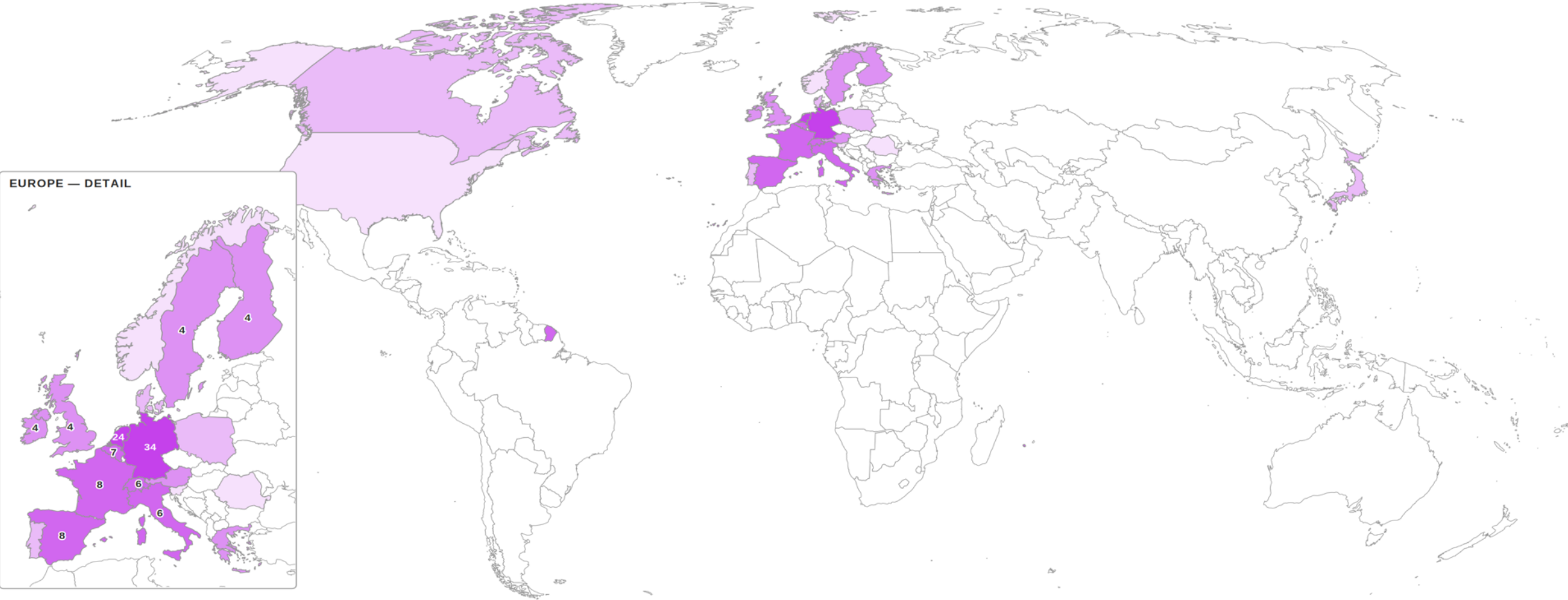
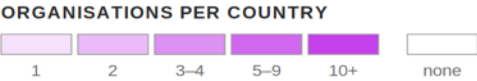


Only self-registered, displayed in random order

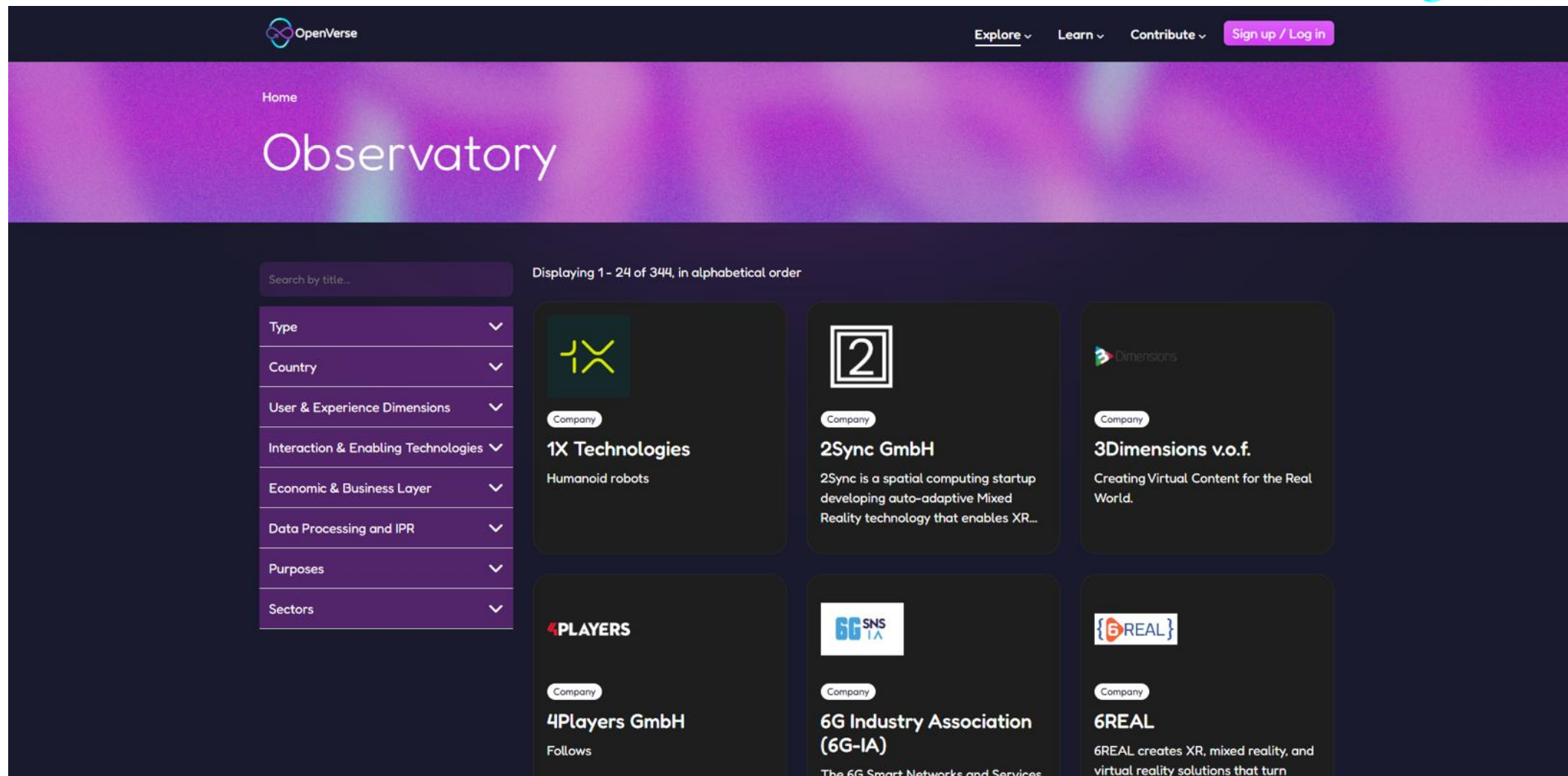
Geographical distribution of organisations

