

Governance of electrotechnical standardisation in Europe

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Preface

Electrotechnical standardisation has a tradition of more than 100 years. Because it started earlier than standardisation in other fields, it has its own organisations at the international, European, and sometimes also at the national level. Seven of these independent organisations at the national level in Europe, DKE (Germany), Electrosuisse (Switzerland), OVE (Austria), NEC (the Netherlands), NEK (Norway), SEK (Sweden), and SESKO (Finland) asked me to conduct a study on the governance of electrotechnical standardisation in Europe. The two other independent National Committees (NCs) in Europe, CEB-BEC (Belgium) and CEI (Italy) were also involved in the project. These nine are a minority within the 33 members of the European Committee for Electrotechnical Standardization CENELEC, but industries in these nine countries provide the majority of experts and secretariats in European electrotechnical standardisation. The findings of this study do not necessarily reflect the opinions of these nine NCs – academic research should be independent.

The issue is topical. The European Union has commissioned consultancy firm EY to conduct a review study about the European standardisation system. Some national standards bodies in Europe have developed proposals for better alignment between the European Committee for Standardization CEN and CENELEC. Moreover, the Transatlantic Trade and Investment Partnership (TTIP) is a challenge for the European system. It is therefore time to evaluate current governance and possibly improve it.

As the report shows: the relevance of standardisation is undisputed and is continuing to increase, but the way standardisation is organised is up for improvements. The report provides suggestions for such improvements from the perspective of the independent CENELEC NCs.

I would like to thank these nine NCs for their confidence and support, and all interviewees for their willingness to contribute. Moreover I thank my student assistant Marijn Aalbrecht for his help, in particular with the interviews and data analysis, and Stephan Fertig, Sandy van der Meer-Lieftinck and Paul Wiegmann who checked the final draft and provided useful suggestions for improvement.

I hope this report contributes to a healthy future of standardisation in Europe, for the benefit of business and society.

Henk de Vries

Associate Professor of Standardisation

Executive Summary

This report provides recommendations about the governance of electrotechnical standardisation in Europe to seven independent National Committees: DKE (Germany), Electrosuisse (Switzerland), OVE (Austria), NEC (the Netherlands), NEK (Norway), SEK (Sweden), and SESKO (Finland). It answers the following questions:

1. How can formal standardisation be organised so that it enables industry to have optimal impact with minimal effort, without compromising reasonable participation and influence by other stakeholder groups?
2. Does CENELEC have any added value as a separate European standardisation organisation next to CEN and ETSI?
3. How can it be ensured that industry defines market relevance of standardisation projects?

The researcher first interviewed the general directors of these NCs and listened to their concerns. These concerns were then analysed using some additional interviews, professional and scientific literature, and the researcher's own experience.

Problems as perceived by the seven electrotechnical NCs include:

- Concerns whether industry, the main stakeholder in electrotechnical standardisation, can remain in the lead for both technical and for governance issues.
- Concerns that current governance directs most of its attention at the European level of standardisation, whereas the international level is far more important for industry.
- Concerns about the increasing influence of the European Commission and the decreasing influence of industry.
- Concerns about the complex governance structure of CENELEC and its counterpart CEN.
- Concerns about further integration of CENELEC and CEN, which brings more 'political' (non-technical) and European (non-international) issues to CENELEC agenda, leads to a decrease in the influence of the electrotechnical industry on policy, and results in sub-optimal solutions for the electrotechnical sector.
- Dissatisfaction with CEN CENELEC Management Centre that is supportive in regular technical work, but insufficiently supportive in governance-related issues and sometimes putting the wrong emphasis.
- Difficulty to align with newer CENELEC members from Central, Eastern and partly Southern Europe which tend to have less involvement of the electrotechnical industry and have a different culture, which leads to differences in input in CENELEC.
- Bureaucracy: the huge number of governance-related committees and working groups which leads to vast numbers of meetings and documents and puts a huge administrative burden on NCs.

