3 The Standards Ecosystem

3 The standards ecosystem

- The learning objectives of this section are:
  - To **understand and apply** the different **criteria** for establishing the classifications of **organizations and documents**, especially in the **ICT** arena.
  - To be able to **describe** the role in **ICT standardization of SDOs, recognised SDOs, and industrial consortia**, as well as their **interplay**.
  - To **identify** the **characteristics** of **formal and de facto standardization**, and to be aware of the processes through which de **facto standards are adopted by SDOs**.
  - To **identify** the main **categories of ICT standards and documents**, including which type of documents may be produced by each organisation, and to get familiar with the **naming conventions**.
  - To **understand** the differences among **National, Regional and International** organizations, the benefits derived of their **coordination**, and to be aware of the main **agreements** and procedures supporting it.
  - To **understand** why **standards** are usually **referenced by legislation**, and the need to issue **standardization requests** when a societal need is identified in a specific area.

3.1 Introduction

- The standardization **landscape is rich and complex**, because of the variety in standard development organizations (SDOs) and the documents they produce…
- The current chapter aims to provide some **basic concepts** to help readers **find their way** around the **standards ecosystem**.

3.2 Standards organizations
Formal standardization and SDOs (1/2)

- **Formal standardization** is based on **well-defined processes**, open to any individual or organization, and its results are produced in consensus with all interested parties.
- **It is inspired** mainly by the six principles of the **Technical Barriers to Trade (TBT)** Committee of the Word Trade Organisation (**WTO**): Transparency, Openness, Impartiality and consensus, Effectiveness and relevance, Coherence, and Development dimension.
- Organizations doing formal standardization are known as **Standards Development Organizations (SDOs)**. They do it in response to specific industry or societal needs.

3.2 Standards organisations
Formal standardization and SDOs (2/2)

- Some SDOs are officially **recognized by regulatory systems** as providers of standards. They are known as **recognized SDOs**.
- Sometimes, the expression **"de jure" standards** is used as an equivalent to **SDO standards**.
  - However, "de jure" fits only in the case of a subset of these standards, i.e., those that are used by legislation.

3.2 Standards organizations
Recognized SDOs in the European Union

- **Regulation (EU) No 1025/2012** of the European Parliament and of the Council:
  - **Designates CEN, CENELEC and ETSI** as the **European Standardization Organizations (ESOs).**
  - The aims set out in the EU treaties are achieved by several types of legal act: regulations, directives, decisions and opinions.
  - Example: Directive (EU) 2016/2102 on the accessibility of the websites and mobile applications of public sector bodies makes references to the CEN/CENELEC/ETSI standard EN 301 549.

3.2 Standards organizations
SDOs that are not officially recognized

- Besides the officially recognized SDOs, there are **well respected and long existing SDOs**,
  - like **W3C, IETF, OASIS, IEEE, OMG.**
- These are **not officially recognized** by the authorities, **but they have well established procedures** to ensure the quality of their standards.

3.2 Standards organizations
SDOs that are not officially recognized. Examples

- W3C's Web Content Accessibility Guidelines (WCAG) standard is explicitly referenced by CEN/CENELEC/ETSI standard EN 301 549 on ICT accessibility requirements.
- **IEEE** counts on a specific board (the IEEE-SA Standards Board) for coordinating the development and revision of IEEE standards:
  - This includes approving the initiation of standards projects and reviewing them for consensus, due process, openness, and balance.
- **IEEE 802** is just an example of an IEEE family of standards with a significant impact in society.
  - 802 standards deal with local area networks and metropolitan area networks.

3.2 Standards organizations
Public and private organizations

- Public organizations have been normally created by treaties. This is the case of ITU, which is an agency of the United Nations

- Other standards organizations are private, such as ISO, OMG, ETSI or ANSI.

3.2 Standards organizations
De facto standards (1/3)

- These **ICT-related items** have in common that they have had a **huge impact** in society…
  - **PDF**: a document format created by Adobe Systems.
  - **HTML**: a language for describing the structure of Web pages. It was originally created by Tim Berners-Lee, and it is currently published and maintained by W3C.
  - **Microsoft Windows**: an operating system that became an industry standard, and so did its specifications (e.g. the Microsoft Web Services Security specification, WS-Security).
- … They are called "**de facto standards**". They are **common practices adopted by the market**, which are not the result of any standardization process.

3.2 Standards organizations
De facto standards (2/3)

- A **de facto standard** is a **custom or convention** that has achieved a **dominant position** by public acceptance or market forces, and that usually has the attractive characteristic of having been **validated by market processes** (Maxwell 2006)
- Abernathy and Utterback (1978) introduced the '**dominant design**' concept.
  - Dominant designs may not be better than other designs; they simply incorporate a set of key features that sometimes emerge due to technological path- dependence and not necessarily strict customer preferences.

3.2 Standards organizations
De facto standards (3/3)

- De facto standards may be adopted as formal standards by recognized SDOs:
  - ISO/IEC 15445:2000 Information technology -- Document description and processing languages -- HyperText Markup Language (HTML).
  - ISO 32000-1:2008 Document management -- Portable document format -- Part 1: PDF.

3.2 Standards organizations
De facto standards vs SDO standards (Blind 2008)

SDO STANDARD	DE FACTO STANDARD
▪ Developed in SDOs ▪ Open and consensus-oriented with the option of opposition, which may sometimes lead to lengthy decision procedures ▪ Clear and transparent participation and voting rules	▪ Dominant design through a standard wars or natural selection. E.g., a company achieves a dominant position by public acceptance or market forces ▪ Standardization process with restricted access; homogeneous environment may allow fast decisions ▪ Direct participation of company alliances (e.g. consortia) and individual companies

3.2 Standards organizations
Industrial consortia

- **Some standards organizations** were created as **industrial consortia**, e.g.:
  - The Home Gateway Initiative (HGI) developed a smart home architecture that enables applications to connect with devices on any home network interface.
  - The EnOcean Alliance created a wireless standard to develop self-powered wireless monitoring and control systems for sustainable buildings as well as energy harvesting solutions.
- In the ICT context of rapid developments, consortia benefit from a **lighter process** and a **lower level of consensus** of document approval than SDO standards go through.
- Documents developed by a **single company** (e.g. Windows as as Microsoft standard) **do not fall into this category**.

