# XR & Virtual Worlds Standardisation.

## A Global Overview

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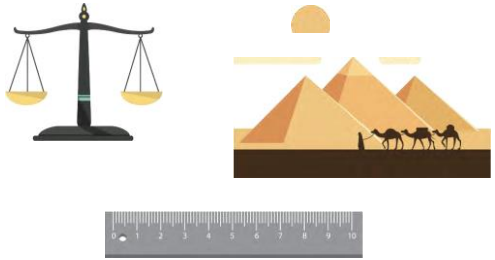
# Introduction

- standards support everyday life much more than people think
- society recognized  importance of standardized measurements thousands of years ago: e.g. weight, distance or length
- development of a common reference system agreed upon people and institutions



- rapid technological progress -> need for standardization grows
- especially in the a rea of Information and communications technologies (ICT)
- standardization and standards boost progress and create basis upon which technology can evolve

# Standards in everyday life

Using a Smartphone for browsing
(some of possibly involved standards) :

- User equipment  regarding hardware
- characteristics, also taking into account safety issues
- Connectivity among user devices and wireless  network as well as the functionality of the same network
- Functionality of the Internet and the protocols to support web  browsing

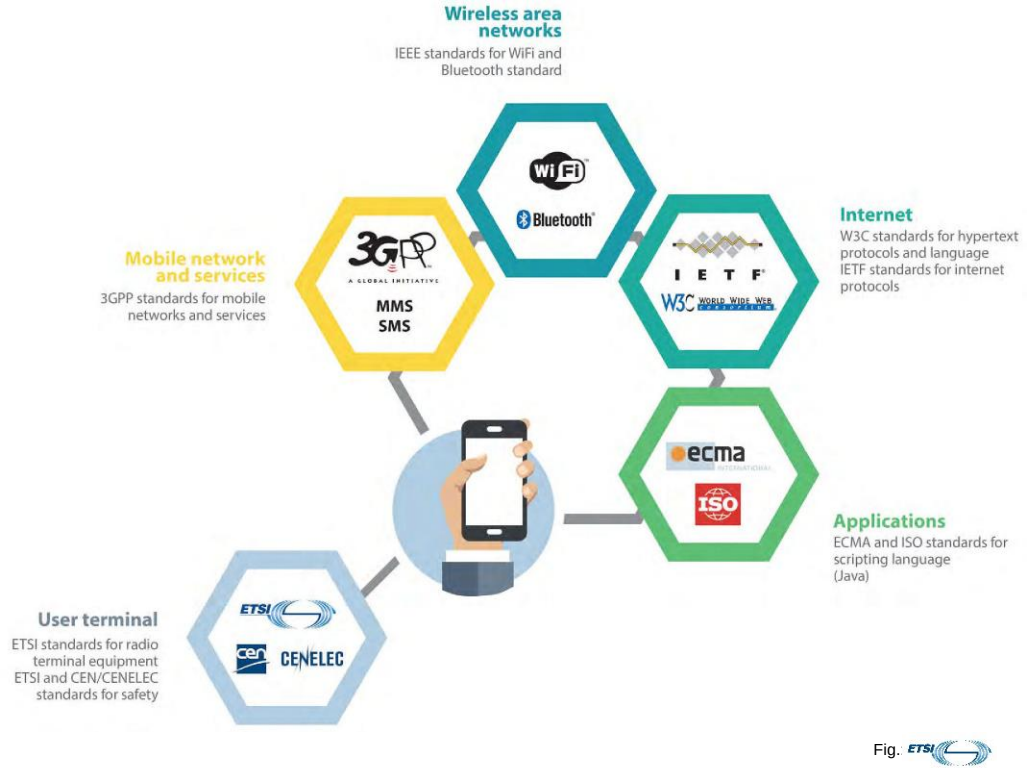



Fig. ETSI

# Formal standardization, SDO standards, and regulation

- Standards are not laws.
- Standards are NOT regulations.
- Standards are NOT a set of thorough design rules.
- Standards are voluntary NOT compulsory
- Yet, they may inspire both

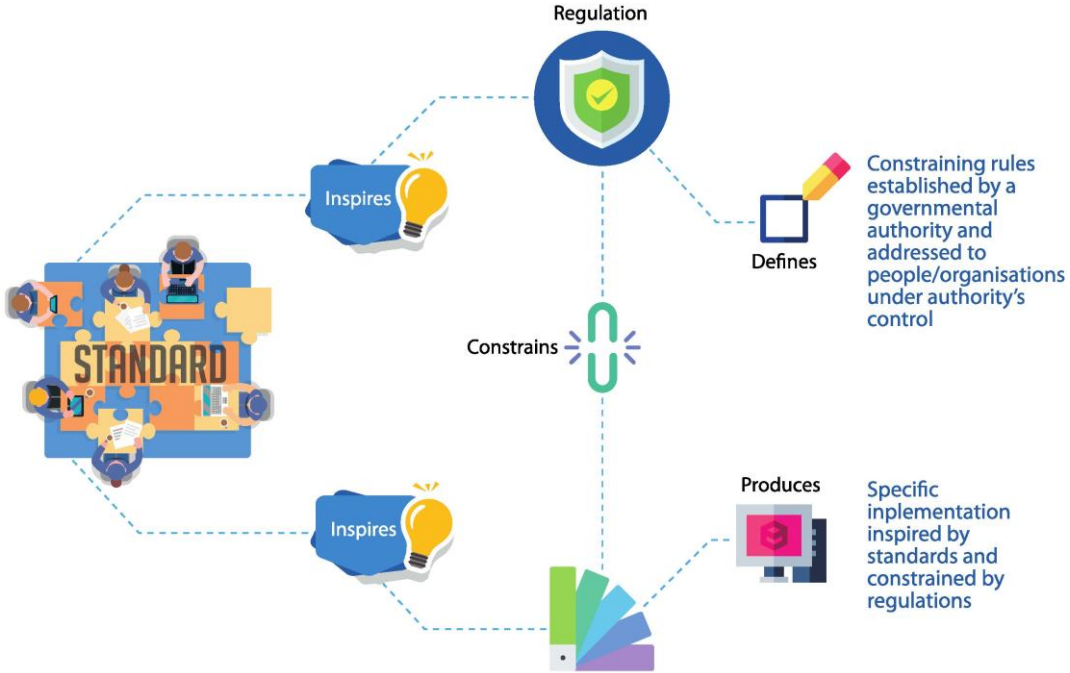
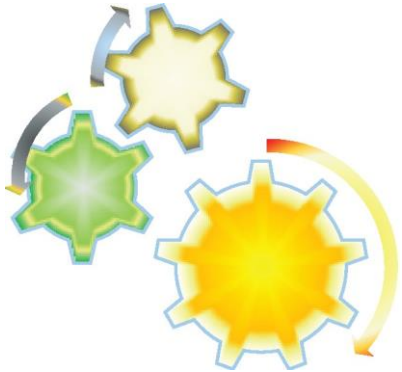



