

StandICT.eu 2023

ICT STANDARDISATION OBSERVATORY AND SUPPORT FACILITY IN EUROPE

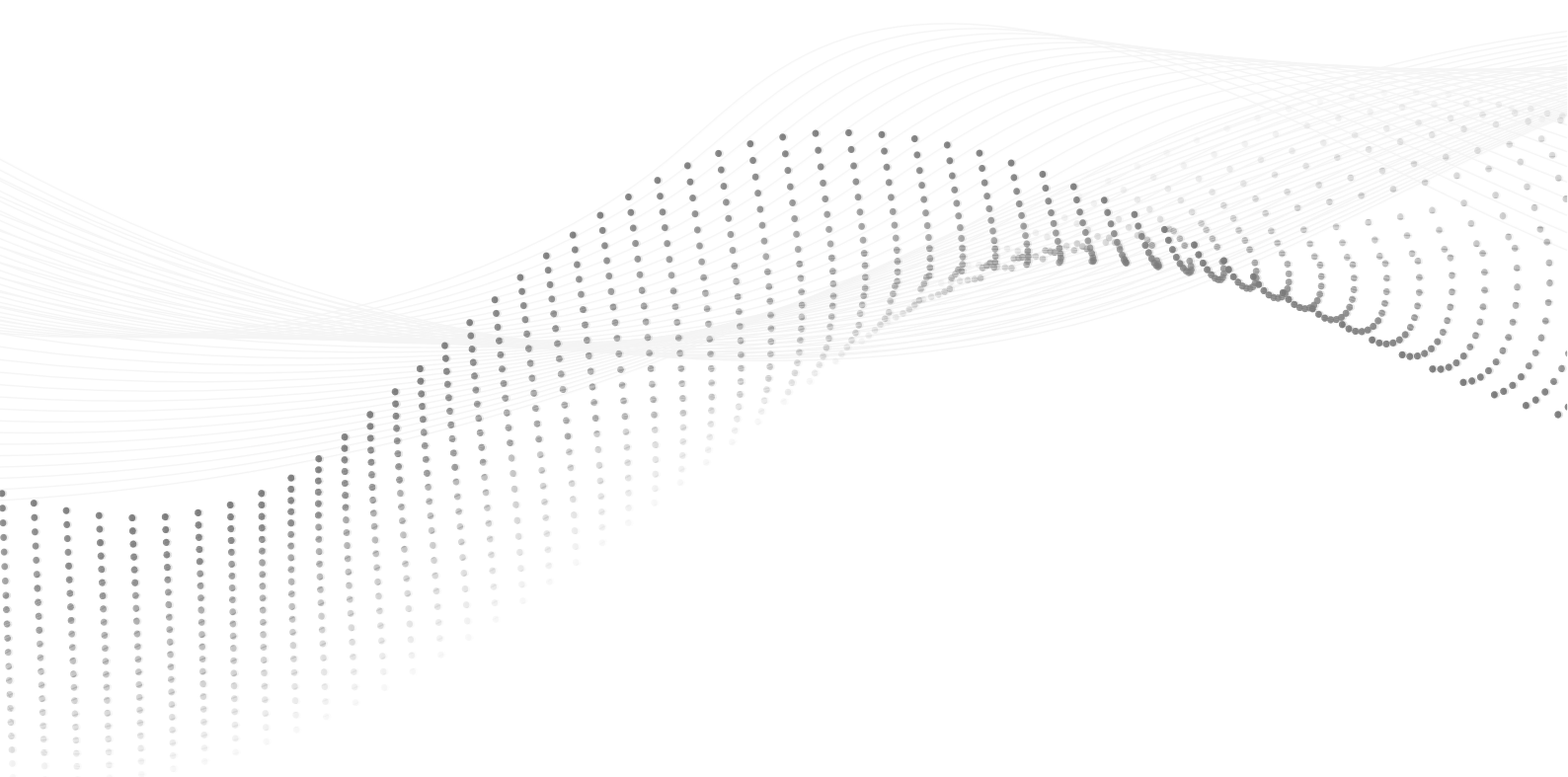
Future Standardisation Education

Reflections and
Recommendations



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Standardisation

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Executive summary

As far back as 2017, the pilot Coordination and Support Action CSA H2020 project StandICT.eu was funded and thanks to the continued support from representatives at the European Commission involved at DG CONNECT, DG GROW and DG RTD over the past five years, the project has been able to achieve, as its mandate requested, both a strong, engaged and vibrant standardisation community primarily in ICT. The project has also managed to provide more visibility to European Standardisation competent professionals eager to engage in European and International Standardisation.

