HARMONI
INDUSTRIAL COOPERATION ON REGULATION AND STANDARDISATION

Deliverable 4.1

Participation experience of the process industry in the European standardization process

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ABBREVIATIONS

CCMC	CEN/CENELEC Management Centre
CEN	European Committee for Standardization
CEN/TR	Technical Report
CEN/TS	Technical Specification
CENELEC	European Committee for Electrotechnical Standardization
CWA	CEN Workshop Agreement
DIN	Deutsches Institut für Normung e. V.
EFTA	European Free Trade Association
EN	European Standard
ETSI	European Telecommunications Standards Institute
IEC	International Electrotechnical Commission
ISO	International Organization for Standardization
ITU	International Telecommunication Union
NSB	National Standards Body
STAIR	STAndards, Innovation and Research
SPIRE	Sustainable Process Industry through Resource and Energy efficiency
TC	Technical Committee
UNE	Spanish Association for Standardization - Asociación Española de Normalización
WP	Work Package

PARTNERS SHORT NAMES

CIRCE: Fundación CIRCE – Centro de Investigación de Recursos y Consumos Energéticos

CEFIC: Conseil Européen de l'Industrie Chimique

CEMBUREAU: Association Européenne du Ciment

A.SPIRE: Association for SPIRE

DIN: DIN - Deutsches Institut für Normung e.V.

ECREF: European Centre for Refractories gGmbH

ECREF / FGF: Forschungsgemeinschaft Feuerfest e.V.

ECREF / VDFFI: German Refractory Association

FEHS: Institut für Baustoff-Forschung e.V.

PUBLISHABLE SUMMARY

The fourth work package (WP4) of the HARMONI project has the title “Suggestions for improving European standardization to support innovation in the process industry” and is led by DIN e. V. the national standards body (NSB) in Germany. The main objective of WP4 is the provision of recommendations for an optimized standardization climate and for a facilitation of innovation in the process industry in order to support the progress towards a sustainable and competitive industry. The present report provides the outcome of the conducted “analysis of the current participation of the process industry in European standardization”. It aims giving an overview about the European standardization system and the current involvement of the process industry within the standardization processes.

For this purpose this deliverable explains the standardization system and process on European level. The different steps for developing and reviewing an EU standard are described and possibilities to participate are pointed out. Also the benefits of participating in standardization are discussed. An assessment of main concerns of the process industry about the current EU standardization procedure shows, that besides clear benefits the process industry's most prominent concerns about standardization are a long time to market, missing resources to participate and a too complex decision-making processes.

Two analyses of the current participation of the process industry in standardization are conducted on association level as well as on company level. It turns out that all considered associations in the process industry participate in the EU standardization process. The intensity of participation depends on the size of the association and the perceived importance of standardization. It was possible to gain insights into the internal structures of associations regarding the participation in standardization itself and the communication between associations and their members.

From the analyses a map was created providing an overview about similarities, differences and interconnections between the different sectors. Moreover the map shows potential for future standardization activities.

The results of the present report lay the foundation to develop participation strategies in the European standardization process throughout the further progress of the HARMONI project in order to contribute towards an optimized standardization climate and the facilitation of innovation in the process industry.

TABLE OF CONTENTS

Figures

Tables

1 INTRODUCTION

1.1 Motivation

The fourth work package (WP4) has the title "Suggestions for improving European standardization to support innovation in the process industry" and is led by DIN e. V. the national standards body (NSB) in Germany. The main objective of WP4 is the provision of recommendations for an optimized standardization climate and for a facilitation of innovation in the process industry in order to support the progress towards a sustainable and competitive industry.

Standardization as lingua franca of technology can serve as a catalyst for innovation and thereby often helps to bring solutions to the market and to provide solutions for free global trade of goods and services.[1] The ability to implement new ideas and research findings as innovative products, methods and services is decisive for competitive ability.[2] Using European standards opens up possibilities for new products on the European market and ensures compatibility with existing systems. By enabling the process industry to take advantage of standardization, standardization serves as an important element for HARMONI. It supports the industry to foster their innovation activities, the dissemination of new products as well as the transferability of developments. As energy and resource intensive industry the process industry by definition covers a broad range of products and processes with many stakeholders involved. Therefore, a clear documentation of these procedures is crucial in order to verify and assure a steady quality, especially at the in- and output of products and resources as transferal point of the system boundary. Standards often include requirements that specify these processes.

All SPIRE associations as members of the HARMONI consortium will actively participate in WP4 and contribute their knowledge to identify and improve relevant standardization activities.

WP4 utilizes among other the results of WP2, which analyzed EU projects and further studies of the industry. WP4 will cooperate with associations being project partners to identify standardization needs of the industry and to propose recommendations that facilitate the adoption of innovative technologies and methodologies by the process industry. The current procedures to mandate EU standards are analyzed and possibilities for improving procedures will be explored. Therefore HARMONI will make use of the STAIR platform which will be implemented in WP4. The objective of the platform is to discuss urgent issues of the industry in the context of standardization in order to develop recommendations for an optimization of the current process.

1.2 Objective

This report summarizes the steps and results achieved in task 4.1. This task of the HARMONI project has the title "analysis of the current participation of the process industry in European standardization" and aims to provide an overview about the European standardization system and the current involvement of the process industry in the standardization processes.

For this purpose this deliverable explains the standardization system and processes on European level. The different steps for developing and reviewing an EU standard will be described and possibilities to participate will be discussed subsequently.

An assessment of main concerns of the process industry about the current EU standardization procedure will be conducted. Afterwards the current participation of the industry in standardization will be analyzed on association level as well as on company level. This will help to characterize the current structure of the participation of the industry and of single companies as well as their internal organization structures.

The results of the assessment will enable to develop strategies in the further WP progress in order to contribute towards the aforementioned objectives.

2 METHODOLOGY OF THE DELIVERABLE

The identification of relevant TCs was partly done in WP2. In the D2.2 a list of TCs was published is based on internal databases as well as pertinent information sources offered by CEN and ISO. In D2.2, the gathered data were condensed and classified by sector in order to make a best choice of TCs that are relevant to the HARMONI project and to support the evaluation of the cross-sectorial importance of the TCs. As summary of D2.2 it can be concluded that on European CEN level especially the CEN/TC 183 “Waste management” and the CEN/TC 292 “Characterization of Waste” possess a strong cross-sectorial relevance while most of the other TCs can be assigned to one sector. On-going activities of the TCs were extracted from the database in order to present active areas with relevance for HARMONI and possibilities to participate in current standardization activities.

WP4 builds upon these results but uses further information gained, e.g. via survey, within the duration of the project to extend the description of the participation of the process industry in the European standardization process. Within HARMONI two surveys were developed making standardization subject of discussion.

