



Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

The Life Cycle of Standards

Presented by
the International Electrotechnical Commission





Aim

- This presentation was developed by the International Electrotechnical Commission (IEC) to create a better awareness and understanding of the importance of standards for students of business schools and management of technology, and technology policy faculties of technical universities.
- It consists of three lectures:
 - An introduction to standards and their importance
 - A discussion of the life cycle of standards, their development, use and maintenance
 - A discussion of the economic value of standards (i.e. their relevance for business, innovation and international trade).



Contents

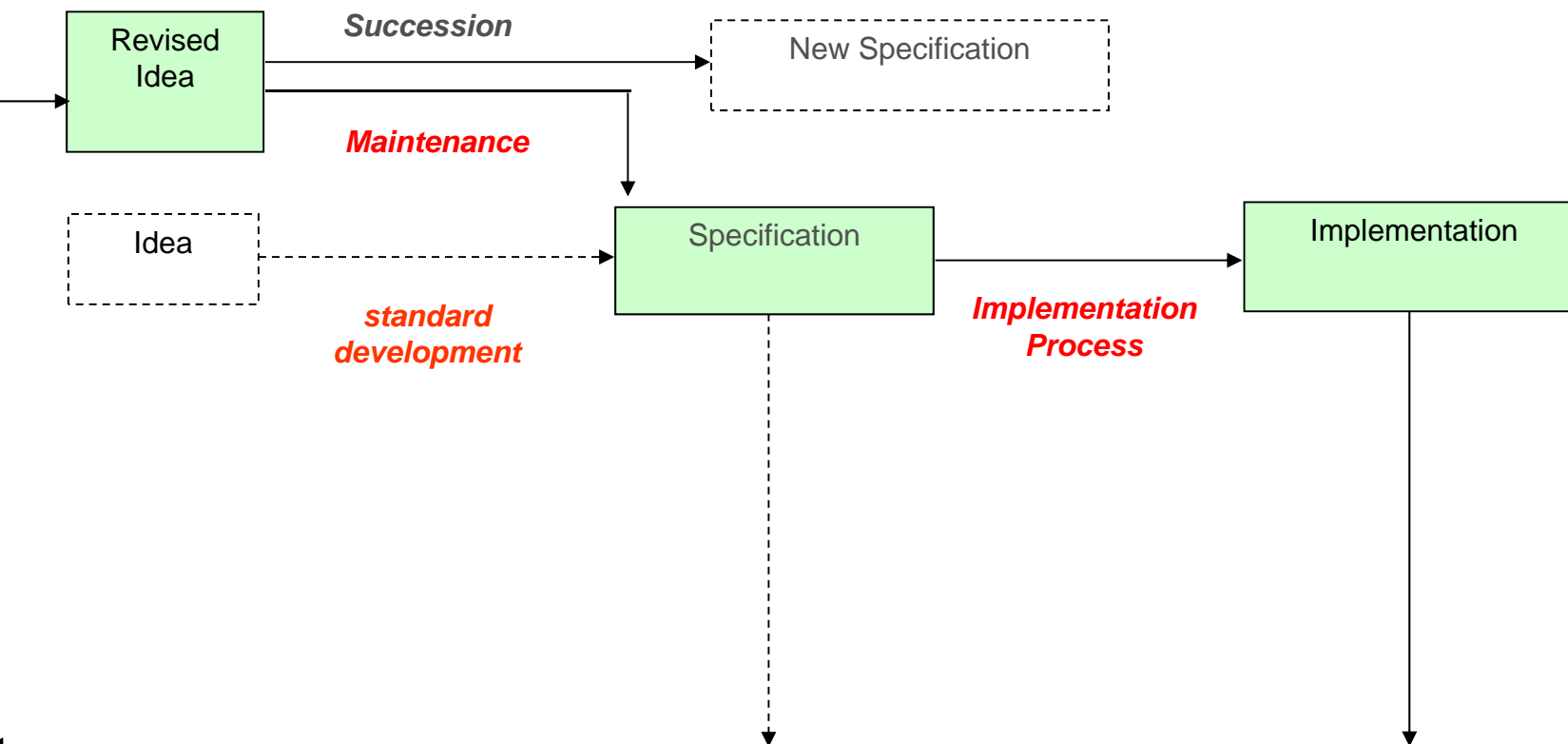
- ▶ The life cycle of a standard
- ▶ Standards development
 - ▶ Which organizations develop standards?
 - ▶ Open standards
 - ▶ Difficult issues
- ▶ And after they have been developed...?
 - ▶ Implementation
 - ▶ Maintenance
 - ▶ Standard Dynamics
- ▶ Summary



The Life Cycle of a standard

- ▶ Development
- ▶ Implementation
- ▶ Maintenance

The Life Cycle of a standard (cont.)