Other interviews, industry position papers¹, and internal CENELEC documents confirm the relevance of these issues, but one specifically appears to be up for discussion: the wish to focus on the international level. Indeed, this is the natural level for industry, in combination with the national level. The European level is an artificial level for political reasons. But it is a reality. Standards have contributed to the single European market without barriers to trade. Standards are relevant for policy areas as well, such as sustainability and the digital agenda. Because CENELEC prefers to focus on rubberstamping international standards, the European Commission largely determines the European agenda and as a result, industry is no longer in the lead and may feel pressurised to participate in committees they would not have chosen themselves. Meanwhile the agenda of governance-related committees is overwhelmed by European issues, sometimes also related to politics. CENELEC, its sister organisation CEN, and their common secretariat CCMC have responded by creating even more committees, which generate new documents. As a result, the system is bogged down by bureaucracy and is no longer effective. In order to improve the situation, CENELEC, CEN, their members and CCMC have focused on more efficiency, but as will be explained in this report, this makes the situation worse instead of better because it draws attention to internal issues while the external environment requires more effectiveness.

An 'escape' is needed and two scenarios have been designed. Scenario A is in line with the wishes of the independent NCs: a focus on alignment with IEC. Scenario B advocates a more proactive European role. In both scenarios, the overload of committees and working groups is stopped simply by dismantling most of them. Although they may be important, they hinder more important work. Their work should stop or be (partly) taken over by the secretariat.

In Scenario A, the focus shifts further to the international level by aligning European structures and meetings with international ones and by putting the European Commission at a distance. Standardisation requests are no longer honoured, the default answer to these requests is 'no'. Compared to the current situation, CENELEC becomes leaner, industry can focus on technical standardisation issues, and the administrative workload of NCs is reduced considerably. It requires a more pro-active role of the secretariat. If CCMC is not prepared to play this role, then a move to another secretariat can be considered. However, this scenario more or less ignores European issues, and the default rejection of standardisation requests is not realistic. The focus on IEC leads to less rather than more integration between CENELEC and CEN, which may be beneficial for the electrotechnical industry but not necessarily for CEN and CENELEC members, particularly those members from countries that have a limited electrotechnical industry and thus hardly have any involvement in IEC.

In Scenario B, the needs in the European market get more priority. The market for electrotechnical components and products is global, but the market for systems in which these are applied can be global, European, national, or even local. In these systems, electrotechnology is interwoven with ICT, other technologies, and services. In Scenario B, CENELEC takes a forerunner role in developing architectures of standards for such

¹ Orgalime 2011a, 2013, 2014.

systems. It develops the electrotechnical standards themselves in cooperation with IEC, while leaving the remaining standards to other standards setting bodies, including ETSI and CEN. In this scenario, CENELEC cooperates with the European Commission but in a different way than it currently does – next to it, not under it. The proactive role requires a proactive secretariat that is knowledgeable in the art of systems-related standardisation. CCMC, in its current shape, is not in a position to play this role. Many conveners of committees and standardisation officers at the national level need additional education to enable them to lead and support this more sophisticated form of standardisation. In this scenario, CENELEC remains independent from CEN, 1) because of this sophisticated character, 2) to allow industry to be in the lead, 3) because of its relation to IEC, and 4) to ensure an external focus. However, if CEN moves in a similar direction, more integration between CEN and CENELEC makes sense at a later stage – the historical reasons for having separate organisations disappear due to the integration of technologies and markets.

First feedback suggests that most NCs involved in this project are not prepared to play a more active role in Europe and therefore prefer Scenario A. However, because its weaknesses, a third scenario has been developed that starts as an improved version of Scenario A and then moves in the direction of Scenario B. CENELEC's purpose would be to develop, approve and disseminate trustworthy and sound standards in the field of electrotechnology, relevant for stakeholders in Europe. In this growth scenario, CENELEC would start with a pilot project of system-related standardisation.

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1 Introduction

‘Just taking a look at the governance structure for example. It’s so complicated. It’s so difficult to get a good impression about who is influencing whom. If you just take a picture of the governance structure showing the governance of CEN-CENELEC together with certain joined bodies and separate bodies and who is preparing the decision for whom and finally is doing the decision. The whole system is so complex. Ok, Industry is asking: what do I get for my money? Where is my influence? Where is the efficiency?’

(Interviewee, Director General of one of the NCs).

