Germany in the Metaverse:
Positioning ourselves and Perspectives
Other Countries' Metaverse Strategies and what we might learn from them

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Honorary Professorship Heilbronn University

The Metaverse Coordinate System

distributed-collaborative V/AR;
decentral data storage;
Web3.0 / blockchain

collective spaces

hardware competency

seamless interaction spaces

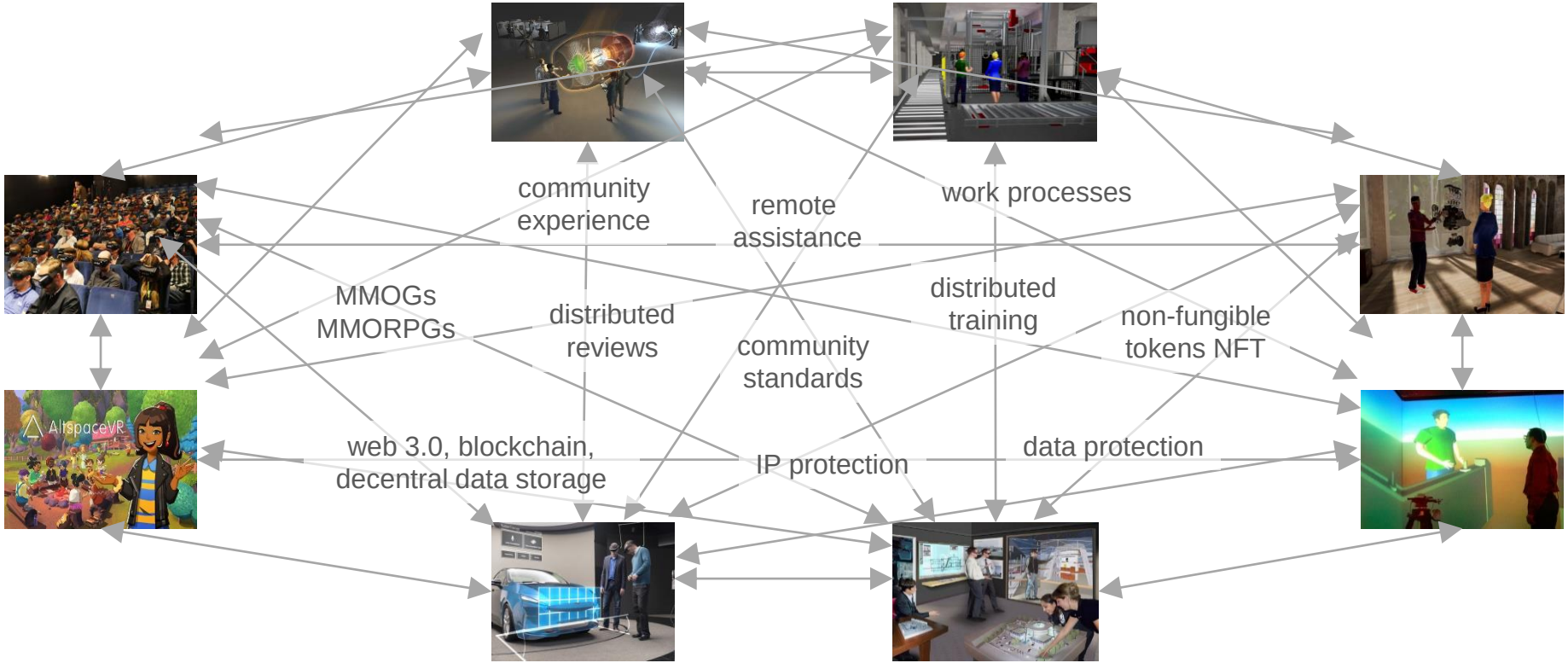
digital twin

competences on capture, planning, design, assistance

Living Lab XR-Interakt

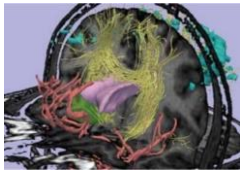
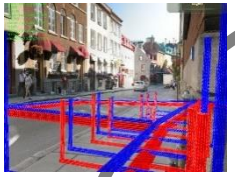
VIRTUAL DIMENSION CENTER

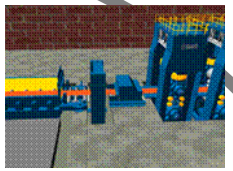
Collaborative XR environments, with rules, ethics, ownership, safety and security



Cyberspace is a mouldable, persistent image of reality, and vice versa.

vertical integration


machining

fashion

services


Virtual Reality (VR)

Reality is planned, tested and experienced with the help of cyberspace.

Cyberspace is an image of reality and makes it possible to accompany, improve, control and master it.


health & care

construction

logistics

reality



Hard boundaries between fully synthetic virtual reality and reality will disappear.

eXtended Reality(XR) continuum

derived from Milgram

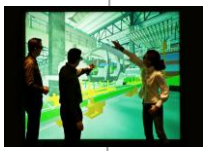
virtual environment ← → real environment

ambient computing, ubiquitous computing; neededamong others: mobile data infrastructure – wearable computing - data protection – data secutiry

virtual reality (VR)

full immersive

semi-immersive



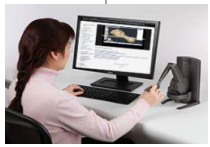
augmented virtuality

augmented reality (AR)

see-through AR

spatial AR

tangible user interfaces (MR – mixed reality)



reality

Virtual worlds are attracting great attention in business and society under the term "metaverse”

The impact on the economy and society is considered to be substantial:

- forecast of metaverse markets of up to USD 394 billion by 2025 (BCG) and USD 5 trillion by 2030 (McKinsey)

XR in Germany:

- 60,000 people in over 1,600 XR companies generated sales of up to € 550 million in 2022, according to Cologne University of Applied Sciences with sales growth of around 30% (despite coronavirus!). (2012; Prognos analysis; other research method said: even more than 2,500 of 3D-companies in Germany)
- start-up activity in the XR market is encouraging, with four times as many start-ups as closures since 2019.
- XR sector is characterized by many small and medium-sized companies -> creating many jobs

⇒ virtual worlds are a highly relevant topic for us

⇒ virtual worlds hold the potential for value creation and jobs in Germany

⇒ they enable new business models in existing and emerging industries.

⇒ they are essential for the long-term interoperability and connectivity of our traditional industries.