Standards development: Organizations

- ▶ Formal standards bodies (e.g. internationally IEC, ISO, ITU-T)
- ▶ Consortia (e.g. W3C, ECMA, OASIS, IETF, Open Group)
- ▶ Professional organizations (e.g. IEEE)
- ▶ Trade organizations
- ▶ Government agencies
- ▶ Etc.

Next slides: formal standards bodies and consortia



Standards development: Formal standards bodies

- ▶ International, regional, national formal standards bodies
- ▶ Standardization process is based on
 - ▶ *consensus principle*
 - ▶ *voluntary application* of standards
 - ▶ *quality* of standards
 - ▶ *broad constituency* of national delegations, etc.



Standards development: Consortia

- ▶ Standards consortia, or *specification groups* (Updegrave, 1995)
 - ▶ R&D-oriented and pre-competitive
 - *Research consortia* (Updegrave, 1995)
 - *Proof of technology consortia* (Weiss & Cargill, 1992)
 - ▶ *Implementation and application consortia* (Weiss & Cargill, 1992)
- ▶ *Strategic consortia* (Updegrave, 1995)
- ▶ Consortia that organize educational activities (Hawkins, 1999)



Standards development: Polarized discussion

- ▶ Polarized discussion among standardizers about the difference between formal standards bodies and consortia
 - ▶ Formal bodies are held to be too slow (due to consensus)
 - ▶ Consortia are held to be less open
 - ▶ In reality: difference is small*
- ▶ Of much greater concern to standardizers should be that technologies that should be standardized often - are not standardized
- ▶ Related to this discussion: What does *openness* actually mean?



Standards development: What are *open standards*?

A standard is perceived as open* (Krechmer, 2006):

- ▶ By standards creators: if the creation of standards is based on open meetings, consensus and due process
- ▶ By implementers: if it serves the market they wish, does not carry additional cost, does not limit their innovation, does not obsolete their prior investment, does not favour the competitors
- ▶ By users: the standard is supported over the product's expected lifetime, and backward compatibility is provided with previous implementations



Standards development: Difficult issues

- ▶ Participation: Are the right people and parties participating?
Backed by the right level?

- ▶ Should contributions with Intellectual Property Rights (patents, copyright) be included?
 - ▶ IPR policies of standards bodies for *essential patents* (Bekkers & Liotard, 1999)
 - Example: IEC policy*
 - (F)RAND: license technology under (Fair,) Reasonable and Non-Discriminatory terms

- ▶ Bilateral Licensing Patent Pool Patent Platform (Blind *et al*)



After standards have been developed...

- ▶ Implementation (Use; Egyedi & Dahanayake, 2003; Egyedi & Hudson, 2003)
- ▶ Maintenance (Update; Egyedi & Heijnen, 2005)
- ▶ Succession (New technology; Egyedi & Loeffen, 2002)

In the following slides emphasis on the first two.



Standards implementation

Sometimes standards are*

- ▶ *not used*
- ▶ used
- ▶ used, but in a way that breaches the integrity of the standard ...



Standards implementation: Malevolent breach of integrity

Breaches in the integrity of the standard can be

- ▶ *Malevolent* when standards are corrupted as part of a market strategy (i.e. embrace-and-extend strategy)

This leads to

- ▶ incompatibility with other genuinely standard-conform products
- ▶ doubts of end-users about the quality of the standard



Standards implementation: Benevolent deviation from standard

Breaches in the integrity of the standard are called *benevolent* when implementers deviate from the standard

- ▶ knowingly for legitimate reasons: e.g. because a standard is too complex and expensive for the implementer's use (partial implementation of the standard)
- ▶ unknowingly: e.g. because of an ambiguity in the standard, it was unwittingly implemented the wrong way

Whether knowing or unknowing, benevolent deviations from the standard usually also lead to incompatibility.



Standards implementation: Causes of 'benevolent incompatibility'

Causes of benevolent deviations are e.g.

- ▶ Errors, ambiguities, inconsistencies in the standard
- ▶ Missing details in a standard
- ▶ Too many options (may cause e.g. interference between standard implementations)

Benevolent causes can be addressed more easily than malevolent ones by standards development bodies.