Electrotechnical standardisation in Europe faces an issue of governance: how can it be organised in such a way that its main stakeholder, industry, is in the lead? This is the core question in this research project.

In the first half of the 20th century, national associations of engineers and/or industrialists took the initiative to found national standardisation organisations. During the years, emphasis shifted from developing national standards to providing the national input for standardisation at the international level: the International Organization for Standardization ISO and/or the International Electrotechnical Committee IEC. Triggered by the political initiative to establish a single European market without barriers to trade, a third level of standardisation was added: the European level. This effort has been very successful in the sense that differences between voluntary national standards have disappeared so they no longer form a non-tariff barrier to trade. The ‘New Approach’ has provided common regulation, mainly for product safety, which refers to voluntary standards, and this successful approach might be extended to other areas. The European Union’s involvement increases the importance of ‘government’ at the European level as an additional stakeholder next to industry, and emphasises that the technical contents of standards are not only important for business reasons, but also may relate to legislation. Moreover, the increased attention for societal issues adds societal stakeholders such as NGOs to the landscape and raises issues of legitimacy of the standardisation system and the resulting standards. On the industrial side, there have been numerous changes. These include the shift from products to (also) services, the shift from single products and services to complicated systems of interrelated products and services, the integration of ICT in all sectors, the pressure to shorten time to market and mitigate cost, and the shift of production towards Asia and the related emphasis on global supply chain management including conformity assessment.

These changes in the landscape of business interests and stakeholders raise challenges for the functioning of the standardisation system and the interrelationships between the national, European and global levels of this system. Traditionally the system was managed by ‘volunteers’ delegated by industry. However, companies may be reluctant to offer capacity for such tasks that benefit all. Moreover, the tasks themselves have become more complicated due to the reasons mentioned above. Meanwhile, at the European

level, the European Union is gaining more influence. As a result, industry representatives may have less direct influence on the agenda of European standardisation. The increase in the number of consortia suggests that formal standardisation has a shrinking share in the increasing 'market' of standardisation, and this raises the question whether the current system is becoming less attractive for industry. Industrial consortia are an alternative, and in some cases NGOs have introduced standardisation activities as well, for example, for fair trade or sustainable forestry. The result of these developments is a tangle of standards, difficult to trace and often competing. This may affect the effectiveness of standards as such and of the participation in standardisation in particular.

The history of electrotechnical standardisation differs from the other fields. It started at the international level from the outset, the IEC being founded in 1906. This start was dominated by private actors, whereas the start of many other standardisation organisations showed quite some governmental involvement.² The most important industrial countries at that time established National Committees. Until now, IEC exists next to ISO and, at the European level, CENELEC next to CEN. Nine European countries continue to have a separate IEC member body next to the ISO member body. The main issues in electrotechnical standardisation continue to be interoperability and safety, the latter also being related to legislation. Electrotechnical standardisation organisations at the global, European and national level seem to have more 'industry steering' than ISO, CEN and their national members. However, within Europe, this involvement is at stake due to the addition of new IEC/CENELEC members with a different tradition, the merger of some IEC NCs with ISO member bodies (recently in France), and the further integration of CEN and CENELEC. This raises concerns within the industry as can be seen from the 'Joint Call to CEN and CENELEC to place industry at the core of European standardisation governance' issued on 20 February 2014 by Orgalime and its member associations of European high-tech industry sectors.³ Apparently there is a governance issue and this is the focus of this research project.

1.1 Research questions

This research should answer the following questions:

1. How can formal standardisation be organised in such a way that it enables industry to have optimal impact with minimal efforts, without compromising reasonable participation and influence by other stakeholder groups such as Government/Legislator?
2. Does CENELEC have any added value as a separate European standardisation organisation next to CEN and ETSI?
3. How can it be ensured that industry defines market relevance of standardisation projects?

² Galland, 2001; Russell, 2007.

³ Orgalime et al. 2014.

The first question applies equally to ISO, IEC and ITU at the global level, to CEN, CENELEC and ETSI at the European level, and to the national members of ISO and IEC. The study will focus on ISO, IEC, CEN and CENELEC and their national members and thus will address the telecommunication field (ETSI and ITU) only marginally. The second question is about CENELEC's added value and the answers to the two questions should provide insights to discuss CENELEC's future.