The first survey was developed under WP2 and distributed among members of the participating associations as well as among the identified TCs. The survey included questions contributing to WP4 in order to align both work packages and to generate the maximum output of the survey. Its purpose was the identification of the utilization and awareness of standards and the standardization process in companies of the European process industry. As a survey it included questions targeting WP2 as well as further questions targeting the work envisaged in WP4. In total about 70 companies participated in the survey providing useful answers. These companies represent the European process industry since participating companies are located in 21 different European countries.

The second mainly qualitative survey was designed by DIN under WP4 and addressed the associations and two research organizations participating in HARMONI (see ANNEX A: Survey to associations for the full survey). The survey included questions about the structures within the

association with regard to standardization within the associations, the interchange between the association and its members and about current challenges related to standardization. It was developed in close cooperation with CIRCE and Cefic. The evaluation focused mainly on the compilation of common statements relevant for all sectors. In total eight responses were received from CEMBUREAU, CERAME-UNIE, EUROFER, CEFIC, EUROSLAG and Euroalliages.

3 STANDARDIZATION LANDSCAPE

3.1 National, European and international standardization

3.1.1 International standardization work

The International Organization for Standardization (ISO) together with the International Electrotechnical Commission[4] (IEC), are the responsible standardization organizations on global level. The International Telecommunications Union[5] (ITU) is the United Nation's specialized agency in terms of information and telecommunication technologies.

Many of ISO's members belong to regional standardization organizations. ISO has recognized regional standards organizations representing Africa, the Arab countries, the area covered by the Commonwealth of Independent States, Europe, Latin America, the Pacific area, and the South-East Asia nations.

3.1.2 European standardization work

At the European level, following the EC information directive[6,7], standardization work is carried out by the European Committee for Standardization[8] (CEN), the European Committee for Electrotechnical Standardization (CENELEC) and the European Telecommunication Standards Institute (ETSI).

The European standardization organizations are associations of national standardization bodies. Members of CEN and CENELEC are first and foremost the national standards bodies of EU and EFTA member states, as well as the national standards bodies of other countries intending to become members of the EU or EFTA. Members of ETSI are direct members such as companies, institutes and services throughout Europe. The responsibility of CEN/CENELEC is the harmonization of existing national standards in Europe.

The CEN/CENELEC organization structure has working groups including the General Assembly, Administrative and Technical Boards as well as Technical Committees (TC). Those are open to all members, and include national delegations presenting agreed positions. European organizations which represent a particular sector may have an observer status. In addition to full members, there are also affiliated standards bodies and associate organizations.

European standardization documents

At European level, different standardization documents are available. Each of these represents a different level of consensus:

- The European Standard (EN) aims at developing a normative specification reflecting the current state of technology and knowledge. Every CEN member is obligated to acquire the EN and to withdraw national standards which are in conflict with or duplicate EN standards.
- Other products of European standardization include European Technical Specifications (CEN/TS) which aim to aid market development and growth for products or methods that are still in the development and/or trial phase, and European Technical Reports (CEN/TR) which provide specifications of a recommendatory and explanatory nature.
- Special specifications, which are developed with the rapid consensus of expert stakeholders (no full consensus needed), can be found in CEN Workshop Agreements (CWA).

In the further progress of this chapter we will exemplary explain the development of an EN and a CWA. Due to HARMONI's focus on innovations, the CWA is seen as interesting instrument to be further illustrated.

Development of a European Standard (EN)

The first step towards the publication of a new standard is the proposal of a new topic by anyone who has a certain demand. This proposal can be submitted to the national standards bodies, which forwards it to CEN when a European interest is given. If CEN decides to work on the subject, all CEN member countries must stop current national standardization work regarding the specific subject. A working group responsible for the new work item drafts a first version of the standardization document. The draft is then distributed to all CEN member states, therefore enabling all European citizens and the standardization organizations to comment on the draft for usually three months. The CEN member states then vote on accepting the proposed draft. If the enquiry is successful the EN is published and adopted without changes by all CEN member states. Besides English the official languages are French and German. Translations into further languages can be made by the members themselves if needed. All conflicting national standards still in use have to be withdrawn.

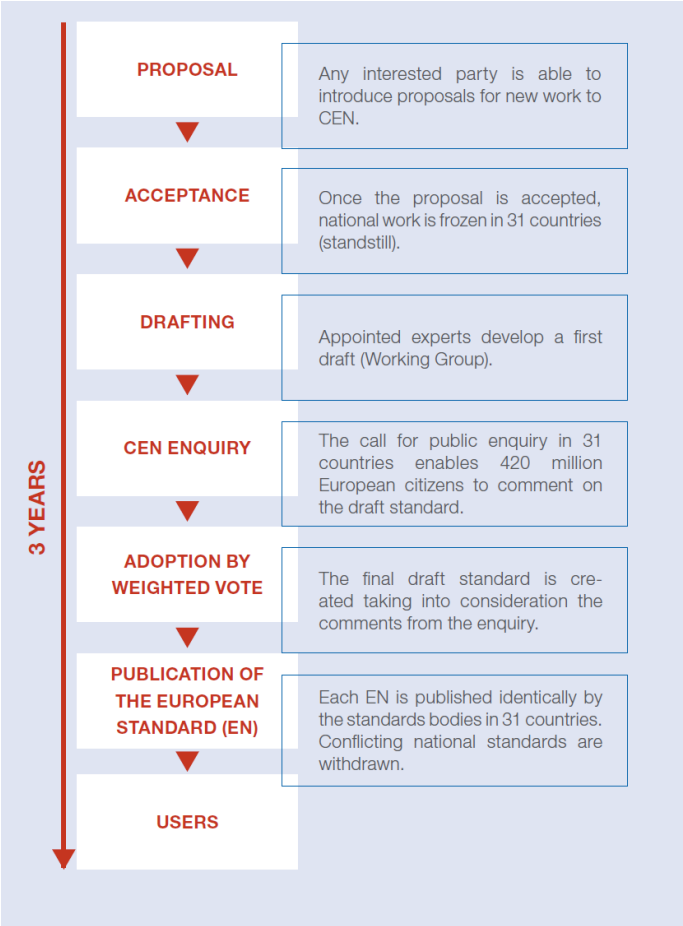

Figure 1 Development of an EN[9]

Development of CEN Workshop Agreement (CWA)

"A CWA is an agreement developed and approved in a CEN workshop; the latter is open to the direct participation of anyone with an interest in the development of the agreement. There is no geographical limit on participation; hence, participants may be from outside Europe. The development of a CWA is fast and flexible, on average between 10-12 months.