Self-registered organisations by country

OpenVerse Observatory — 135 self-registered organisations across 23 countries



Rich content - Companies, National initiatives & more



The screenshot shows the OpenVerse Observatory website. At the top, there's a navigation bar with the OpenVerse logo, links for Explore, Learn, and Contribute, and a Sign up / Log in button. Below the navigation bar is a large purple header with the word "Observatory" in white. The main content area has a dark background. On the left, there's a sidebar with a search bar and several filter categories: Type, Country, User & Experience Dimensions, Interaction & Enabling Technologies, Economic & Business Layer, Data Processing and IPR, Purposes, and Sectors. The main area displays a grid of company cards. The first row shows 1X Technologies (Humanoid robots), 2Sync GmbH (spatial computing startup), and 3Dimensions v.o.f. (Virtual Content for the Real World). The second row shows 4Players GmbH (Follows), 6G Industry Association (6G-IA) (The 6G Smart Networks and Services), and 6REAL (XR, mixed reality, and virtual reality solutions).

OpenVerse

Explore ▾ Learn ▾ Contribute ▾ Sign up / Log in

Home

Observatory

Search by title...

Displaying 1 - 24 of 344, in alphabetical order

- Type ▾
- Country ▾
- User & Experience Dimensions ▾
- Interaction & Enabling Technologies ▾
- Economic & Business Layer ▾
- Data Processing and IPR ▾
- Purposes ▾
- Sectors ▾



Company

1X Technologies

Humanoid robots



Company

2Sync GmbH

2Sync is a spatial computing startup developing auto-adaptive Mixed Reality technology that enables XR...



Company

3Dimensions v.o.f.

Creating Virtual Content for the Real World.



Company

4Players GmbH

Follows



Company

6G Industry Association (6G-IA)

The 6G Smart Networks and Services



Company

6REAL

6REAL creates XR, mixed reality, and virtual reality solutions that turn

A Growing Community!

A GROWING COMMUNITY!