1.2 Research approach

This research was conducted in three main phases

Phase 1: Problem finding

The above introduction suggests that there are problems, but this proposition should be confirmed (or rejected...) first. This was done by interviewing the directors of the seven CENELEC NCs that initiated this project plus the CENELEC Vice President Policy. The latter and the representatives from DKE and NEC were interviewed face to face, the other interviews were conducted by telephone. Their answers were analysed and the problems were grouped under 11 headings. Nine of these formed the basis for the next phase, problem analysis, the two remaining ones were beyond the scope of this study. NC feedback on the written report of the problem finding phase was used to make some minor changes in this report.

Phase 2: Problem analysis

For the analysis of the problems, the researcher relied on more than 30 years of own experience in standardisation, but also on standardisation literature and talks with representatives from industry and from the European Commission. Preliminary findings were discussed with a focus group consisting of representatives from the seven NCs plus the Belgian NC.

Phase 3: Design of solutions

Based on the problem analysis, solutions to these problems were developed. This is a creative process in which the researcher could build on his own experience and on the literature. The same focus group meeting was used to present draft solutions in the form of two scenarios. Based on the feedback, these scenarios were slightly modified, and a third scenario was added. Finally, a draft report was sent to the NC representatives for further feedback. The final report was checked by an industry expert in electrotechnical standardisation, an academic researcher in this field, and a linguistic expert.

2 Challenges for independent NCs

Interviewees mention several challenges for electrotechnical standardisation in Europe. These interrelated challenges are listed below. Citations have been anonymised.

2.1 Industry lead

The interviewees see industry as the main stakeholder of electrotechnical standardisation and therefore it seems evident that it should be in the lead, not only in technical matters but also in steering the process and setting priorities. Because the standardisation scene is becoming increasingly complicated, this steering and prioritising is also becoming increasingly difficult. Of course, industry should be supported by IEC, CENELEC and NC staff, but it should manage the process, set the agenda and take the decisions. This is not only the opinion of industry representatives, but also of all NCs that initiated this project:

‘The industry should get what they want. We only provide a platform to make standardisation possible by guiding the process.’

‘Industry has the necessary expertise and provides this expertise. This experts capital is valuable for electrotechnical industry. On national level, international level and also on European level. They have the best know-how of electrotechnical problems and details. They are also educated and know things behind the technologies on for example safety and environmental issues. They also work in research and development. They are part of the innovation process in our country. I guess in whole Europe because these enterprises are international. (...) The process should be voluntary and knowledge driven. Expertise, theory and research are always needed in the process of standardisation. The industry can deliver knowledge and should be committed to the process by participating’

2.2 Three levels: International, European, national

All interviewees have a strong preference for standardisation at the international level because the market is international and the main industries operate at a global scale.

‘We don’t want money for European projects. We want to go international.’

‘The industry in my country does not see the need of European standards and they definitely don’t see any need to copy the international standards and make some small changes (...) on the European level. (...) Of course we might need some home-grown standards in Europe. We can’t do everything in a global perspective. We know that, but if we need to do standards in Europe they should be market

driven. The organisation for doing this should be very slim, very limited so to say, very efficient.'

The 'rubberstamping' role of CENELEC is seen as a strength. Most CENELEC standards are unmodified adoptions of IEC standards and their adoption as European standards ensures that the IEC standards are implemented in the national standards collections of all EU and EFTA member states and other CENELEC member countries. Moreover, due to the international alignment, European stakeholders can fully profit from the international market of electrotechnical components, products and systems. Therefore, the standards have to be developed at the international level. European standards are needed only for some specific topics because of their relation to European legislation (in particular, via the New Approach), but even then there is a strong preference to develop such – mostly safety-related – standards at the international level.

'80% comes from the IEC and we want even to improve this to 95% or 99%.'

Several interviewees pointed out that if IEC were to adopt the leading role, then the European Standardisation Organisations (ESOs) CEN, CENELEC and ETSI should not have bilateral agreements with organisations in other regions or try to influence them, e.g. by sending a 'standardisation expert' to China, India or Brazil. This is expensive, requires the attention of NCs, and has no added value for industry in Europe.