A CWA does not have the status of a European Standard. It involves no obligation at national level. A CWA may not conflict with a European Standard; if a conflicting EN is subsequently published, the CWA shall be withdrawn." [10]

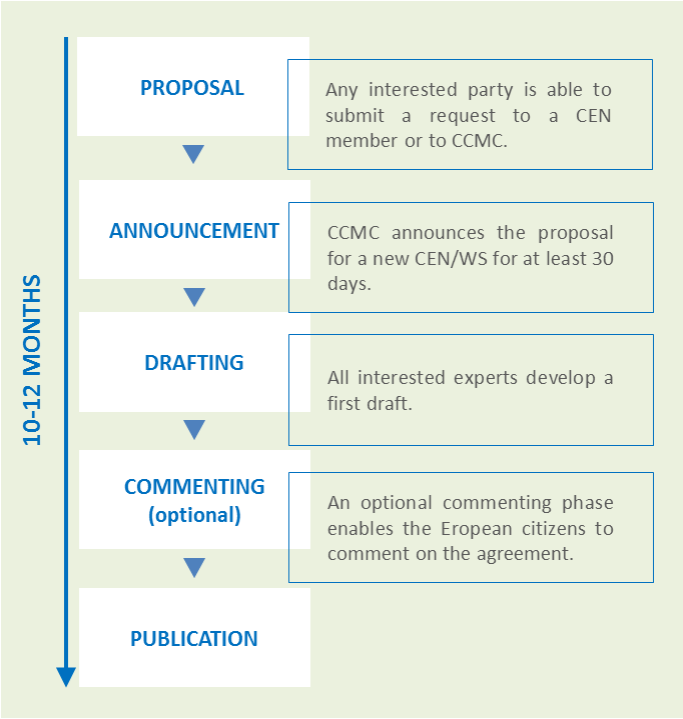

Figure 2 Development of a CWA (own work)

CWA have streamlined processes and quicker adoption procedures which make them a perfect tool for innovations. The development time of a CWA is on average between 10 and 12 months.

The CWA development starts with a request of an interested party to a national standardization body (NSB) as a member of CEN or to the CEN/CENELEC Management Centre (CCMC). The proposer needs to prepare a draft project plan, which describes the objective of the CEN workshop. This can be prepared with the help of an NSB. Subsequently, the CCMC announces the proposal for a new CEN workshop for information and transparency reasons in order to inform the public about the ongoing standardization activity. Comments on the draft project plan can be made and shall be considered in the further development of the document.

During the kick-off meeting, the proposed project plan is approved, the workshop formally launched and the participants who want to work on the CWA become registered. The workshop participants develop draft CWA(s) according to the project plan. The chairperson decides when an agreement is reached amongst the workshop participants on the final text of the CWA. Subsequently, the optional commenting phase begins. It is open to everyone for at least 60 days. The comments are considered by the workshop members. Afterwards the workshop secretariat submits the approved CWA to the CCMC. CWAs do not have the status of a European Standard and there is no obligation for the national standards bodies to adopt them as national standards. They are checked after 3 years and have a total lifetime of 6 years. The CWA can be understood as a test-document. The European companies can work with it and if it is found to be positive, it will be likely used as basis for a new European standard. Since a CWA is created in a rather short time, it is an ideal tool for innovations and research projects.

3.1.3 National standardization work

National standards bodies publish national standards and are members of the European and international standards bodies. One example is DIN, the national standardization body of Germany. Anyone and any organization within Germany can propose and participate in DIN. All incoming requests are reviewed and it is then decided by the corresponding committee whether there is a demand in the affiliated industry, whether European or international standardization activities already exist and on which level the proposed work shall take place. Subjects that are ongoing on European level will initiate a standstill clause on national level. If the document is only on national level, TCs are responsible for the technical input. Those comprise a number of 30 000 experts.

TCs are also open for participation of new experts, as they have to include members of each group of interest such as research organizations, industry and associations. The draft version of a document is released for commenting to the general public for at least 60 days. This is yet an additional possibility for anyone to get involved. Everyone who has commented on the draft is invited to a meeting where the objections are discussed. The final document is published afterwards.

3.2 Participation in the standardization process

The way for participating in standardization[11] starts on national level. Everyone can easily propose new standardization topics at the national standards body. Also, during the commenting phase everyone is able to comment on the draft. Another way is to participate in person in the national TCs.

A TC is a technical decision making body with a title, a scope and a work program. It manages the preparation of standardization documents in accordance with the agreed business plan. CEN holds a list[12] containing all TCs. To ensure a high value of standards, the TCs are composed of experts belonging to different interested groups. These groups are for example manufacturers, customers, universities, research institutes or authorities. Any expert is welcome to apply for a seat in a TC. The applications will be examined, depending on the composition, the number of experts already present in the concerning TC and the regulations of the national standards body. Experts, who are members of national TCs, have the chance to participate in European and international standardization. They are send as national delegates to European or international TCs to represent the national interests within a standardization project.

European associations have the option to participate directly on the European level through liaisons with TCs. As a liaison organization, the associations are observers on a consultative basis and are also informed about standardization activities.[13]

Most standards are initiated by the industry. Other standardization projects can come from consumers, Small and Medium Enterprises or associations. In addition, the European Commission proposes standards, which are developed to support European legislation.[6,7]

The choice on how to participate in standardization and which instrument to use depends strongly on the individual case. In general for specific issues that need a quick standardization process a CWA is often the preferred choice. Thus, for innovations CWAs is often the optimal instrument. For guidance in choosing the right instrument CEN provides a research helpdesk[14, 15] on its website.

3.3 Discussing the use of standardization

Standardization facilitates the exchange of goods, processes and services by eliminating technical barriers. From the size of credit cards to petrol and train tracks: all of these things are standardized and can be used in different countries across the world. The producers benefit of the raised transferability and marketability of innovations.[3] Thereby both, consumers and producers benefit from standardization through increased quality as well as lower prices. Products can reach by far a bigger market with low development and testing costs. Manufacturers benefit from being able to use a broader basis of external suppliers, from greater quality assurance, and increased efficiency. Additionally, customers are more likely to accept trustworthy products or services. An overview on benefits of standardization is given in the list below:

Lineup of further benefits of standardization[1]

- Dissemination and application of innovations
  - Promotion of worldwide trade
  - Standardizing interfaces enhances compatibility
- Time advantage and knowledge lead
  - Preview of what's happening on the market
- Lower R&D risks and costs
- Assurance of quality
- Environmental protection
- Improving communication and information exchange

A recent study of Blind and Mangelsdorf (2016)[2] identified different strategic motives for companies to participate in standardization. The most important motives were the ability to design industry friendly regulations, enforce own content, prevent formal standards from conflicting with own interests, solve industry specific technical problems and acquire competitive advantages through a head start in knowledge.

4 RESULTS

4.1 Survey to companies

4.1.1 General information

The survey for European companies was split into two sections. The first section deals with the awareness and usage of standards and was already presented in deliverable 2.2. The second section comprises questions related to the participation of European companies of the process industry in standardization, Thereby it belongs to the present deliverable D4.1.

As pointed out in D2.2 the online survey was distributed among members of the intensive industries' associations and among companies participating in European, German and Spanish TCs by CCMC, DIN and UNE. In total about 70 companies participated the survey in a way that the answers were useful enough to be analyzed. For further information about the participating companies and the survey please consult D2.2.

