STAIR - INNOVATION

An Integrated Approach for Standardization, Innovation and Research

Introduction

Europe is paying increasing attention to innovation issues. In the context of improving Europe's competitive performance through innovation, there are close links between standardization and research, as exemplified for instance in the European Commission Communication 'Towards an increased contribution from standardisation to innovation in Europe' (COM(2008) 133 final, 11 March 2008) and the Council Conclusions on standardization and innovation (Brussels, 25 September 2008). Many research projects deal with issues such as interoperability of technologies, defining specific techniques that may need to be included in standards, etc.

The results of research projects can be invaluable to standardizers, and, conversely, research projects need to have state-of-the-art information on standards that are available or that are under development. In some cases, the standards activity itself may generate the need for additional research, for instance into the appropriate test methods for a product.

A dedicated joint working group on **STA**ndardization, **I**nnovation and **R**esearch, (STAIR), has been created to provide strategic advice to the CEN and CENELEC Technical Boards on synchronizing standardization with innovation and research. The CEN and CENELEC Technical Boards have endorsed the STAIR view that standardization has to be considered during all stages of a research or innovation project. This brochure is a first concept.

In 2010 and 2011, STAIR will focus on practical ways to implement the “integrated approach”. But already CEN and CENELEC can provide research projects with practical help to link to standardization.

1. The economic benefits of standards and standardization regarding research and innovation

General arguments

Standardization contributes to:

- global market access for innovative solutions, thereby increasing the competitiveness of European organizations in the context of an innovation-friendly framework;
- the protection of health and the environment, and helps ensure safety, especially in relation to innovative technologies and services;
- economies of scale and cost savings;
- compatibility and interoperability.

Arguments for policy makers

Standardization contributes to:

- economic growth via faster and broader diffusion of innovations;
- international competitiveness via enhanced productivity and innovativeness;
- the knowledge economy via the gathering and diffusion of knowledge;
- benefiting society by protecting health, the environment and helping to ensure safety.

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Arguments for organizations funding research and innovation

Standardization contributes to:

- the dissemination of knowledge in addition to scientific publications and patents, as standards represent the state of the art in science, technology, services, tools, techniques and management;
- the exploitation of funded research results, including intellectual property rights, which are integrated into standards;
- maximizing the practical application of research results.

Arguments for researchers and research organizations

Standardization facilitates:

- the transfer of knowledge and technology into marketable products and services;
- the dissemination and exploitation of research results;
- the enhancement of recognition and reputation;
- networking with other researchers, industries and stakeholders for future research and innovation;
- the inclusion of all interested parties in framing the rules relevant for future research;
- leveraging licensing revenues of own patents by referencing them into standards.

Arguments for venture capitalists and financial organizations

Standardization facilitates:

- the assessment of new technologies;
- the investment decisions related to specific companies based on their involvement in standardization

Arguments for enterprises

Standardization facilitates:

- shaping the framework conditions of new and emerging markets;
- the access of new technologies to the market;
- reduced time to market and increased market share;
- timely access to knowledge of other stakeholders;
- networking with competitors, suppliers, customers and regulatory bodies;
- interoperability of own technologies with complementary technologies;
- the management of financial risk related to innovations;
- the acceptance of innovations among customers and public procurers;
- licensing of patents by referencing them into standards.

2. The objectives of the Integrated Approach

To help overcome the various obstacles that may be encountered between research/innovation and standardization, a number of issues need to be addressed, such as a general lack of knowledge about the role and benefits of standardization and insufficient incentives and resources, including time and money, for researchers to manage a standardization project. As a matter of fact, the potential of standards and standardization processes to promote the effectiveness and efficiency of research and innovation processes has not been fully exploited by researchers, innovators, and funding organizations.

Consequently, the Integrated Approach aims at:

- raising awareness of the benefits of standardization in the research and innovation process;
- transferring research results and outcomes of innovation activities into standardization;
- fully exploiting the functions of standards for research and innovation activities in order to increase the competitiveness of the EU Member States (Lisbon agenda).

3. Delivering the Integrated Approach

Delivering the benefits

How to integrate standardization into research and innovation projects and programmes:

- Take into account existing standards when proposing activities and drafting new programmes, avoiding both unnecessary duplication of effort and the development of conflicting standards.
- Consider the potential of standards and standardization as possible additional selection criteria.
- Include standardization in work packages or as a separate support measure.
- Consider standardization and standards as a means to disseminate the results of research and innovation projects, including intellectual property rights, towards marketable product and process innovation activities.
- Use standards and consider their possible economic impacts as output and performance indicators when evaluating the outcome of research and innovation projects and programmes.

