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Beginner 2

Course 1

STANDARDISATION TRAINING ACADEMY

Topic:

CONSORTIA-BASED STANDARDISATION

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Module Objectives

After completing this module, you should be able to:

1. recognise the major differences between – and commonalities of – standards consortia and SDOs (in terms of, e.g. process, governance, membership, IPR policy);
2. decide which consortium would be best suited for a particular task at hand;
3. communicate why using consortia for ICT standardisation may well be a good idea;
4. understand how consortia relate to the EU's standardisation policy and how they link to SDOs;
5. discuss if the proliferation of ICT standards consortia is a good thing for ICT standardisation;
6. integrate the different points of view regarding SDOs and consortia and come to your own conclusions; and
7. assess why some companies go for consortia rather than SDOs.

Key Terms

consortia, consortia-based standardisation, ICT standardisation

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1 A QUICK INTRODUCTION

A major part of the world we live in today would probably look rather different without standards consortia. The specifications for USB (Universal Serial Bus; originally developed by Intel) were published in 1996 by the USB Promoter Group, a rather more informal consortium of seven companies (see e.g. [van den Ende et al., 2012]). The IETF [1] develops the standards for the Internet (which wouldn't have come into being without standards in the first place), the W3C [2] does the same for the World Wide Web. Overall, many of the standards that shape Information and Communication Technologies (ICT) have been developed by consortia. It is safe to say that they have been (and continue to be) highly influential in this sector. However, while consortia continue to be most prominent by far in the ICT sector, they are also not entirely unheard of in other sectors as well (e.g. in bio-technology [de Lorenzo & Schmidt, 2018]) and in pharmaceuticals [Williams, H. D. et al. [2012]).

Focussing on the ICT sector, this module will provide some more information about the phenomenon of consortia. First, section 2 will provide some background information. Section 3 will then discuss two important consortia in more detail. This will be followed by a discussion of the links that may (or may not) exist between SSOs [3] (section 4). Section 5 will then briefly discuss the differences that exist in the perceptions of consortia between the EU and the US. Finally, section 6 will provide a brief summary.

2 A BIT OF NECESSARY YET PERHAPS SLIGHTLY BORING BACKGROUND

Wikipedia [4] defines a consortium (plural: consortia) in general as “an association of two or more individuals, companies, organisations or governments (or any combination of these entities) with the objective of participating in a common activity or pooling their resources for achieving a common goal”. Adapted to the realities in standardisation, this might read “A consortium is an association of companies and organisations with the objective of developing and/or promoting a single standard, a set of (related) standards or generally standards for a certain environment”. Note the difference – individuals and governments are rarely if ever members of a standards consortium (even though it might be possible in principle in some cases). From a slightly different perspective, “Consortia, also sometimes called Fora or Special Interest Groups (SIGs), are private sector-led organisations that create or otherwise support standards, but that are not formally recognised by a government authority as a standards developer” [Biddle, 2018, p.19]. In contrast, “Formal Standards Development Organizations (SDOs) are standards developers that are formally recognised by some government authority” [5] [Biddle, 2018, p.18]. Structurally, a consortium may be anything from an

[1] Internet Engineering Task Force (https://www.ietf.org/). Strictly speaking, this is not a consortium, but is frequently subsumed into this category. See section 3 for more information about the IETF.
[2] World Wide Web Consortium (https://www.w3.org/).
[3] Standards Setting Organisations; the superset of SDOs and consortia.
[4] https://en.wikipedia.org/wiki/Consortium.
[5] Which leads to the interesting question who formally recognised ISO and IEC in the first place.

unincorporated association of companies to an incorporated entity with offices, marketing, technical and administrative staff and a multi-million-dollar budget. [6] Today, the more important standards consortia fall into the latter category.

Standards consortia emerged on a broader scale in the mid-1980s (see e.g. [Cargill, 1999]), then exclusively in the ICT sector. The major reason behind this development was vendors' growing concerns about the 'official' standards setting processes (i.e. those adopted by the SDOs). These concerns, in turn, were triggered by users' dissatisfaction with the speed of the processes and, perhaps even worse, with the new phenomenon that standards for software, which may provide for different options and have been implemented by different vendors, may well yield implementations that are standard compliant, yet not interoperable (see e.g. [Weiss & Cargill, 1992] or [Egyedi, 2007]). One solution envisaged to resolve this issue was the formation of new entities that would speed-up the process and lead to interoperable implementations (at least by the consortium members).