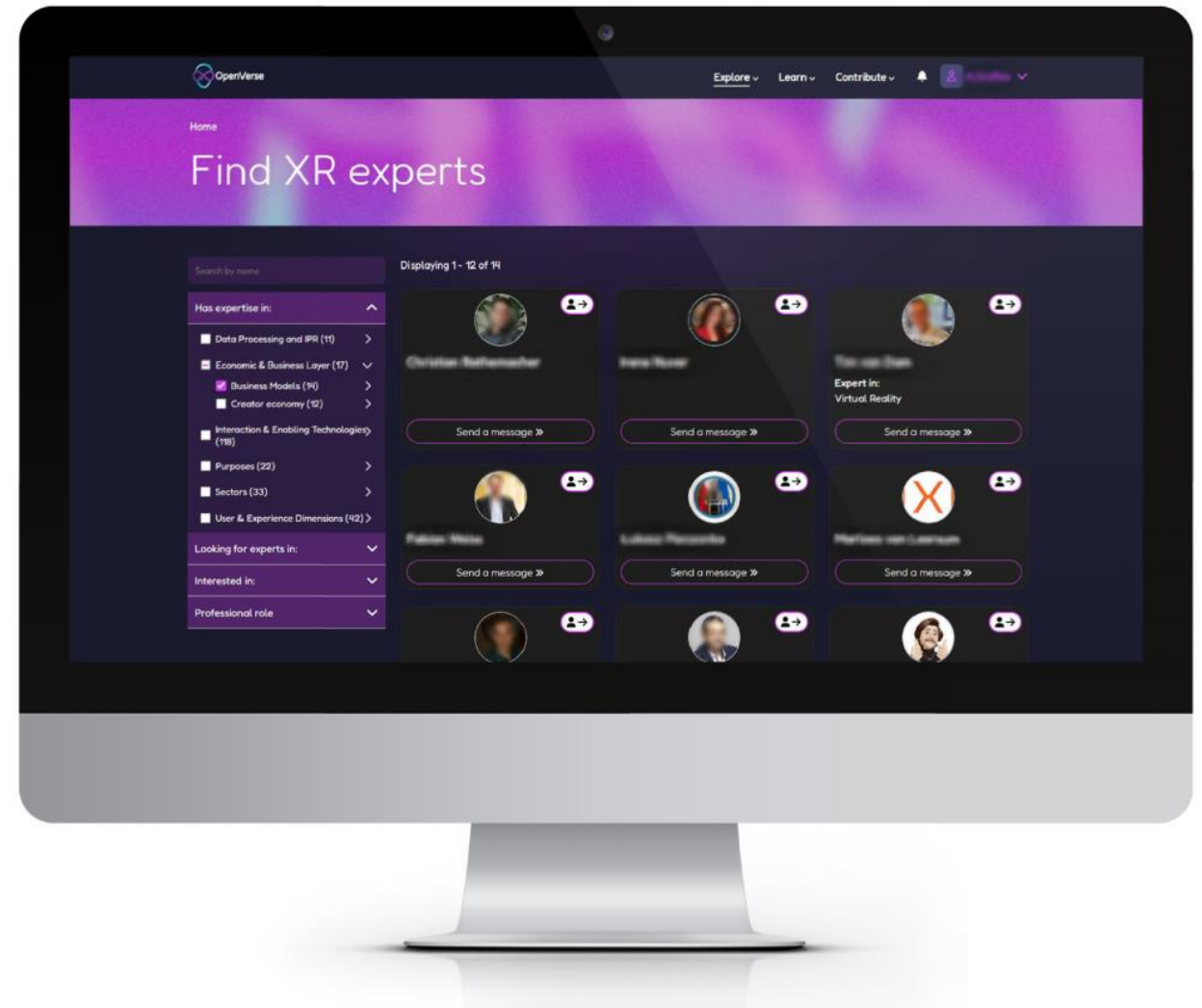


250+ registered experts in XR/VW

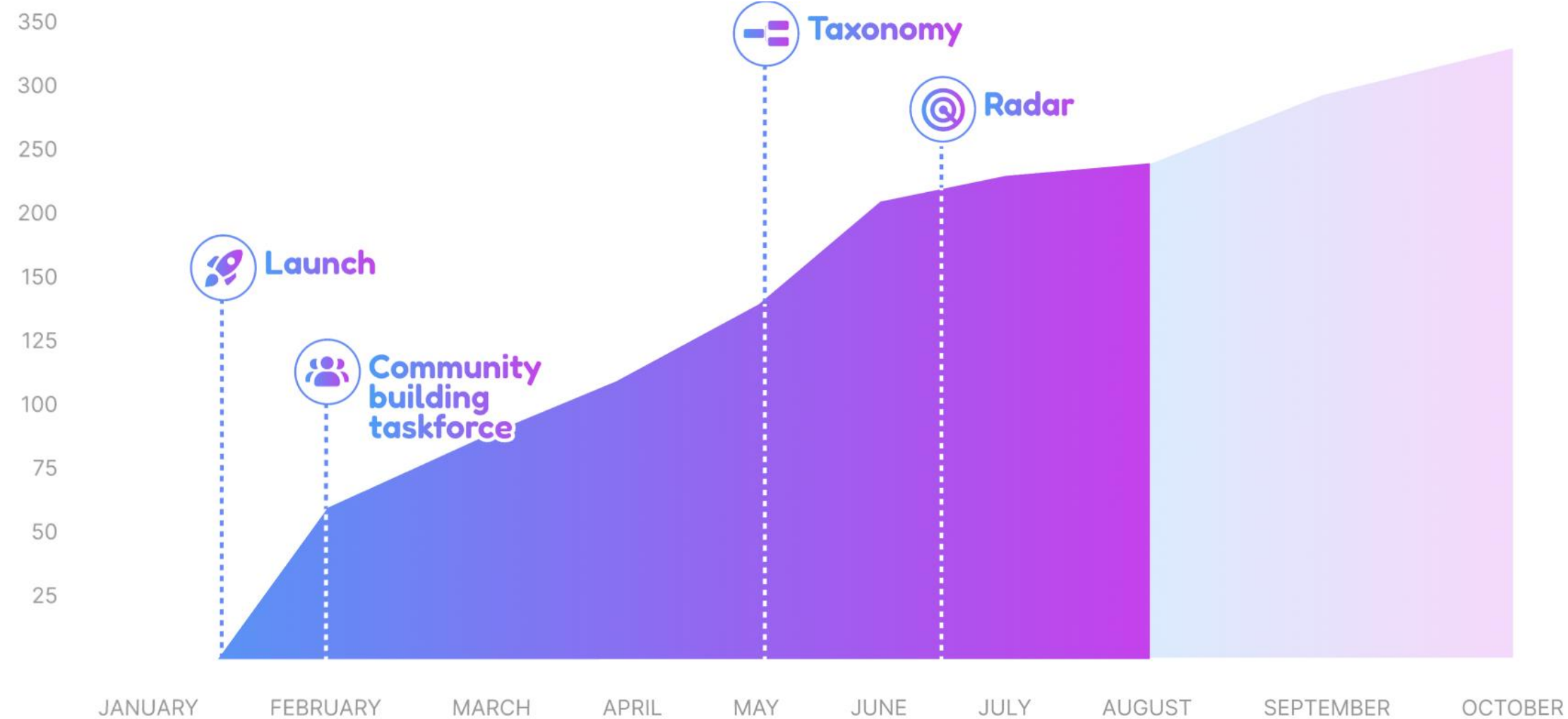


140+ matchmaking conversations started