Standards implementation: Feedback

Experience with standards implementation can lead to suggestions for improving the standard

- ▶ Standards maintenance, in the following slides
 - ▶ Maintenance procedures
 - ▶ Degree of maintenance work

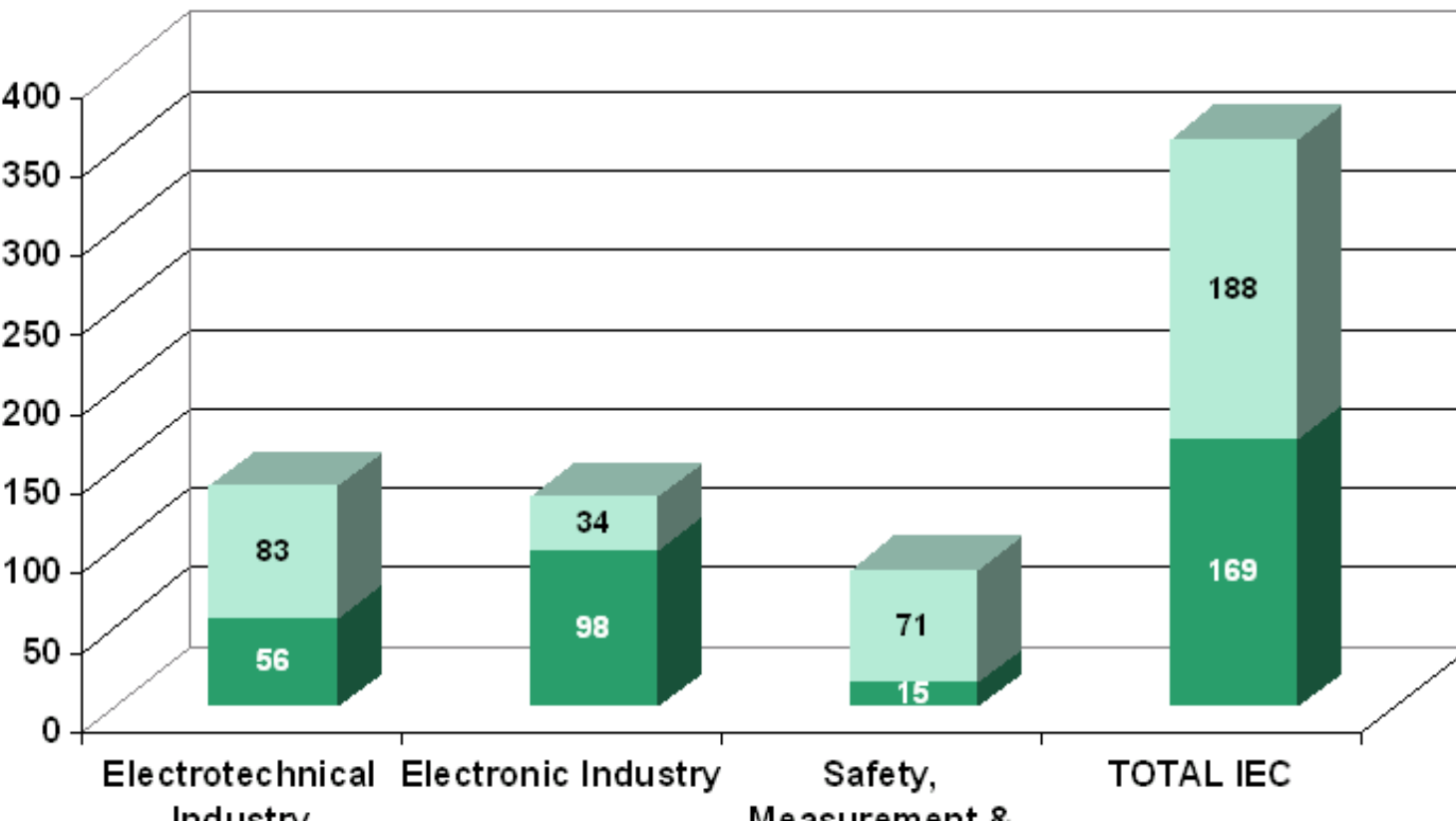


Maintenance: Procedures

- ▶ Standards undergo a Periodic Review

- ▶ A standard can be (ISO/IEC, 2004a)
 - ▶ Confirmed
 - ▶ Revised
 - Amendment
 - New Edition
 - Change of document type*
 - ▶ Withdrawn

Maintenance: Degree of maintenance work in IEC (IEC, 2004)