The accurate number of active consortia is next to impossible to determine (and would probably be inaccurate by next week anyway). The ConsortiumInfo.org web site maintains a page that lists a number of ICT consortia in the high 3-figure range. [7] This site also nicely demonstrates the different understandings of mainly the US and the EU of 'consortium' – many entities listed under the heading 'De Jure Standards Development Organizations' (i.e. SDOs) would be considered consortia in the EU (see sect. 4 for more details).

3 INTRODUCING TWO ORGANISATIONS

In the following, two important sample organisations will be briefly discussed (W3C as 'classical' consortium and the IETF as an important SSO that is neither a consortium nor an SDO, really, but that is typically considered to be one). Following a brief general introduction, the focus will be on the structure and form of governance, processes and IPR rules of the respective SSO.

In general, the differences between the processes, by-laws and guidelines adopted be SDOs and consortia, respectively, are not as significant as might be expected. On the one hand, many SDOs have introduced faster lightweight processes (e.g. Workshop Agreements) to approximate a consortium process. On the other hand, 'fast' consortium processes may take almost forever: IPv6 became an IETF Draft Standard in December 1998, it was approved as an Internet Standard after almost 19 years, in July 2017. A closer look at the respective processes also shows that the gaps that had initially been visible are getting smaller; the same may be said for governance and IPR regimes (this holds at least for the major consortia). However, differences may still be observed.

[6] See https://www.consortiuminfo.org/guide/participating-in-a-sso/what-is-a-sso/.
[7] See https://www.consortiuminfo.org/sso-list/.

3.1 World Wide Web Consortium (W3C)

"The W3C mission is to lead the World Wide Web to its full potential by developing protocols and guidelines that ensure the long-term growth of the Web. Below we discuss important aspects of this mission, all of which further W3C's vision of One Web". [8]

The W3C was founded in 1994 and is led by a Director and a CEO. The consortium is made up of member organisations and full-time technical/administrative staff. In September 2022, W3C had 472 members. Membership fees depend on an entity' size and the country where it is headquartered. Overall, the fees appear reasonable. [9]

The W3C's organisational structure is pretty straightforward and similar to those of many/most SSOs (with two notable exceptions, though):

- The Working Groups comprise member representatives and invited experts. They do the technical work and produce the technical deliverables (e.g. W3C recommendations, technical reports, software, test suites).
- Interest Groups serve to exchange ideas on (potential) Web technologies and policies (e.g. on issues relating to privacy or patents and standards).
- The Advisory Committee (AC) comprises one representative of each member organisation. It performs various review roles in the W3C Process (relating e.g. to IPR issues). Its members elect the Advisory Board and the Technical Architecture Group.
- The Advisory Board (AB) provides guidance on issues of strategy, management, legal matters, processes and conflict resolution. AB members act in an individual capacity; they do not represent their respective organisation.
- The Technical Architecture Group (TAG) is a rather more high-level WG. It aims to establish consensus around principles of the Web architecture and to interpret and clarify these principles; they also resolve issues relating to the general Web architecture brought to the TAG.
- The CEO's overall task is to ensure that W3C continues to be the leading forum for the technical development of the Web.
- The W3C Director is the entity that sets the W3C's structure apart from those of other SSOs. The role has been described as a 'benevolent dictator' [Egyedi, 2001]. Ultimate decisions are made by the Director; in (exceptional) cases, the consensus principle [10] (to which W3C is proud to subscribe) may be overthrown by the Director's decision. [11]

[8] See https://www.w3.org/Consortium/mission.
[9] For instance, the annual fee for a not-for-profit organisation headquartered in Afghanistan is USD 953, for one from the US USD 253. If revenues exceed USD billion the fee would be USD 77,000 for a US-based company.
[10] See https://www.w3.org/2021/Process-20211102/#Consensus.
[11] As e.g. in the case of the Encrypted Media Extensions (EME) recommendation, which came into force in 2017: "despite strong opposition and the fact that the approval vote [] marked a strong departure from consensus"(see e.g. [Kanevskaia, 2020] and [Contreras, 2015]).

- Community and Business Groups actually operate outside the standards process ("the groups do not necessarily represent the views of the W3C Membership or staff"). [12] Work in these groups is supposed to serve as basis for potential future W3C standardisation activities.