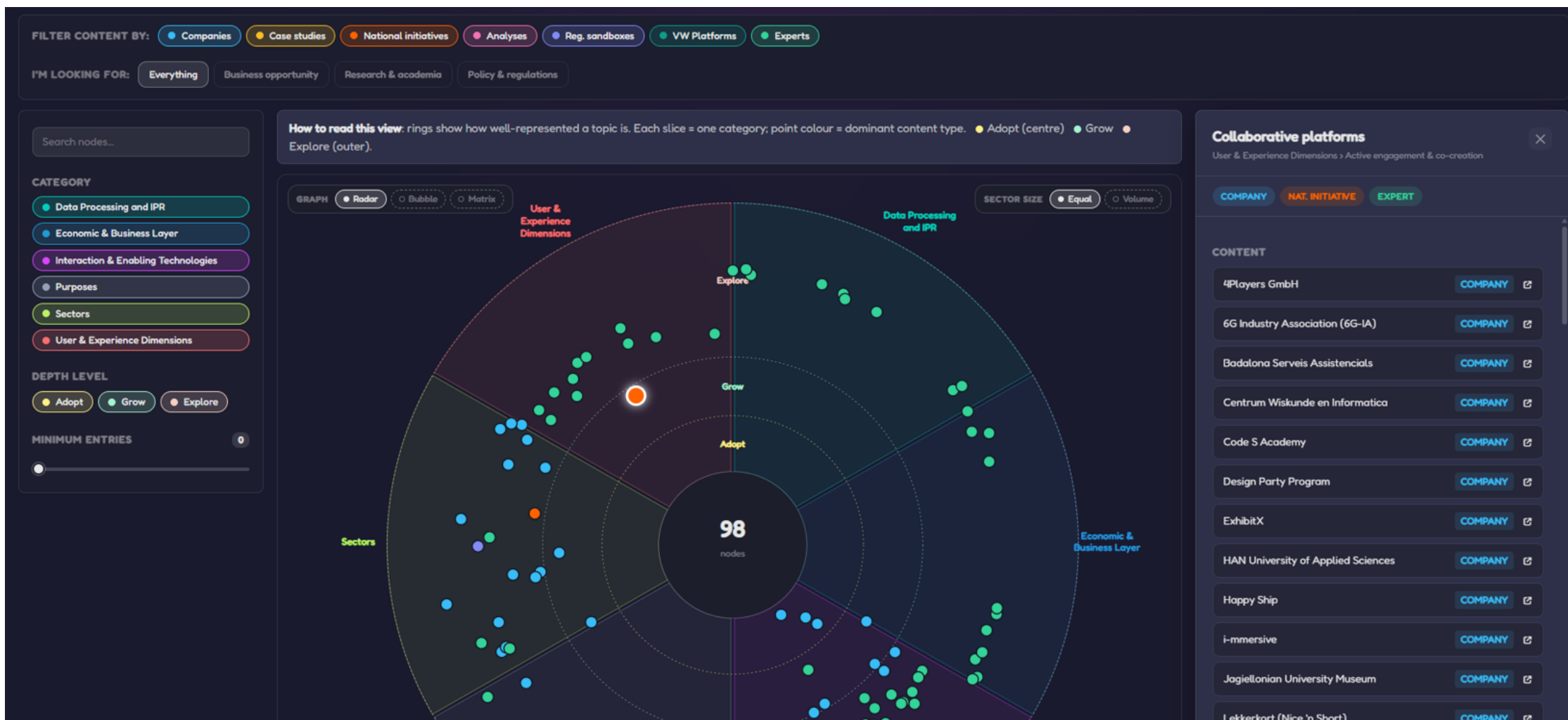
Since the registration & matchmaking features were launched in February 2026