4.1.2 Participation of the process industry in standardization

Over three quarters of the companies answered that they actively participate in the developments of standards (Figure 3). 17% of these companies also participate in strategic standardization issues, as being representative in a coordination group, which coordinates standardization activities in a certain field. Only 23 % of the companies indicate that they do not participate in standardization.

Since the survey was distributed by the associations but also by CCMC, DIN and UNE in different relevant TCs, this might have led to a slightly higher ratio of companies actively participating in standardization.

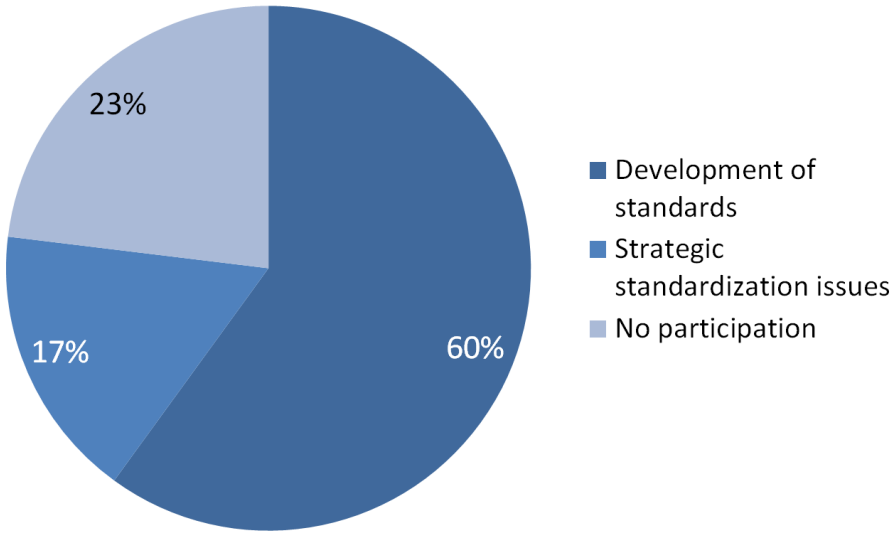

Figure 3 Standardization activities of companies.

Splitting the participation by national, European and international level, we find that all companies which are active in standardization participate in at least one national TC. The work on the European or international level is empowered through mirror committees which send representatives to CEN/CENELEC/ETSI or ISO/IEC committees. 63 % of the active companies participate in TCs on the European and 55 % on the international level.

Figure 4 gives a detailed picture of the participation by level. The numbers indicated in the legend are the number of TCs the companies are actively contributing to. The ratios refer to the number of companies, which actively participate in standardization. Companies mostly participate in 1-5 TCs, independent from the level. On national level there exist significantly more companies which are present in many TCs. This is in line with the organization of mirror committees which only send delegations to the TCs of the European or international level.

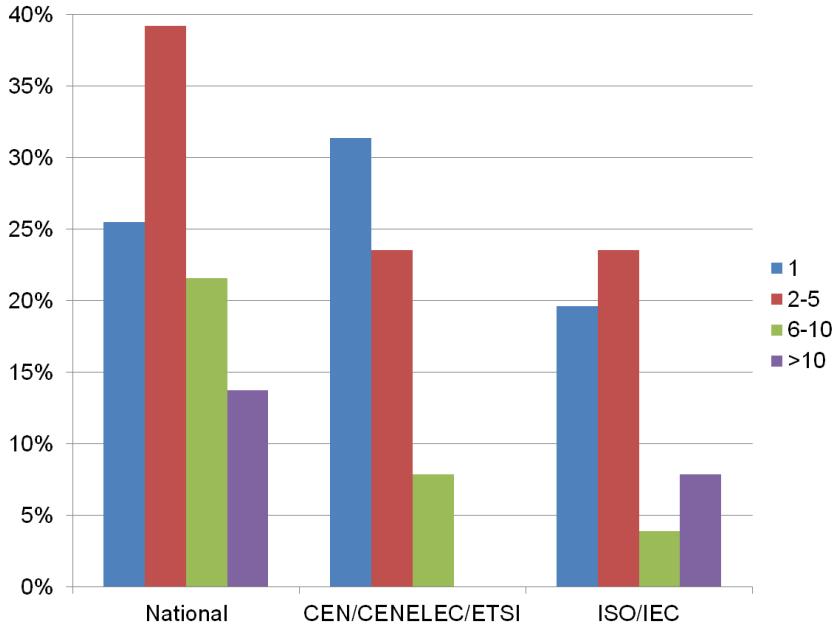

Figure 4 Participation by national, European and international level

4.1.3 Benefits of participation for the process industry

Within the survey the companies pointed out their benefits which they have by participating in standardization. The answers indicate that one important benefit of companies is, that they are able to contribute to the content of standards. Furthermore, additional benefits are that they acquire knowledge on the content of standards as well as the easier application and adjustment of routines due to the change of existing standards. Further benefits are also located in the fields of trade and legal certainty, marketing and planning, certification and in exchange of information. The following list summarizes the benefits that were given in the survey. These results go along with the aforementioned study by Blind and Mangelsdorf (2016)[2], demonstrating that even different sectors work similar and that knowledge on standardization is transferable across sectors.

Freedom of development

- It allows industry to contribute to standardization
- You get to know the proposals before they become standards, you can influence the content of the standards because you are part of the drafting and revision committee, you can make new proposals
- For our European and International Business, developing acceptable, state of the art, secure and safe frame conditions for products and processes
- Develop standard with broad stakeholder acceptance
- Influence on standards, exchange of knowledge, personal development
- To include and lead main market issues and anticipate standards requirements

Information (exchange)

- Access to information on topics which are important and affect similar industries in other countries,
- Competency
- recognize challenges of other stakeholders,
- Valuable input on future changes in normative documents
- Exchange of information between the participants
- Better knowledge of the interests of the expert group members
- Possibility to monitoring of standards for products

Trade & Legal certainty

- Standards are basic elements of the legal system on construction safety.
- Avoiding trade barriers
- To secure the safety of materials and products in contact with drinking water

Marketing & Planning

- Knowing the future restrictions helps planning and fosters innovation developments to meet future requirements
- a much greater awareness of challenges facing the wider supply chain

Application of standards

- it is a possibility to submit a proposal and it is easier and faster to apply new standards in the company's activities
- Better understanding of standard content, and possibility to expose daily needs in a technical forum

Certification

- Drive the certification process

4.1.4 Perceived bottlenecks of standardization by companies

In order to identify the main concerns, different bottlenecks were to be judged in the survey. The possible answers range from 1 to 5, so that a neutral value would be 3. In Figure 5 the average value of the companies' answers grouped by sector is presented. The bottlenecks were sorted by the overall average which allows a visualization of a clear trend. Noteworthy is, that the different sectors agree with the importance of the bottlenecks. There are no clear differences between the

sectors in standardization activities. The three top bottlenecks are a long time to market, missing resources to participate and a too complex decision-making process.