Fast forward six years, this report entitled: ***“Future Standardisation Education Reflections and Recommendations”*** is an outcome of the StandICT.eu online event which took place on the **18th January 2023**, which organised this intense 3 hour workshop at a crucial time when the European Green Deal & the New Industrial Strategy for Europe as well as the geopolitical environment call for a strong European presence in international standardisation development. Building up a strong and sustainable pool of European standardisation competent professionals who are ready to engage In European and International Standardisation is crucial.

The report goes on to showcase some of the achievements the project has produced thanks to its funded fellows within the various technological domains where standards are critical including: **Digital Twins, Blockchain & DLT, 5G, Digital Product Passport, Artificial Intelligence, Fintech and RegTech, Spatial Computing and GeospatialStandards, eHealth**. The results from these domain areas are being picked up in the efforts in defining multiple landscape and gap analysis reports, StandICT.eu delivers, through the work within the Technical Working Groups (TWGs) targeted around specific, important technologies supporting the EU Green Deal and the Industrial Strategy for Europe. The European Commission together with global and European Standardisation Organisations have worked hard to identify solutions on how standardisation can allow stakeholders at all levels to develop a shared understanding and increased standardisation knowledge at large that can cover respectively technological, innovation-supportive and societal aspects that include the potential of standards to safeguard EU core values. The report outlines some of the key opportunities and activities organisations are working on to acknowledge what is happening in Europe, appreciate the benefits of standardisation and to make Europe’s voice heard in international standardisation efforts.

Finally, to position Europe as a global standard-setter, Europe needs to have a robust and sustainable pool of European professionals ready to contribute in European and international standardisation. Joint efforts between educators from EU universities /Higher Education Institutions who already integrate standardisation-related content in their lectures with a coordinated cooperation with industry to help design an innovative teaching concept of standardisation are greatly needed in Europe and look to its global partners who have best practices in place. The report considers this approach and discusses what is happening already in Europe and provides some recommendations for future priorities within the Standardisation and education space.

The report is intended as complementary material to the discussions that will take place amongst the members of the High-Level Forum on European Standardisation meeting scheduled on the 20th January 2023.



Glossary of terms

AI	Artificial Intelligence
CSA	Coordination and Support Action
DLT	Distributed Ledger Technologies
DPP	Digital Product Passport
DT	Digital Twin
EC	European Commission
ESO	European Standardisation Organisation
ESG	European Standards and Guidelines
EUOS	EU Observatory for ICT Standards
EURAS	European Academy for Standardisation
HEI	Higher Education Institution
ICT	Information and Communication Technologies
IoT	Internet of Things
ML	Machine Learning
NSB	National Standards Body
PPPs	Public Private Partnerships
SDGs	Sustainable Development Goals
SDO	Standards Development Organisation

Introduction

The release of the [Standardisation strategy](#) issued in February 2022, and the creation of the High-Level Forum on European Standardisation have put a major priority on activities and achievements in Standardisation on a European level.

On 18th January 2023, [StandICT.eu 2023](#) in collaboration with the European Commission, organised a stimulating, three hour Workshop on “[Future Standardisation Education](#)” covering the principal results and impacts that StandICT.eu 2023 and other invited projects EU funded projects, such as [HSbooster.eu](#) and [Stand4EU](#), have achieved. Moreover, compelling insights from [CEN and CENELEC](#), the [STAIR initiative](#) and [ETSI](#) activities on standardisation and education were highlighted.

The event has demonstrated the synergies and collaborations with the PPPs and other associations, the [success stories](#) of StandICT.eu [funded fellows](#), and the impact from some applications within a societal, economic and technological context.