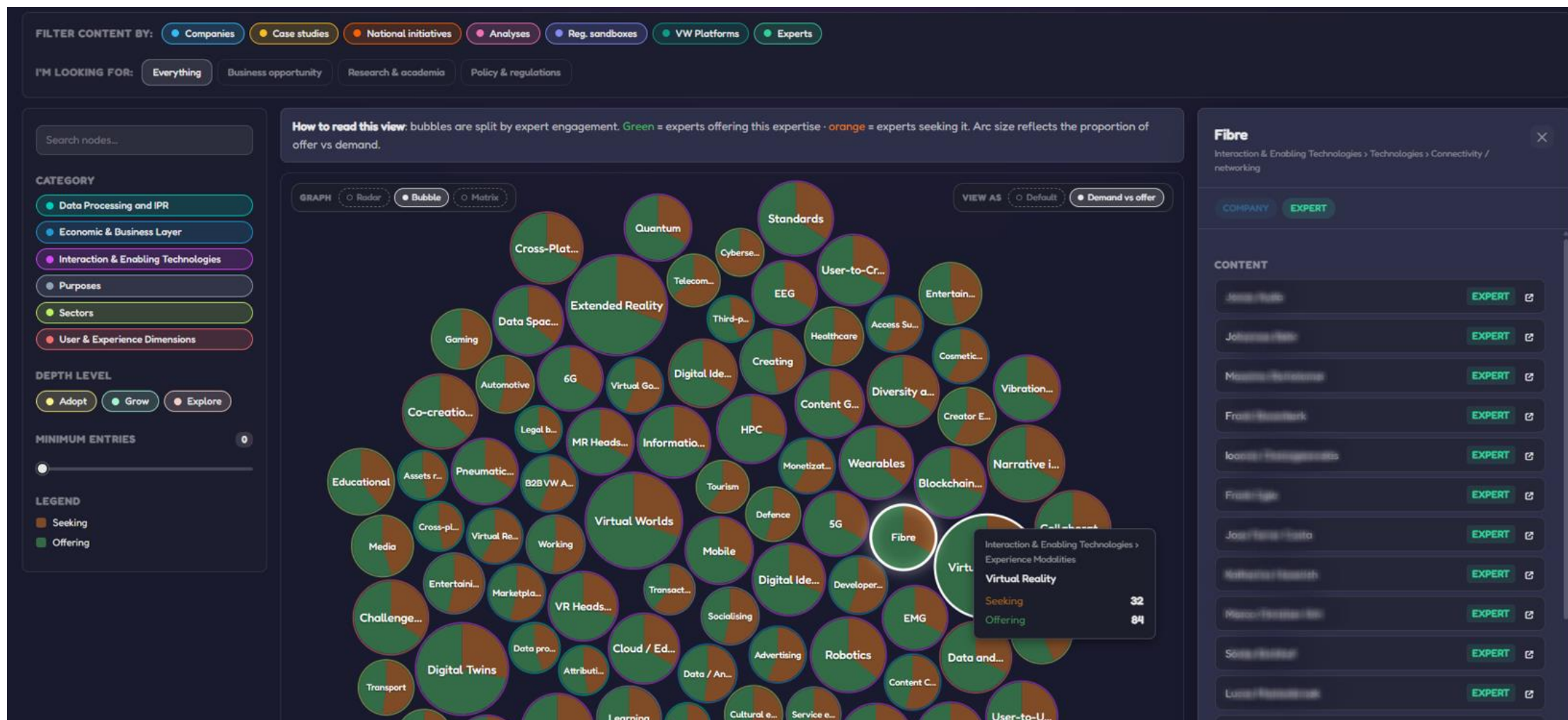
Growth over time



Technology Radar and Taxonomic views



Matchmaking expertise supply and demand



XR Experts testimonials

“ The OpenVerse Observatory is the key to a wider network, giving you greater **visibility**, helping you make an **impact**, and enabling you to **shape the future** of XR ”



Tim Van Dam
CHANGEFIED
GAMIFIED SOCIAL SOLUTIONS

“ Openverse brings together the **right people** with the **right mindset** ”



David Löhner
MindPort

“ The OpenVerse community provides **inspirations** and **ideas** by showcasing examples of **good practice** ”



Anestis Papadopoulos
pi tech

“ The OpenVerse Observatory is a **great place to start** if you want to help **shape the future** of XR in Europe ”



Julien Castet
IMMERSION
IMAGINATION, INTERACTION ...



OPENVERSE
Summit

OPENVERSE
Collective Intelligence

- MediaWiki-based platform designed to provide a dedicated space for **exchange** and **co-creation** for **EU-funded Virtual Worlds projects**.
- The **Collective Intelligence** acts as a **hub for European Virtual Worlds research, publications, software, and datasets**.
- Accessible gateway for **SMEs, innovators, and EU project coordinators and participants** to accelerate development, design products, and connect with the broader European ecosystem

OPENVERSE Collective Intelligence



Explore

Accessing open repositories, research outputs, and strategic innovation agendas for Virtual Worlds ecosystems

Contribute

Inviting users to register and actively shape the Roadmap for Open and Co-created Virtual Worlds

Re-use

Provide a pragmatic entry-point to the OPENVERSE co-creation toolkit and reusable components



OPENVERSE Collective Intelligence

Explore	Re-use	Contribute
• More than 40 EU-funded projects on Virtual Worlds • 650+ Technical and research outputs, categorised • Mapping of 20+ Strategic Research and Innovation Agendas	• OPENVERSE Co-creation Toolkit, showcasing 50+ co-creation tools • 200+ reusable components repository	• Roadmap for Open and Co-created Virtual Worlds • OPENVERSE Technological framework

OPENVERSE Collective Intelligence

Open and reusable components repository

Page [Discussion](#) [Read](#) [View source](#) [View history](#) [Tools](#) ⌵

This page provides a list of open and reusable components for the domain.

Each of the output is a list of the output content published in the domain.

[Search](#)

Technical and research outputs repository

Page [Discussion](#) [Read](#) [View source](#) [View history](#) [Tools](#) ⌵

This page provides a list of technical and research outputs for the domain.

Each of the output is a list of the output content published in the domain.

Project
6G-XR
6G-XR
6G-XR
6G-XR
THEIA-XR
THEIA-XR
ADVHANDTURE
POPULAR
XTREME

Co-creation Toolkit

Page [Discussion](#) [Read](#) [View source](#) [View history](#) [Tools](#) ⌵

A Toolkit for Co-Creation in Virtual Worlds

This page provides an overview and links to the co-creation tools developed by Politecnico di Milano in the context of the OPENVERSE project. A core component of planning is the selection and contextual adaptation of co-creation tools. The OPENVERSE Toolkit includes a wide variety of such tools—a curated set of 48 co-creation tools mapped across the four phases of the [Double Diamond](#)—that support everything from early exploration to final decision-making.

DOUBLE DIAMOND

Double Diamond
Design Council (2005)



DISCOVER Conduct research and gather insights to deeply understand the problem space and uncover user needs and opportunities.

DEFINE Analyze and synthesize the research findings to clearly articulate the core problem and create a focused design brief.

DEVELOP Generate a range of ideas, build prototypes, and test solutions through iterative cycles to refine concepts.

DELIVER Finalize the best solution, implement it, and prepare for launch while continuously testing and improving to ensure effectiveness.

Double Diamond design process model Work by Politecnico di Milano, adapted from Design Council's original work - CC BY-NC-SA 4.0 