3.2 Standards organizations
Industrial consortia interplay with SDOs: The PAS process (1/3)

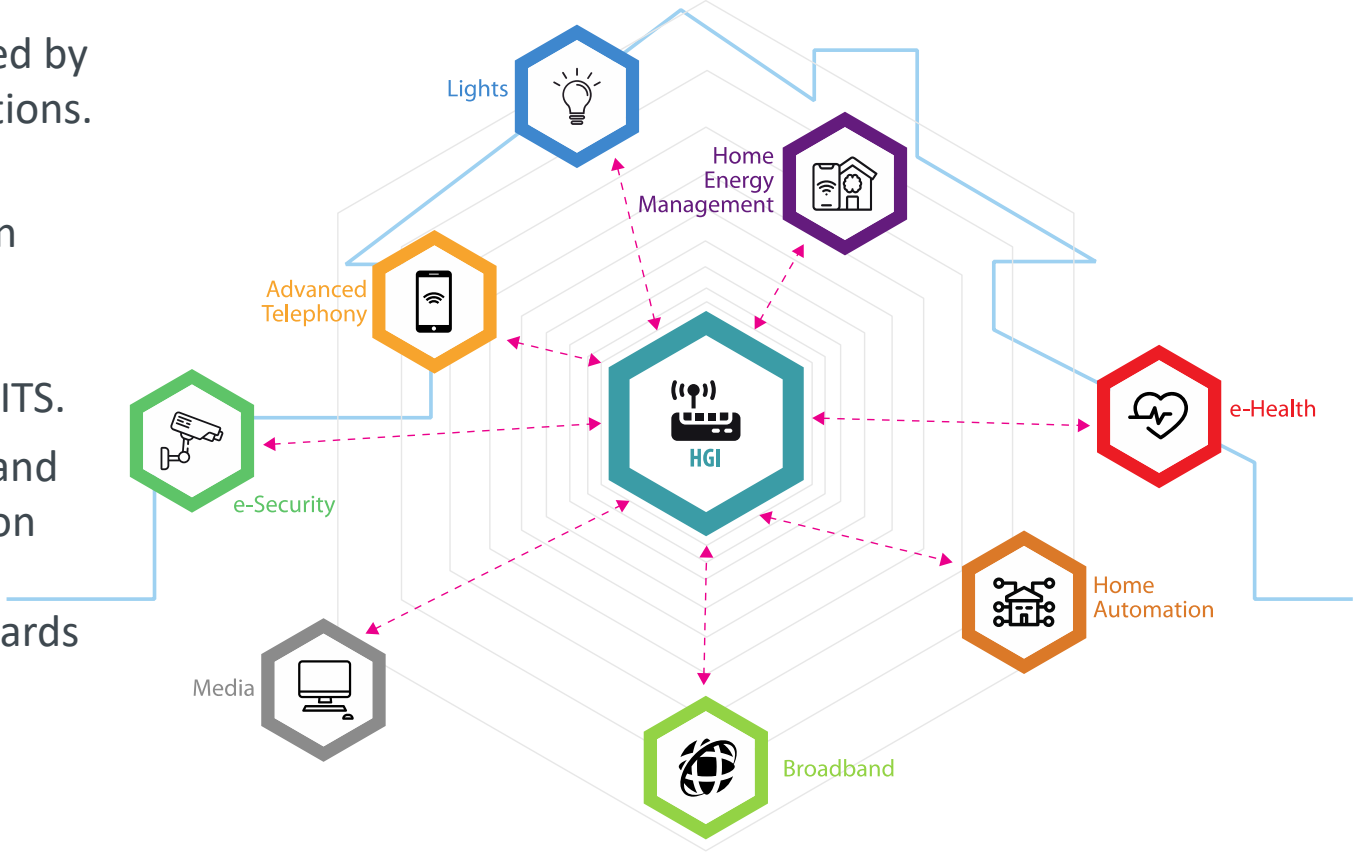
- What is the **Publicly Available Specification** (PAS) process?
  - A means to transpose a specification more rapidly into an international standard published by a recognized SDO.
- The document to be published in a **PAS process** is:
  - A publication already developed at a quasi-final stage.
  - Approved by consensus at the consortium level.
- The **PAS process involves:**
  - Benefiting from the **SDO's reputation** as a provider of standards for global use.
  - Subsequent **maintenance and possible evolution** by the SDO that applied the procedure.
  - **Faster availability to the market** and in a lighter way than with the full regular SDO process.

3.2 Standards organizations
Industrial consortia interplay with SDOs: The PAS process (2/3)

- **ISO PAS process**
  - EnOcean Alliance develops specifications for sustainable buildings
  - Wireless Short-Packet (WSP) protocol developed by EnOcean ratified as standard ISO/IEC 14543-3-10.
  - EnOcean Alliance complements this standard with dedicated equipment and generic profiles

3.2 Standards organizations
Industrial consortia interplay with SDOs: The PAS process (3/3)

- **ETSI PAS process:**
  - HGI specifications were transposed by TC SmartM2M into ETSI specifications.
  - The Car Connectivity Consortium (CCC) defined the MirrorLink open standard for smartphone-car connectivity that has been adopted by Technical Committee ITS.
  - O-RAN's Fronthaul Control, User and Synchronization Plane Specification has been published as an ETSI specification by the Mobile Standards Group Technical Committee



3.2 Standards organizations
Industrial consortia interplay with SDOs: extension of standards

- SDO standards may be **extended by industry** to create **test suite specifications** and **promote** the involved technology.
  - The Wi-Fi Test Suite was designed by the Wi-Fi Alliance to support the certification of devices with the IEEE 802.11 standard.
  - The Global System for Mobile Communications Association (GSMA) writes guidelines and specifications to help implementers use the ETSI standards developed by 3GPP.

3.3 Types of documents produced by SDOs

- There are **different types of documents** produced by SDOs.
- **Different organizations** may produce different types of **documents.**
- The **definition/purpose** of each type of document may differ across organizations.
- Different types of documents may differ in:
  - Their **scope** and addressed **stakeholders.**
  - The **process** leading to their approval/publication.

3.3 Types of documents produced by SDOs
Normative and informative documents (Hatto, 2013)

- **Informative** documents, **do not contain any requirements** and it is therefore not possible for compliance claims to be certified.
- **Normative** documents **contain requirements** that must be met in order to claim compliance with the standard.
  - **Requirements** in a standard are usually worded with the term "**shall**".
  - **Recommendations** in a standard are usually worded with the term "**should**".
  - In order to avoid confusion or contradiction, **informative elements** (even in normative documents) **cannot contain requirements.**

3.3 Types of documents produced by SDOs
Normative documents (1/2)

- **Standard**:
  - A document containing requirements or recommendations that have reached **wide consensus**.
  - Normally, approval of standards requires to go through the **most comprehensive and rigorous procedures** of organizations publishing them.
  - E.g., ISO/IEC 27001 Information technology — Security techniques — Information security management systems — Requirements.

3.3 Types of documents produced by SDOs
Normative documents (2/2)

- **Specification**:
  - A document **needed by industry** in the short term concerning a **technical aspect that is still under development**, or where it is believed that there will be a future, but not immediate, **possibility of agreement on a standard.**
  - E.g., ETSI TS 103 645 CYBER; Cyber Security for Consumer Internet of Things.

3.3 Types of documents produced by SDOs
Informative documents

- **Technical report**:
  - A document with **explanatory material** about a topic.
  - E.g., ETSI TR 103 234 Power Line Telecommunications; Powerline recommendations for very high bitrate services.
- **Guide**:
  - Documents used by standards organizations for**providing advice on how to handle specific technical standardization activities**.
  - E.g., ISO/IEC Guide 71:2014 - Guide for addressing accessibility in standards, guides standardizers on how to address accessibility when either producing new standards or revising existing ones.
  - E.g., CEN-CENELEC and ISO-IEC Guide 17 – Guides standardizers to take into account SME needs, e.g. making "simple and understandable" standards.