Projected horizons of metaverse growth and adoption

Metaverses are in the making

WORLD ECONOMIC FORUM

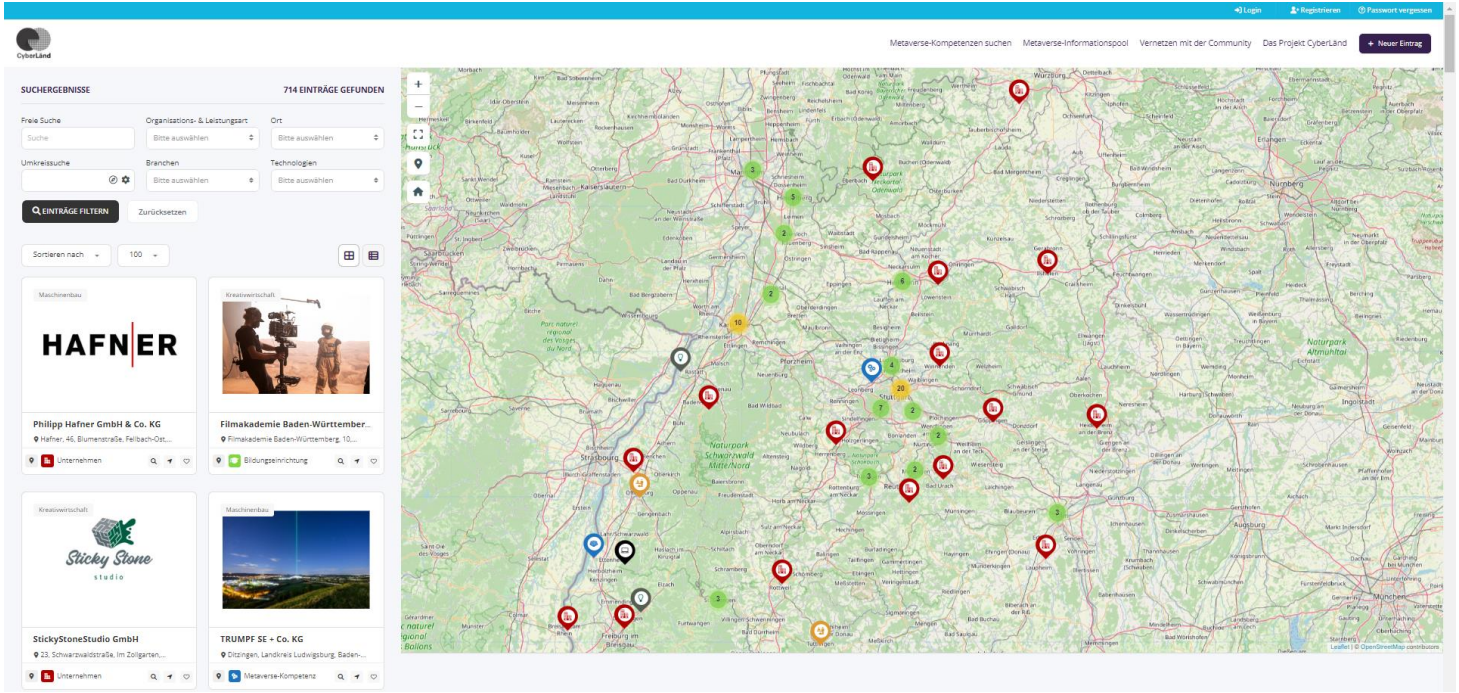
https://www.weforum.org/agenda/2023/02/metaverse-use-cases-industrial-consumer-enterprise/

Baden-Württemberg Metaverse Competence Map: 700+ entries

entries are MV-related

- companies
- research labs
- consultants, attorneys
- educations & trainings
- events
- best practices
- …

⇒ we have a good stock of expertise



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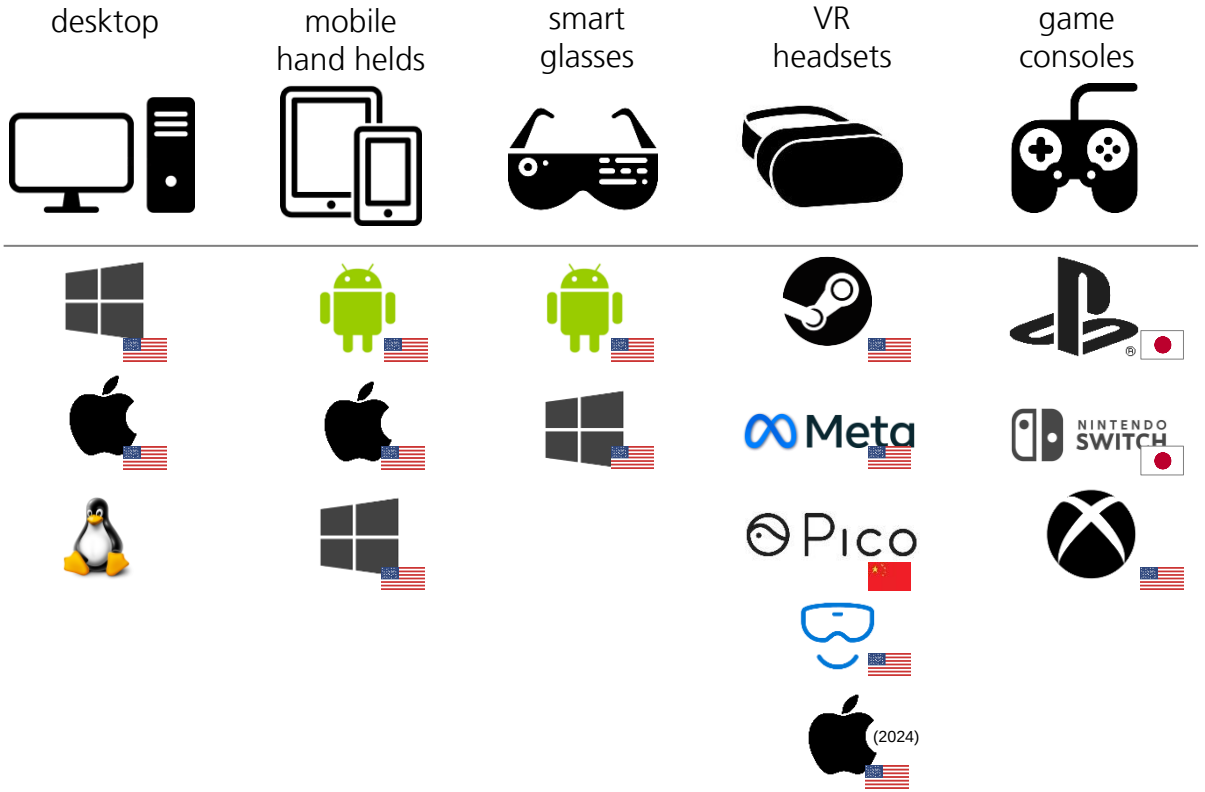
VIRTUAL DIMENSION CENTER

Europe finds itself only at the sideline of a fight for global XR ecosystems.

problem:

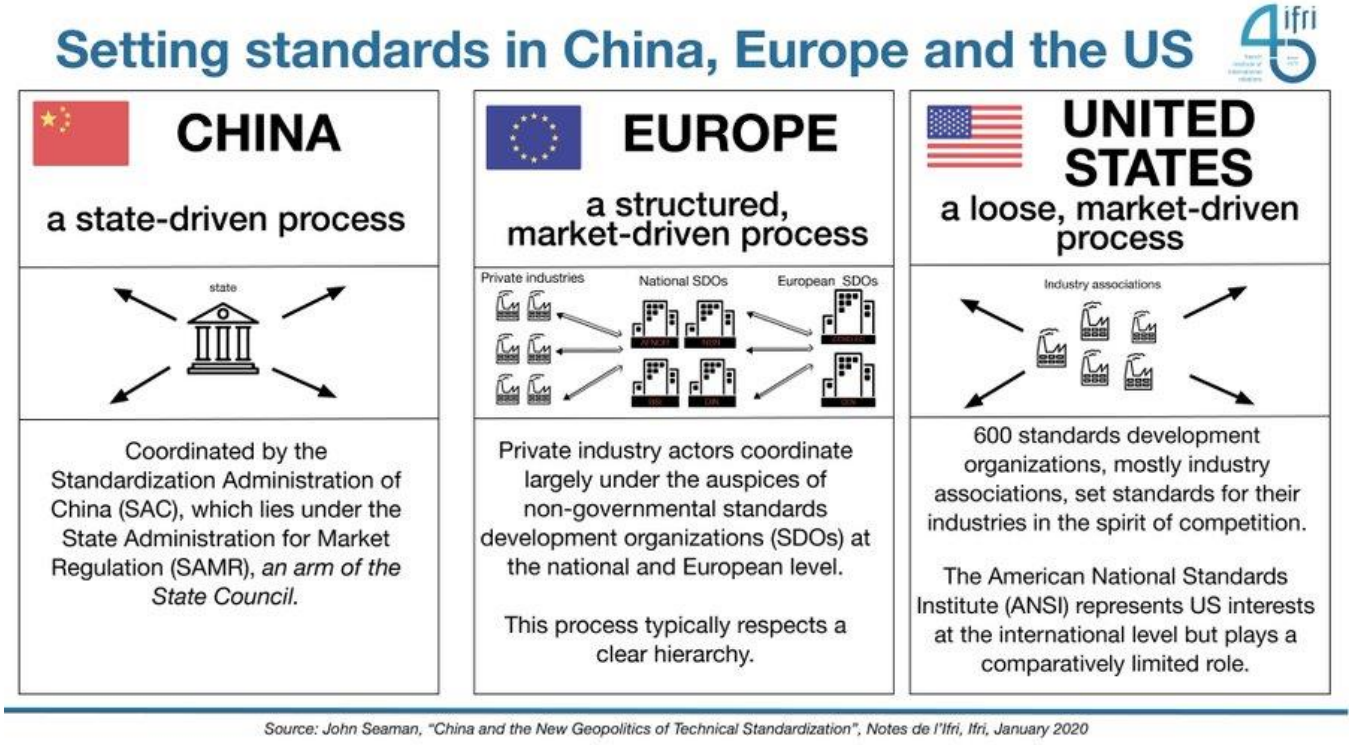
- Europe does not provide a huge, global platform provider
- platform providers aim at vendor lock-in