The event generated a rich discussion on the current standardisation challenges in Europe, considering both ICT and non-ICT sectors, and the following report provides a set of recommendations and reflections that the participants at the event and authors of this report believe could be considered to boost the importance of standardisation at a European level.

The ultimate goal of the workshop was to help engage more interest and direct engagement from Europeans in the standardisation process from academia, research and industry and hope to have achieved this with this workshop.



Workshop themes

The event was organised around four main sessions here summarised:

Session 1 “Defining Standardisation needs, priorities and contributions provided at the European level”

was dedicated to an overview of the EC ongoing activities and standardisation priorities. The session was introduced by *Helen Koepman, Deputy Head of Unit Digital Innovation and Blockchain at European Commission DG CNECT*. The European Green Deal & the New Industrial Strategy for Europe as well as the geopolitical environment call for a strong EU presence in international standardisation development. Building up a strong and sustainable pool of European standardisation competent professionals who are ready to engage in European and International Standardisation is crucial. The EC has set up numerous activities, including, among others:

- 📄 A **dedicated Horizon Europe call** to attract students which will contribute to creating a Pool of European Experts on standardisation at an international level.
- 📄 The [Competitiveness Council](#) has put together valorisation guidelines and indicated standardisation as guiding principles for the valorisation of results to market.
- 📄 Multiple activities in standardisation education including [EURAS](#) events

ONLINE WORKSHOP

Future Standardisation Education

Reflections & Recommendations

Session 1: Defining standardisation needs, priorities and contributions provided at the European level

Moderator
Silvana Muscella, CEO,
Trust-IT & StandICT.eu
Coordinator



Helen Köpman,
Deputy Head of Unit Digital
Innovation & Blockchain at
European Commission DG
CNECT

 StandICT.eu 2023 has received funding from the European Union's Horizon 2020 (H2020) research and innovation programme under the Grant Agreement No. 951972.

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Session 2 “A snapshot of some key European Standardisation activities and their main achievements”

was organised as a panel discussion with *Eurico G. Assunção, Deputy Director, European Federation for Welding, Joining and Cutting (EFW) (STAND4EU)*, *David Boswarthick, Director of New Technologies, ETSI*, *Livia Mian, Innovation Project Manager, CEN-CENELEC*, *Ray Walshe, Asst. Professor, Dublin City University (StandICT.eu EUOS Director)* and moderated by *Nicholas Ferguson, Senior Project*

Manager, COMMpla (HSbooster.eu Coordinator). The session aimed at showcasing the work that various projects and organisations have put in place with the support of the European Commission and the European Standardisation Organisations to identify solutions on how standardisation can allow stakeholders at all levels to develop a shared understanding and increased standardisation knowledge at large that can cover respectively technological, innovation-supportive and societal aspects that include the potential of standards to safeguard EU core values. Examples of the developed activities include:

- 📄 [StandICT.eu](#): funding to experts to operate in SDOs (fellows) and tracking of the impact with specific reports, technical working groups providing landscape reports identifying potential gaps ,developed with the involvement of standards experts across the board such as professional experts, research and academia, SDOs, and government and funding bodies, a standards academy with training material made
- 📄 [CEN CENELEC](#): various engagement activities with stakeholders, including workshops (e.g. on data quality for AI for trustworthy and ethical AI and how standards can contribute to support ethical AI deployment. Another event was on Trusted Chips.
- 📄 [ETSI: ETSI Research Conference on maximising the impact of European Research through standardisation](#) is being held from 6-8 February 2023, involving projects, researchers and standards engineers to network
- 📄 [HSBooster.eu](#): is a 24-month European Commission initiative that will provide the European Standardisation Booster. The booster provides expert services to European projects to help them to increase and valorise project results by contributing to the creation or revision of standards.
- 📄 [STAND4EU](#): This is a two-year EU-funded project to identify barriers to standardisation in research and industrial innovation. This project will establish an interface to facilitate the collection and the sharing of information about the obstacles, remedies and best practices for standardisation.