3.3 Types of documents produced by SDOs

- Some **documents are particular** to certain organizations:
  - ETSI Standard (ES).
  - CEN Workshop Agreement (CWA).
  - ISO Workshop Agreement (IWA).
  - ISO Publicly Available Specifications (PAS).

3.3 Classification of ICT standardization documents (modified from de Vries, 2006 and Hatto, 2013)

- **Terminology** standards:
  - ITU-T E.800 Definitions of terms related to the quality of service.
  - ISO/IEC 17788:2014 Information technology — Cloud computing — Overview and vocabulary.

- **Measurements or test** methods
  - IEEE Std 299-2006 IEEE Standard Method for Measuring the Effectiveness of Electromagnetic Shielding Enclosures.
  - ETSI ES 203 228 V1.3.1 (2020) Environmental Engineering (EE); Assessment of mobile network energy efficiency.

3.3 Classification of ICT standardization documents (modified from de Vries, 2006 and Hatto, 2013)

- **Specifications**:
  - ISO/IEC 10918-1:1994 Information technology — Digital compression and coding of continuous-tone still images: Requirements and guidelines.
  - CLC/TS 50134-9 Alarm systems - Social alarm systems - Part 9: IP Communications Protocol.
- **System architecture**:
  - ISO/IEC/IEEE 42010:2011 Systems and software engineering — Architecture description.
- **Reference models:**
  - ISO/IEC 7498:1994 Preview. Information technology — Open Systems Interconnection.
  - W3C Recommendation 15 December 2004 — the Architecture of the World Wide Web, Volume One.

3.3 Classification of ICT standardization documents (modified from de Vries, 2006 and Hatto, 2013)

- **Software and networking**:
  - Computer software, including programming languages (e.g. C++ is published as ISO/IEC 14882).
  - Application Programming Interfaces (API) (e.g. ISO 17267 on API for navigation systems for intelligent transport systems).
  - Communication protocols (e.g. Wifi IEEE standards).
  - File information and formats (e.g. RFC 8259 JSON).

- **Quality assurance**:
  - IEEE 730-2014 — Software Quality Assurance Processes.

3.3 Classification of ICT standardization documents

- The above classification is **not strict!** One document may be allocated to more than one category, for example:
  - Requirements standards may include testing procedures to assess whether the requirements are met.
  - Documents where systems or reference models are described may include the involved vocabulary.
  - Software standards may include requirements.

3.3 Classification of ICT standardization documents
Vertical and horizontal standards (de Vries,2006)

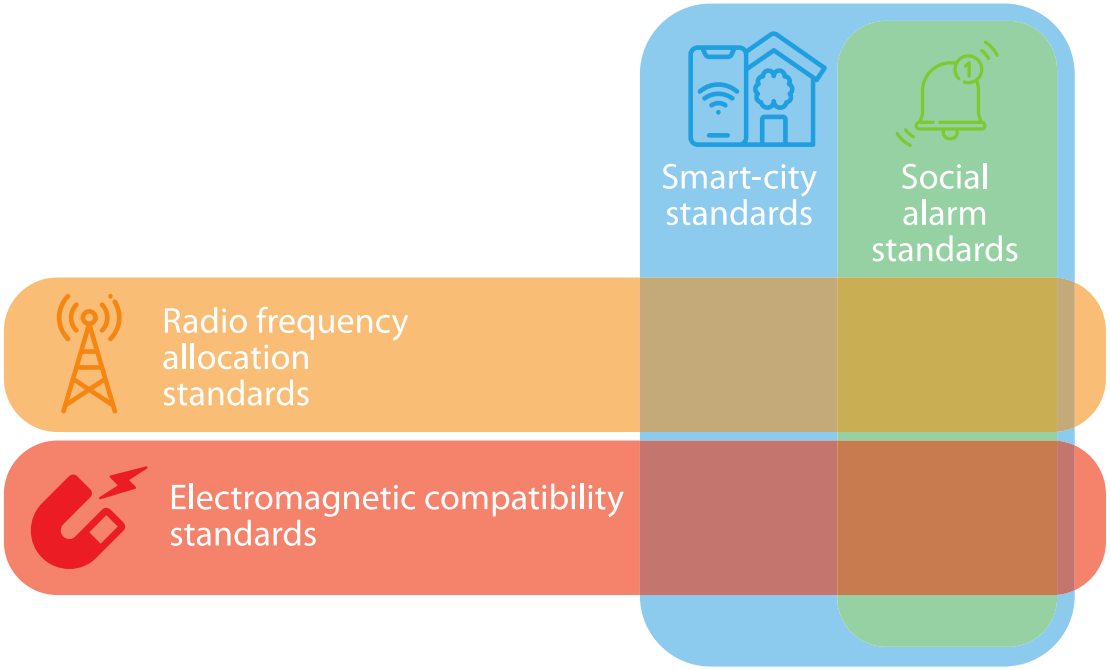
- **Horizontal** standards are applicable across multiple industries or entities:
  - E.g., the Electromagnetic compatibility (EMC) standards which are applicable in all electrical/electronic equipment, like the EN 61000 family of EMC standards.

- **Vertical** standards apply to a particular industry or entity
  - E.g. the CENELEC family of standards about social alarm systems (EN 50134) includes direct or indirect references to the EN 61000 standards.

- **Vertical** standards normally **reference horizontal** standards.
  - For instance, standards about mobile phones or social care alarm devices reference EMC standards.

3.3 Classification of ICT standardization documents

Vertical and horizontal standards



3.3 Naming conventions for standardization documents
Information provided by a document's name (1/2)

- The **SDO** (or SDOs, in case it is a joint publication) that has published it.
- **Other SDOs** that might have **adopted** the standard after it was originally published.
- The **type of document**, e.g., whether it is an International, European or National standard, a specification, technical report, etc.
- Whether the document belongs to a **family** of standards.

3.3 Naming conventions for standardization documents
Information provided by a document's name (2/2)

- Whether it is a **harmonised** standard.
- The **version** number of the standard, indicating whether it is a draft or final version, as well as informing of major, technical or editorial changes.
- The **year** of publication of the document.
- The **title** of the standard.