'My industry can't understand why the European standardisation system wants to be everywhere in the world. In China, India. I don't know, doing a lot of promotion or negotiation with other countries. It confuses a lot of industries in the global arena when the European standards are marked or labelled as international standards but through the European system and once again put on the global market. (...). Use global standards as far as possible and don't compete with ISO and IEC.'

Proposals for a future governance structure of CENELEC should make it easy for industry to focus at the international level:

'The industry of electrotechnical sector, who is actively participating with its experts and secretariats at IEC level, is asking us not to duplicate the work of their experts participating to the technical work. And they are the main contributors of the standardisation system in terms of time their people devote to the technical work. The duplication of the European governance meetings is not essential for them (which, on the contrary, affects the NCs staff personnel), provided that the international work already done is not wasted in useless ping pong discussions at European level.'

2.3 System technologies

Electrotechnology is increasingly interwoven with ICT and with the fields in which the electrotechnology and ICT are being applied. Various standards setting organisations are related to these fields. At the international level these include IEC (electrotechnology), the ISO/IEC Joint Technical Committee on Information Technology ISO/IEC JTC1 (IT), ITU (telecommunication), and ISO (application areas such as mechanical engineering, construction and healthcare). At the European level, the organisations are CENELEC, ETSI and CEN. This raises the question, which organisation, if any, should take the lead in standardisation for complex systems.

‘In Europe we say there is a new trend, let’s talk about it. No action. This gives other parties the opportunity to pop up as the winner.’

For systems standardisation, the question is which level fits best – the European or the international level? The interviewees are clear about this: the international level should prevail.

‘Systems comprise components or subsystems coming from everywhere around the world which make an international focus necessary.’

This may also apply to initiatives from the European Commission – these can be directly forwarded to the IEC and this is what actually happens.

‘Innovation is not really taking place in Europe. In the electrotechnical sector it is international innovation. There is no European innovation. (...) There are some examples like smart grid where the Europeans did a good job but it’s only one highlight so to speak. (...) Give me one example where an innovative area is identified by the Commission which is not of interest at the worldwide level? I have no idea. There might be one issue: energy efficiency.’

However, there may be system priorities at the European level as well:

‘We talk about Europe. We need to have a better energy supply and energy market. We need to have a free energy market. We need to build energy resources for the future. We don’t discuss any of this. I don’t know why. Here we could do a really good thing for every country in Europe. Innovative. We could be very diplomatic on a standardisation level and we have all the technical players on board.’

And also the national and even local level may be relevant:

‘The problem is that different parts of the system may have a different focus. We have an international focus, but other system parts may have a European, national or even community focus.’

It can be argued that due to the trend of integration of technologies, there are no technical or market reasons anymore for electrotechnology to be an independent sector. Some of the interviewees disagree.

‘The electrotechnical sector should stay an independent sector. An alternative is to make it a subsector of other sectors.’

Apart from this discussion, new fields, and in particular system technologies, lead to a variety of groups within and outside CENELEC.

‘We have so many focus groups and coordination groups. Even the Commission has groups, CENELEC has groups. For a small country, or a small industry, it’s not clear where to go to. (...) It’s crazy. It’s a total mess. Since there are so many cooks, you never will get any meal out of it.’

2.4 Role of the European Commission

The European Commission sees standardisation as an important instrument for the functioning of the single market without barriers to trade, to strengthen Europe’s industry, to support innovation, and to facilitate the realisation of other policy objectives. Therefore, the EC influences the standardisation agenda both informally and formally. Informally, it does so by being in close contact with CEN, CENELEC (mostly via their common secretariat CCMC) and with ETSI. Formally, it does so via ‘Standardisation Requests’ better known by the old name ‘Mandates’. These are requests to develop one or more standards for a certain technical field. CEN and CENELEC are not obliged to accept these requests, but they strongly influence the standardisation agenda. The interviewees notice the increase in EC influence and give the following explanation:

‘The European Commission doesn’t have so much tools that work. I think they want the power of the standardisation. Standardisation is very powerful. I think they want that power so to say to control the market, to have a tool to control from the legalisation out to the technical decision of the standardisation, and also the content in the standards. They want to be a part of it and to affect it much more than they do today. You can see that there are more and more mandates for making standards. In different areas. Some of the areas really don’t need to be controlled by the authorities. (...) They want a stronger European standardisation. They want more innovative standards coming from Europe. They want that Europe speaks with one strong voice in the standardisation. Our industry doesn’t want that.’