What turns out to be no bottlenecks is the relevance of standardization for the companies, the access to the standardization process and that the benefits of standardization may be unclear.

A solution for the two bottlenecks concerning the complexity of the process and especially the time to market can be a CWA. A CWA can be created within a year with less complexity due to mostly less participants and easier decision making processes. If subsequently a standard is created through the normal process, the CWA is already usable until the creation of the standard is finished.

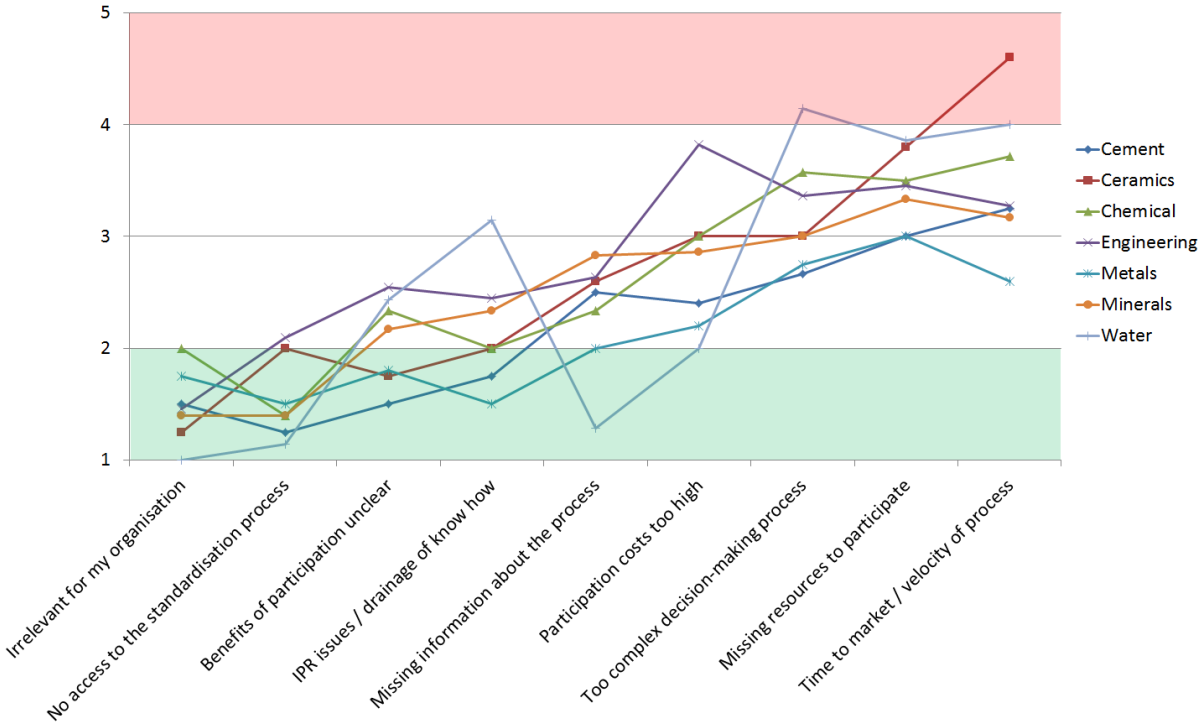

Figure 5 Bottlenecks in participation

The following list summarizes the bottlenecks that were indicated in the survey.

Processes

- Membership in committees is conservative / static.
- Unclear decision making processes; important decisions, parts of standards are often developed between Meetings on decision of the conveyors; very hard to get these "proposals" out of the draft-standard; often they go to enquiry.
- Very long way from development stage to approval and issue
- Need to speed up standardisation process (standards development)

Organization

- CEN-Consultant missing from the beginning for mandatory work. High priority, to avoid fundamental failures and misunderstandings for following standardisation work.
- Exact meaning translation of standards.
- Indirectly affected stakeholders, i.e. metal makers or recycling companies

- And you need 5+ countries in EU for a successful application for changes or revision

Expertise

- Lack of skills of authorities
- Language
- Lack of precision data for testing methods

Other aspects

- The opportunity for access is very limited for most SME.
- As association of a sector it is depending on which influence and when the members want to have.
- (Industrial) Standardisation processes are often parallel to democratic (political) regulation processes.

4.1.5 Standardization and innovation

Standardization can accelerate the market access of innovations. During the standardization process, different parties come together and contribute each other. Innovative products and the needs of the customers are matched.

It was asked if standardization is seen as an enabler for innovation. The possible answers ranged from -3 to +3. The neutral answer was 0. Nearly 50 % see the standardization as enabler for innovation, whereas around one third disagrees with the statement. 20 % of the answers are neutral. Some respondents also see standardization as restriction for innovation. But generally speaking it can be concluded that most companies foresee standardization as a helpful instrument in regard to the market uptake of innovations.

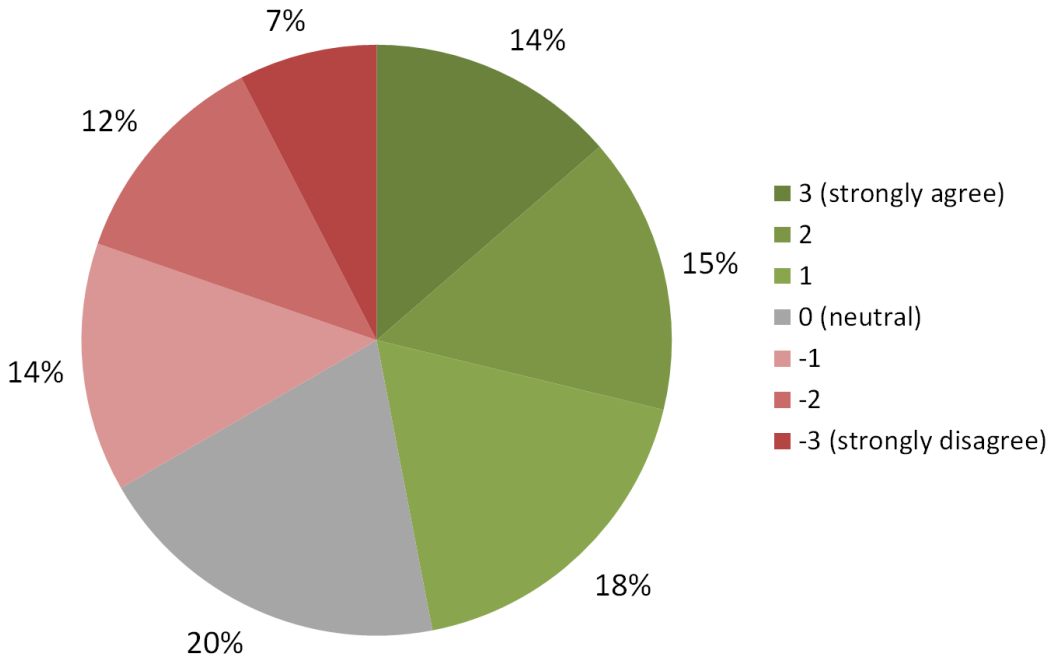

Figure 6 Standardization as enabler for innovation

4.2 Survey to associations

4.2.1 General information

Within WP4 it is required to analyze the current participation of the process industry in the European standardization in order to clarify the organizational structures of associations regarding standardization and to assess how effective participation is ensured.