3.3 Naming conventions for standardization documents
Examples (1/3)

- EN 45502-2-3:2010 Active implantable medical devices - Part 2-3: Particular requirements for cochlear and auditory brainstem implant systems
  - The “EN” prefix indicates that it is a European Standard.
  - The code of the standard “45502-2-3” indicates that it includes the 2nd part and the 3rd sup-part documents of a standard family (“45502”).
  - It was published in 2010.
  - The family name is “Active implantable medical devices”.
  - The title of the standard itself is “Part 2-3: Particular requirements for cochlear and auditory brainstem implant systems”

3.3 Naming conventions for standardization documents Examples (2/3)

- ETSI TS 102 412 V12.1.0 (2019-06) "Smart Cards; Smart Card Platform Requirements Stage 1" (Release 12)
  - The “ETSI” prefix indicates that this standard has been published by ETSI.
  - The “TS” prefix indicates that it is a Technical Specification.
  - The code of the standard is 102 412.
  - This is the version 12.1.0 of the standard (which is confirmed by the “release 12” in the title). ETSI uses three numbers (x.y.z) to indicate its document versions. The first final version of a document will be Version v1.0.0. Subsequent final documents will increase the first number "1.x.x" of the version number (1.a.b, 2.c.d, etc.). In these examples, a and c indicate the corresponding "technical" version numbers, while b and d indicate the corresponding "editorial" version numbers.
  - It was published in June, 2019.
  - The document is part of the “Smart cards” family of standards.

3.3 Naming conventions for standardization documents
Examples (3/3)

- DS/EN ISO/IEC 27002:2017 Information technology. Security techniques. Code of practice for information security controls
  - The “DS/EN ISO/IEC” prefix indicates that this standard was first published by ISO/IEC
  - Then adopted as a European Standard (EN), and then as a Danish standard (DS)

3.4 National, Regional and International standardization
Geographical scope of organizations and standards (1/2)

- Recognized SDOs have **national**, **regional or international geographical** scope, and so do the formal standards they produce:
  - ISO, IEC and ITU are official **international** standard organizations, with a worldwide scope.
  - CEN, CENELEC and ETSI are officially recognized as **European** bodies for standardization.
  - PASC is a regional SDO in the **Pacific** area.
  - DIN, UNE, ANSI, and BIS are national SDOs in, respectively, **Germany, Spain, USA, and India.**

3.4 National, Regional and International standardization
Geographical scope of organizations and standards (2/2)

Standardization Structures:

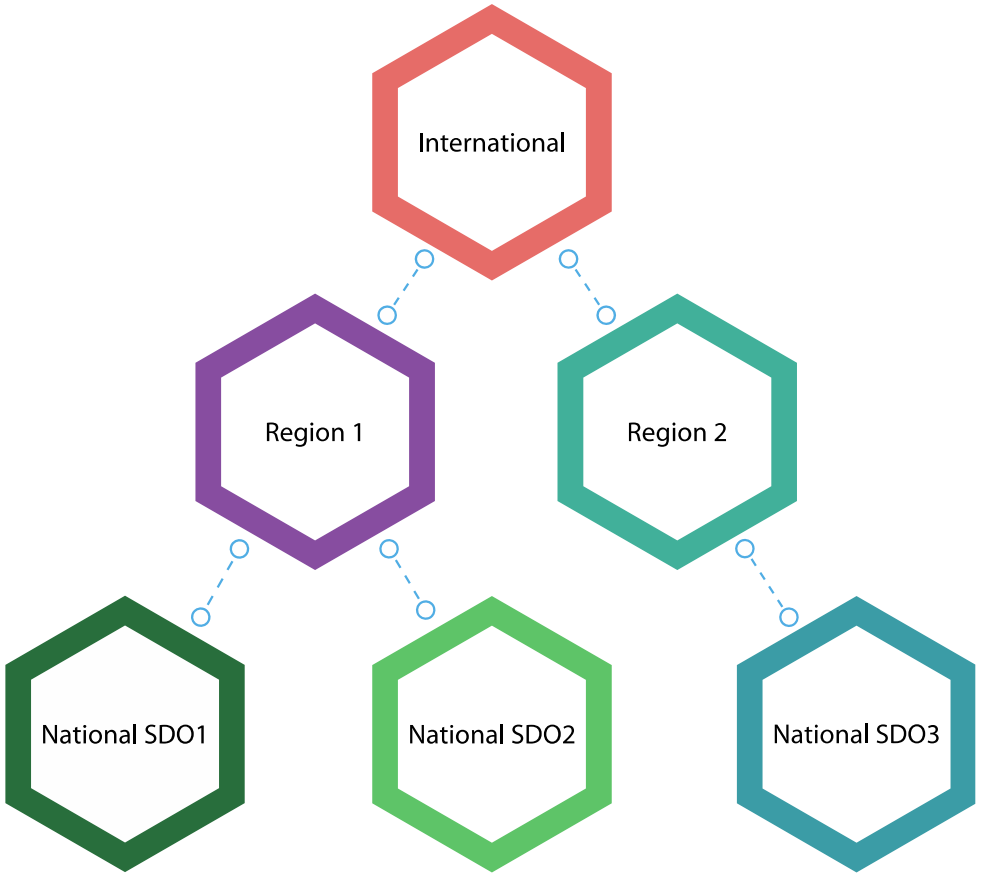
3.4 National, Regional and International standardization

Do standardization practices fit 100% that schema?

- ETSI publishes standards that are adopted globally, such as the GSM family of standards.
- PASC does not produce standards, but it supports the participation of the region's SDOs in the ISO and IEC activities.
- In the USA there are approx. 200 organisations producing American National Standards (ANS). These are SDOs, accredited by ANSI, the only National SDO.
  - ANSI is the only official representative of the United States at ISO and IEC.

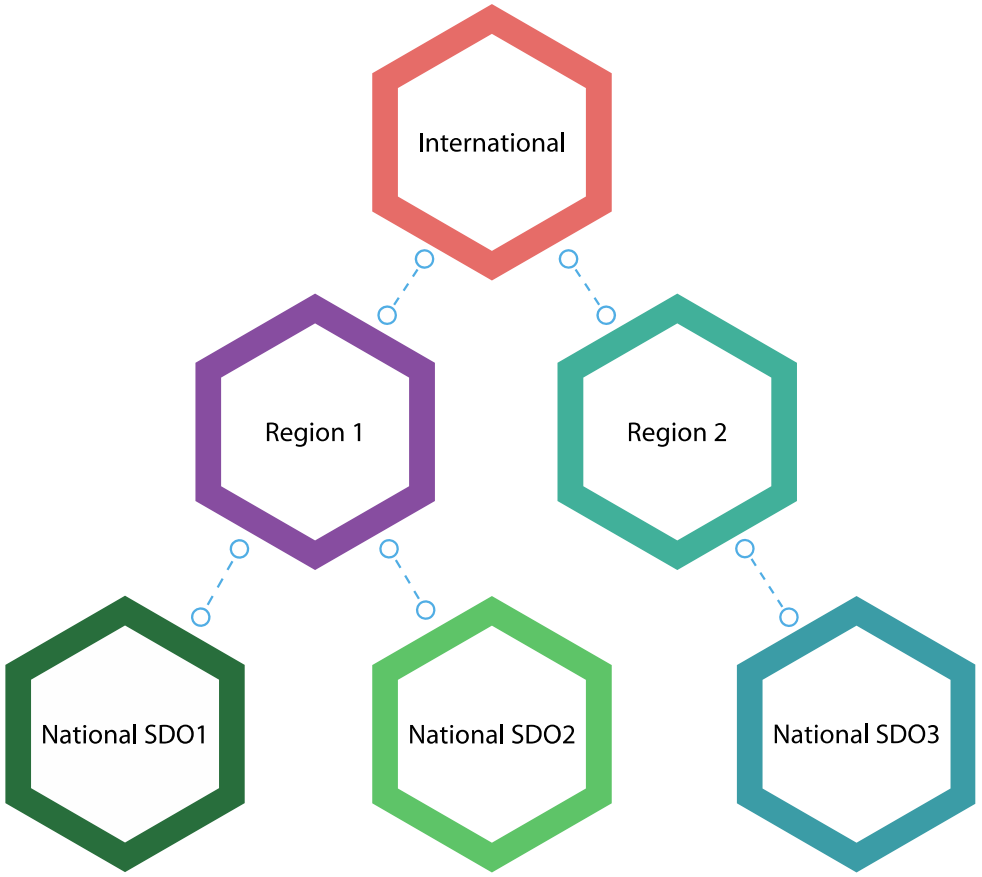
3.4 National, Regional and International standardization
Cooperation and coordination (1/2)