⇒ standardization and regulation could be valid options for us



Standardization in the EU

- official bodies
- contribution from state and industry
- strong system and process
- considering all relevant stakeholders
- basis for regulation
- but: slow



Metaverse-relevant regulations in the EU

Digital Markets Act

Regulation 2022/1925, commonly referred to as the Digital Markets Act, is an EU regulation that aims

- to make the digital economy fairer and
- more contestable.

The regulation became applicable, for the most part, on 2 May 2023.

The DMA intends to ensure a higher degree of competition in European digital markets by preventing large companies from abusing their market power.

- first legal proceedings already underway against some big "gate keepers".

⇒ **certainly applicable for the metaverse**

Metaverse-relevant regulations in the EU

Digital Services Act

The Digital Services Act (Regulation (EU) 2022/2065, DSA) is a regulation in EU law to update the Electronic Commerce Directive 2000 regarding

- illegal content,
- transparent advertising, and
- disinformation.

It was submitted on 15 December 2020.

The DSA is meant to "*govern the content moderation practices of social media platforms*" and address illegal content. It is organised in five chapters, with the most important chapters regulating the liability exemption and obligations of intermediaries.

⇒ **certainly applicable for the metaverse**

Metaverse-relevant regulations in the EU

General Data Protection Regulation

The GDPR 2016/679 is a European Union regulation on information privacy. It was adopted the GDPR on 14 April 2016, to become effective on 25 May 2018.

The GDPR's goals are

- to enhance individuals' control and rights over their personal information and
- to simplify the regulations for international business

⇒ **certainly applicable for the metaverse**

Metaverse-relevant regulations in the EU

EUROPEAN DATA ACT

<u>European Data Act</u>

published 22.12.2023; it aims

- to facilitate and promote the exchange and use of data within the European Economic Area

European standards may be drafted by the European SDOs following standardization requests from the EC in order to support the application of the requirement that

- 'products shall be designed and manufactured, and related services shall be provided, in such a manner that
- data generated by their use are, by default, easily, securely and, where relevant and appropriate, directly accessible to the user'.

⇒ **certainly relevant for the metaverse**

Metaverse-relevant regulations in the EU

eIDAS - electronic IDentification, Authentication and trust Services

eIDAS is an EU regulation with the stated purpose of

- governing "electronic identification and trust services for electronic transactions"

It passed in 2014 and its provisions came into effect between 2016 and 2018.

eIDAS–compliant

⇒ **certainly applicable for the metaverse**

Metaverse-relevant regulations in the EU

AI Act

EU regulation on artificial intelligence. Its scope encompasses all types of AI in a broad range of sectors. As a piece of product regulation, it would not confer rights on individuals, but would

- regulate the providers of AI systems, and
- entities making use of them

in a professional capacity. The proposed AI Act aims to

- classify and
- regulate AI applications

based on their risk to cause harm. Exceptions made for AI face biometrics if used for harmless AR use cases.

⇒ **certainly relevant for the metaverse**

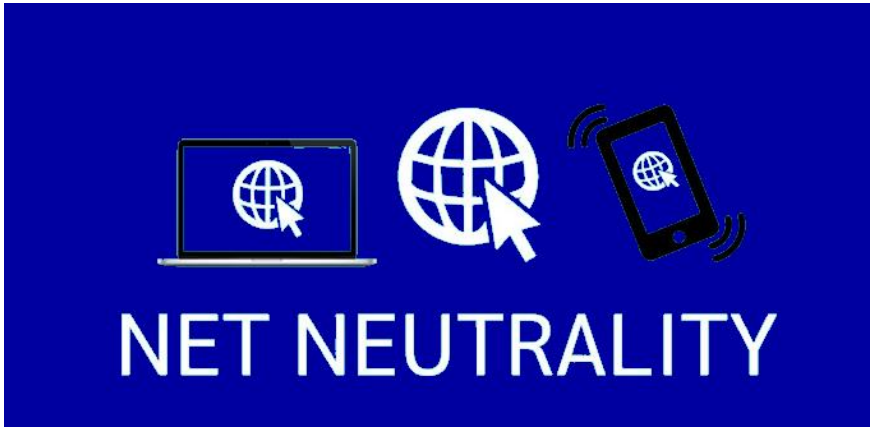
Metaverse-relevant regulations in the EU

Net Neutrality

The Net Neutrality Regulation 2015 (No 2015/2120) is a Regulation in EU law where article 3(3) lays down measures concerning open internet access.

Net neutrality is the principle that

- Internet service providers must treat all Internet communications equally,
- offering users and online content providers consistent rates.



⇒ **certainly applicable for the metaverse**

Metaverse-relevant regulations in the EU

Digital Fairness – Fitness Check on EU Consumer Law

EU Fitness Check on Digital Fairness

This fitness check (evaluation) will look at the following pieces of EU consumer protection legislation to determine whether they ensure a high level of protection in the digital environment:

- Unfair Commercial Practices Directive 2005/29/EC
- Consumer Rights Directive 2011/83/EU: aligns and harmonises national consumer rules, for example on the information consumers need to be given before they purchase goods, services or digital content, and on their right to cancel online purchases, wherever they shop in the EU.
- Unfair Contract Terms Directive 93/13/EEC

⇒ **certainly relevant for the metaverse**

EU Strategy on „Virtual Worlds“

The European Commission have adopted a strategy on Web 4.0 and virtual worlds to steer the next technological transition and ensure an open, secure, trustworthy, fair and inclusive digital environment for EU citizens, businesses and public.c administrations.

3.1. People and skills

- 3.1.1. Building a talent pool of virtual world specialists
- 3.1.2. Virtual worlds toolbox for the general public
- 3.1.3. Empowered and protected children in virtual worlds

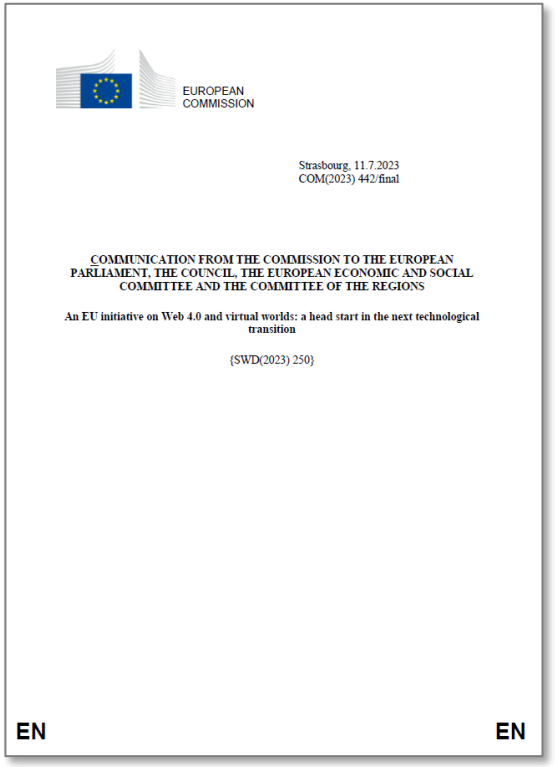
3.2. Business: supporting a European Web 4.0 industrial ecosystem