Open knowledge for
European Virtual Worlds



wiki.open-verse.eu

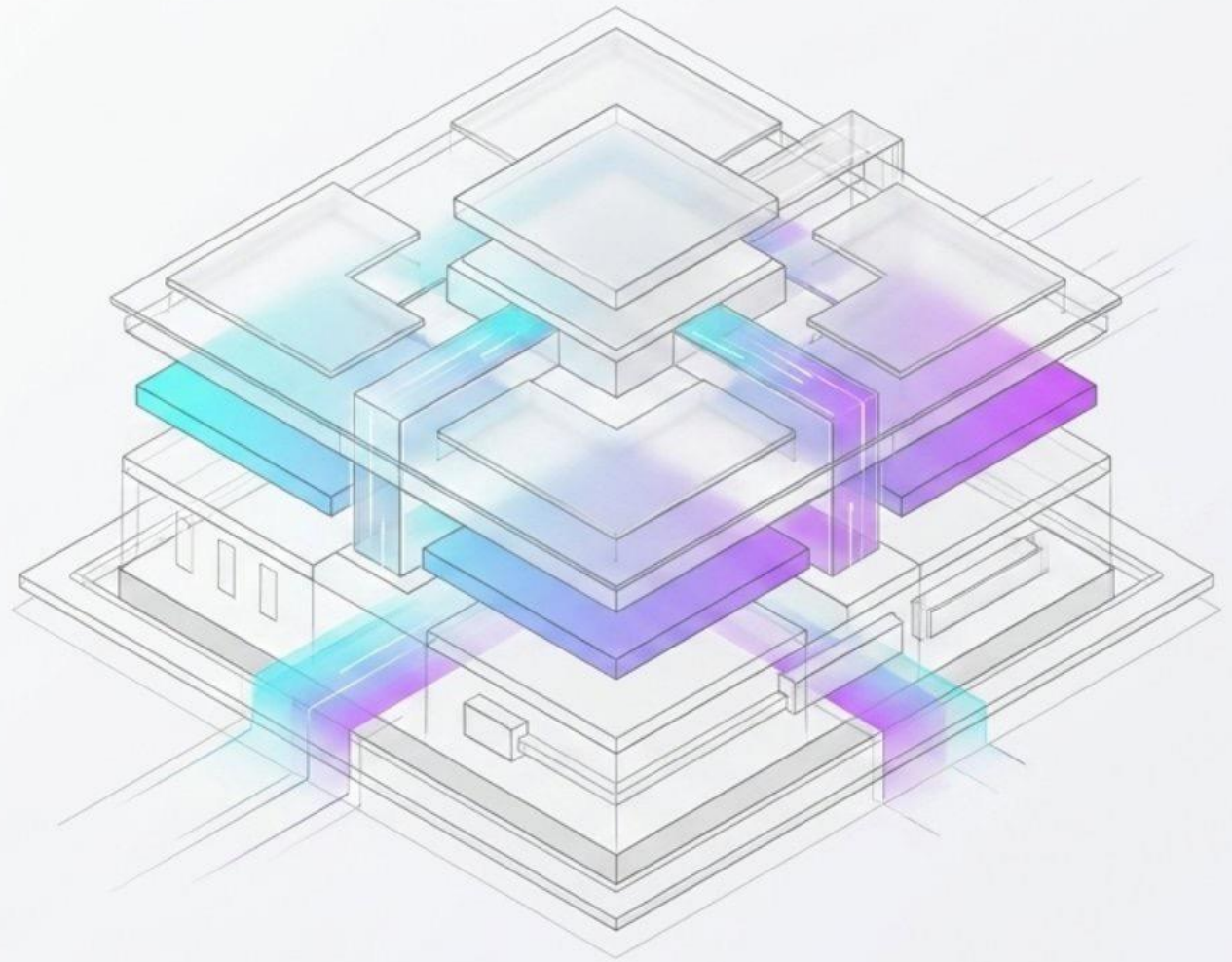


OPENVERSE
Summit

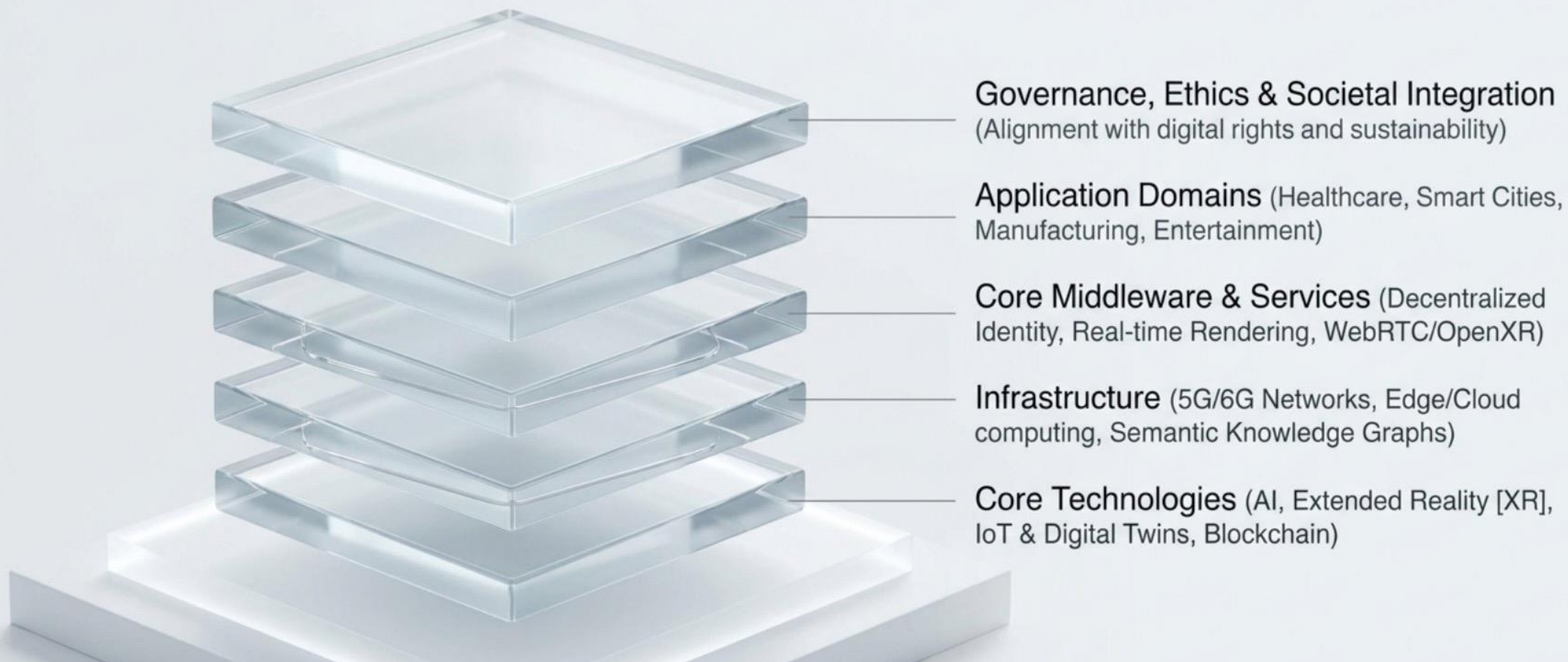
Graph-RAG for Governance & IPR Intelligence