‘The Commission wants a strong and fast standardisation system which they control. This makes it hard to move to the IEC level because the Commission don’t want to lose the tool of standardisation but we are convinced that there is no alternative.’

‘The Commission is afraid that they lose grip. Not on what CEN-CENELEC does but on what other parts of the world are doing.’

The EC provides financial support for CCMC and for the NCs, which means that it is more difficult for the secretariats to reject a request. The interviewees do not like the amount of EC influence.

‘EU standards should only be linked to some legislation, nothing else. Politicians should only set desired levels on, for example, safety or environmental aspects, and benefit from the expert knowledge available.’

Even in this case, IEC standards might be used. One of the interviewees suggests adding specific European modifications, needed because of European legislation, to IEC standards as extra information:

‘We develop these legal specialties for Europe as a national annex to an IEC standard which finally in Europe is just rubberstamped. That means, more or less, to shift the work to elaborate common modifications to the IEC level. At IEC it’s an informative annex but through CENELEC it becomes mandatory.’

The interviewees also have the impression that the EC would like more innovation of the standardisation system itself.

‘We didn’t change a lot in the last years and I think the Commission expects us to revolutionise the system. We should not try to maintain what we have but always look at what the benefit is.’

‘The Commission focuses on the CEN and CENELEC level and sees the national delegation principle as a burden to speed up the system. (...) ‘The Commission stresses the importance of SMEs but on the other hand doesn’t want national delegation.’

2.5 CENELEC governing structure

Any organisation requires a governing structure. In the case of CENELEC, the structure is confusing:⁴

- **General Assembly (GA).** The supreme governing body of CENELEC. It determines CENELEC’s policy. Members: delegations from NCs. It meets once a year.
- **Administrative Board (CA).** Manages and administers the Association’s business, prepares GA agendas and ensures correct execution of GA decisions. Twelve members, appointed by the GA.

⁴ CENELEC, 2015.

- **Advisory bodies:** Advise CA. Members: representatives of NCs, the number varies per topic.
 - **FINPOL – Financial Policy Committee.** Meets at least once a year.
 - **WG POL – CENELEC Working Group Policy.** Prepares items for CA.
- **Technical Board (BT).** Controls the standards programme and promotes its speedy execution. Members: President, Vice-President and one delegate from each NC.
 - **CENELEC BT Working Group 128-3 BT Efficiency.**
- **Presidential Committee.** Governing body created jointly by CEN and CENELEC and mandated by both Administrative Boards to manage and administer both associations' business with respect to strategic matters of common interest that are not sector-specific to CENELEC or CEN, like innovation and research, external relations, and common communications and visibility policy. Members: the common Director General, the two Presidents and the six Vice Presidents. Meets at least twice a year and reports to the two Administrative Boards.
- **Technical Bodies.** More than 300 **Technical Committees, Subcommittees** and **Task Forces** do the real standardisation work. They report to the TB. All consist of national delegations.

Additionally, there are ad hoc working groups, currently including:

- CENELEC Action Plan (resulting from a former WG Strategy CEN/CENELEC). CENELEC has six objectives, with a working group for each objective:
 - CENELEC Purpose
 - CEN-CENELEC-ETSI Joint Working Group Rules & Procedures
 - WG Internal Regulations
 - WG Membership
 - CENELEC BT WG 128-3 'BT efficiency'
 - WG ICT and Tools
- CEN-CENELEC Joint Working Group Education about Standardisation
- CEN-CENELEC BT Working Group 6 ICT Standardisation Policy
- CEN-CENELEC BT Working Group 7 Reduction of Development Time

It's not surprising that even permanent delegates get confused.