- The objective is to ensure that organizations make **the best use of their resources:**
  - to support **information exchange**,
  - to increase the **transparency** of procedures,
  - and to **reduce the possibility of duplicating** work unnecessarily at a national, regional or international level.



3.4 National, Regional and International standardization
Cooperation and coordination (2/2)

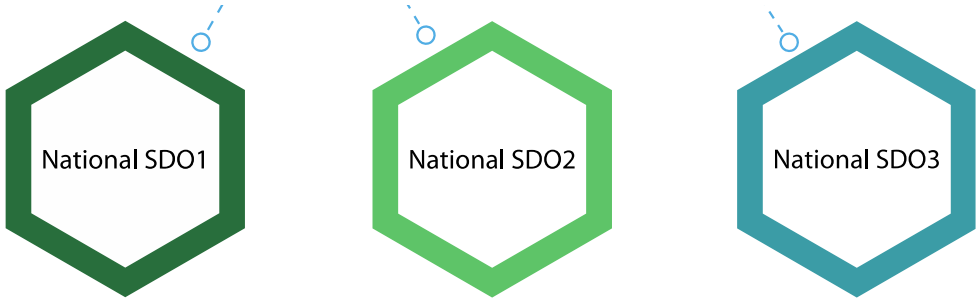
- **International** standardization usually takes **precedence** over **regional** standardization, which again takes precedence over **national** standardization.
- Ideally, approved **international standards** are simultaneously **adopted as regional** standards, and then as **national standards** in region's countries.



3.4 National, Regional and International standardization

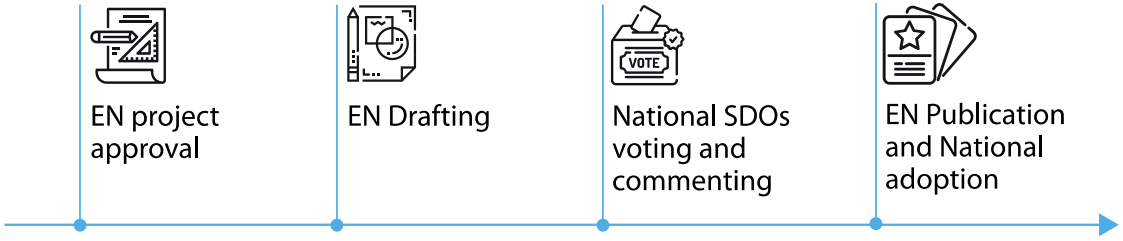
Cooperation and coordination: NSOs

- National SDOs (NSOs) **represent** their own countries' standardization activities in regional and international SDOs.
- They support national experts to **track regional and international standards**,
- They **adopt international standards** as national standards.
- There is only one NSO per country.



3.4 National, Regional and International standardization
Cooperation and coordination in Europe

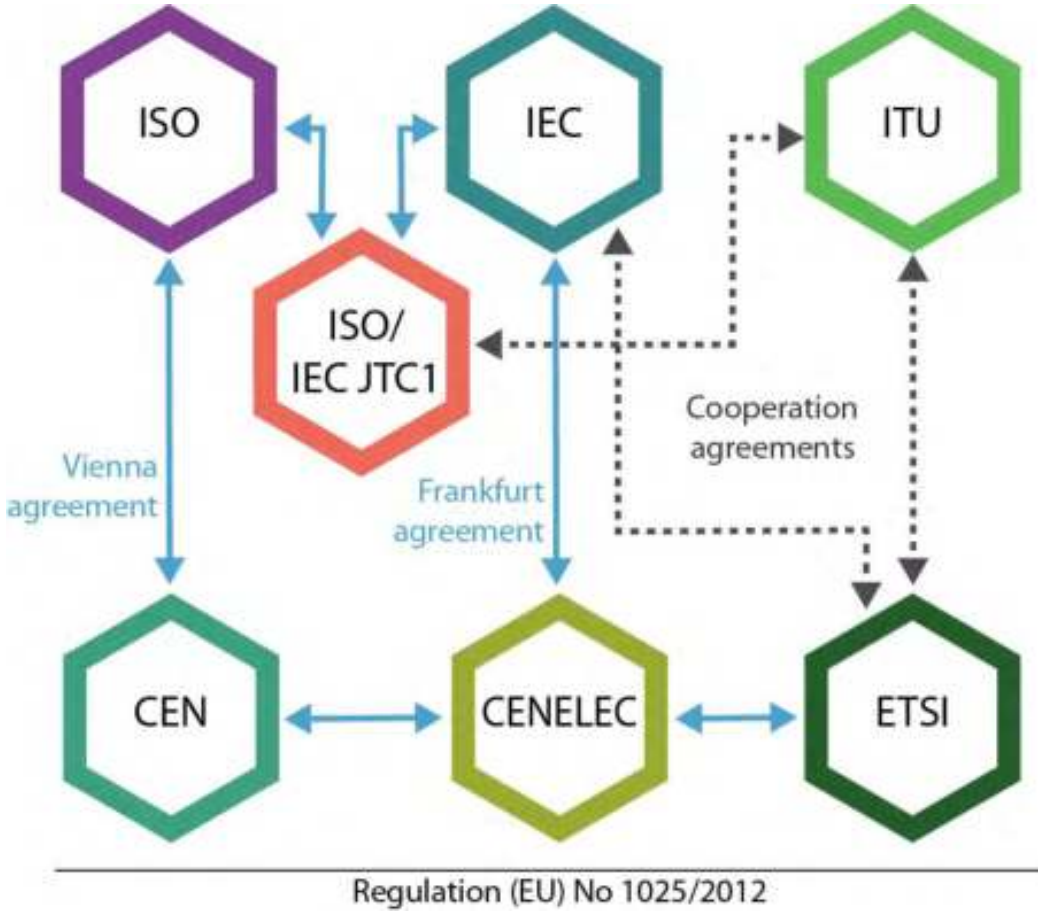
- Coordination among European and National standardization activities
  - **European** and their **national** member SDOs **publish periodically their work programmes** and the list of **approved/adopted** standards
  - "**Standstill**": obligation for the National SDOs not to take any action, neither during the preparation of a European Standard (EN) nor after its approval
  - The generic **process of coordination between European and National** standardization can be described as follows: **project approval**, **drafting**, National SDO **voting and commenting**, EN **publication** and **National adoption**.