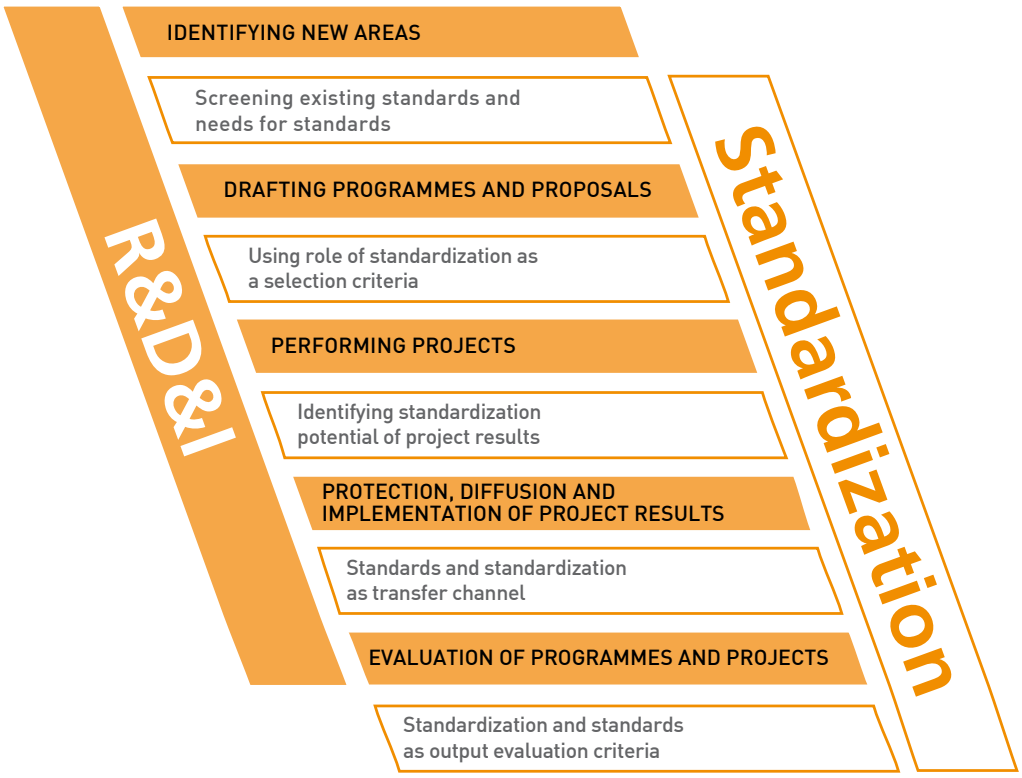

Figure 1 – The Integrated Approach: Standardization at the service of research and innovation.

Including innovative standardization services in research and innovation programmes

In the field of research and innovation, the standardization bodies:

- seek the inclusion of standardization aspects in R&I projects;
- identify projects needing standardization and how these needs will be best met;
- identify existing standards and those under development;
- take up new standardization opportunities resulting from research and innovation;
- promote activities at conferences, etc.

For the activities of the standardization bodies, and the standardization work packages of the research partners, funding should be provided by public or private research- and innovation-funding organizations who support European or national competitiveness policies or strategies. Where the research activities are

> Standardization bodies need the support and collaboration of research organizations, private enterprises and the researchers themselves in order to implement the Integrated Approach.

conducted by public research organizations, e.g. universities, more public funding is required to support any related standardization activities. Where development and innovation activities are closer to the market, the onus of supporting standardization activities may fall on private industry funding sources.

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The right standard at the right time

This publication refers to the concepts of standards and standardization. CEN and CENELEC have a range of solutions for delivering standards and related information in a timely manner. This includes 'full' standards (ENs), voted upon by national members of CEN and CENELEC, and other publications, such as Technical Reports or Technical Specifications and CEN and CENELEC Workshop Agreements. For the sake of convenience, all such standards-related information is referred to as 'standards' in this publication.

Annex I: Background to the Integrated Approach

In the Council Conclusions on standardization and innovation published on 25 September 2008, the Council of the European Union adopted crucial recommendations of actions regarding the interactions between standardization and innovation strategy. In particular, the Council Conclusions recognized the following aspects:

- the potential of standardization to contribute to developing innovation and competitiveness 'by facilitating access to markets, enabling interoperability between new and existing products, services and processes, enhancing protection of users, giving consumers confidence in innovations and disseminating research results';
- the potential of standards to encourage innovation in areas such as services;
- legislation promoting the free circulation of goods and services and the role of standards to support the better regulation policy;
- the importance of competitiveness outside Europe in the context of increasing globalization.