The W3C standards setting process is guided by the W3C Process Document. [13, 14] It relies heavily on democratic principles (see footnote 9 for a possible alternative procedure). W3C subscribe to the OpenStand paradigm [15], which highlights, among other aspects, the adherence to the principles of due process, broad consensus, transparency, balance and openness, collective empowerment.

A standardisation activity will commence once a sufficient level of interest and a support by members has been identified [16] and the administrative tasks have been completed (including the creation of a Charter). [17] The subsequent work is carried out at meetings (face-to-face or virtual) and via mailing lists. In most cases, the outcome will be a Technical Report (TR). A number of steps are subsequently required to turn the TR into a W3C Recommendation (i.e. a standard). The associated W3C Recommendation Track consists of:

- Publication of the First Public Working Draft for review by interested parties (including e.g. the community and the public), patent issues will also be addressed at this stage.
- Publication of zero or more revised Working Drafts (ditto).
- Publication of a Candidate Recommendation. Such a document is considered complete and fit for purpose. Independent interoperable implementations are now required to show that it actually is or to identify any shortcomings. [18]
- Publication of a Proposed Recommendation. This triggers a formal review by the Advisory Committee.
- Publication as a W3C Recommendation upon positive review by the AC.

Decisions during the standards setting process shall be made by consensus; voting is considered the last resort and shall only be applied if consensus is impossible to achieve. In such cases, the respective Chair decides if and when this situation occurs. When it comes to voting, a Member or group of related Members (e.g. subsidiaries) are considered a single organisation, as is the W3C Team.

The important role of the W3C 'Team' (consisting of the Director, the CEO, W3C paid staff, unpaid interns, and W3C Fellows) is another characteristic that distinguishes the W3C governance from other SSOs. The Team plays a much more important role than staff in other SSOs typically does; its tasks extend way beyond

[12] See https://www.w3.org/community/groups/.
[13] See https://www.w3.org/2021/Process-20211102/.
[14] See [Halpin, 2020] for a pretty massive critique of the process (and its potential misuse) based on examples from the security domain.
[15] See https://open-stand.org/about-us/principles/. These principles are not very different from the provisions of the WTO-TBT Agreement, see https://www.wto.org/english/tratop_e/tbt_e/principles_standards_tbt_e.htm.
[16] How exactly this is determined remains unclear, though.
[17] Among other details, a Charter identifies the group's mission, the scope of its work, its duration and the nature of any deliverables, see https://www.w3.org/2021/Process-20211102/#WGCharter.
[18] The Director(!) will decide whether or not adequate implementation experience has eventually been gained.

administrative issues. JRC [2019] identifies the W3C governance as a 'Leadership-driven model', where the ultimate decision rests with an unelected leadership and where the staff plays a significant role.

W3C runs a Royalty Free (RF) IPR policy. However, this policy applies only to members who have joined a WG; just being a Member of W3C alone, does not imply the need for RF licensing obligations. The W3C has also adopted a 'reciprocity' requirement. Here, the SEP holder agrees to license an implementer only if the implementer grants the SEP holder a comparable license under its own SEPs covering the same standard. Despite the general RF policy, it is possible for W3C members to "exclude specifically identified and disclosed Essential Claims from the overall W3C RF licensing requirements". [19]

3.2 Internet Engineering Task Force (IETF)

First and foremost – the Internet Engineering Task Force (IETF) is not a consortium, although it is typically mentioned in the same breath.

The IETF is the Internet's standards organisation that develops many/most the technical standards around and on top of the TCP/IP protocols that together provide the Internet's services. It was formed in 1986 and was initially supported by the US federal government. Since 1993 it has operated under the auspices of the Internet Society, an international non-for-profit organisation. The IETF considers itself an open standards organisation. It has no formal membership; those who participate in the standards setting process are volunteers. The outcome of this process is referred to as Requests for Comments (RFCs).

Please note: All standards produced by the IETF are RFCs, but not all RFCs are actually standards. [20]

"Rough consensus and running code" is some sort of mantra for the IETF. The latter sets it apart form SDOs (which do not normally require any implementations as part of their respective standards setting process, the former distinguishes it from (pretty much) all other SSOs. [21]

[19] See https://www.w3.org/Consortium/Patent-Policy-20200915/#sec-Exclusion. "W3C is serious about RF. However, during the difficult process of getting their RF policy approved, they had to make this concession so that some patent holders would agree. In effect, it allows a patent holder to withdraw patents from RF licensing, which kind of makes sense: If somebody else proposed a specification that covers your patents, you might not want them to be licensed under RF terms. In any case, this is optics only. I don't think anyone really does this at W3C". Thanks to Jorge Contreras for providing this information.