Fig.: ETSI

As a consensus-built set of rules for doing something, a Standard benefits **innovation**, by



- reducing development time, costs and risks, by steering designers' activity, which facilitates the uptake of innovation in the marketplace

- improving quality
- decreasing time to market
- promoting the interoperability of products, services and processes
- attract customers

# Two main different types of "*standards*"

- Different types of standards according to the development process (standardization)

**SDO standards** a re produced by devoted organizations, called organizations whose purpose is to develop standards and Standards Development Organizations (SDOs) . SDOs are that put in place forma l well-defined procedures to guarantee a fair development process. De facto standards can become formal standards if they a re approved by a SDO. Examples: HTML PDF

**De facto standards**, or standards in actuality, are adopted widely by an industry and its customers. These standards a rise when a critical mass simply likes them well enough to collectively use them.

## Recognized SDOs:

- These a re officially recognized by regulation systems or political bodies
- ITU, UN specialized agency for information and communication
- UE regulation 1025/2012 rules the standardization at an European level and lists a set of reference SDOs with either an international (ISO, IEC, and ITU) or European scope (CEN, CENELEC, and ETSI)

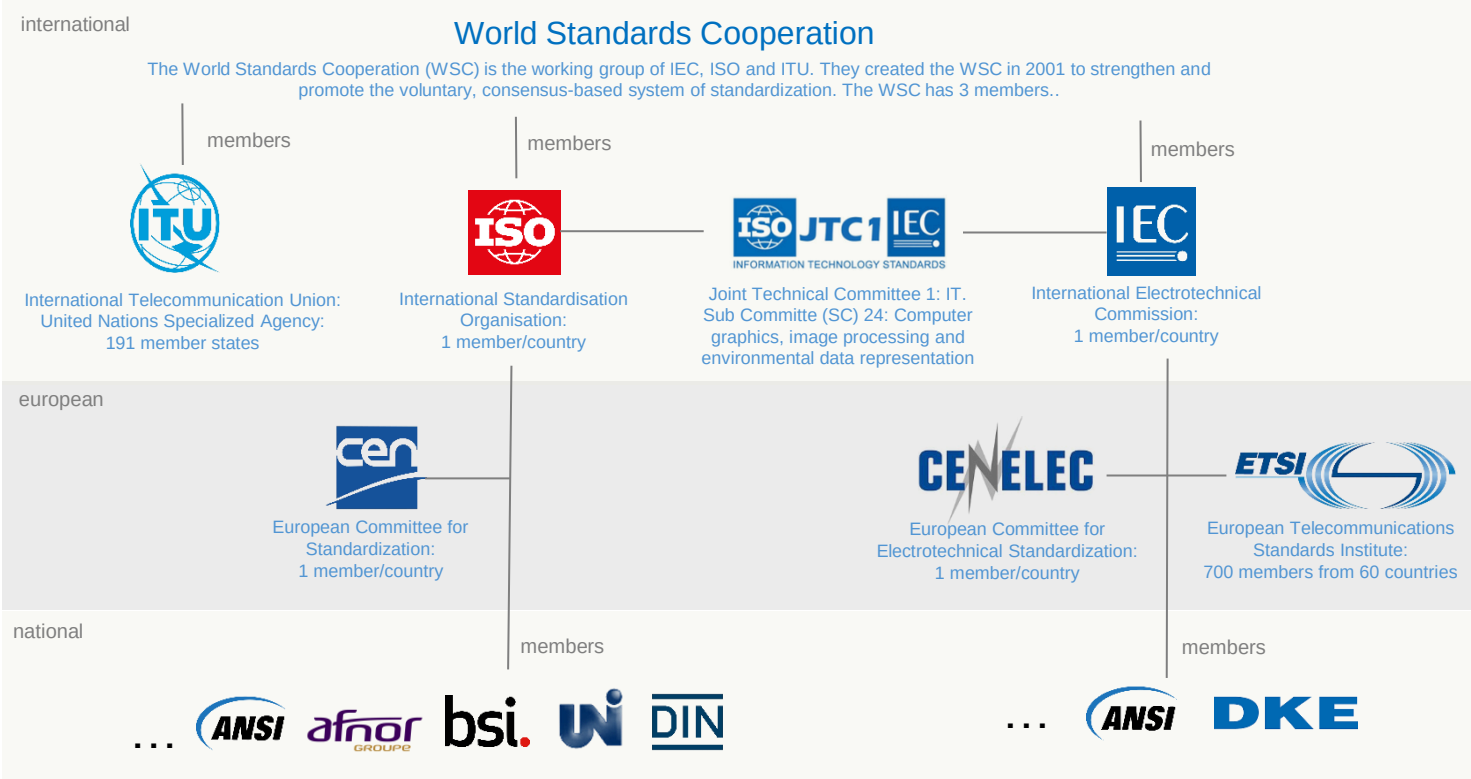
.

## Not Recognized Organizations:

- These are not recognized by any political bodies
- IEEE is a primary SDO with a large number of active technical standards, ranging from wireless communications and digital health to cloud computing, power and energy, 30 video, electrical vehicle standards, and the Internet of Things. It was created by the Institute of Electrical and Electronics Engineers (IEEE), the American association of Electrical and Electronics Engineer and it brings together and organizes members from all over the world.