Therefore, DIN developed a survey that was sent to the participation associations in order to collect input about the practical, implemented processes.

The survey was circulated in April 2018. In total eight responses were received from CEMBUREAU, CERAME-UNIE, EUROFER, EUROSLAG, Euroalliages. CEFIC contributed three questionnaires from two different departments. The results were mostly in written form which resulted in a qualitative analysis of the finding.

The full survey can be found in the ANNEX A: Survey to associations.

4.2.2 Participation in standardization

Generally it can be said that the associations are very heterogeneous with regard to standardization. One important conclusion is that all associations are actively participating in the standardization process on European level. Furthermore it was shown that generally all possibilities of participation are utilized especially directly but also via liaisons to contribute to and from standardization procedures.

However the degree of involvement differs strongly between the associations. Some associations are highly active in their field of activity due to significant benefits; on the contrary other associations show only a minor involvement. They do not perceive standardization as a strategic instrument facilitating companies and their innovations. Therefore, these associations mostly participate in specific areas of interest with a restricted bundle of methods participating in the process.

This shows, as the associations also indicated, that for some associations the importance of participating in standardization is only mediocre. Associations also have to conduct further tasks, which often have the foremost priority. Thereby, standardization is sometimes happening on a side stage, being subsequent to other essential responsibilities.

4.2.3 Structures of associations

The structures for participating in standardization implemented by associations vary strongly as well. In the following, it will be distinguished between the structures that organize the transfer between associations and members and the relations between associations and CEN.

In general, both approaches are indicated to be mostly designed as a flexible process that is initiated when the need is given. If initiated, the relevant people seek for a bilateral solution to satisfy the respective need.

In case of the relationship between associations and their members urgent issues are discussed within meetings that are flexible organized on demand. Information about required actions or the need for wider discussion is exchanged by mail, during meetings or shared by extranet. The information flow is mostly directed from the associations to members. Members can consult the association with standardization issues but the standard procedures which retrieve members input are improvable.

The associations indicate to be limited in their possibilities to contribute to the standardization process. Therefore, responsibility is often shifted directly to the members which have more freedom in participating in the standardization process.

The organization of exchange between CEN and associations resembles the structure between members and associations featuring the same discrepancies.

Exemptions that can be positively highlighted are associations that have regular standardized processes and fixed meeting schedules in order to discuss ongoing standardization activities. Using these procedures the associations have special working groups to focus on specific areas. These groups are used for a joint development of position papers focusing a certain scope. Also procedures to organize regular consultation of the members are implemented in order to generate input for the position and to exchange information about the common position. Furthermore, while most associations provide only few extra services in terms of standardization, some exemptions offer extra services as the analysis and information about upcoming standards, advice on participation possibilities, development of joint positions and finally the information about outcomes.

Mostly the input to European standardization bodies is defined in internal discussions, but also here some associations have good procedures in place enabling them to contribute proactively to standardization in their field of activity.

4.2.4 Perceived bottlenecks of standardization by the associations

The main challenges indicated by the associations of the process industry in case of standardization have a diverse character.

First, the period that is consumed by the standardization process is too long. Second, associations have limited possibilities to contribute to the standardization work since they have no voting right as liaison organization. Third, the access to information is sometimes difficult and could be improved.

A further challenge for an effective participation in standardization is the lack of qualified employees and enough resources to supervise the standardization process extensively.

4.3 Current participation of the process industry in standardization

The following mapping is meant to give a comprehensive overview about the current participation of the process industry in the European standardization, more precisely in the TCs of CEN/CENELEC. It therefore illustrates similarities and differences between the sectors. The map is based on the information generated throughout the project. It thereby summarizes and visualizes the information collected through both surveys as well as direct contact to the associations. The data was enriched by own research in databases of DIN, CEN and ISO.

The liaisons of following associations have been considered: CEMBUREAU, CERAME-UNIE, CEFIC and IMA-EUROPE. The three associations EUROFER, EUROSLAG and European Aluminum were merged to the sector "Metals" due to the purpose of clarity (see Table 1). A full list of TCs with the names can be found in the Annex Table 2 and the titles of the TCs in Annex Table 3.

Table 1 Lineup of sectors and the corresponding associations

Sector	Associations
Chemicals	Cefic
Minerals	IMA-Europe
Ceramics	CERAME-UNIE
Cement	CEMBUREAU
Metals	EUROFER, EUROSLAG, European Aluminium

Due to clarity and visualization reasons the sectors Water and Engineering were excluded from the mapping since for the corresponding associations WssTP and EUnited no liaisons could be found. The only data generated by the survey to the companies showed little participation: Companies of the engineering sector indicated to participate in the TC 250 and TC 340 while the water sector only participates in TC 164 and TC 426. The corresponding lines would be very short without adding further value to the mapping. For the associations ESTEP, EUnited, Eurometaux, WssTP or Euroalliages no data about existing liaisons could be found. This illustrates the above mentioned discrepancy between the sectors again. It cannot be excluded that the mentioned associations or their members participate in standardization using other ways; that have not assessed.

The design was chosen to provide a clear visualization of the dependencies between the different sectors and standardization as well as to easily present the complexity of the data. The lines symbolize the different sectors. Whenever a line goes through a station the corresponding sector participates in standardization at the particular TC mostly in the form of a liaison with the association but sometimes also by direct participation of a company.

This way it is easy to identify overlaps and the interlinkages of the process industry. Furthermore, it gives the possibility to show future potential and discrepancies between the initial analysis conducted and the further progress of the HARMONI project. To this extend the grey line shows TCs that were initially identified as committees with possible relevance for the process industry. Since no current participation could be identified during the research, these TCs resemble potential

points of future actions. The participation of associations (mainly liaisons) is indicated by the grey colored stations, while TCs without association participation are indicated in white.

In general, it is seen that some sectors participate very actively in the standardization (having many stations) while others participates only slightly (having few stations). Another statement that is illustrated in the map is the strong relevance of in total five TCs which have four sectors participating. The five TCs are TC 89 “Thermal Performance of Buildings and Building Components”, TC 127 “Fire safety in buildings”, TC 137 “Assessment of workplace exposure to chemical and biological agents”, TC 351 “Construction Products / Assessment of release of Dangerous Substances” and TC352 “Nanotechnologies”.

Other TCs are only relevant for a specific sector, featuring no interconnection to other sectors. Some TCs that were indicated as important in the initial analysis play a minor relevance in the actual current participation.