[20] An RFC that is not supposed to eventually become a standard will be labelled as Informational, Experimental, Best Current Practice or Historic. See https://www.rfc-editor.org/rfc/rfc2026.html#section-4.2 for descriptions of these Non-Standards Track maturity levels.

[21] Rough consensus is a bit of a double-edged sword. It may well speed up the process, but it also makes it more susceptible to e.g. individuals who follow their own agenda "The IETF does not have a strategy for dealing effectively with an individual who is inhibiting progress, …" [IETF, 2004]. See also e.g. [Spring et al., 1995] or [Jakobs, 2003].

"The mission of the IETF is to produce high quality, relevant technical and engineering documents that influence the way people design, use, and manage the Internet in such a way as to make the Internet work better" [IETF, 2004].

The IETF comprises a number of groups including, among others: [22]

- Standardisation work of the IETF is carried out in a number of Working Groups (WGs; 34 as of September 2022 [23]), each of which belongs to a specific Area. [24]
- Each Area has one (possibly more) Directorates, comprised of experienced IETF participants. They support the Area Directors, who do the Area management.
- The Internet Architecture Board (IAB) oversees the IETF's external relationships and also provides long-range technical direction for Internet standards. It is composed of twelve members selected by the IETF Nominations Committee (see below).
- The Internet Engineering Steering Group (IESG) is responsible for the technical management of IETF activities and of the Internet standards process. The IESG is composed of the IETF Area Directors.
- The Internet Research Task Force (IRTF) is the 'research arm' of the IETF, working on topics that relate to Internet protocols, applications, architecture and technology.
- The RFC Editor manages the editing, publication and archiving of RFCs.
- The IETF Administration LLC (IETF LLC) provides the corporate legal home for the IETF, the IAB and the IRTF.
- The Nominating Committee is made up of ten randomly chosen experienced volunteers who review open IESG and IAB positions and nominate a candidate for each.
- The IETF Trust Group was created to manage the intellectual property and other property relating to Internet standards.

A major characteristic of the IETF's standards process is 'modularity'. In contrast to e.g. ISO, the IETF does not aim to produce bulky standards that address all potential issues from the outset. Rather, they produce comparably simple specifications that may be extended or combined with others to address new problems. The goals of the process include technical excellence; prior implementation and testing; clear, concise, and easily understood documentation; openness and fairness and timeliness. Participation in the process is on an individual basis, i.e. participant are not supposed to represent their respective employer's interests [IETF, 2014].

Almost all RFCs are produced by a WG, and every RFC starts its life as an Internet Draft (I-D). Anyone can author an I-D. An I-D needs to observe guidelines regarding both formatting and content. [25]Assuming that an appropriate WG exists [26], it will need to adopt the I-D. From this point onward, the IETF owns the copyright of the document. Work on the I-D may yield a number of iterations. Once the document is considered final, it will be reviewed by the responsible Area Director and subsequently by the IESG and the overall IETF. Upon

[22] For the full list of groups see https://www.ietf.org/about/groups/.
[23] The full list of WGs may be found at https://datatracker.ietf.org/wg/.
[24] See https://www.ietf.org/topics/areas/ for the full list of current areas.
[25] See https://authors.ietf.org/en/choosing-a-format-and-tools and https://authors.ietf.org/en/content-guidelines-overview, respectively.
[26] See https://www.ietf.org/about/participate/tao/#5 for how to proceed if this is not the case.

approval by the IESG and if the I-D is destined for the Standards Track, it will be published as Proposed Standard. [27] To move from Proposed Standard to Internet Standard, at least two independent interoperating implementations with widespread deployment and successful operational experience are required, as well as the absence of any errata and unused features in the specification. If Essential Patents are involved independent and successful uses of the licensing process also need to be demonstrated. Following an IETF-wide Last Call, the IESG will make its final decision. The standardisation Work in the IETF is primarily carried out via mailing lists and at three annual meetings. [28]

The IETF Trust Group manages IPR-related issues. The guidelines established in IETF [2017] require any individual who makes a contribution to the IETF as part of an Internet-Draft or an RFC to disclose any known IPR that might relate to said contribution as soon as possible. An associated licensing declaration is not required but strongly encouraged. Licensing shall be on (F)RAND or RF basis.