- 3.2.1. Boosting the EU’s technological capabilities
- 3.2.2. Accelerating the uptake of new business models and solutions
- 3.2.3. Fostering a supportive business environment

3.3. Government: supporting societal progress and improving public services

3.4. Governance

- 3.4.1. Governance at the EU and global level
- 3.4.2. Monitoring the development of virtual worlds and Web 4.0



EUROPEAN COMMISSION

Strasbourg, 11.7.2023
COM(2023) 442/final

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

An EU initiative on Web 4.0 and virtual worlds: a head start in the next technological transition

{SWD(2023) 250}

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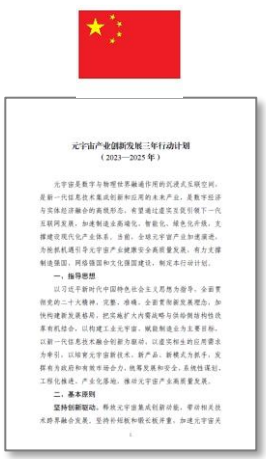
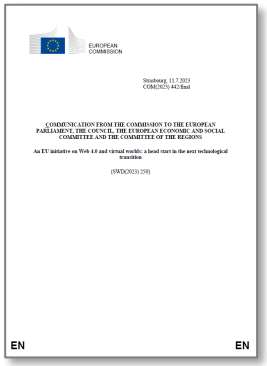
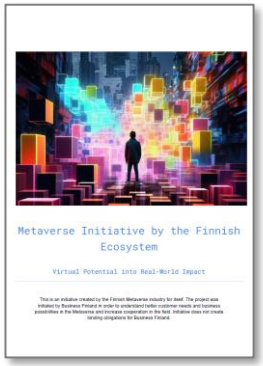
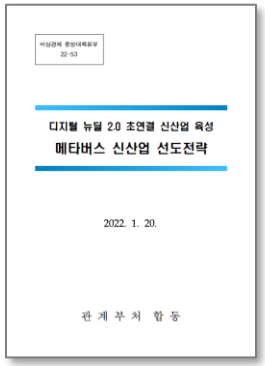
Perspectives to other Countries

Other countries are going ahead: some strategies









Other countries are going ahead

Other countries

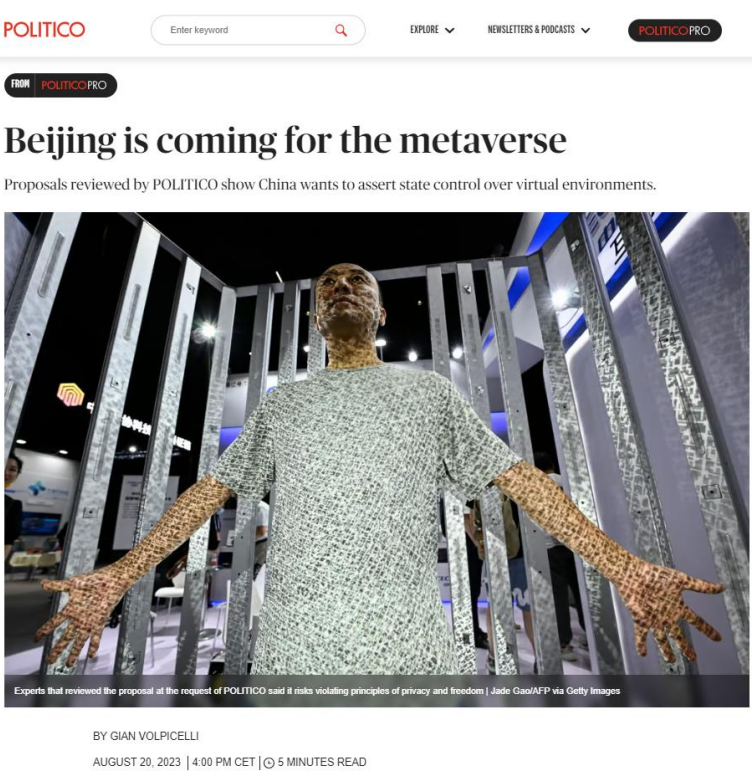
- identified economic potential and
- started initiatives
- some of the strategies appear ambitious to almost aggressive

Chris Kremidas-Courtney, senior fellow at Brussels think tank „Friends of Europe“ and Lecturer for Institute for Security Governance (ISG) in Monterey, California.

He said that China plans to “*be the world leader in metaverse development*,” a technology that dovetails with its plan for a state-controlled digital renminbi. Standard-setting is the natural first step in that roadmap.

“If you want to seize the future, you set the standards for it”

Chris said.



POLITICO

Enter keyword

EXPLORE

NEWSLETTERS & PODCASTS

POLITICO PRO

FROM POLITICO PRO

Beijing is coming for the metaverse

Proposals reviewed by POLITICO show China wants to assert state control over virtual environments.

Experts that reviewed the proposal at the request of POLITICO said it risks violating principles of privacy and freedom | Jade Gao/AFP via Getty Images

BY GIAN VOLPICELLI

AUGUST 20, 2023 | 4:00 PM CET | 5 MINUTES READ

Standards Strategy China

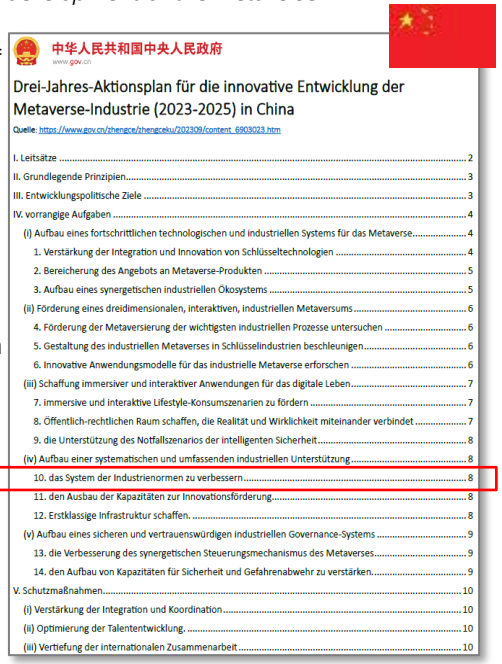
"China Standards 2035"

- 15-year plan to shape the future, to set the global standards for the next-generation of technologies.
- pushing domestic firms and experts to be part of the global effort to set standards
- research on China Standardization System, Method and Evaluation
- research on Supporting High-quality Development Standardization System
- research on Standardization Military-Civil Integration Development
- start with the national standards of **virtual reality technology**, integrated circuit design, intelligent health care and 5G key components, and gradually expand to the emerging areas of Internet of Things, photovoltaic, information equipment and other industries.