ONLINE WORKSHOP

Future Standardisation Education

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Session 2:
A snapshot of some key European Standardisation activities and their main achievements

Moderator
Nicholas Ferguson,
Senior Project Manager,
COMMpla
(HSbooster.eu
Coordinator)

Eurico G. Assunção,
Deputy Director, EWF
(STAND4EU)

Livia Mian,
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Director)

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Session 3 “Interactive discussion on how technologies are impacted by Standardisation - A voice to the experts”

included a panel moderated by *Silvana Muscella, CEO, Trust-IT (StandICT.eu Coordinator)* featuring a set of European Standardisation competent professionals (eager to engage in European and International Standardisation, who are deeply involved in StandICT.eu activities via their funded fellowship and the multiple landscape and gap analysis reports targeted around specific, important technologies supporting the EU Green Deal and the Industrial Strategy for Europe. Their experience and knowledge was key to identify many of their sector-specific challenges and recommendations included in this report

ONLINE WORKSHOP

Future Standardisation Education

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Session 3:
Interactive discussion on how technologies are impacted by Standardisation - A voice to the experts

Moderator
Silvana Muscella,
CEO, Trust-IT & StandICT.eu
Coordinator

Jeroen Broekhuijsen,
Team Lead Digital
Factories, TNO

Fiona Delaney,
CEO & Founder, Origin Chain
Networks

Muslim Elkotob,
Principals Solutions Architect,
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Jens Gayko,
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Nikita Lukianets,
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Research & Consulting

Suno Wood,
Chair eHealth, ETSI

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Session 4 “Attracting tomorrow’s professionals to contribute to Standardisation”

was also organised addressing Training, Educational and Standardisation efforts and new calls published under the Horizon Europe Programme dedicated to this. The panel was made up of *Antonio Conte, ICT Standardisation Policy Officer, European Commission DG GROW, Knut Blind, Professor for Innovation Economics at TU Berlin & Fraunhofer ISI and Chair of CEN-CENELEC Working Group STAIR, Ivana Mijatovic, Full Professor, University of Belgrade and HSbooster.eu Training Academy, Brian McAuliffe, Director of Technology Standards, HP and Chair of EUOS Standards Academy, Michelle Wetterwald, Senior mobile networks expert, Netellany and ETSI Specialist Task Force on Education on ICT Standardisation.*

The panel was moderated by *Ray Walshe, Asst. Professor, Dublin City University (StandICT.eu EUOS Director).* The session was focused on discussing joint efforts between teachers of EU universities / Higher Education Institutions who already integrate standardisation-related content in their lectures with a coordinated cooperation with industry to help design an innovative teaching concept of standardisation. Universities are key in shaping the digital transformation and ensuring that we have the skills we need in standardisation as they will guarantee the future generation of standardisation experts. It is important to mention that In the next Work Programme of Horizon Europe there will be two calls relevant to education, one to address both to improve education in universities and higher education another to enhance cooperation between academia and industry.

ONLINE WORKSHOP

Future Standardisation Education

Reflections & Recommendations

Session 4:
Attracting tomorrow's professionals to contribute to Standardisation

Moderator
Ray Walshe, Asst. Professor, Dublin City University (StandICT.eu EUOS Director)

Antonio Conte,
ICT Standardisation Policy Officer, European Commission DG GROW

Knut Blind,
Professor at TU Berlin and Chair of CEN-CENELEC Working Group STAIR

Ivana Mijatovic,
Full Professor, University of Belgrade and HSbooster.eu Training Academy

Brian McAuliffe,
Director of Technology Standards, HP and Chair of EUOS Standards Academy

Michelle Wetterwald,
Senior mobile networks expert, Netellany and ETSI Specialist Task Force - Education on ICT Standardisation

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Key Challenges

Based on the event outcomes, the following **challenges** have emerged:

Key challenges in Standardisation

- ☐ Some standards such as for example the standards manufacturing scenario has two very stark contrasts, **areas where standards have been in use for a long time** and are very much consolidated in the market, if subject to routine updates, while on the other hand for new technology it is an entirely different situation where innovation and development of new processes, such as for example additive manufacturing **are at a completely different stage of maturity are new or yet to have been developed** and therefore it is these gaps that need to be identified and addressed.
- ☐ A key challenge is managing to combine efforts in Europe, creating a common basis and also looking to the future forward how digital standards will be developed and used;
- ☐ Attracting the European portfolio of projects into the SDO ecosystem and to raise public awareness about standardisation and accelerating the integration of new and emerging technologies into the work programme of SDOs.
- ☐ Monitoring what is happening in the scene nationally and internationally to ensure there is no duplication of efforts.
- ☐ Many standards already exist. Individuals or organisations or researchers need to understand how they can get involved and where to go to find the existing standards.
- ☐ Many domains are interlinked, particularly across ICT. This means that a silo approach to standardisation will not work.
- ☐ While it can be difficult to involve every individual from every stakeholder group in the standards development process due to lack of funding and or time, collaboration and not isolation is key to ensure the standards being developed reach maturity quickly. .
- ☐ It is sometimes difficult to escalate national standardisation priorities to a European and International level due to language barriers from the contributors.
- ☐ Often, especially in new domains, no consensus on terminology and/or vague terminology exists. This results in multiple groups using different terms for the same things and using similar terms to describe different contexts.
- ☐ The current liaison-only approach to shared standardisation objectives is suboptimal as an interface and results in minimal collaboration among SDOs in overlapping areas.
- ☐ There is no single “Get Started” space for experts who want to get involved, leading to dispersed groups and siloed funding.

Key Challenges in Standardisation education

- ☞ There is an obvious need to increase the number of students educated in standardisation, as the requirement for this type of profession is growing and many of the more seasoned experts in the field, albeit contributing immensely, are retiring and therefore this needs to be implemented with innovative teaching methods in European universities and HEIs.
- ☞ Market participants are not very happy with what is happening in education. The number of students is falling and it is also a challenge to attract new students.
- ☞ The multidisciplinary nature of standardisation also presents a challenge in bringing this topic into the curricula of university, as this touches so many domains.



Recommendations

A set of recommendations have been collected to at least partially address the various identified challenges:

Recommendations to encourage standards adoption

- ☐ To ensure **broad adoption** of the hundreds of existing standards, also listed in the [EUOS Standards Observatory](#), we need a more collaborative approach to guide and correct the implementation of standards and we also need the **involvement of Innovators early in the process**
- ☐ **Removing duplication** and intensifying effort **involving all of the actors** across the board is definitely the way forward to harmonise standards, not just in ICT, but in other sectors, this can lead to improved standards and new standards.
- ☐ The **research sector** is key to standardisation. European Union funded projects and European Standardisation Organisations are playing a key role in making sure this happens and making sure that the **right incentives and recognition** are evident.
- ☐ **Communities** around standardisation priorities are key. **Participation** requires **passion** to address challenges, **practical support** to newcomers and visibility of **progression** in addressing challenges.
- ☐ Democratising knowledge, independent of different companies or countries
- ☐ Ensure standards support European regulations and policies
- ☐ Any standard involving UN Human Rights should be labeled or marked for additional review.

Recommendations to support standardisation in various ICT domains

- ☐ **Digital Twins:** Use CSA calls to capture types of twins, their structures & reusable building blocks for specific domains; Develop a set of best practices for the use of standards in digital twin implementations (to help bring twin examples to methodology & developing the supporting tools to create a transition path; go from twin examples to methodology & developing the supporting tools to create a transition path; define “common good” twins versus Intellectual Property twins; better define “good” decisions for sustainability, resilience & competitiveness
- ☐ **Blockchain, DLT and emerging technologies:** create access to new technologies facilitating a dialogue with active companies. In this field, **innovation management** often happens in the workplace and this should be integrated as part of the standardisation dialogue. We should extend opportunities for industry, academic and in particular startups/SME participation and contribution to SDO activities. Expert time in research and networking new standards as they emerge, is the greatest contribution to the SDO community and should continue to be nurtured as best it can be. Positive opportunities to collaborate and share knowledge are beneficial and opportunities such as those emerging in TC307 WG6 - Blockchain and DLT use cases, which are industry-facing, inviting startups local to plenary meetings and globally through national body relationship management are approaches worth elaborating upon.
- ☐ **5G:** Identify strategic USPs of each SDO in a specific area covered by other SDOs as well; so as to leverage the strengths of each and let contributions/strengths complement each other; Incentivize/encourage joint activities and small projects that are inter-stakeholder with the specific focus on standardizing an important aspect or asset of a technical setup