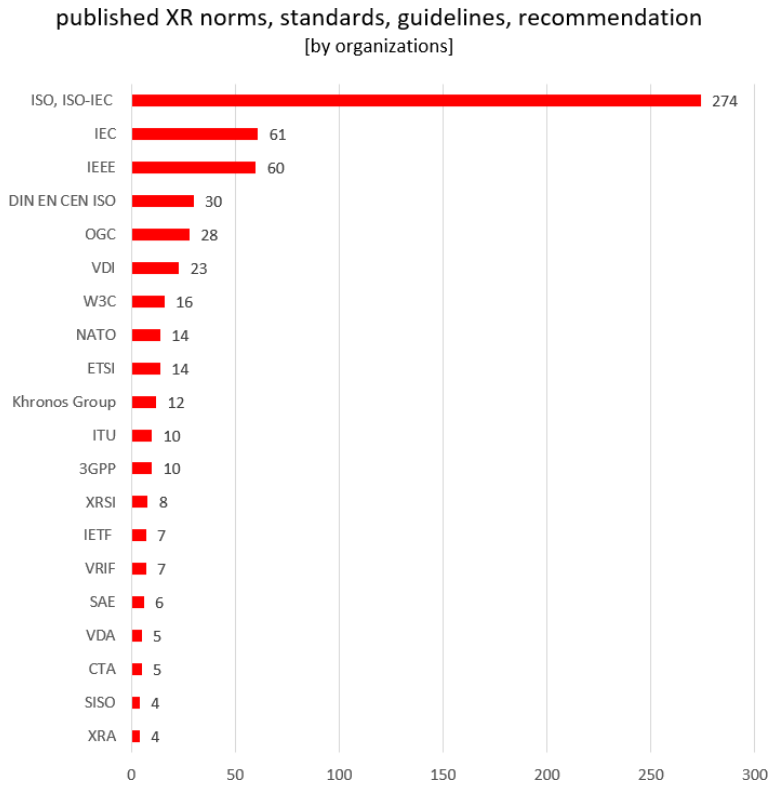
# Structure of International Standardization

National SDOs organize so-called "mirror committees" to ISO and IEC committees. They represent national input and interests in ISO and IEC and feed information from ISO and IEC back to their homeland.



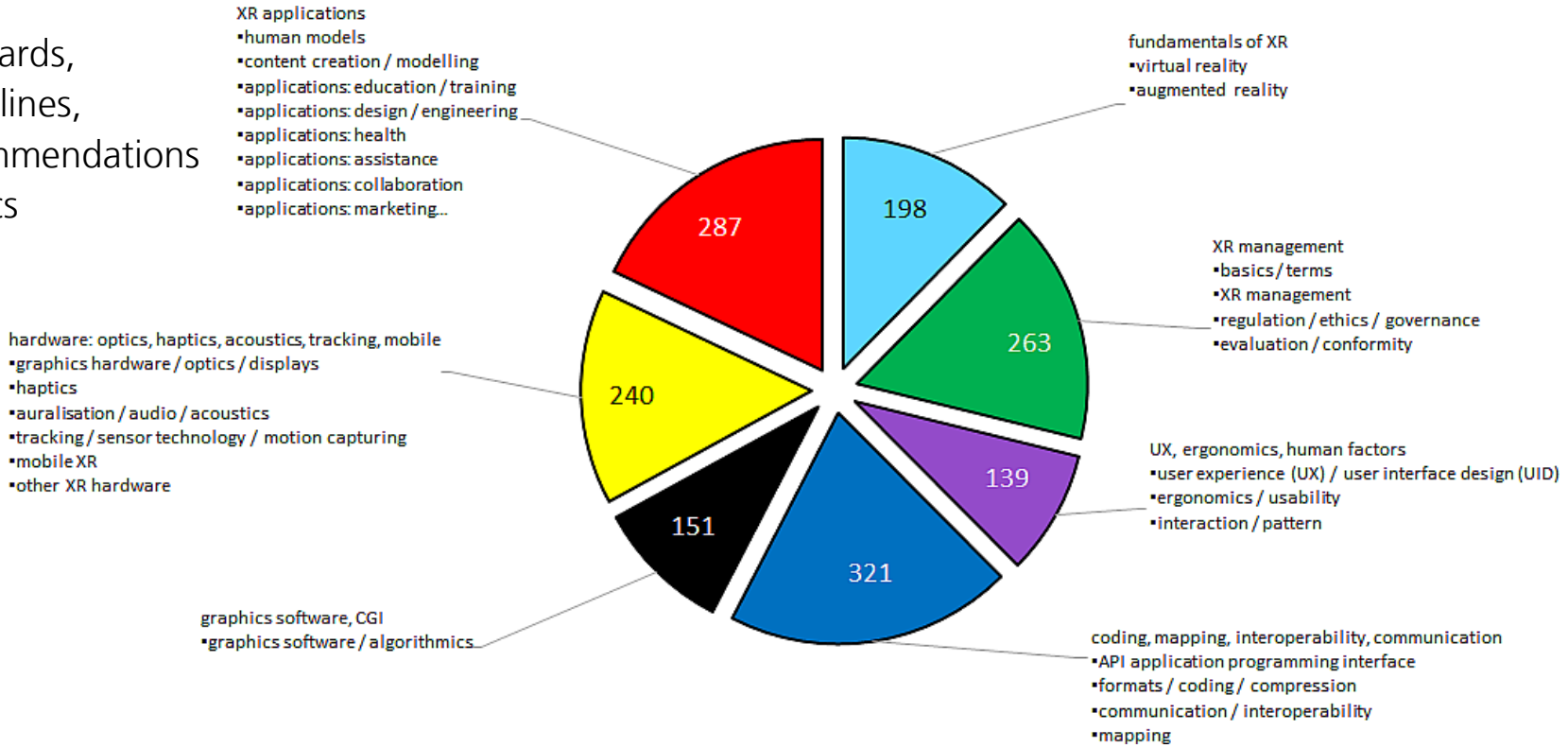
# Anything about XR in this topic?!

# XR Standard Development Organizations (SDOs)



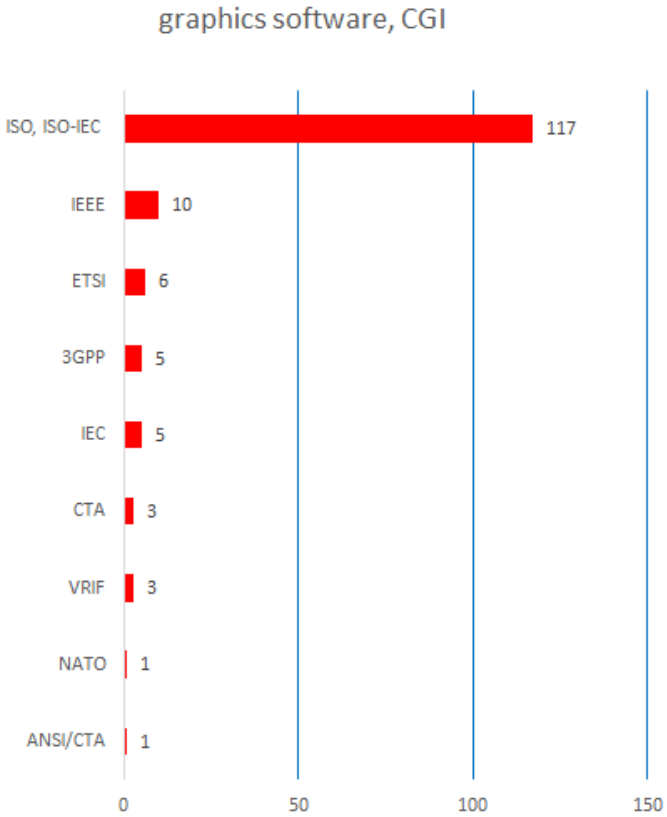
clustering
- XR standards,
- XR guidelines,
- XR recommendations