Metaverse Strategy China

"Three-year action plan for the innovative development of the metaverse industry (2023-2025) in China"

- Extensive publicising and promotion of standards and their implementation
- Identify the standardisation needs of the metaverse value chain
- Promote the establishment of metaverse standardisation organisations
- Encourage industry to actively participate in international standardisation work
- Organise and carry out the formulation and preliminary study of national standards, industry standards and group standards.
- Encourage application industries to promote the formulation of standards in specific areas
- focal points:
  - fundamental similarities
  - networking
  - security
  - trustworthiness
  - privacy protection
  - industrial applications


中华人民共和国中央人民政府

Drei-Jahres-Aktionsplan für die innovative Entwicklung der Metaverse-Industrie (2023-2025) in China

Quelle: https://www.gov.cn/zhengce/zhengceku/202309/content_6903023.htm

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3. Aufbau eines synergetischen industriellen Ökosystems ... 5
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(iii) Vertiefung der internationalen Zusammenarbeit ... 10

China

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(i) Development of an advanced technological and industrial system for the metaverse

(ii) Promotion of an interactive, 3D industrial metaverse

(iii) Creating immersive and interactive applications for digital life

(iv) Development of systematic and comprehensive industrial support

(v) Establishment of a secure and trustworthy industrial governance system

V. Security measures

(i) Strengthening integration and coordination

(ii) Optimizing talent development

(iii) Deepening international cooperation

"Three-Year Action Plan for the Industrial Innovation and Development of the Metaverse (2023-2025)"

5 key tasks

1. Building advanced metaverse technologies and industrial systems
2. Cultivating a three-dimensional and interactive industrial metaverse
3. Creating immersive interactive digital life applications
4. Establishing comprehensive industrial support
5. Constructing a secure and trustworthy governance system

14 specific measures, each tailored to address unique aspects of metaverse development

4 major initiatives that span

1. key technological enhancements
2. ecosystem cultivation
3. industrial empowerment and
4. foundation strengthening

Aim of the strategy:

- better respond to disruptive innovation and emerging new technologies, and be prepared for the future
- 13 new projects leveraging virtual worlds in the health, tourism, and education industries.
- Aside from merely sinking in the funds, the Ministry of Science added startups would also receive technological and regulatory support in order to thrive.
- The Ministry announced that it would also invest KRW40 billion (US$30 million) to fund smaller firms dabbling in virtual world projects. The ministry said this would be used to urge the smaller firms to pursue mergers and acquisitions that will strengthen the local ecosystem.
- announced work on Metaverse Seoul, a replica of South Korea's capital city, which is expected to be completed by 2026. According to the disclosure, the move is designed to expand the city's public services into virtual worlds, allowing avatars to access tax offices and counseling facilities.

South Korea

Pan-government strategy on metaverse as part of Digital New Deal 2.0 initiative. It focuses on four main subjects:

1. First is to reinvigorate the metaverse platform ecosystem, and foster an environment for the metaverse platforms to grow.
2. Second is to nurture experts and talent in the metaverse field, and providing people with opportunities to access metaverse without regional restrictions, and to participate in a variety of metaverse events.
3. Third is to nurture leading companies specialized on metaverse. To this end, metaverse infrastructure like metaverse demonstration facilities, and diverse types of funds will be provided.
4. Last is to create an exemplary metaverse world.

Japan

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Agreement on the creation of the "Japan Metaverse Economic Zone"

1. Background and Purpose of the Basic Agreement
2. "RYUGUKOKU (TBD)" is a Metaverse infrastructure with a Worldview
3. Three solutions for the promotion of DX and EX
   a) "AUTO LEARNING AVATAR" (hereafter ALA)
   b) "PEGASUS WORLD KIT" PWK)
   c) "MULTI MAGIC PASSPORT" (MMP)
4. Plans for future consideration

Japan Government Metaverse Statement: Interim summary of the study group on utilisation of the metaverse, etc. for the Web3 era

(1) issues for improving user convenience, such as how the avatar of the metaverse should be

(2) issues for business development for each use case

(3) the impact of the increased use of the metaverse

Creation of the Japan Metaverse Economic Zone:

Many Japanese tech and finance giants, including Mizuho Financial Group, Sumitomo Mitsui Financial Group, and Mitsubishi UFJ Financial Group, have signed an agreement to form this innovative platform.

- The idea is to power Japan through the development of next-generation games. Companies will use their respective technologies and areas of expertise to design the social infrastructure for the metaverse.
- Areas of focus will include enabling interoperability, gamification, fintech and information communications technology (ICT).

Japan Government Metaverse Statement:

Usability, accessibility and social aspects

Intellectual Property Promotion Plan 2022"

- Within its "Top 10 IP Strategy Measures," a primary emphasis was placed on the need to adjust to rapidly emerging technologies, particularly the metaverse, NFTs, and generative AIs. A key component of this visionary strategy is the planned development of guidelines addressing both content-related and inherent legal challenges of the metaverse.

The strategy aims to build on Dubai's achievement of attracting more than 1,000 companies in the fields of blockchain and metaverse. It also promotes Dubai's ambitions to support more than 40,000 virtual jobs by 2030.

Central to this strategy is the establishment of Dubai as a global epicenter for metaverse activities, achieved through the cultivation of an innovation-friendly environment and the creation of a launchpad for metaverse-oriented ventures. The existing technological parks, incubators, and accelerators within the UAE will play a role in nurturing the growth of startups and tech companies focused on the metaverse domain, facilitating their engagement with a worldwide clientele.

Dubai

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01 Fostering Metaverse innovation and economic contribution

02 Cultivating Metaverse talent through education and training

03 Developing metaverse usecases and applications in Dubai Government

04 Adopting, scaling, and globally

4 key sectors, namely:

01 Tourism

02 Education

03 Government Services

04 Retail and real estate

Finland seeks to become metaverse global leader by 2035

Core Principles:
Finnish values, such as collaboration with other nations and leveraging its geopolitical positioning, Inclusivity, Ethics, and Digital Rights

3 key sectors from which to start:
- Industrial
- Healthcare
- Social Interaction

Action Plans:
The report presents actionable steps across various categories, including
- technology enablers,
- business networks,
- metaverse society,
- metaverse health, and
- industrial metaverse.

Strategies:
include setting up research consortia, promoting business cooperation, talent attraction, organisational participation, and regulatory frameworks for metaverse technologies.

Finland

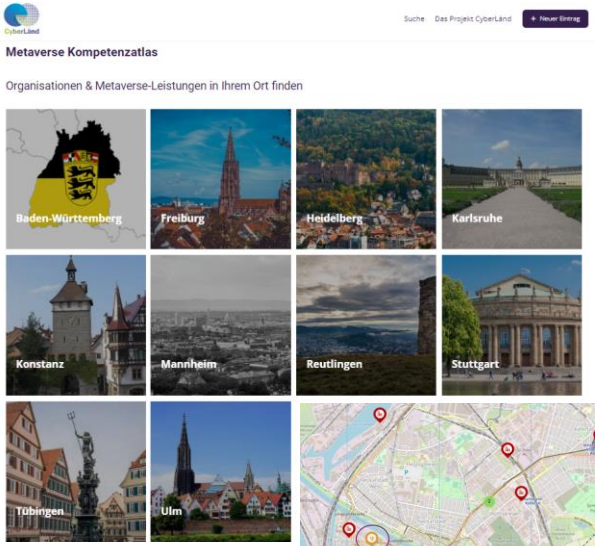
2. 2035 VISION FOR FINLAND
2.1 Economic growth
2.2 Well-being
2.3 Freedom
2.4 Openness
2.5 Trust
3. THE WAY TO THE FUTURE
3.1 Be guided by vision and values
3.2 Foster cross-boundary collaboration
3.3 Leverage our strengths
3.4 Enhance education for the Metaverse
3.5 Boost economic growth
3.6 We can improve marketing and sales on a global scale
3.7 Advance metaverse research
4. RECOMMENDATIONS AND ACTIONS
4.1 Metaverse in Action Programs
4.2 Recommended actions
4.2.1 Technology Enablers
4.2.2 Business Networks
4.2.3 Industrial Metaverse
4.2.4 Metaverse Society
4.2.5. Metaverse Health
A CALL TO ACTION

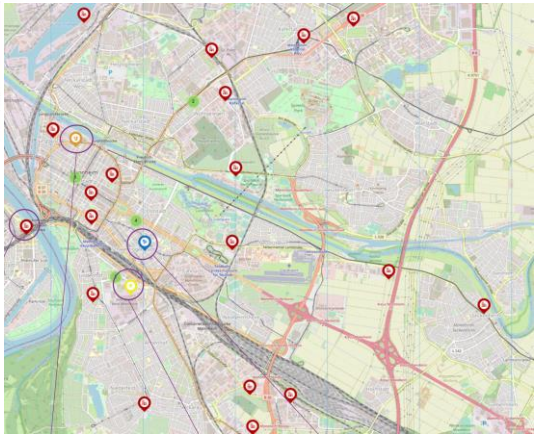
Our Options for Action

Networking the local Metaverse Community

Metaverse Competence Map

- making Metaverse partners easily discoverable
- enable users to find Metaverse partners based on geographical location, type of service, organizational structure, and technology
- providing best practices
- those who have not yet established their connection to the Metaverse can recognize their opportunities
- assessment of existing know-how