Recognizing the above, and in the light of the 11 March 2008 communication from the European Commission on standardization and innovation (COM(2008) 133 final), the Council of the European Union recommended that:

- public research bodies and public sponsors of research programmes at European and national level examine the potential interest in developing standards in order to exploit research results;
- the European Commission encourages the financial support of 'technology watch' activities in order to identify areas where standardization could be useful in the transfer of research and development results;
- standardization bodies work closely with the research community in order to include research results in standardization work to promote their dissemination;
- the Member States take action to increase the value of participation in standardization activities in the careers of researchers;
- both standards and patents be recognized as innovation dissemination tools;
- the European Commission support the use of standards in matters relating to sustainable industry policy, lead markets, public procurement, information and communications technology and the better regulation policy;
- the potential of innovation existing in the services sector be highlighted, and the possible benefits linked to the development of standards in that area be better promulgated, in order to improve the quality and competitiveness of European services;
- the Member States improve the position of standardization in education programmes and academic curricula to familiarize students with the strategic benefits and challenges of standardization.

All these recommendations concern the interaction between research, innovation and standardization and have to be taken as background, but also a justification for the development of the Integrated Approach.

Annex II: Definitions:

Research, Innovation, Standards and Standardization

In order to have a commonly accepted European understanding of research, innovation and standardization, we rely on definitions which are published by international or European organizations or the European Commission.

Definition of RESEARCH (OECD 2003)

- Research and experimental development (R&D) comprises creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications.

Definition of INNOVATION (OECD, Eurostat 2005)

- An innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations (either new to the firm, the market or the world).
- Innovation activities are all scientific, technological, organizational, financial and commercial steps which actually, or are intended to, lead to the implementation of innovations.
- A product innovation is the introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses. This includes significant improvements in technical specifications, components and materials, incorporated software, user friendliness or other functional characteristics.
- A process innovation is the implementation of a new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and/or software.
- An organizational innovation is the implementation of a new organizational method in the firm's business practices, workplace organization or external relations.
- A marketing innovation is the implementation of a new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing.

Definition of STANDARDIZATION (Commission of the European Communities 2008)

- Standardization is a voluntary cooperation among industry, consumers, public authorities and other interested parties for the development of technical specifications based on consensus.
- Standardization complements market-based competition, typically in order to achieve objectives such as the interoperability of complementary products/services, and to agree on test methods and on requirements for safety, health, organizational and environmental performance. Standardization also has a dimension of public interest, in particular whenever issues of safety, health, security and of the environment are at stake. In addition the standard-setting process needs to be in line with European competition provisions.
- European stakeholders engage in standardization both formally and informally. Formal standardization has a three-level structure which includes the National Standards Bodies (NSBs), the three European Standards Organizations (ESOs) and the international organizations (ISO, IEC and ITU). The ESOs have been formally recognized by the EU in Directive 98/34/EC7. Industry also engages in informal standardization in hundreds of fora and consortia, with different characteristics in terms of longevity, sectoral coverage and territorial scope, which is often global and thus may clash with the three-level structure of formal standardization.

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Annex III: Best Practices

Nanotechnologies: Innovation on the smallest scale (BSI)

Nanotechnology is one area in which the recent development of standards has had a clear effect on assisting growth. Standardization documents in this new field will enable it to have an internationally agreed terminology, measurement methods and characterization. This will check consistency and quality and allow for the more careful specification of materials. Applying protocols for health and safety evaluation will also remove a considerable barrier to innovation. Researchers and industries are persuaded that standardization will supply a strong foundation to enable technology to move forward and thrive.

Laser technology: from research to an industrial success (DIN)

Although the production of laser beam sources in Germany was still in its infancy during the 80s, the German laser industry has since grown: it now has a world market share of 40% and thousands of jobs have been created in this sector. A rapid technology transfer has lead to a real boom, partly due to the development of measurement and testing standards during an early stage in the laser technology R&D process.

Stellarator (DIN)

For many years, the Max Planck Institute for Plasma Physics has been developing nuclear fusion technology for energy production. In Germany, the reactor Wendelstein 7-X, a research reactor of the stellarator type is currently under construction. The aim is to have continuous operation from 2014 onwards in order to demonstrate the suitability of this type of fusion facility for a power plant. Numerous standards specify the basic equipment needed to ensure the required safety and operability of such plants. For instance, the procedure described in EN 61788-1 'Superconductivity — Part 1: Critical current measurement — DC critical current of Nb-Ti composite superconductors' is used to check the properties of superconductors used in the stellarator.