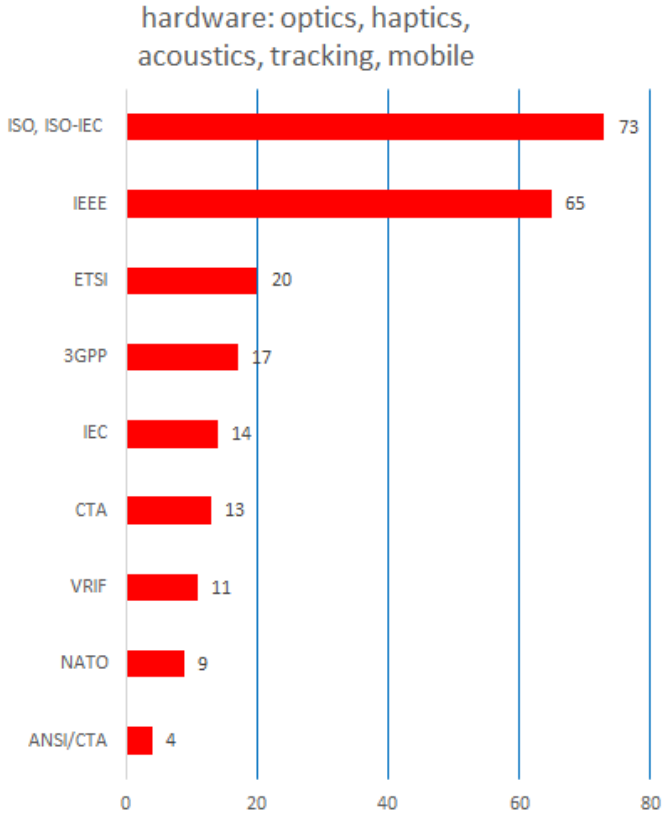
into 7 topics



analysis on the right hand side shows XR SDOs contributing with own documents to certain XR fields.

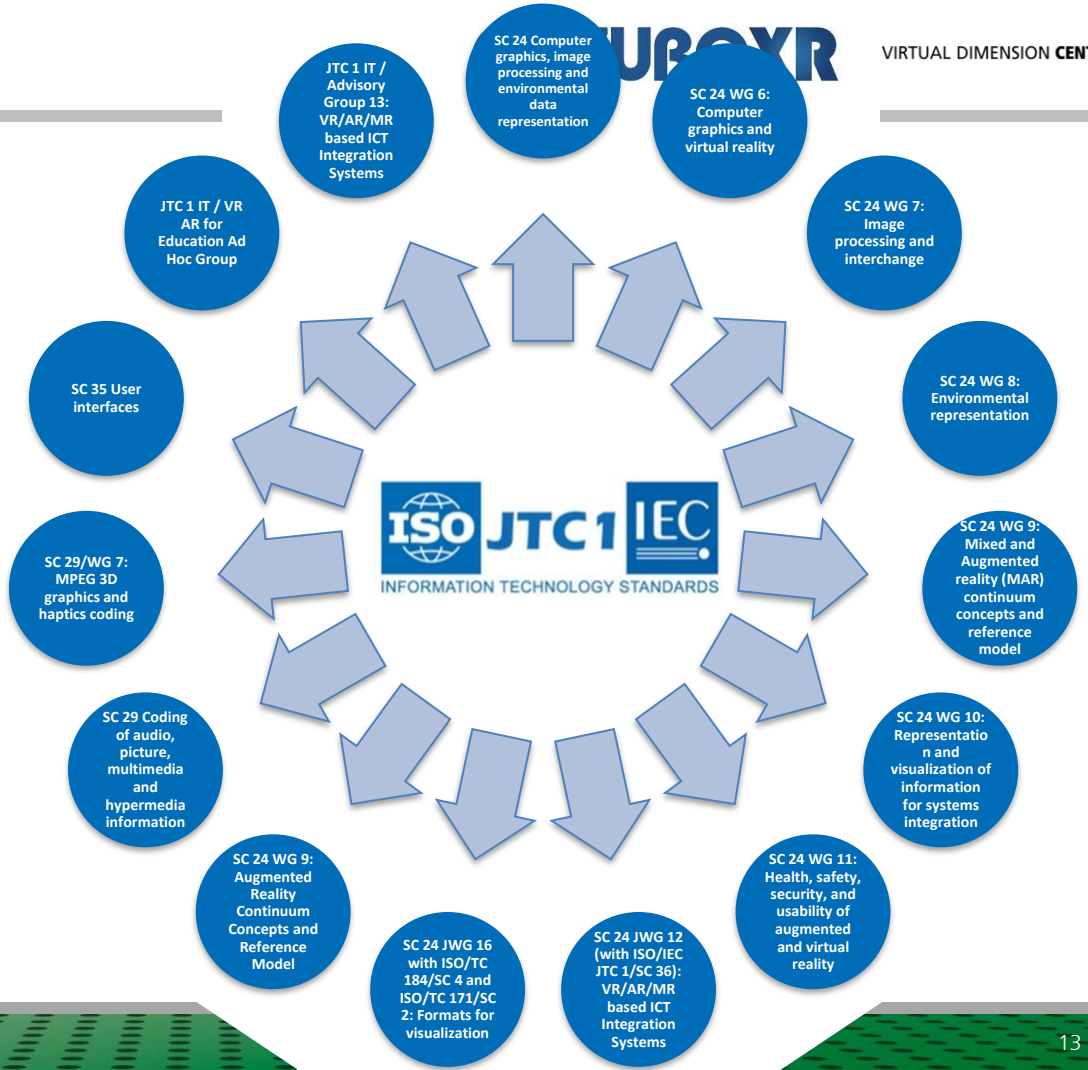
It becomes further obvious that certain XR topics are treated by SDOs in different number at total.