The OpenVerse Technological Framework

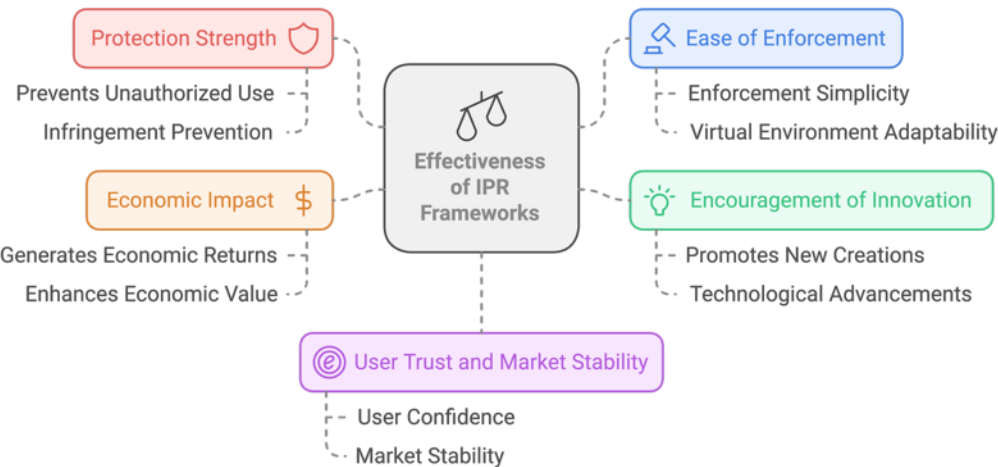
A Blueprint for Web 4.0
& Virtual Worlds



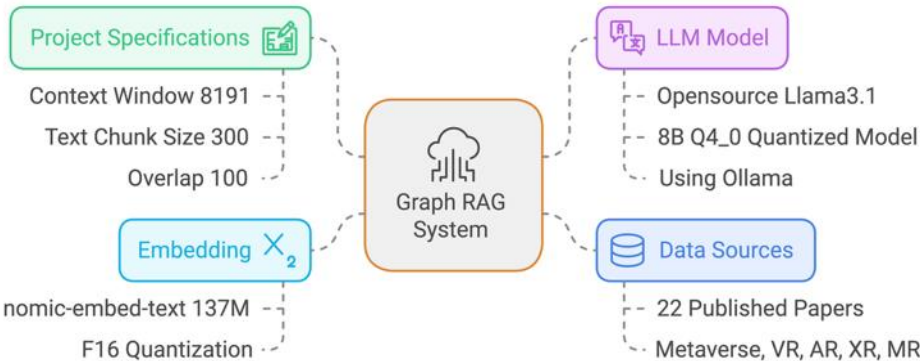
Technological Framework



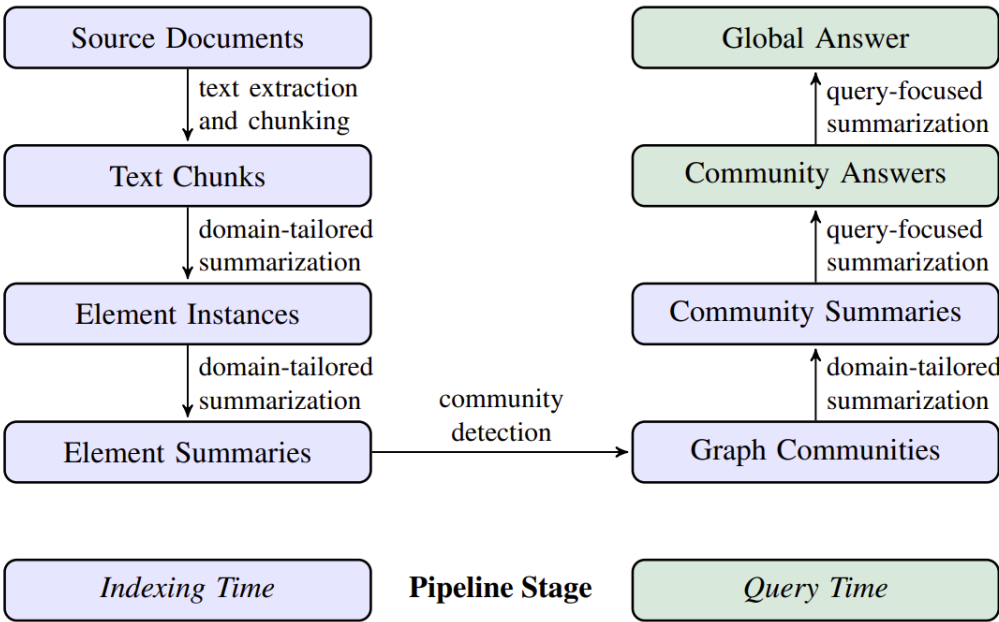
Graph-RAG for Governance & IPR Intelligence



Different IPR frameworks are based on five key criteria: Protection Strength, Ease of Enforcement, Encouragement of Innovation, Economic Impact, and User Trust & Market Stability, highlighting how each framework performs in fostering secure, innovative, and economically viable virtual environments



Proposed Framework



Graph RAG pipeline using an LLM-derived graph index of the source document text.