- 📄 **DPP:** Need for common vision, Need for research on details, Need for training for market actors. The EC initiative for a digital product passport (DPP) should be based on standards developed by EU industry for data exchange in industrial value chains. This would enable a data economy based on EU values and a central element of European sovereignty for data based business models
- 📄 **AI and ML:** Creating standards for pre-trained models and incentivizing developers/ML engineers to share these models across industries, Creating standards for datasets and incentivizing developers/ML engineers to share them across industries, Imposing standards on AI/ML inputs outputs so that we focus on the outcomes of the models instead of the process of how this model was built; Imposing standards on transparency of AI/ML components (training datasets, boundaries, code sharing) making systems more predictable/interoperable/trustable
- 📄 **ICT Management Standards:** Europe's digital, green and industrial transformation needs the best standards in technology, but these must be accompanied by new standards in the ways of managing services, productivity and contribution of technology to business.
- 📄 **ICT in general:** ICT people must matter for future standards, ICT management standards must be developed according to how technology standardisation evolves
- 📄 **eHealth:** Discussions on standards should always include an awareness of the European respect for Human Rights issues which may arise as a result of new technologies to be employed in the health environment.

Recommendations on the standardisation processes and methods

- 📄 We need to address “real problems” and not invent problems for standardisation to solve. Prototyping should be done in advance of standardisation (trying our solutions before doing the standards work).
- 📄 We must make sure the standards we release are implemented with ease (toolkits, tool samples, coding).
- 📄 Interoperability standards should be prioritised as a baseline goal.
- 📄 Create standards for pre-trained models and incentivized developers/ML engineers to share these models across industries
- 📄 **ICT Management Standards:** Europe's digital, green and industrial transformation needs the best standards in technology, but these must be accompanied by new standards in the ways of managing services, productivity and contribution of technology to business

Recommendations to support Standardisation education

- 📄 Ensure greater recognition of standardisation activities, via dedicated metrics and KPIs to support, e.g. academic/career progression
- 📄 New teaching approaches should address society at large and also take into account EU policies such as the Green Deal.
- 📄 Education bridges a gap between researchers, industry ,academia and SDOs. Therefore, it should have at least two levels of engagement, both from the universities and from the professionals:
 - 📄 There is no simple one way to engage Higher Education Institutions in standardisation. involving academia is not only about engaging researchers, students and teachers but also programme managers/decision makers. A long term strategy is needed which takes a 10-15 year horizon plan to deliver the requisite number of standards professionals for future European market needs.

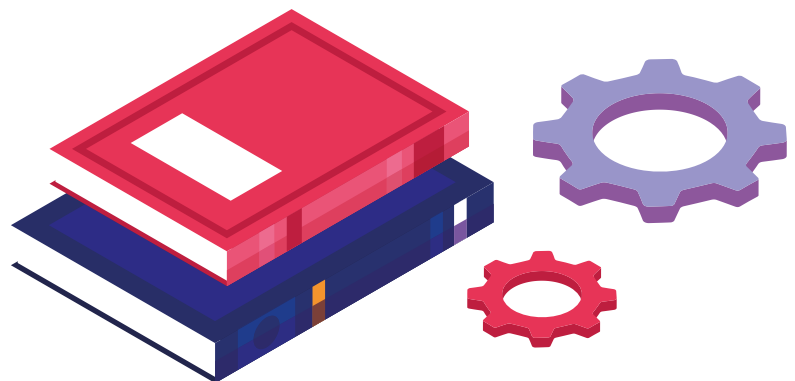
- 📄 In order to get industry onboard it is important that professionals are involved as instructors and share their experience via teaching activities. Also, there is a need to create industry clusters to improve knowledge exchange and ensure that demand and supply are both involved. This will have a favourable spill over effect on the various communities.
- 📄 In addition to thoughts of promoting curricula and courses, standardisation could also be provided as a module of “soft skills” as part of courses on another discipline for example such as IoT.
- 📄 To attract new talent, an idea could be creating a professional body such as in engineering to give this some traction as a career.