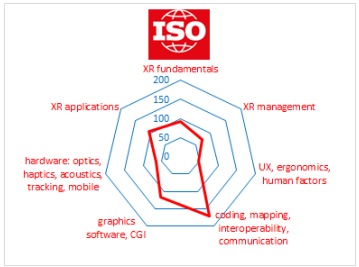



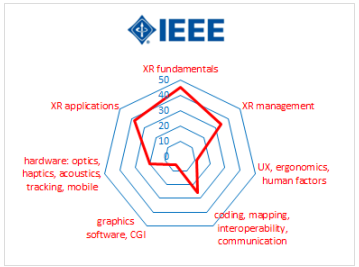
# XR Standards Working Groups

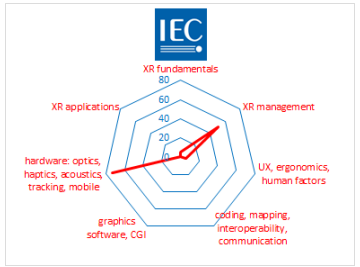
The **International Organization for Standardization (ISO)** is an independent, non-governmental organization, whose members consist of various national standardization bodies. As of 2022, there are 167 members who represent ISO in their country, with each country having only one member. The organization develops and publishes international standards in all technical and non-technical areas, except for electrical engineering and electronics, which fall under the jurisdiction of the International Electrotechnical Commission. By February 2023, ISO has developed over 24,676 standards that cover all areas from industrial products and technology to food safety, agriculture, and healthcare. **The Moving Picture Experts Group (MPEG)** is a group of experts dealing with the standardization of video compression and related areas, such as audio data compression or container formats. Colloquially, "MPEG" usually refers not to the group of experts, but to a specific MPEG standard. The MPEG meets three or four times a year for five-day meetings. About 350 experts from 200 companies and organizations from 20 countries participate in these meetings, the MPEG meetings. MPEG is part of ISO/IEC JTC1/SC29.

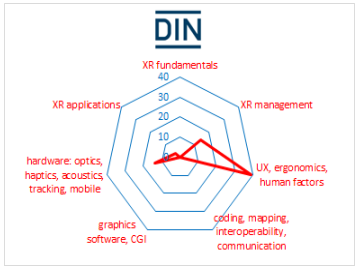


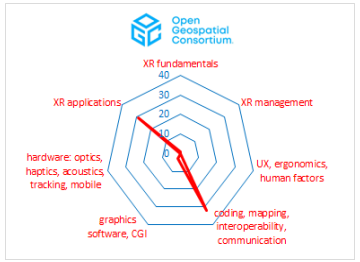
# Focuses of XR standardization organizations varying