Consequently it can be said, that the process industry is already participating in standardization but the degree of participation is very unequal leaving room for improvement and a higher rate of participation of some sectors. Also a common approach could be a useful improvement for the industry.

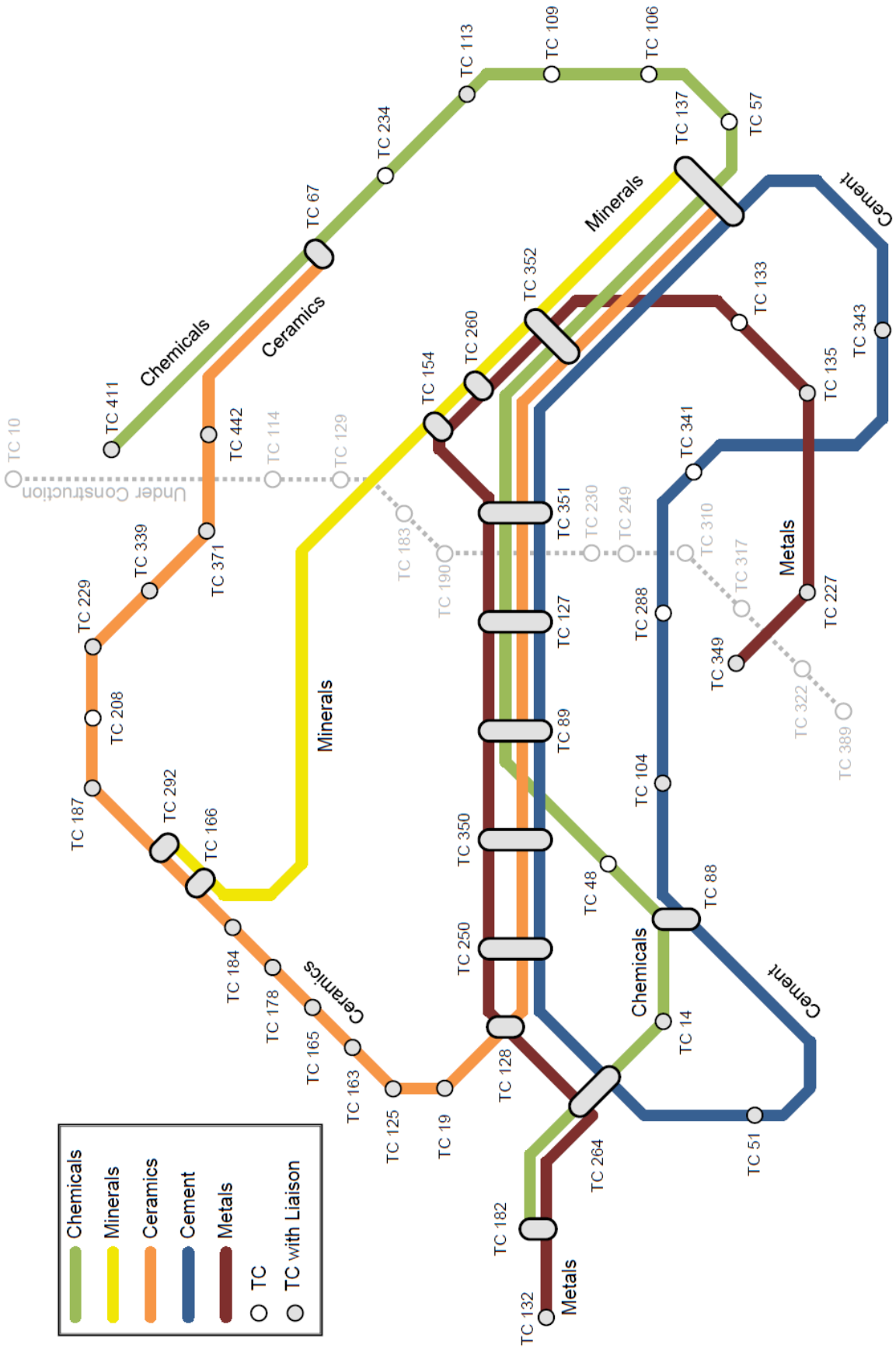

Figure 7 Mapping of current participation in standardization

5 Conclusion & Outlook

The results from the surveys for companies and associations as well as the mapping of the standardization activities lead to the following conclusions:

- The companies in the process industry seem to actively participate in standardization on national, European and international level.
  - Standardization, the access to the standardization process and clear benefits from standardization have a high relevance for the companies.
  - Main concerns are long time to market, missing resources to participate and a too complex decision-making process.

- Most approached individuals agree on standardization being an enabler for innovation.
  - For half of the companies standardization is perceived as an enabler for innovations.
  - Several arguments mentioned along the document indicate that CWA is an interesting tool for the process industry to support innovations.

- All associations in the process industry participate in the EU standardization process. The intensity of participation depends on the size of the association and the perceived importance of standardization.

- Associations which effectively participate in standardization, participate on the European level by themselves and on the national level through their members.
  - For the participation on the European level, associations have liaisons with relevant TCs, which means that they can directly participate as observer on a consultative basis and are informed about standardization activities.
  - For the participation on the national level these associations have processes and internal structures which ensure a bidirectional communication between the members and the associations. Usually workshops are held by the associations to inform the members about standardization activities, to identify needs, to discuss new standardization topics and to develop position papers.

- The mapping shows differences between different sectors.
  - Some sectors are very active and have liaisons with many TCs. Other sectors are only active in specific TCs.
  - The mapping visualizes the potential for further activities in standardization, indicated by the grey line.

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7 ANNEXES

ANNEX A: Survey to associations

General

Q1. For your Association, please rank the importance of steering/contributing to the standardization process.

0 (not important)	1	2	3	4 (highly important)

Association Structures and Processes

Q2. Please describe the internal process of your Association to define a position/input to be provided to European standardization bodies.

……

……

Q3. Which channels does your Association have to provide input to European standardization bodies?

……

……

Q4. Please indicate which board/entity you utilize for transmitting your position/input to European standardization bodies.

Technical or system committee:	
Coordination group:	
Sector forum:	
Liaisons:	
Mandate:	
Workshop:	
Other platform:	

Structures & Processes – Association Members

Q5. Please describe how you manage requests and suggestions of your members regarding the standardization process.

……

……

Q6. How do you coordinate the participation of your members in the standardization process, e.g. their participation at technical committees?

……

……

Q7. Please describe the way of providing information about standardization to your members, e.g. data management, data exchange.

……

……

Q8. Which additional service and benefits do you offer to your members regarding standardization, e.g. analysis of new standardization potential?

……

……

Challenges with the standardization process

Q9. In your opinion, what are the main factors preventing your effective participation in the standardization process, e.g. missing channels, missing services, missing information?

……

……

Q10. Which barriers or bottlenecks did your Association experience in the standardization process, e.g. access, timing, format?