4 LINKS BETWEEN SSOS

In September 2022 the consortiuminfo.org web site listed over 1,100 SSOs. While this figure is bound to change frequently, the order of magnitude of SSOs active in the ICT sector in one way or another is highly likely to remain at roughly this level for the foreseeable future. Many of these entities do not have or need any points of contact (because they are active in different, largely unrelated fields). However, links will exist between others. These links may take on various forms and may be established between two consortia, between a consortium and an SDO and between a consortium and some other entity, respectively. [29] Links between SSOs may serve several purposes. They support information exchange between SSOs, help to co-ordinate the work of different SSOs, to avoid duplication of work and, ultimately, the emergence of competing standards from different organisations. Overall, they improve interoperability. Figure 1 gives a (very incomplete) initial idea of the complexity of today's web of SSOs in the field of ICT. You will find the SDOs mostly active in the 'traditional' IT sector on the lower right-hand side, those working in telecommunications on the lower left hand side and consortia in the small box at the top. Especially the latter only shows some sample links; the reality is far more complex. Please also note that the links drawn may be of very different types (see below) and that additional links may exist between individual entities (WGs, TCs) of different SSOs.

[27] See also https://www.rfc-editor.org/rfc/rfc6410.html.
[28] It is not a requirement to attend meetings. But if you want to push a certain specification or approach it will be a good idea to attend at least some
[29] W3C, for instance, is in liaison with different DGs of the European Commission, with the EU's Joint Research Centre and its Multi-stakeholder Platform, OASIS with the OECD and the World Customs Organisation.

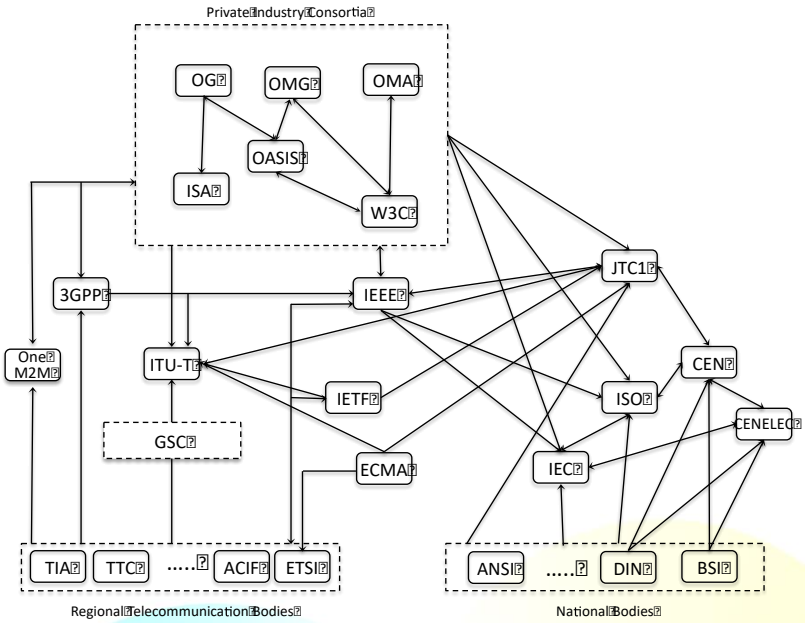

Fig.1. An incomplete impression of the web of SSOs

Different types of links may exist between individual SSOs. Two popular such types of links are introduced below.

- Publicly Available Specifications (PAS) – Consortium -> SDO

The PAS process has been designed to transpose specifications developed by consortia more rapidly into an international standard published by a recognised SDO. In the case of ISO/IEC/ JTC1 [30] , accepted PAS submissions will be considered as Final Draft Standards and are thus sent for country voting to become ISO/IEC standards. The idea behind the process is that specifications that have gone through the process of a 'Recognised PAS Submitter' are comparable to ISO Final Draft Standard. Obviously, this implies that the PAS Submitter's process needs to be comparable to ISO's process, in terms of e.g. transparency, consensus and due process. In addition, a PAS will be closely scrutinised by the SDO committee in charge. In 2021, the list of Recognised PAS Submitters comprised 13 consortia, including e.g. the W3C, [31] The Open Group, OASIS (Organization for Advancement of Structured Information Standards) and the OMG (Object Management Group). A PAS published as a standard will subsequently be maintained (and possibly developed further) by the SDO. From an SDO's point of view, the process allows the document to be available to the market faster than with the full, regular SDO process. From a consortium's point of view, a specification 'ennobled' by having been accepted as an (ISO) standard increases its legitimacy and may increase its scope of application (see e.g. [Kanevskaia, 2020]).