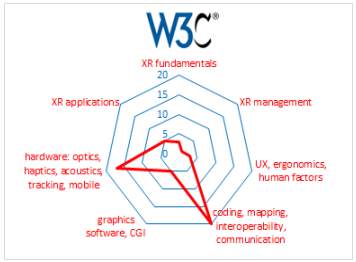


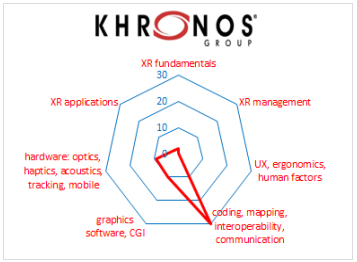



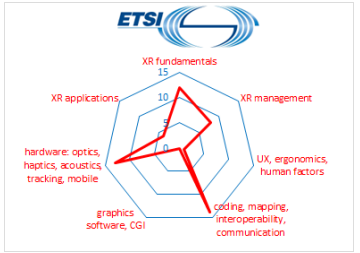



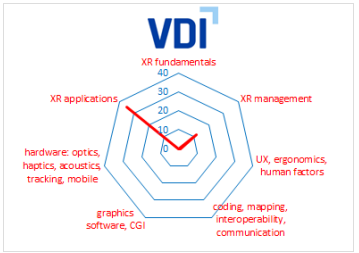



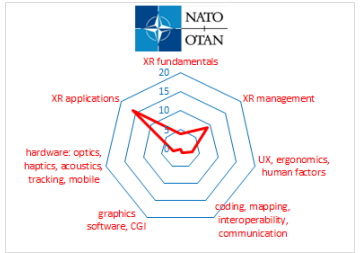



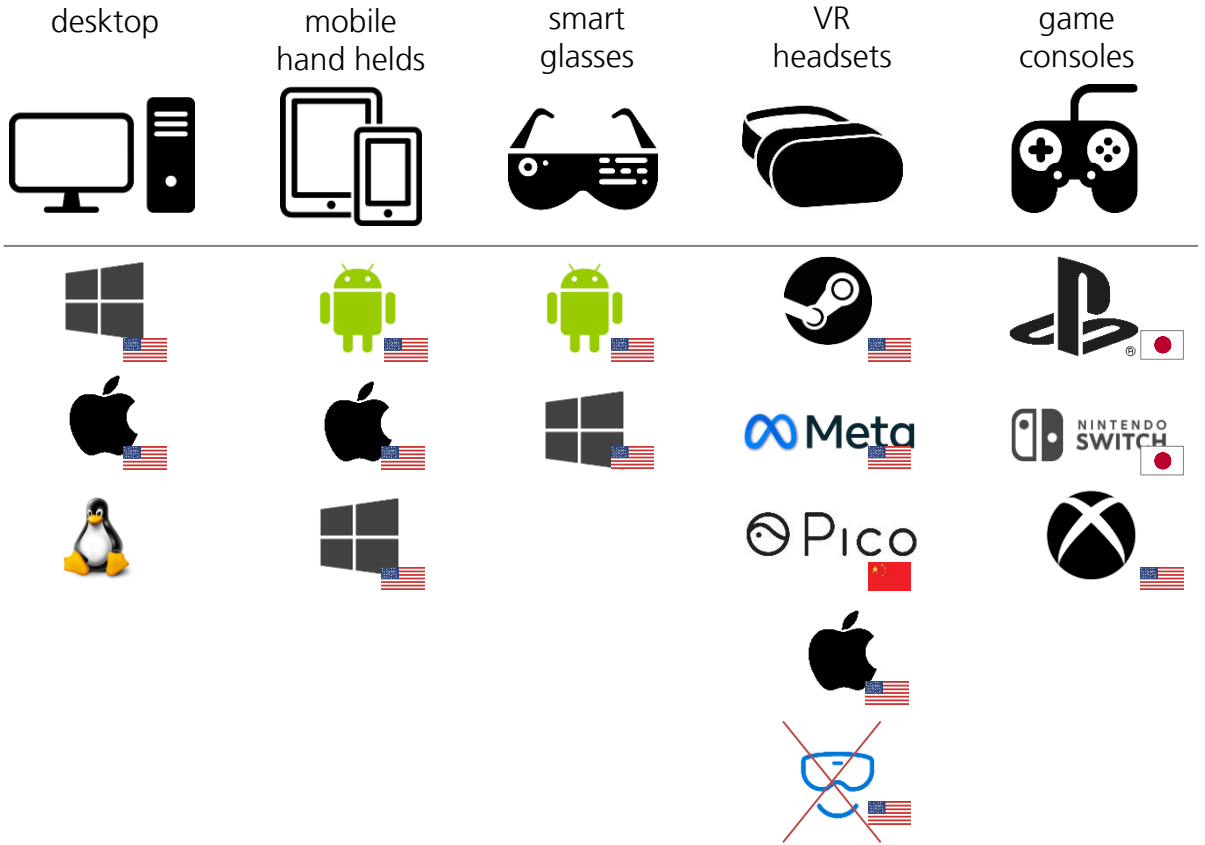



**Europe finds itself only at the sideline of a fight for global XR ecosystems.**

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

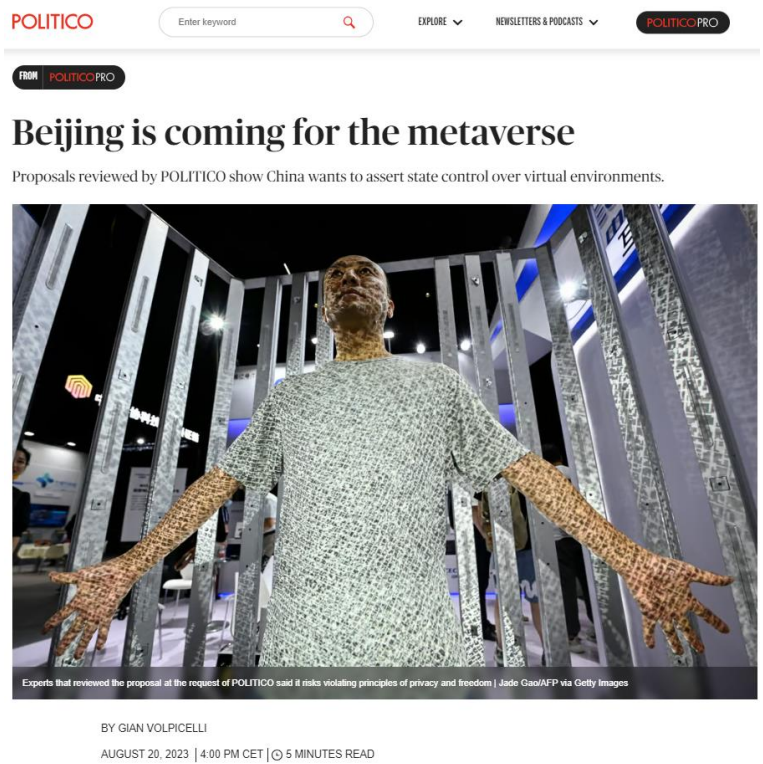


*Chris Kremidas-Courtney, senior fellow at Brussels think tank „Friends of Europe“ and Lecturer for Institute for Security Governance (ISG) in Monterey, California.*

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.



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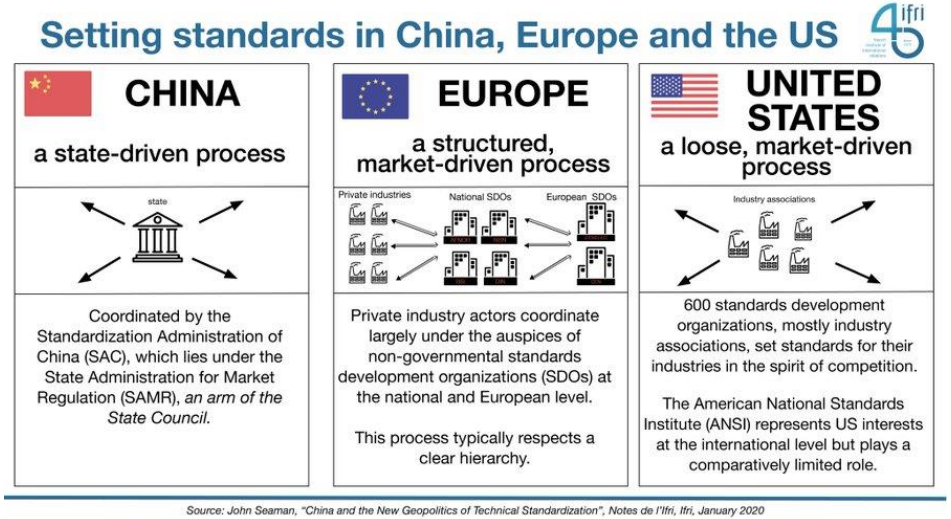
## Beijing is coming for the metaverse

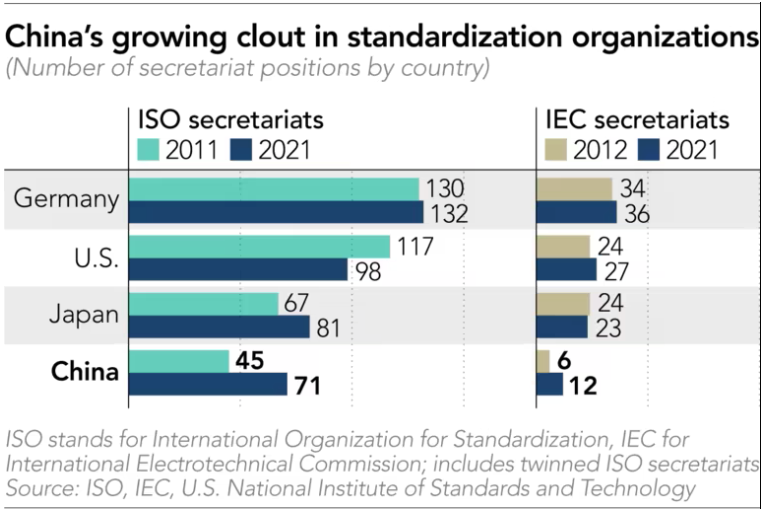
Proposals reviewed by POLITICO show China wants to assert state control over virtual environments.