……

……

Q11. Please indicate your main advantage from participating in the standardization process?

……

……

Q12. What could Sector Associations and national standardization bodies do to improve the participation in the standardisation process?

……

.....

Innovation as enabler

Q13. Do you consider innovativeness as an important instrument for the strategic development of your Association?

-3 (strongly disagree)	-2	-1	0 (neutral)	+1	+2	+3 (strongly agree)

Q14. Do you agree on standardization being a facilitator for your innovation process?

-3 (strongly disagree)	-2	-1	0 (neutral)	+1	+2	+3 (strongly agree)

Q15. How should the standardization process be modified in order to support innovation?

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ANNEX B: List of TCs relevant to the process industry

Table 2 Overview of TCs with involvement of process industry

Type	Number	No. of sectors	Participating sectors
CEN/TC	351	4	Cement, Chemical, Ceramics, Metals
CEN/TC	89	4	Cement, Chemical, Ceramics, Metals
CEN/TC	127	4	Cement, Chemical, Ceramics, Metals
CEN/TC	137	4	Cement, Chemical, Ceramics, Minerals
CEN/TC	250	4	Cement, Engineering, Ceramics, Metals
CEN/TC	352	4	Chemical, Ceramics, Minerals, Metals
CEN/TC	350	3	Cement, Ceramics, Metals
CEN/TC	264	3	Cement, Chemical, Metals
CEN/TC	88	2	Cement, Chemical
CEN/TC	67	2	Ceramics, Chemical
CEN/TC	128	2	Ceramics, Metals
CEN/TC	292	2	Ceramics, Minerals

CEN/TC	166	2	Ceramics, Minerals	
CEN/TC	182	2	Chemical, Metals	
CEN/TC	154	2	Metals, Minerals	
CEN/TC	260	2	Metals, Minerals	
CEN/TC	164	2	Metals, Water	
CEN/TC	288	1	Cement	
CEN/TC	341	1	Cement	
CEN/TC	104	1	Cement	
CEN/TC	51	1	Cement	
CEN/TC	343	1	Cement	
CEN/TC	229	1	Ceramics	
CEN/TC	187	1	Ceramics	
CEN/TC	208	1	Ceramics	
CEN/TC	165	1	Ceramics	
CEN/TC	184	1	Ceramics	
CEN/TC	125	1	Ceramics	
CEN/TC	163	1	Ceramics	
CEN/TC	178	1	Ceramics	
CEN/TC	339	1	Ceramics	
CEN/TC	371	1	Ceramics	
CEN/TC	442	1	Ceramics	
CEN/TC	19	1	Ceramics	
CEN/TC	411	1	Chemical	
CEN/TC	48	1	Chemical	
CEN/TC	57	1	Chemical	
CEN/TC	106	1	Chemical	
CEN/TC	109	1	Chemical	
CEN/TC	234	1	Chemical	
CEN/CLC/JTC	14	1	Chemical	
CEN/TC	113	1	Chemical	
CEN/TC	340	1	Engineering	
CEN/TC	133	1	Metals	
CEN/TC	135	1	Metals	
CEN/TC	132	1	Metals	
CEN/TC	227	1	Metals	
CEN/TC	349	1	Metals	
CEN/TC	426	1	Water	
CEN/TC	10	0		Identified in initial analysis; so far without participating sector
CEN/TC	114	0		
CEN/TC	129	0		
CEN/TC	183	0		
CEN/TC	190	0		

CEN/TC	230	0		
CEN/TC	249	0		
CEN/TC	310	0		
CEN/TC	317	0		
CEN/TC	322	0		
CEN/TC	389	0		

ANNEX B.1: Title of TCs

Table 3 Title of TCs

Type	Number	Title
CEN/TC	351	Construction Products / Assessment of release of Dangerous Substances
CEN/TC	89	Thermal Performance of Buildings and Building Components
CEN/TC	127	Fire safety in buildings
CEN/TC	137	Assessment of workplace exposure to chemical and biological agents
CEN/TC	250	Structural Eurocodes
CEN/TC	352	Nanotechnologies
CEN/TC	350	Sustainability of Construction works
CEN/TC	264	Air quality
CEN/TC	88	Thermal insulation Materials and Products
CEN/TC	67	Ceramic tiles
CEN/TC	128	Roof covering products for discontinuous laying and products for wall cladding
CEN/TC	292	Characterization of Waste
CEN/TC	166	Chimneys
CEN/TC	182	Refrigerating systems, safety and environmental requirements
CEN/TC	154	Aggregates
CEN/TC	260	Fertilizers and liming materials
CEN/TC	164	Water supply
CEN/TC	288	Execution of special geotechnical works
CEN/TC	341	Geotechnical Investigation and Testing
CEN/TC	104	Concrete and related products
CEN/TC	51	Cement and building limes
CEN/TC	343	Solid Recovered Fuels
CEN/TC	229	Precast concrete products
CEN/TC	187	Refractory products and materials
CEN/TC	208	Elastomeric seals for joints in pipework and pipelines
CEN/TC	165	Waste water engineering
CEN/TC	184	Advanced technical ceramics
CEN/TC	125	Masonry
CEN/TC	163	Sanitary appliances

CEN/TC	178	Paving units and kerbs
CEN/TC	339	Slip resistance of pedestrian surfaces - Methods of evaluation
CEN/TC	371	Energy Performance of Buildings project group
CEN/TC	442	Building Information Modelling (BIM)
CEN/TC	19	Gaseous and liquid fuels, lubricants and related products of petroleum, synthetic and biological origin.
CEN/TC	411	Bio-based products
CEN/TC	48	Domestic gas-fired water heaters
CEN/TC	57	Central heating boilers
CEN/TC	106	Large kitchen appliances using gaseous fuels
CEN/TC	109	Central heating boilers using gaseous fuels
CEN/TC	234	Gas infrastructure
CEN/CLC/JTC	14	Energy management, energy audits, energy savings
CEN/TC	113	Heat pumps and air conditioning units
CEN/TC	340	Anti-seismic devices
CEN/TC	133	Copper and copper alloys
CEN/TC	135	Execution of steel structures and aluminium structures
CEN/TC	132	Aluminium and aluminium alloys
CEN/TC	227	Road materials
CEN/TC	349	Sealants for joints in building construction
CEN/TC	426	Domestic appliances used for water treatment not connected to water supply
CEN/TC	10	Lifts, escalators and moving walks
CEN/TC	114	Safety of machinery
CEN/TC	129	Glass in building
CEN/TC	183	Waste management
CEN/TC	190	Foundry technology
CEN/TC	230	Water analysis
CEN/TC	249	Plastics
CEN/TC	310	Advanced automation technologies and their applications
CEN/TC	317	Derivatives from coal pyrolysis
CEN/TC	322	Equipments for making and shaping of metals - Safety requirements
CEN/TC	389	Innovation management