[30] Other SDOs, like e.g. ETSI, have a similar procedure in place.
[31] For some more information about the W3C's application for PAS submitter status see https://www.w3.org/2010/03/w3c-pas-submission.html.

- Liaison (possibly different categories) – consortium <-> consortium; consortium <-> SDO

Liaisons are arguably the most prominent type of links between SSOs. The term refers to the co-ordination of activities between two (or more) organisations. The mechanisms applied may differ and include e.g. an individual from organisation A participating in a Working Group (WG) of organisation B, the exchange of documents between two SSOs or co-ordinated activities. The W3C, for instance, distinguishes between 'Simple Liaisons' (which shall help both parties to gain a better understanding of their respective activities and identify potential joint activities) and 'Formal Agreements for Joint Work' (which requires an extensive review process and, eventually, a signed Memorandum of Understanding (MoU)). [32] ISO distinguishes between liaisons at the technical committee/subcommittee level (Category A and B liaisons) and at the WG level (JTC1: Category C liaisons; ISO: Category D), each of which has its own distinct requirements and provisions. [33] ISO A-Liaisons have the right to 'Fast-Track' their specifications, i.e. to submit them for voting as Draft International Standard [34] without any further review. The W3C's liaisons with ISO, for example, are typically at WG level (categories C & D), OASIS is always (in 11 cases) a category A liaison and the OMG's liaisons are a mix. [35]

5 DIFFERENT REGIONAL PERCEPTIONS OF CONSORTIA

The legal boundary conditions differ significantly between the EU and the US. In the EU, the European Standardisation System (ESS) comprises the three European Standardisation Organisations (ESOs; CEN, CENELEC, ETSI) and the various National Standards Organizations (NSOs). In addition, standards developed by ISO, IEC and ITU (which maintain close co-operations with their European counterparts) are recognised in the EU. From a policy point of view, consortia and their standards do not play any role worth mentioning. [36] The one exception is the ICT sector. Here, the importance of consortia and their work has been realised, albeit only to a limited extent. In practice, specifications developed by consortia (or indeed by organisations others than those of the ESS and ISO, IEC and ITU) do not play a major role, really.

[32] See https://www.w3.org/2001/11/StdLiaison.
[33] See https://www.iso.org/sites/directives/current/consolidated/index.xhtml#_idTextAnchor115.
[34] As an aside: Liaisons may have a potentially detrimental side effect. In 2005, Microsoft submitted its OOXML specification for ECMA (not for ISO). At that time, OASIS had already approved a functionally very similar standard, ODF (Open Document Format), work on which had started in 2002. This was submitted via the PAS process for JTC1 in September 2005, which meant a close scrutinising of the submission by ISO. During the ECMA process the original OOXML specification grew from roughly 1,900 to about 6,000 pages. ECMA submitted the specification as Class-A-Liaison via the Fast Track procedure in December 2006. The submission attracted more than 1,000 comments, led to accusations of attempts at bribery and criticism of the changes to the JTC1 procedures during the process (like comments grouped for 'block-voting') (see e.g. [Egyedi & Koppenhol, 2010]).
[35] This suggests a closer connection between OASIS and ISO, W3C generally appears to be more of an observer (perhaps focussing more on their PAS-submitter status) and OMG seems to look closely how and where to bets represent its own interests. Both the OMG and OASIS are also PAS submitters to ISO.
[36] CEN and CENELEC are in liaison with a few consortia outside the ICT sector, see https://atelier-digital.be/CENCENELEC/Report2021/0001.html.