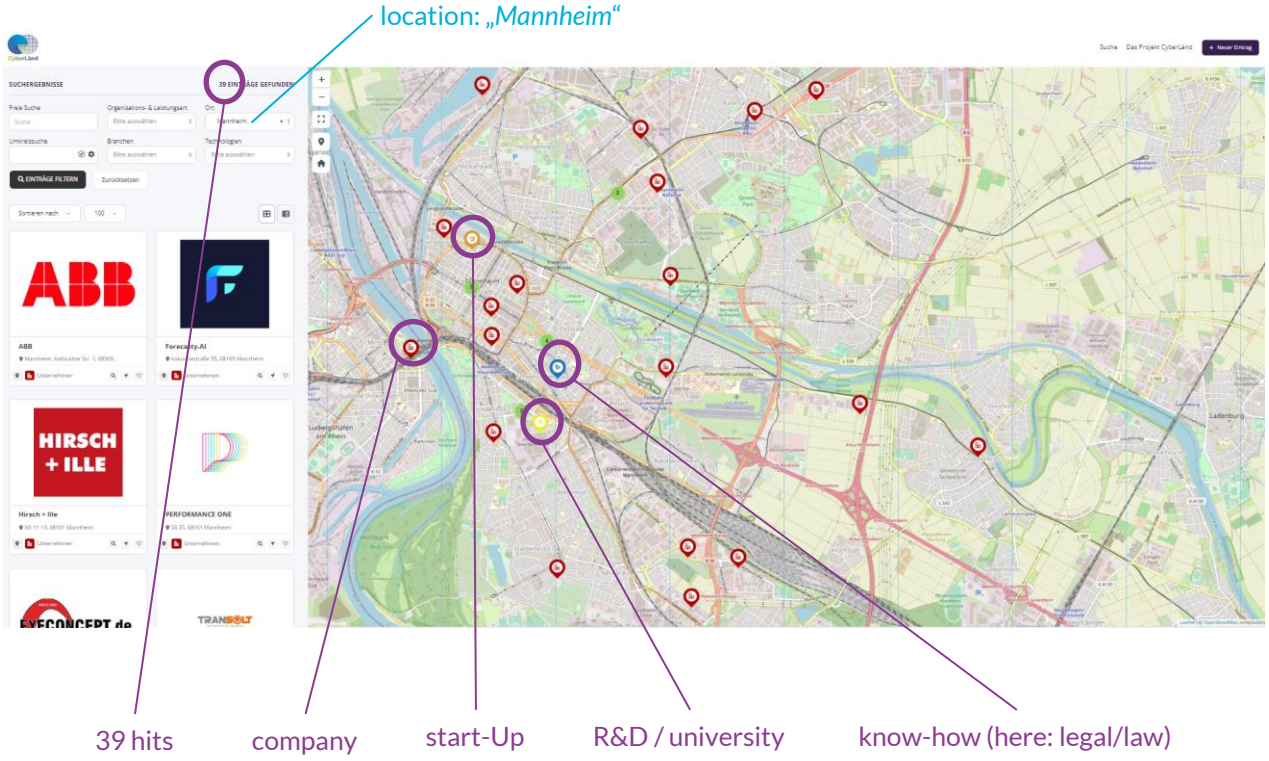


Networking the local Metaverse Community

Metaverse Competence Map

- foster community engagement
- build trustyworth networks
- create value chains

⇒ **Let us network our strong XR & MV community**



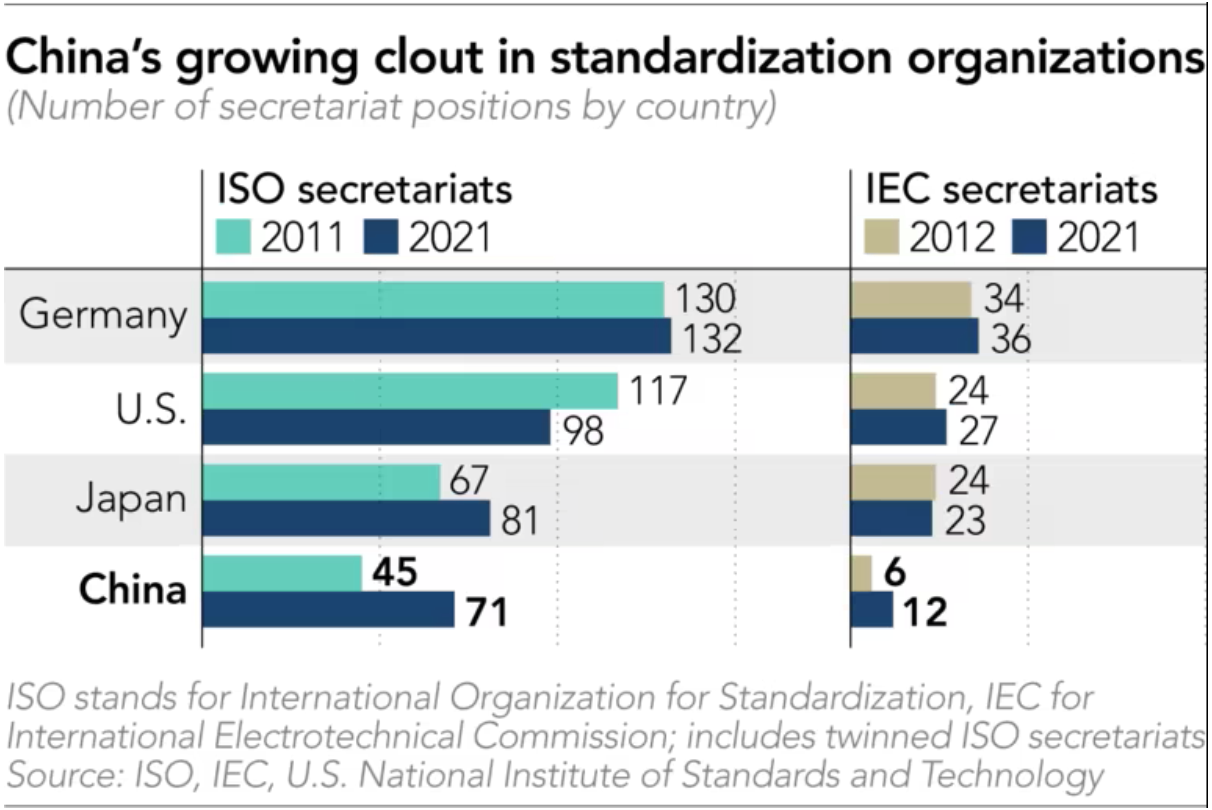
Standardization

We still hold a strong position in official standardization organizations such as DIN, ISO, IEC, CEN, CENELEC.