Conclusions

The workshop was put together in a short space of time and it generated strong interest from the standardisation community which is proof of a growing and engaged community wanting to contribute to a dialogue of today's digital landscape that is changing so fast and where the importance of finding consensus between **research, industry and policy with the standardisation processes** is crucial. Efforts such as the ones we witnessed at this online workshop can contribute to this consensus process.

The workshop also demonstrated that strong coordination efforts are needed to accelerate knowledge-sharing across SDOs and territorial boundaries and embrace diversity, cooperation and collaboration in open innovation practices.



References and Useful Links

EC Activities

- ↓ [New Guiding Principles for Knowledge Valorisation](#)
- ↓ [Call for expression of interest: Join the European Union campaign to boost knowledge valorisation](#)
- ↓ [EC Scoping Study for “Code of Practise on Standardisation for Researchers”](#)
- ↓ [High Level Forum on European Standardisation](#)
- ↓ [Provide for a strong and sustainable pool of experts for European Standardisation: attract the students of university/HEI](#)
- ↓ [Piloting communities of expert facilitators to improve industry-academia-public sector co-creation \(CSA\)](#)

CSA Activities

- ↓ [Stand4EU](#)
- ↓ [StandICT.eu](#)
- ↓ [HSbooster.eu](#)

For Researchers

- ↓ [ETSI offerings for Researchers](#)
- ↓ [CEN-CENELEC offerings for Researchers](#)
- ↓ [CEN-CENELEC Standards Database](#)
- ↓ [CEN list of Technical Committees](#)
- ↓ [CENELEC list of Technical Committees](#)
- ↓ [ITU offerings for Researchers \(annual conferences\)](#)
- ↓ [STAND4EU Questionnaire](#)

Industry Standardisation

Artificial Intelligence

- ↓ [Landscape of Artificial Intelligence standards](#)
- ↓ [OpenEthics](#)
- ↓ [Canvas for Collaboration](#)
- ↓ [Generation of the Disclosure and a standardized Labels](#)
- ↓ [Exchange of AI Disclosures as a mechanism for bottom-up transparency](#)
- ↓ [Open Ethics Vector as a basis for recommendation](#)

Augmented Reality

 [Current Status of Standards for Augmented Reality \(researchgate.net\)](https://www.researchgate.net)

Blockchain and DLTs

 [Blockchain and distributed ledger technologies – Use cases](#)

Digital Twins

 [Landscape of Digital Twins](#)

Edge Computing

 [Landscape of Edge Computing standards](#)

General

 [German Standardisation Panel \(DNP\): an annual survey that collects data on standardisation activities of companies.](#)

 [The Internet and Sustainable Development](#)

 [Role of Standards in SDGs](#)

 [AI and Big Data Standardisation: Contributing to United Nations Sustainable Development Goals](#)

 [Standards in the global value chains of the European Single Market](#)

Internet of Things

 [Landscape of IoT standards](#)

Machine Connectivity

 [Authentise Flows](#)













Smart cities

 [Landscape of Smart Cities Standards](#)

Trusted Information

 [Landscape of Trusted Information standards](#)

Standardisation Education

-  [EUOS Standards Academy](#)
-  [European Standards and Guidelines \(ESG\)](#)
-  [European University Information Systems](#)
-  [ETSI educational materials](#)
-  [ISO education materials](#)
-  [EURAS European Academy for Standardisation e.V](#)
-  [Academy and Capacity Building - IEC](#)
-  [Interoperability of educational data demands standards](#)
-  [Cases of Education About Standardisation](#)
-  [Necessary Competences of Employees in the Field of Standardisation](#)
-  [Motivation for and barriers against the inclusion of standardisation in European academic research and education](#)
-  [IoT class at Telecom Paris executive education](#)





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