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


Setting standards in China, Europe and the US
CHINA
a state-driven process
state
Coordinated by the Standardization Administration of China (SAC), which lies under the State Administration for Market Regulation (SAMR), an arm of the State Council.
EUROPE
a structured, market-driven process
Private industries
National SDOs
European SDOs
Private industry actors coordinate largely under the auspices of non-governmental standards development organizations (SDOs) at the national and European level.
This process typically respects a clear hierarchy.
UNITED STATES
a loose, market-driven process
Industry associations
600 standards development organizations, mostly industry associations, set standards for their industries in the spirit of competition.
The American National Standards Institute (ANSI) represents US interests at the international level but plays a comparatively limited role.
Source: John Seaman, "China and the New Geopolitics of Technical Standardization", Notes de l'Ifri, Ifri, January 2020


China's growing clout in standardization organizations
(Number of secretariat positions by country)
ISO secretariats
2011 2021
IEC secretariats
2012 2021
Germany
130
132
34
36
U.S.
117
98
24
27
Japan
67
81
24
23
China
45
71
6
12
ISO stands for International Organization for Standardization, IEC for International Electrotechnical Commission; includes twinned ISO secretariats
Source: ISO, IEC, U.S. National Institute of Standards and Technology

# Global Metaverse Strategies Comparison

| | strategy goals | target groups | strategy key elements | discrete measures |
|---|---|---|---|---|
| China | ▪ world-leading industrial mature metaverse ecosystem<br>▪ Metaverse as an important growth pole of the digital economy<br>▪ establish three to five companies with global influence<br>▪ establish a number of specialised SMEs<br>▪ establish three to five industrial development clusters<br>▪ establish yuan / renminbi universe<br>▪ secure and efficient governance system for the metaverse | ▪ industry<br>▪ public administration<br>▪ society | ▪ upgrade key technologies<br>▪ Promote an industrial ecosystem<br>▪ enable the industrial metaverse<br>▪ strengthen the industrial base (incl. standardization) | ▪ metaverse business parks<br>▪ MV infrastructure<br>▪ MV standardization agencies<br>▪ create MV best practices<br>▪ create MV applications for digital life |
| Dubai | ▪ turn Dubai into one of the world's top 10 metaverse economies<br>▪ turn Dubai into a global hub for the metaverse community<br>▪ attract more than 1,000 companies<br>▪ support more than 40,000 virtual jobs by 2030<br>▪ foster innovation; promote advanced ecosystems<br>▪ foster talent<br>▪ invest in future capabilities<br>▪ create new governmental work models | ▪ tourism<br>▪ education<br>▪ government services<br>▪ retail and real estate<br>▪ [health care] | ▪ XR and MV technologies<br>▪ foster MV innovation and economic contribution<br>▪ cultivate MV talent through education and training<br>▪ develop MV use cases and applications in Dubai government<br>▪ Adopting and scale globally<br>▪ Dubai as the "crypto-capital" of the world<br>▪ UAE as a "test bed" for new technologies | ▪ over fifteen initiatives and strategies were announced in the 2022 assembly<br>▪ MV virtual embassy<br>▪ Emirates Airlines training in the MV |
| European Union | ▪ boost the EU's technological capabilities<br>▪ accelerate the uptake of new business models and solutions<br>▪ support access to finance to support creators and to scale up innovative business models<br>▪ support societal progress and improve public services | ▪ industry<br>▪ creative industry<br>▪ society / consumers | ▪ foster a supportive business environment; support SMEs, start-ups<br>▪ Interoperability, standardisation, open standards and interfaces<br>▪ support open-source community<br>▪ build a talent pool of virtual world specialists<br>▪ empower and protect children in virtual worlds<br>▪ EU's robust legislative framework<br>▪ IP protection | ▪ skills development for MV technologies (Digital Europe programme)<br>▪ guiding principles for virtual worlds through citizens' panel<br>▪ research on impact of MV on people's health through Horizon Europe<br>▪ develop a MV toolbox for the general public<br>▪ create European initiaive on Virtual Worlds<br>▪ create EU partnership on virtual worlds<br>▪ analysis of XR & MV standards landscape |
| Finland | ▪ establish Finland as a leading architect and enabler for the Metaverse<br>▪ Finland to be considered as a benchmark society<br>▪ attract major foreign direct investments in all parts of the Metaverse value chain<br>▪ avoid domination by a single company or country | ▪ society<br>▪ healthcare<br>▪ industry | ▪ Finish vision, values and strengths<br>▪ boost economic growth<br>▪ cross-boundary collaboration<br>▪ education for the Metaverse<br>▪ marketing and sales on a global scale<br>▪ advance metaverse research | ▪ Metaverse in Action Program (however just recommendations!):<br>  ○ support technology enablers<br>  ○ create / suport business Networks<br>  ○ showcase industrial Metaverse<br>  ○ showcase Metaverse society<br>  ○ showcase Metaverse healthcare |
| Japan | ▪ respond to rapidly growing demand for digital transformation (DX) for enterprises and government agencies<br>▪ enable interoperability and collaboration between Metaverse platforms<br>▪ serve as new social infrastructure for enterprise DX and employee experience (EX) transformation<br>▪ promote metaverse business<br>▪ expand the "*Japan Metaverse Economic Zone*" globally<br>▪ respond to MV risks | ▪ society / consumers<br>▪ government services<br>▪ enterprises | ▪ agreement of numerous companies using their respective mature technologies to create an open Metaverse infrastructure supporting authentification, digital twins, NFTs, etc.<br>▪ analysis by the "*Study Group on Utilization of Metaverse, etc. for the Web3 Era*" established by the Ministry of Internal Affairs and Communications | ▪ create Metaverse economic zone „Ryugukoku"<br>▪ media conference |
| Saudi Arabia | ▪ gaming and e-sports market: US$ 13.3 billion to gross domestic product (GDP) and 39.000 jobs by 2030<br>▪ create digital MV twin of futuristic megacity NEOM | ▪ e-games, e-sports<br>▪ real estate<br>▪ society / consumers | ▪ MV is key part of Vision 2030<br>▪ launch of national „*Gaming and e-Sports Strategy*" | ▪ the US$ 500 billion futuristic megacity NEOM shall have ist own metaverse<br>▪ investment in metaverse gaming |
| South Korea | ▪ take the upper hand in the global metaverse market (5th largest market share by 2026)<br>▪ train metaverse experts (total of 40,000 people by 2026)<br>▪ nurture metaverse service providers (220 companies by 2026)<br>▪ discover metaverse best practices (total of 50 cases by 2026) | ▪ society / consumers<br>▪ government services<br>▪ enterprises | ▪ create world-class metaverse platform<br>▪ create and support MV ecosystem<br>▪ train Key players in the metaverse era<br>▪ nurture specialized corporations that could<br>▪ lead the metaverse industry<br>▪ build an exemplary metaverse world | ▪ metaverse platform of the city of Seoul<br>▪ diverse types of funds to be provided<br>▪ "*Expanded Virtual World*" marketing campaign<br>▪ K-Metaverse pavillon: further showcases |