But:

- in-official organizations such as Metaverse Standards Forum act much faster
- China is catching up quick

⇒ **we should use our strong position the define the future of technology**

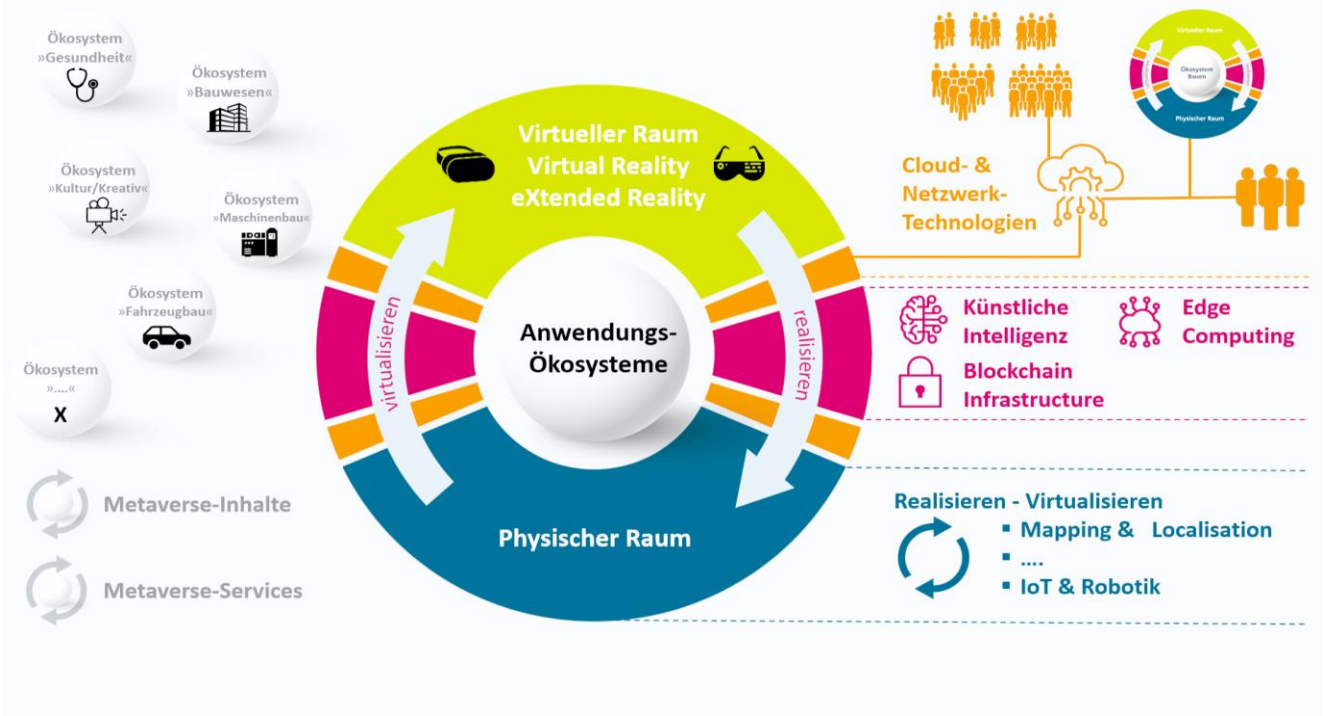


The Metaverse Tech Stack

The Metaverse Tech Stack is full of our competencies

- VR, AR, MR, XR
- cloud + edge computing
- artificial intelligence
- real world – virtual world synchronization, e.g. mapping, localization, sensors, automation,…
- specific domain knowledge of application areas

⇒ **we can build products, services, components for MV**



Digital Twinning: sensing and tracking

thousands of solutions from the most diverse industries with the most diverse technologies and concepts but the same goal:

Mapping the physical reality in the model

Subfield Tracking, Positioning:

- hundreds of providers
- 20+ technologies
- from photogrammetry with smartphone cameras to satellite positioning
- convergence (sensor fusion) will deliver seamless indoor and outdoor positioning

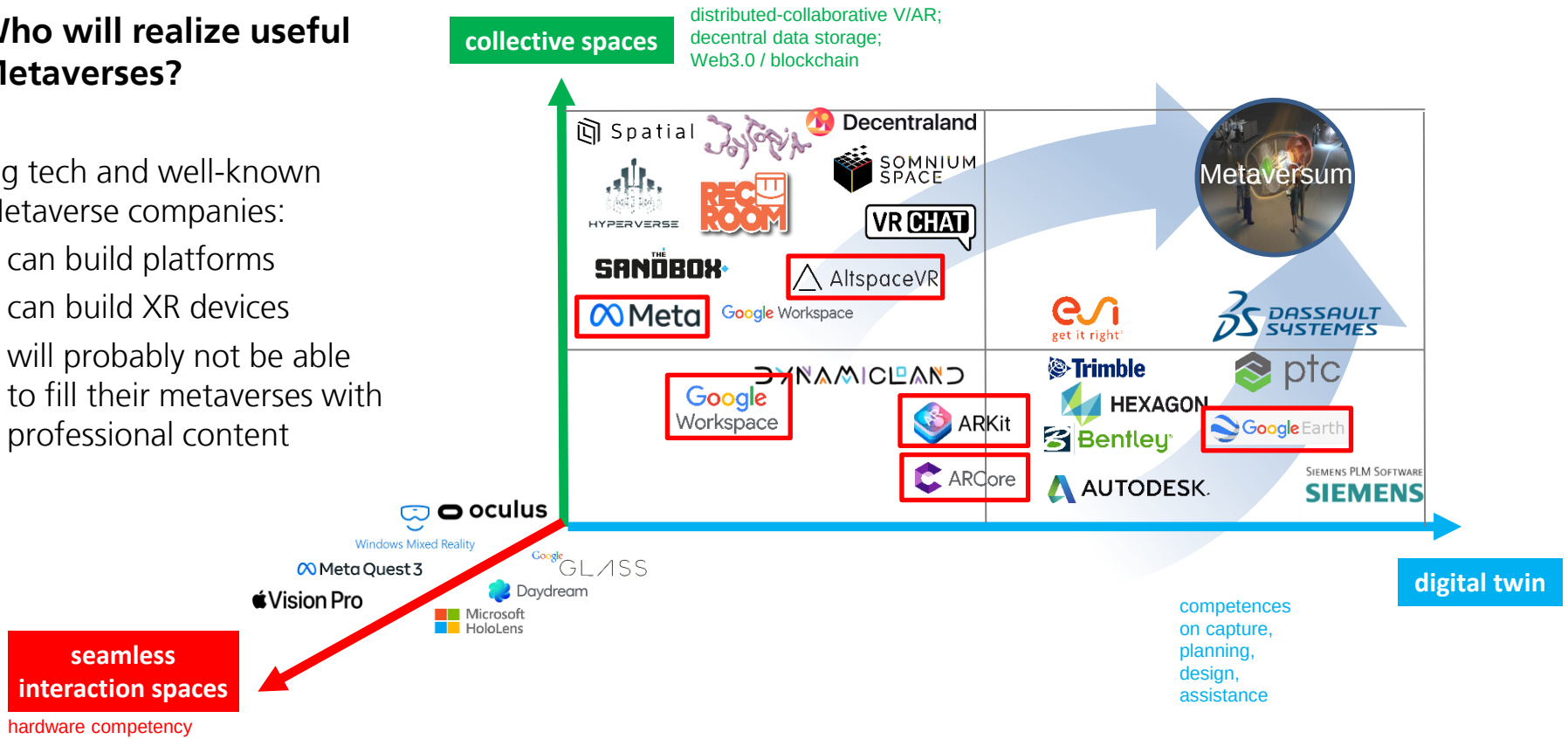
⇒ **Many from Europe and Germany**

⇒ **We can deliver components and products**

Who will realize useful Metaverses?

Big tech and well-known Metaverse companies:

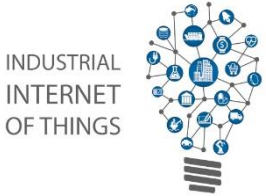
- can build platforms
- can build XR devices
- will probably not be able to fill their metaverses with professional content



Digital Twinning: twin platforms

thousands of solutions from the most diverse industries with the most diverse technologies and concepts but the same goal: Mapping the physical reality in the model

⇒ **those should be the Metaverse data base**



IDTA
Industrial
Digital
Twin
Association

INDUSTRIE4.0

Is there any opportunity for us?

Analysis by EY and NOKIA (2023)

Who will drive the industrial metaverse?

It will not only be

1. the big tech companies (1st place) and
2. existing metaverse platforms (2nd place) that will drive future metaverse developments,

but also

1. industrial equipment suppliers (3rd place),
2. manufacturers of enterprise software (4th place) and
3. game developers (5th place).