3.4 National, Regional and International standardization

Cooperation and coordination

- There are **cooperation and coordination** agreements between **European** and international SDOs
  (modified from Jakobs, 2008)



3.4 National, Regional and International standardization

The Vienna agreement between ISO and CEN

- The **Vienna agreement** provides rules and methods for the ISO-CEN collaboration.
- **ISO standards** are **automatically approved as European Standards**, and they are **adopted as national** standards by **each CEN national SDO** member, e.g.
  - ISO 9001:2015 Quality management systems– Requirements.
  - EN ISO 9001:2015 (European standard).
  - UNE-EN 9001:2015 (Spanish standard).
- **30% of CEN standards** are developed under the **Vienna agreement**.
- The agreement **recognizes** the particularities of the **single European market**, and foresees the participation of ISO members in CEN standards urgently required in EU.

3.4 National, Regional and International standardization
Frankfurt Agreement between IEC and CENELEC

- The **Frankfurt agreement** provides rules for the collaboration between IEC-CENELEC:
  - Around **80%** of all European electrotechnical standards are identical to or based on IEC International Standards.
  - New electrical **standards projects are jointly planned** between CENELEC and IEC, and where possible most are carried out at international level.
    - E.g., IEC 62236-3-2:2008 Railway applications – Electromagnetic compatibility – Part 3-2: Rolling stock – Apparatus is based on EN 50121-3-2:2006

3.4 National, Regional and International standardization

Guidance for the regional/national adoption of international standards

- **ISO/IEC Guide 21** provides guidance on Regional or National adoption of International Standards and other International Deliverables:
  - It provides methods for the **adoption of International** Standards (and other international deliverables) **as regional or national standards**
  - It defines a system for **indicating the degree of correspondence** between International Standards and their national or regional adoptions

3.4 National, Regional and International standardization

Other examples of coordination and cooperation

- **ISO and IEC** formed **ISO/IEC JTC 1** to avoid duplicative or possibly incompatible standards
- A guide contains a set of procedures for cooperation between **ITU-T and ISO/IEC JTC 1**
- **ITU and ETSI** have established a Memorandum of Understanding (MoU)

3.4 National, Regional and International standardization
3GPP, an example of international coordination (1/2)

- The 3rd Generation Partnership Project (3GPP)
  - Includes organizational members from **North America, Asia and Europe.**
  - Provides them with a **stable environment** to produce reports and specifications about **mobile communication** technologies, a field in constant evolution.
  - SDOs participating in 3GPP **transpose an identical text of 3GPP** deliverables as the corresponding deliverables

3.4 National, Regional and International standardization
3GPP, an example of international coordination (2/2)

- Adoption of a 3GPP specification by ETSI:
  - There is a process through which a 3GPP specification text is adopted and published by ETSI.
  - When requested by the European Commission, the document may be adopted as a European Standard.

- Example:
  - 3GPP TS 23.401 version 14.7.0 Release 14, adopted as ETSI TS 123 401 V14.7.0

3.5 Standards supporting regulation, legislation, and policy making

- **Governments establish policies** through regulations, laws, and other instruments.
- When **implementing policies**, authorities are regularly required to **define technical specifications** to be complied with.
  Specifications may result from different processes:
  - **Developing** their own specifications.
  - **Using** the technical specifications contained in **existing standards**.
  - **Requesting new standards** to be developed for this purpose.

3.5 Standards supporting regulation, legislation, and policy making

Regulations referring to standards

- **Referencing standards** improves **efficacy and efficiency** in Public Administration.
  - It **avoids** the need of regulations having **to describe technical attributes**, such as requirements on performance, on testing limits, etc.
  - It **simplifies** their content and it **increases their common understanding**.

- **Regulations can reference standards** in several ways, including:
  - **by copying the technical specifications** or parts of the standards,
  - **by mentioning them implicitly or explicitly**, with the title and with/ without the date, and with **an optional, privileged or binding reference**.
- It is **recommended that regulations only refer** to the relevant standard and **avoid citing** parts from it.

3.5 Standards supporting regulation, legislation, and policy making
EU's Standardization requests (1/2)

- The European Commission invites the European Standardization Organizations (ESOs: CEN, CENELEC and ETSI) to produce formal standards through **Standardization Requests** (a.k.a. Standardization mandates)
- About a **fifth of all European standards** are developed following a standardization request from the European Commission to the European Standardization Organizations (ESOs).

3.5 Standards supporting regulation, legislation, and policy making
EU's Standardization requests (2/2)

- The EU **process** can be **summarized** as follows:
  - **Draft requests** are drawn up by the Commission **through a process of consultation** with a wide group of interested parties, including ESOs, EU countries, and social & industrial partners.
  - Before being formally sent to the ESOs, they are **submitted for a vote to the "Committee on Standards"**, defined according to the Regulation (EU) 1025/2012.
  - **The ESOs**, which are independent organizations, **have the right to refuse** a request, but this is **very unusual**.
  - The **standardization requests** issued by the European Commission are **available in a specific database**.

3.5 Standards supporting regulation, legislation, and policy making
EU's Standardization requests: Example

- In 2005 the European Commission sent a **standardization request**, called Mandate 376:
  - "To develop a standard that specifies the functional accessibility requirements for publicly procured ICT products and services, so that they can be used by citizens with and without disabilities".
- In 2015 the CEN/CENELEC/ETSI published **EN 301 549** "Accessibility requirements suitable for public procurement of ICT products and services in Europe".
- In 2016, the **Directive** (EU) 2016/2102 on the accessibility of the websites and mobile applications of public sector bodies was approved. It references EN 301 549:
  - "[..] content of websites that fulfils the relevant requirements of European standard EN 301 549 [..] shall be presumed to be in conformity with the accessibility requirements [..]".
- Later on, new standardization requests were issued for addressing uncovered accessibility aspects in the EN, which were relevant to the directive.

3.5 Standards supporting regulation, legislation, and policy making

EU's harmonized standards

- As per the Regulation (EU) 1025/2012, a **harmonized standard is a European standard** developed by a ESO, following a **standardization request**.
- They are developed for the purpose of **being referenced by regulation**.
- They are voluntary and imply the **presumption of conformity**: compliance with these standards is the recommended but not exclusive method to meet essential requirements.
- This process requires that the Harmonized Standards are **published in the Official Journal of the European Union (OJEU)**.