- **Expanded Corpus:** The source corpus has been expanded to encompass a wider range of materials, including current policy papers, technical specifications, and socio-legal studies related to immersive technologies.
- Integrated over 100 curated documents, including policy papers, technical standards (e.g., IEEE/ISO), and socio-legal analyses of immersive tech, enabling robust domain coverage.
- **LLaMA-2 with LoRA Fine-Tuning:** Utilised LLaMA-2 as the core model, fine-tuned via Low-Rank Adaptation (LoRA) for efficient, domain-specific ethical reasoning.
- **Enhanced Entity Recognition and Relationship Mapping:** The precision and semantic depth of entity recognition have been improved, enabling the capture of subtle ethical considerations such as algorithmic transparency, cultural inclusivity, and user autonomy.
- **Advanced Graph-RAG Pipeline:** The enhanced pipeline incorporates superior clustering algorithms for community summarisation and dynamic weighting of ethical dimensions, resulting in more contextually relevant responses.

Model Upgrades Comparison

	 Description
Corpus	Expanded to include policy papers, technical specifications, and socio-legal studies
Documents	Integrated 100+ curated documents
Core Model	LLaMA-2 with LoRA fine-tuning
Entity Recognition	Improved precision and semantic depth
Graph-RAG Pipeline	Enhanced with superior clustering algorithms

Example Queries and their responses (Results)



Local RAG for Ethics/IPR Papers

Ask a question about your paper collection. Answers include citations like [S1].

Question

Ethical challenges in virtual worlds



Answer

Concise Answer

The Metaverse poses several ethical challenges, including bias and discrimination in AI algorithms, privacy concerns, and transparency issues. Studies have demonstrated that biased AI systems can perpetuate inequality and discrimination within virtual environments (Buolamwini and Gebru [12], Ferrer et al. [35], Varona & Suárez [89]). The integration of AI technologies within the Metaverse introduces complex ethical challenges, including content moderation, user safety, and data protection (Alesia Zhuk [S1], Alesia Zhuk [S4]). Regulatory bodies must conduct a comprehensive analysis of current legal frameworks to identify areas where regulations may fall short in addressing these concerns (Maloney [56]). To address these challenges, a human-AI hybrid approach is necessary to strike a balance between creative freedom and user safety (Alesia Zhuk [S1], Alesia Zhuk [S4]).

Sources

S1 — Ethical implications of AI in the Metaverse (pp. 1–2)

DOI: 10.1007/943681-024-00450-5

<https://consensus.app/papers/ethical-implications-of-ai-in-the-metaverse-zhuk/26f42047db735632b31e22b7e0dca6c7/>

ght of these concerns, this paper aims to contribute to the ongoing discourse surrounding the ethical implica- tions of AI in the Metaverse. As the Metaverse continues to evolve, the integration of AI technologies demands a bal- anced approach that considers the potential benefits along- side the ethical risks. By taking proactive steps to address bias, discrimination, privacy concerns, and transparency issues, it is possible to cultivate an ethically sound and sus- tainable virtual world. The d...

Local RAG for Ethics/IPR Papers

Ask a question about your paper collection. Answers include citations like [S1].

Question

What governance mechanisms are recommended for derivative works in virtual worlds?



Answer

Concise Answer

Based on the provided sources, governance mechanisms recommended for derivative works in virtual worlds include:

- Modular governance approaches that enable portability and adaptability to different platforms and use cases ([S2])
- Decentralized autonomous organizations (DAOs) that allow users to be actively involved in decision-making processes ([S2])
- Personal data stores that enable users to own and sell their personal data via smart contracts and intuitive user-friendly interfaces ([S1])
- Data trusts in the form of DAOs that harness the collective power of Metaverse users to protect their interests and promote the public good ([S1])

Evidence Map

Key Points	Supporting Sources
Modular governance approaches are recommended for virtual worlds.	[S2]
Decentralized autonomous organizations (DAOs) can be used for decision-making in virtual worlds.	[S2]

Sources

S1 — The Metaverse: Virtual Metaphysics, Virtual Governance, and Virtual Abundance (pp. 3–4)

DOI: 10.1007/s13347-023-00666-z

<https://consensus.app/papers/the-metaverse-virtual-metaphysics-virtual-governance-and-turner/629023eab98f5683ba9b02e20d3f2811/>

premise, making good governance by standards unlikely” (McStay, 2023: p. 15). McStay ends his article by considering specific governance proposals for the Metaverse that align with data stewardship and the dictates of virtual realist gov- ernance. His primary focus is on interoperability in the Metaverse, which involves the ability to seamlessly transfer one’s personal data, virtual avatar, and other vir- tual possessions across different virtual worlds and applications. McStay proposes personal...

S2 — Life, the Metaverse and Everything: An Overview of Privacy, Ethics, and Governance in Metaverse (pp. 3–4)

DOI: 10.1109/icdcsw56584.2022.00058

<https://consensus.app/papers/life-the-metaverse-and-everything-an-overview-of-privacy-ferr%C3%A1ndez-hu/44a54f5943b7593f80a0423429084d4d/>

the metaverse. C. Modular governance Governance in online platforms is a high-stakes challenge that yet has few basic features of offline (physical) governance legacies [17]. The authors [17] propose a modular

Express your interest in the OPENVERSE Key Exploitable Results

If you see potential to:

- reuse or reference an OPENVERSE result
- apply it in your project or organisation
- explore a future collaboration

please express your interest through our
short, non-binding Letter of Intent.

It takes only a few minutes.



Scan to express your interest

OPENVERSE Summit



Thank You!



open-verse.eu



[@OpenVerse_EU](https://twitter.com/OpenVerse_EU)



[@OPENVERSE](https://www.linkedin.com/company/openverse)



Funded by
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Project funded by



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Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Confederation

Federal Department of Economic Affairs,
Education and Research EAER
State Secretariat for Education,
Research and Innovation SERI