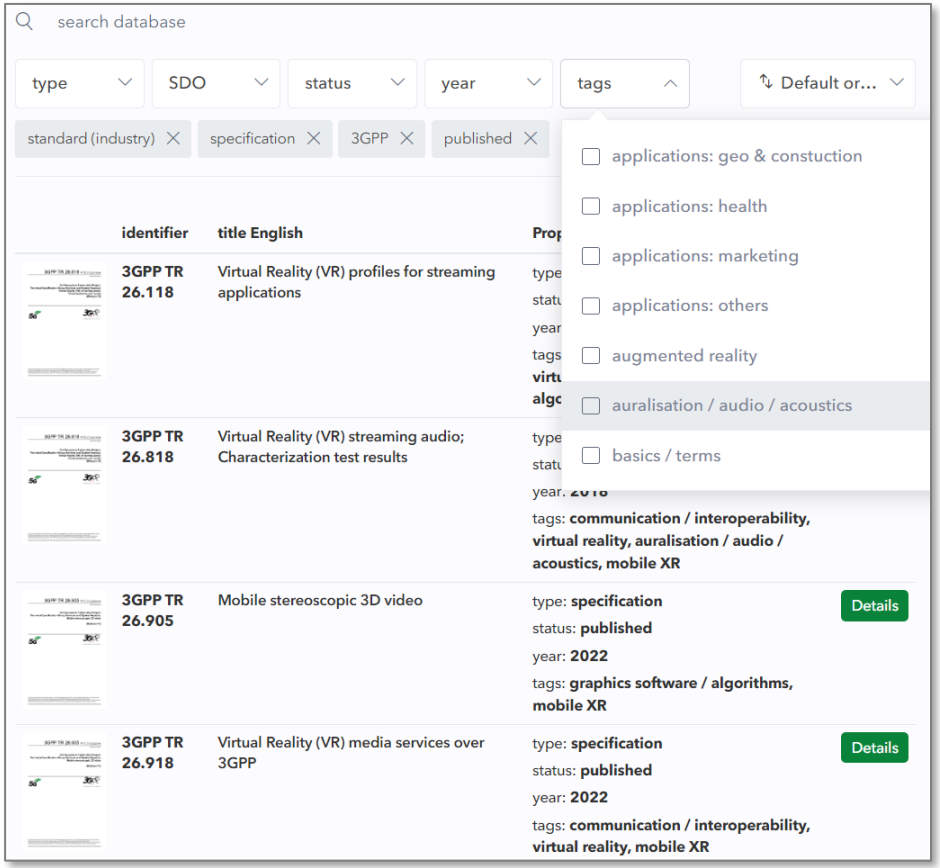
A free, online accessible database for the entire XR community with references to

- 830 XR standards, specifications, guidelines and recommendations
- 145 standardization working groups
- 55 SDOs

They are qualified (by tags) and with a searchable description. The group's entry further comprises the organizing/leading SDO and a link to this resource in the WWW.

Please support by adding standards and SDOs.

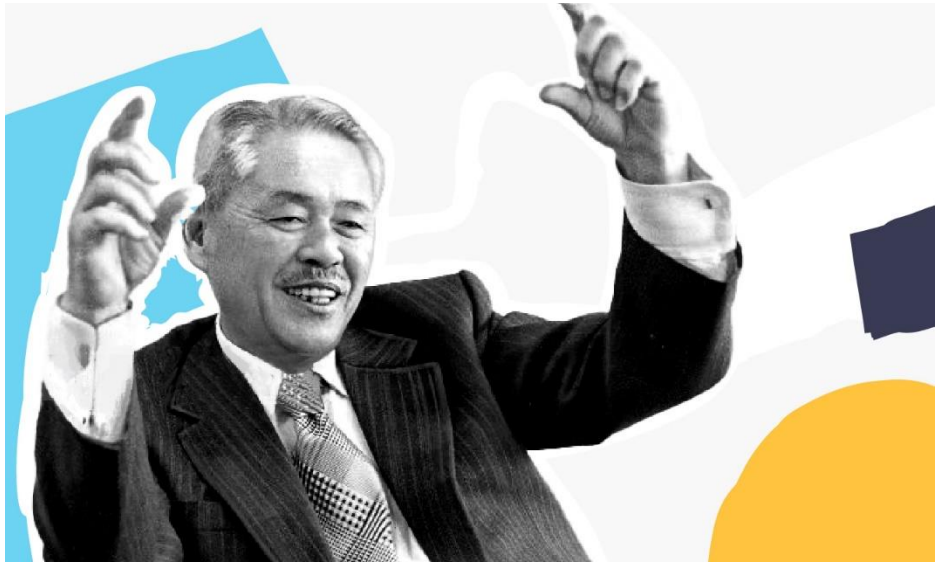
We may offer database as an iFrame for interested organizations' websites.



https://www.vdc-fellbach.de/en/knowledge-database/xr-metaverse-standards-register/

- as cross-cutting technology, XR standardization is scattered among many organizations: thus hard to get an overview.
- individuals and companies are apparently not totally aware of what's on the table; lack of tech transfer
- state support could be an idea, the national approaches worldwide are different anyhow
- there is a already vast number of XR standards out there.
- they provide an excellent basis to build on, avoiding to re-invent the weel and ensuring to concentrate on the real innovative aspects of one's work
- standards pave the way for today's and future markets


**=> let's use them and extend them, engage!**



„*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.

# Thank you for your attention.

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