3.5 Standards supporting regulation, legislation, and policy making

EU's harmonized standards (1/4)

- **Harmonized standard EN 301 549** V3.2.1 (2021-03)
- In 2017 there was a **new request (M554**) to produce a new version of the EN 301 549 standard that would become a **harmonized European standard**.
  - That new version should address, among other things, uncovered aspects of the accessibility of mobile applications that are relevant to the Directive.
- As a response to M554, two versions of the harmonized standard have been published.
  - The most recent version is **EN 301 549 V3.2.1 (2021-03)**
  - It includes a table which maps the relevant provisions from the standard to the accessibility requirements set out in Article 4 of Directive (EU) 2016/2102

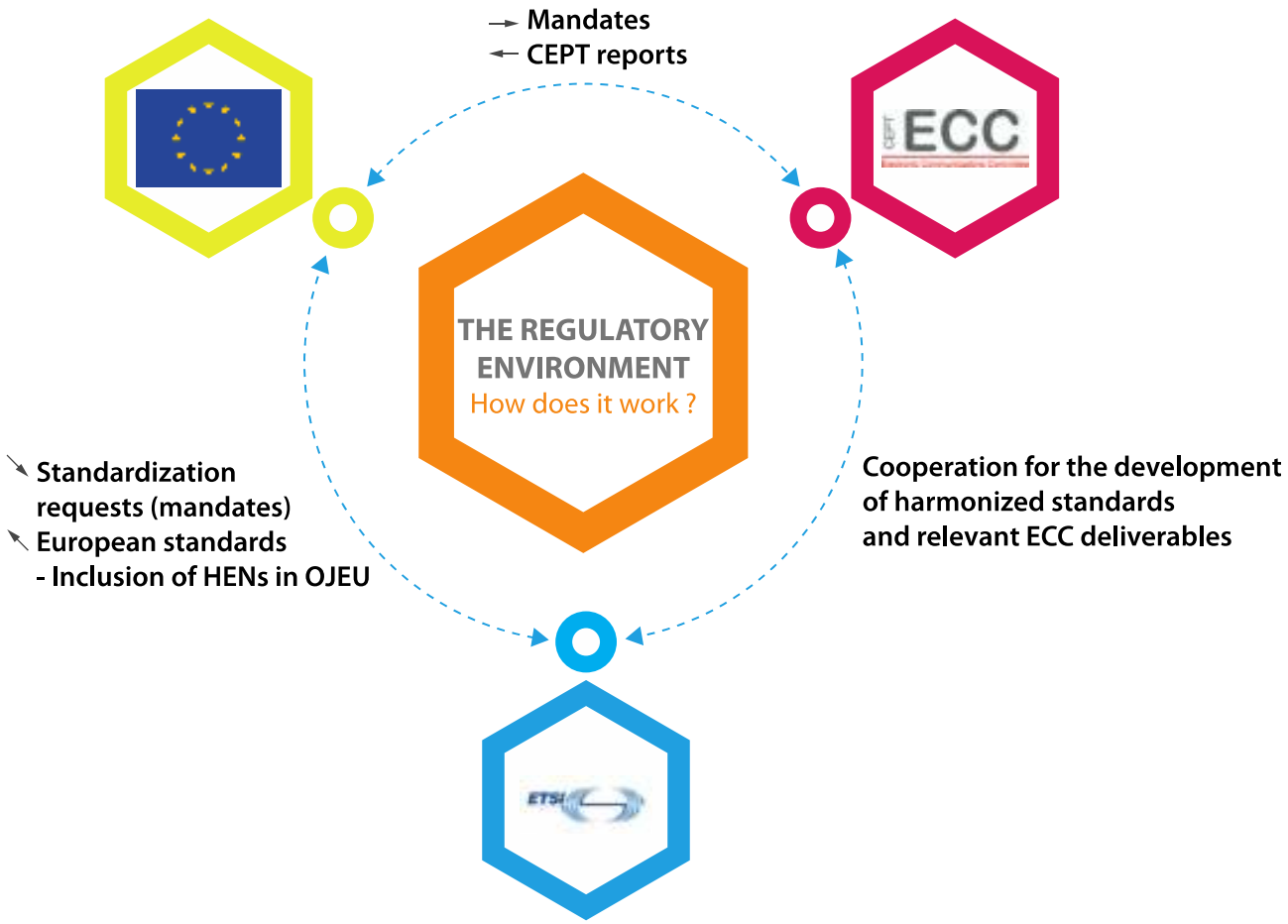
3.5 Standards supporting regulation, legislation, and policy making

EU's harmonized standards: Examples (2/4)

- Radio Equipment Directive (RED), applicable from 13 June 2016.
  - It associates three entities: the European Commission (**EC**), the Electronic Communications Committee (**ECC**) of the European Conference of Postal and Telecommunications Administrations (**CEPT**), and **ETSI** as an ESO.
  - Any provider that wants to place transmitting or receiving radio equipment on the European market and operate it by using the radio spectrum must meet the requirements of the RED.
  - Harmonized standards developed in line with the RED allow manufacturers to enter the market with a presumption of conformity.

3.5 Standards supporting regulation, legislation, and policy making

EU's harmonized standards: Examples (3/4)



3.5 Standards supporting regulation, legislation, and policy making

EU's harmonized standards (4/4)

- **CE marking**
  - Identifies a product as complying with the health and safety requirements contained in European legislation.
- **The requirements of the CE Marking process are as follows:**

  - Identify applicable directive(s).
  - Identify the harmonized standards concerned.
  - Verify the product's specific requirements.
  - Identify whether a conformity assessment by a notified body is necessary.
  - Test the product's conformity with the relevant requirements and, if necessary, have tests performed by a notified body.
  - Establish the required technical documentation.
  - Affix the CE marking and complete the Declaration of Conformity.

List of abbreviations: Chapter 3

- 3GPP: Third Generation Partnership Project
- AFNOR: Association Française de Normalisation (French Standards Association)
- ANS: American National Standard
- ANSI: American National Standards Institute
- API: Application Programming Interface
- ARIB: Association of Radio Industries and Businesses
- ATIS: Alliance for Telecommunications Industry Solutions
- BIS: Bureau of Indian Standards
- BS: British Standard
- BSI: British Standards Institution
- CCC: Car Connectivity Consortium
- CE (Marking): Conformité Européenne (European Conformity)
- CEN: Comité Européen de Normalisation (European Committee for Standardization)
- CENELEC: European Committee for Electrotechnical Standardization
- CEPT: Conférence Européenne des Postes et des Télécommunications

List of abbreviations: Chapter 3

- CWA: CEN Workshop Agreement
- EC: European Commission
- ECC: Electronic Communications Committee
- EEA: European Economic Area
- ETFA: European Free Trade Association
- EM: Electromagnetic Compatibility
- EN: European Standard
- ES: ETSI Standard
- ESO: European Standards Organization
- ETSI: European Telecommunications Standards Institute
- EU: European Union
- GSMA: Global System for Mobile Communications (GSM) Association
- HGI: Home Gateway Initiative
- HTML: HyperText Markup Language
- IAB: Internet Architecture Board