Photocatalysis (AFNOR)

Standardization work on photocatalysis and its applications (treatment of air and water) started in 2007 at the request of researchers. Their analysis had highlighted the need to define standards to measure the performance of photocatalytic processes in order to facilitate possible industrial developments. This initiative shows the interest of bringing together the worlds of research and standardization for adding value to innovative solutions by establishing standardization documents. A European Technical Committee was set up in 2008 and should, in the next few years, produce standards that will foster the development of these technologies.

Clearing mines (CEN)

An extensive programme of standardization on humanitarian mine action was managed by CEN in association with the United Nations. Recently, research results were exploited to expand one of the CEN Workshop Agreements on this topic whereby different soil textures have been classified in relation to their influence on metal detectors and thus making civil demining activities more effective.

Facility Management Services (NEN)

The total Facility Management market in the Netherlands is estimated at €100 billion.
A considerable part (50–60 %) of this market is outsourced. Extending this reality to the European market, TC 348 is developing a Guide to European Benchmarking. This reference document will provide governmental bodies and companies with a tool to improve the costs/performance ratio of their internal services by 5–15 %.
Also, with an improved insight governmental bodies and organizations can improve the performance of their facilities in terms of flexibility (the possibility of changing the distribution of space in facilities), elasticity (the possibility of changing the volume of facilities) and generality (the possibility of changing the function of facilities).
This strengthens the competitiveness of organizations and the 'value for money' for governmental bodies in the EU. The enormous European market demand and supply in the sector of Facility Management will become more visible and transparent; as a result the development of a pan-European market will gain impetus, in response to the dynamic and innovative nature of this service market.

Aerospace industry (DIN)

The European aircraft manufacturer Airbus Industries (EADS) has succeeded in reducing the number of parts for the A330/A340 as opposed to the A300/A310 by using harmonized standards. In fact, harmonization at the European level has resulted in a drastic reduction of the number of purely national standards. Thus, Airbus was able to refer to European Standards rather than the numerous company standards used by its partners in different countries. The result: a reduction in storage costs of € 9,2 million.

Global transportation industry (BSI)

The development of global standards in the field of electronic seals, RFID technology, intelligent transportation systems and intermodal transfer facilitated and contributed to the security of the international supply chain.

Standardization covers all innovative fields of the economy (AFNOR)

A large proportion of innovations relate to processes, organizations, the associated services, management methods and distribution. In all of these sectors, standardization is often much more than a vector of innovation. By comparing different experiences in standardization committees, standardization has resulted in the development of innovative methods, such as the use of life cycle analyses to measure the ecological performance of a product, energy efficiency measurement of buildings, innovative distribution systems and fair trade, or best governance practices improving the social responsibility levels of organizations.

Contributing to our environment (CEN)

A CEN Workshop Agreement improves the understanding of membrane bioreactor (MBR) Technology. Technology by defining common terms and definitions, increases comparability and transparency of products and end-user confidence in them, and should lead to reduced investment costs allowing for an interchangeable MBR system for municipal and industrial wastewater treatment.

Reference documents

- European Commission (2008) *Towards an increased contribution from standardisation to innovation in Europe*, Brussels
- OECD (ed.) (2003) *The Measurement of Scientific and Technological Activities: Frascati Manual 2002: Proposed Standard Practice for Surveys of Research and Experimental Development*, Paris: OECD Publishing
- OECD, Eurostat (2005) *Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data*, Paris: OECD Publishing

ABOUT CEN

The European Committee for Standardization (CEN) is a business catalyst in Europe, removing trade barriers for European stakeholders such as industry, public administration, service providers, consumers and other stakeholders. Its mission is to foster the European economy in global trading, the welfare of European citizens, and the environment. Through its services CEN provides a platform for the development of European Standards and other specifications.

CEN's 31 National Members work together to develop voluntary European Standards (ENs) in various sectors to build a European Internal Market for goods and services and to position Europe in the global economy.

By supporting research, and helping disseminate innovation, standards are a powerful tool for economic growth. More than 60.000 technical experts as well as business federations, consumer and other societal interest organizations are involved in the CEN network that reaches over 480 million people.

For further information, please visit: www.cen.eu

ABOUT CENELEC

The European Committee for Electrotechnical Standardization is officially responsible for standardization in the electrotechnical field. In an ever more global economy, CENELEC fosters innovation and competitiveness, making technology available not only to major businesses but also to SMEs through the production of voluntary standards. CENELEC creates market access at the European level but also at the international level through its cooperation agreement with the International Electrotechnical Commission (IEC).

Through the work of its 31 Members together with its experts, the industry federations and consumers, Electrotechnical European Standards are created in order to help shape the European Internal Market, to encourage technological development, to ensure interoperability and to guarantee the safety and health of consumers and provide environmental protection.

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