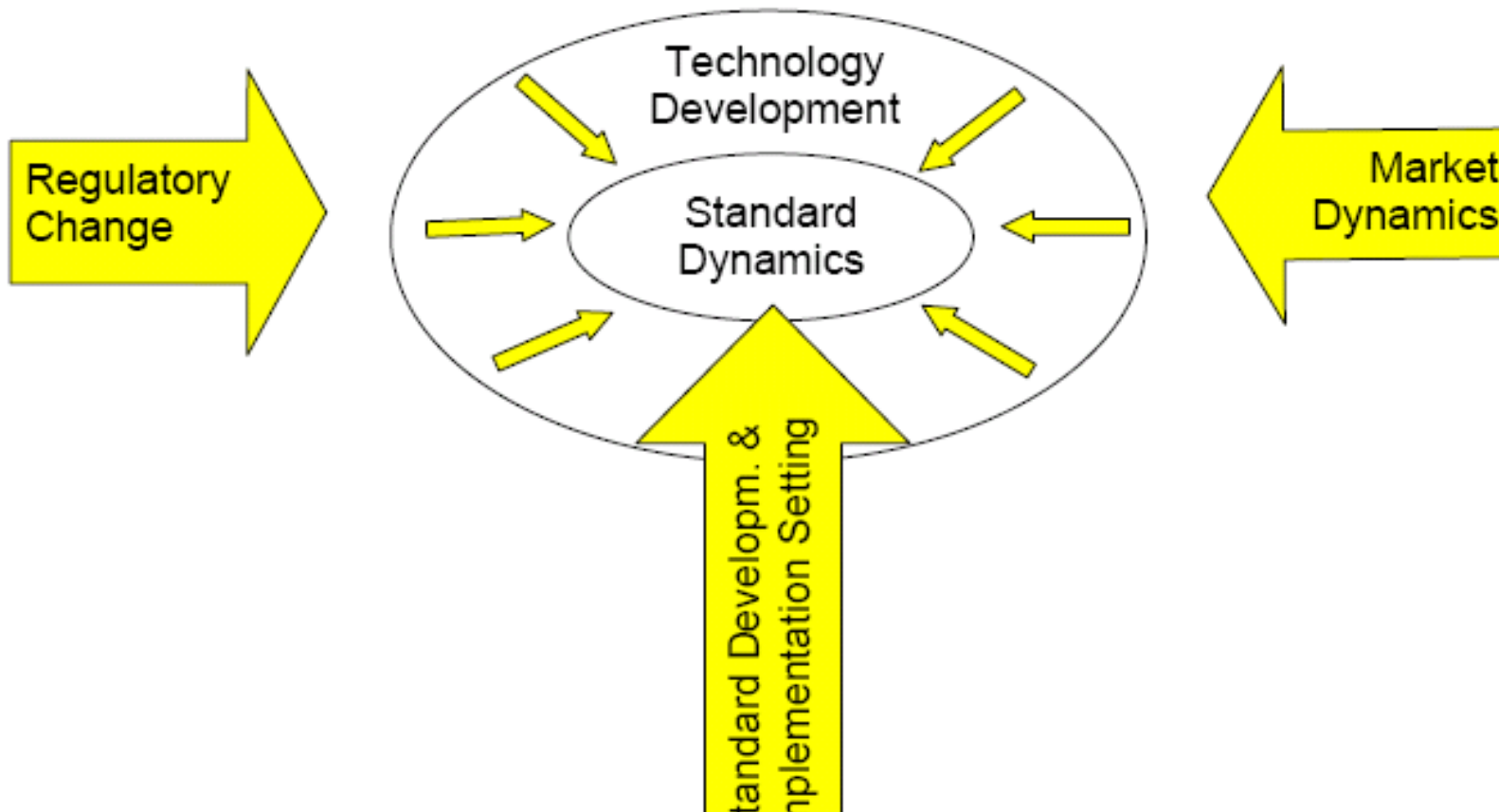




Standard Dynamics

- ▶ “By definition, a standard is reasonably unchanging; therefore, the only time that an architecture should be standardized is when it is no longer subject to change – and when an architecture is no longer subject to change, it is dead.” (Cargill, 1989, p.70)
- ▶ *Standard dynamics**: Changes to a standard once it has been specified
- ▶ Previous slide: more standard maintenance than development work
- ▶ Some degree of change is unavoidable ...

Standard Dynamics: What affects technology affects its standards





Summary

- ▶ Coming back to the ISO/IEC definition of a standard, one of the definitions which the lecture started out with: the aim is to achieve an “optimum degree of order **in a given context**”, a context which for some technologies changes rapidly. In such situations standards need to be responsive.



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