List of abbreviations: Chapter 3

- ICT: Information and Communication Technology
- IEC: International Electrotechnical Commission
- IEEE: Institute of Electrical and Electronics Engineers
- IETF: Internet Engineering Task Force
- IS: International Standard
- ISO: International Organization for Standardization
- ISO/IEC JTC 1: Joint technical committee 1 of ISO/IEC
- IT: Information Technology
- ITU: International Telecommunication Union
- ITU-T: International Telecommunication Union—Telecommunication Sector
- IWA: ISO Workshop Agreement.
- JTC: Joint Technical Committee
- M2M: Machine-to-Machine
- MoU: Memorandum of Understanding
- NSO: National Standards Organization
- OASIS: Not-for-profit consortium, the acronym stands for Advancing Open Standards for the Information Society

List of abbreviations: Chapter 3

- OEM: Original Equipment Manufacturer
- OJEU: Official Journal of the European Union
- OMG: Object Management Group
- PAS: Publicly Available Specifications
- PAS (ISO): ISO Publicly Available Specification
- PASC: Pacific Area Standardization Conference
- PDF: Portable Document Format
- RED: Radio Equipment Directive
- RFC: Request for Comments
- RSC: Radio Spectrum Committee
- SC: Sub-Committee
- SDO: Standards Development Organization
- SME: Small or Medium-sized Enterprise
- Std: Standard
- TBT: Technical Barriers to Trade

List of abbreviations: Chapter 3

- TC: Technical Committee
- TR: Technical Report
- TS: Technical Specification
- TV: Television
- UML: Unified Modelling Language
- UNE: Spanish Association for Standardization
- US: United States
- W3C: World Wide Web Consortium
- WCAG: Web Content Accessibility Guidelines
- WG: Working Group
- WI: Work Item
- WLAN: Wireless Local Area Network
- WS-Security: Microsoft Web Services Security specification
- WSP: Wireless Short-Packet (protocol)
- WTO: World Trade Organization

References: Chapter 3

- Abernathy, W. J., & Utterback, J. M. (1978). Patterns of innovation in technology. Technology Review, 80(7), 1–47.
- Blind, K. (2008). The Influence of Companies' Patenting Motives on their Standardisation Strategies. 13th EURAS Workshop, Sweden, June, 16.
- CCC (2016). Car Connectivity Consortium. http://carconnectivity.org. Accessed 10 August 2023.
- CEN (2016). Implementation of European Standards - ENs not corresponding to national standards on a one-to-one basis. CEN.
- https://boss.cen.eu/reference%20material/guidancedoc/pages/impl.aspx. Accessed 10 August 2023.
- CEN (n.d.). CWA - CEN Workshop Agreement. https://boss.cen.eu/developingdeliverables/cwa/pages/. Accessed 10 August 2023.
- CEN, CENELEC. (2008). CEN/CENELEC Guide 12. The concept of affiliation with CEN and CENELEC. CEN, CENELEC.
- de Vries, H. J. D. (2006). IT Standards Typology. https://www.igi-global.com/gateway/chapter/4654. Accessed 10 August 2023.
- EnOcean (2017). EnOcean Wireless Standard. https://www.enocean-alliance.org/what-is-enocean/enocean-wireless-standard. Accessed 10 August 2023.

References: Chapter 3

- ETSI (2016). Version numbering system. ETSI. https://portal.etsi.org/Services/editHelp/How-to-start/Document-procedures-and-types/Version-numbering-system. Accessed 20 October, 2021.
- ETSI (n.d.). Types of standards. https://www.etsi.org/standards/types-of-standards. Accessed 20 October, 2021.
- ETSI (2016). Home Gateway Initiative smart home specifications published by ETSI, ETSI Press Release, November 2016.
- http://www.etsi.org/news-events/news/1150-2016-11-home-gateway-initiative-smart-home-specifications-published-by-etsi Accessed 10 August, 2023.
- ETSI (2017). Publicly Available Specifications (PAS). https://www.etsi.org/about/our-partnerships Accessed 10 August, 2023.
- ETSI-ECC (2016). The European regulatory environment for radio equipment and spectrum, an introduction. Version 2.1, July 2016.
- European Commission (2018). CE Marking. https://ec.europa.eu/growth/single-market/ce-marking_en. Accessed 20 October, 2021.
- European Commission (2018). Harmonised standards. http://ec.europa.eu/growth/single-market/european-standards/harmonised-standards_en. Accessed 10 August, 2023.

References: Chapter 3

- European Union (2014). Radio Equipment Directive. "Directive of the European Parliament and of the Council of 16 April 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC". Directive 2014/53/ EU. April 2014. Available at http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014L0053&from=EN. Accessed 10 August, 2023.
- Hatto, P. (2013). Standards and standardisation: A practical guide for researchers. European Commission, Publications Office of the European Union.
- HGI, ETSI (2016). Home Gateway Initiative transfers smart home-related requirements to ETSI. https://www.etsi.org/newsroom/news/1082-2016-04-home-gateway-initiative-transfers-smart-home-related-requirements-to-etsi Accessed 10 August, 2023.
- IEC & CENELEC. (2016). IEC - CENELEC Frankfurt Agreement. IEC-CENELEC. https://www.cencenelec.eu/about-cenelec/cenelec-and-iec-cooperation/. Accessed 10 August, 2023.
- ISO. (n.d.). ISO deliverables. ISO. https://www.iso.org/deliverables-all.html. Accessed 10 August, 2023.

References: Chapter 3

- ISO, & CEN. (2001). The Agreement on technical cooperation between ISO and CEN (Vienna Agreement). ISO-CEN. https://isotc.iso.org/livelink/livelink?func=ll&objId=4230458&objAction=browse&sort=subtype. Accessed 20 October, 2021.
- ISO, & CEN. (2016). The Vienna Agreement FAQs. ISO-CEN. https://boss.cen.eu/media/CEN/ref/va_faq.pdf. Accessed 20 October, 2021.
- ISO, & IEC. (n.d.). ISO/IEC JTC 1 — Information Technology. ISO-IEC. https://www.iso.org/isoiec-jtc-1.html. Accessed 20 October, 2021. Accessed 20 October, 2021.
- ITU, & ETSI. (2016). Memorandum of understanding between ETSI and ITU. ITU-ETSI. https://www.itu.int/en/ITU-T/extcoop/Documents/mou/MoU-ETSI-ITU-201605.pdf. Accessed 20 October, 2021.
- ITU, & ISO/IEC. (2014). A.23 : Guide for ITU-T and ISO/IEC JTC 1 cooperation. ITU-ISO/IEC. https://www.itu.int/rec/T-REC-A.23-201406-I%21AnnA. Accessed 20 October, 2021.
- Wi-Fi (2017). Certification: Wi-Fi Test Suite. http://www.wi-fi.org/certification/wi-fi-test-suite. Accessed 15 November 2017. Accessed 20 October, 2021.