Close links between standards, public procurement and innovation have been widely recognised (see e.g. [Blind, 2009]). Specifically, public procurement may serve as a tool to promote standards and standardisation (and thus innovation; see e.g. [Blind, 2017]). In Europe, however, this effect had initially been limited to formal (European) standards (see [EU, 2012] and e.g. [Apostol, 2010] for a discussion). EU [2012] also describes a (fairly complex) process that should be deployed to identify which consortium specifications might be eligible for referencing in public procurement (and thus become far more relevant in practice). The major criteria here include the specification's market acceptance, no conflict with European standards and a standardisation process that meets the WTO-TBT requirements [WTO, 2019]. [37]

Two quotes from official EU documents quite nicely highlight the official position towards consortia. Regulation (EU) No 1025/2012 [EU, 2012, p.12-13] states that "… the Union should encourage contact between European standardisation organisations and private forums and consortia, while maintaining the primacy of European standardisation". Especially the last part is telling.

More recently, the new European standardisation strategy [EU, 2022, p.5-6] maintains that "The EU and its Member States must promote a more strategic approach to international standardisation activities, namely in …. other relevant global partnerships, fora and consortia, in order to ensure the EU's global competitiveness, security and open strategic autonomy, as well as the ability of the EU to promote its values". Basically, this proposes to deploy non-European organisation to foster EU interests. Another very interesting aspect here is the sample list of fora and consortia given in a footnote. This list includes 3GPP, OneM2M, IETF, IEEE, W3C, OASIS, ECMA International. And this leads us to a closer look at the US standardisation system, where all these organisations would be considered as SDOs.

The ESS clearly follows a top-down approach (national governments and the EU have created – and are co-funding – the NSOs and the ESOs, respectively). In contrast, the US system favours a bottom-up approach. Its perhaps most important characteristic may be referred to as 'Decentralised Self-Government' [Ernst, 2013]. Basically, it comprises a huge variety of entities that develop standards. To do so, a pre-requisite is an entity's accreditation by the American National Standards Institute (ANSI). ANSI is also the US' representative to ISO and IEC.

ANSI's accreditation criteria are pretty straightforward and comparable to the WTO-TBT requirements. An applicant needs to demonstrate, for example, that its procedures follow due process, that its "standards development process shall not be dominated by any single interest category, individual or organisation", that decisions shall be made by consensus and that essential IPR shall be licensed on (F)RAND or RF basis. [38] In September 2022, almost 300 entities meet these criteria and are listed as ANSI-Accredited Standards

[37] A list of technical specification that meet these requirements (according tot he Eurpean Commission) may be found at https://single-market-economy.ec.europa.eu/single-market/european-standards/ict-standardisation/ict-technical-specifications_en.

[38] A full description of ANSI's requirements may be found at https://www.ansi.org/american-national-standards/ans-introduction/essential-requirements.

Developers. [39] Mainly, these organisations set standards for use within their own industries. However, some of the standards they develop are subsequently adopted by ANSI as American National Standards.

As mentioned above, the catch here is that almost all ANSI-Accredited Standards Developers would be considered as consortia in Europe. In the US, they are perceived as NSOs. And, of course, their respective legal status differs between the two regions, which may well have undesirable consequences (see the discussion on the ESS above).

[39] A list of these entities, along with descriptions of their respective activities may be found at https://share.ansi.org/Shared%20Documents/Standards%20Activities/American%20National%20Standards/ANSI%20Accredited%20Standards%20Developers/SEPT2022ASD.pdf.

SUMMARY

The discussion above (and in Module 1) will hopefully have shown that something like a perfect standards setting process is highly unlikely to ever surface. Today, processes between SSOs may differ quite considerably, and each one has its particular strengths and weaknesses. For instance, 'speed' does not come for free; it may lead to processes that may, for example, sacrifice a reasonable level of consensus for it or may be hijacked by personal or corporate interests. Co-ordination of SSOs working on similar (or virtually identical) technologies or on systems that depend on each other remains to be an issue. The wide range of co-ordination mechanisms that is available today helps, bit it also serves to make the standards setting environment more complex. A problem that persists is Europe until today is the perception of privately run standards consortia as being inferior to the formal ESO, in terms of e.g. processes, legitimacy of the output and inclusiveness. While this may be correct on paper, in practice these distinctions become increasingly blurred. [40]

[40] The new EU Standardisation Strategy [EU, 2022] highlights the importance of having all stakeholders adequately represented in the standardisation process. In practice, SMEs and societal stakeholders remain being drastically under-represented. This is particularly worrying in the field of smart systems standardisation. The societal, environmental, legal and ethical issues of such systems are far from being clear, but hardly any efforts are being made to address them during one of the earliest stages of their development – standardisation (see e.g. [Jakobs, 2021]).

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