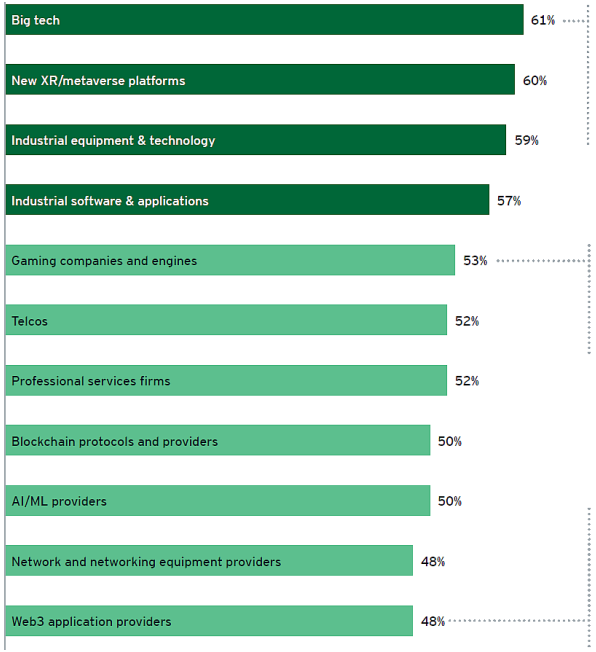
These are industries that have a strong position and tradition in Germany.

⇒ **we can be the drivers**

Key Players in driving the advancement of the metaverse

EY NOKIA

https://www.nokia.com/metaverse/industrial-metaverse/the-metaverse-at-work-research/



Big tech companies are already engrained in the infrastructure of the metaverse through their existing cloud services and visualization tools, while also investing heavily to create new metaverse platforms and AR/VR headsets.

Gaming companies and engines play a key role in the early metaverse by providing the technology needed to make high-fidelity virtual environments like digital twins. Many of the features needed for the industrial and enterprise metaverses like advanced 3D graphics and physics engines have been in development for over a decade in gaming companies.

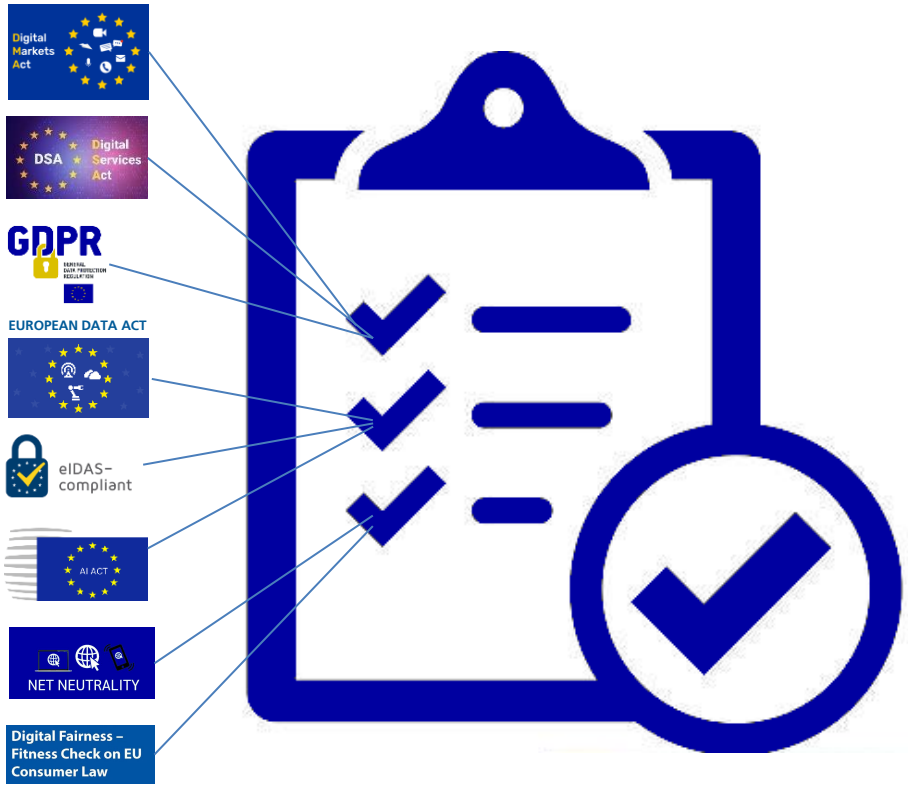
Web3 application providers, while not ranked as highly as other players, are still viewed as important by nearly half of respondents for their ability to handle many of the new challenges metaverse technology will bring. Challenges in user authentication across companies, for example, can be solved with the use of decentralized identities (DIDs)

A EU regulation compliant Metaverse platform

Shall the metaverse be regulated?

- senseless question:
  it is already regulated
- we need a fully compliant
  MV platform

⇒ **We should take up the great challenge of building local platforms**

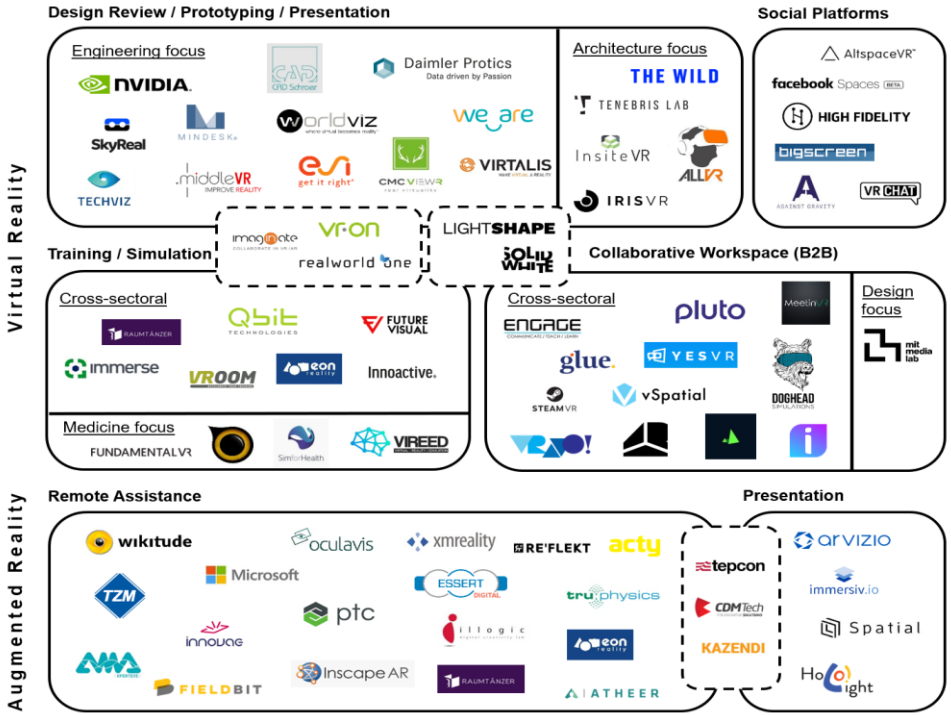


Collaborative XR environments, with rules, ethics, ownership, safety and security

XR collaboration platforms

- hundreds of solutions worldwide
- VR and AR
- partly application- or industry-orientated, partly consumer solutions

⇒ **we are not starting from scratch**



from 2021

So what we should do now:

- network the community, build trustworthy cooperations and value chains
- identify the opportunities of metaverse by each relevant stakeholder
- build products, services, components for the metaverse
- enforce metaverse standardization –
  let's connect the metaverses to the our big data platforms that map digital twins
- fill the metaverses with our 3D contents: from our products, houses, factories, cities, …
  Of course with suitable IP protection and a good business model for us.
- build metaverse platforms fully compliant to EU regulations
- let's be the drivers of the metaverse - let's take great challenge of building local platforms

This could be part of our German Metaverse Strategy.

Germany in the Metaverse:
Positioning ourselves and Perspectives
Other Countries' Metaverse Strategies and what we might learn from them

Thank you very much for your attention.

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

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VIRTUAL DIMENSION CENTER