'I provide the boards with information. It's me who is providing all the documents and guide them through the process. If I get lost the board will get lost.'

'The governance structure is so complicated. It's so difficult to get a good impression about who is influencing whom. If you just take a picture of the governance structure showing the governance of CEN-CENELEC together with certain joined bodies and separate bodies and who is preparing the decision for whom and finally is doing the decision. The whole system is so complex. OK, Industry is asking: what do I get for my money? Where is my influence? Where is the efficiency?'

2.6 Merger with CEN?

Electrotechnology used to be a well-defined technical field with a related industry. However, it has increasingly been integrated with other technologies, and the business gets mixed with other sectors as well. This raises the question whether it makes sense to continue with separate standardisation organisations for electrotechnology (IEC / CENELEC), ICT (ITU / ETSI) and other fields (ISO / CEN). CEN and CENELEC already have similar procedures and a common secretariat (CCMC) so why not set a next step and integrate more or merge? The interviewees are not in favour of this option, and mention several arguments against a merger. These relate to differences in culture and practices:

‘CENELEC is more internationally focused than CEN. This is because CEN consists of a wide variety of sectors and some of them are more focused on the national level. 80% of our standards are coming from the IEC, which is a substantially higher percentage than the standards coming from ISO to CEN. (...). The way of working is very different. CENELEC starts working on the IEC level and then make modifications where CEN starts more often from a European perspective.

‘I know that CEN also has the wish to go to a more international level. (...) They have several sectors which still stick to the national level. The construction area for example. (...) Next, (...) they have a different understanding of the Vienna agreement. So at CENELEC we are used to really start working at the IEC level and then making the common modifications. We take the IEC standard and just modify those parts which don't fit with the European landscape. They are doing it completely different. They just, let's say, they start to develop European standards whenever they want.’

CEN has more projects funded by the EC. Money may bring influence:

‘At the electrotechnical side, the industry doesn't need, doesn't want this money for European projects. We want to go international.’

‘CEN is much more influenced by the Commission than CENELEC.’

The EC complains that the system of European standardisation is too slow. Interviewees have the perception that decision making at CEN side is slower:

‘When we have a lot of common bodies the system has to be adapted to the slower and more inflexible party. We are afraid that working with CEN slows us down.’ (...). It's not feasible to force the slower system to go the faster way. It's always the other way around. The fast system has to slow down until it fits to the slower system.’

A prerequisite for a merger is that it should improve the situation for electrotechnical industry.

'I'm completely open to a merger of CEN and CENELEC as long as the system is very efficient, powerful and fast. But there seems to be little will to make it lean and efficient.'

2.7 CCMC

The CEN-CENELEC Management Centre (CCMC), located in Brussels, is in charge of daily operations, coordination and promotion of all CEN and CENELEC activities. CCMC is responsible for handling the tasks assigned to it by both CEN and CENELEC General Assemblies, the Administrative Boards and the Technical Boards. CCMC is also responsible for correspondence and liaison with the services of the European Commission and the EFTA Secretariat. CCMC is headed by the Director General of CEN and CENELEC, with a staff of some 80 people.

Interviewees are not happy with the merger of CEN and CENELEC offices in CCMC. Traditionally, CEN has a closer relationship with the European Commission and as a result of the merger, CENELEC NCs are faced with more EU policy-related issues.

'What I see coming from Brussels, from the CCMC, is more and more documents to be handled and most of them are set up in a very political way. It's more political work and less technical work. I don't like that at all. We want to work with the technical work to make the world, Europe even better. Still we have to work more and more on political issues. I don't know why but I see it. CCMC is doing what they can do to handle all this. This is not critic towards the CCMC because I think they do the best as they can. And in some way they are also doing a good job for us. I can't see the necessity to work on more political issues. I want to do less political work and more technical work.'

Some interviewees raised the issue that CEN, CENELEC and CCMC have the same head, General Secretary of CEN, General Secretary of CENELEC, and CEO of CCMC, although the interests may differ. This sometimes leads to situations where CCMC forces CEN and CENELEC to align points of view. For instance, a CENELEC decision to give preference to English as the only official language was overruled by CCMC because CEN took another position. This is another complication for CENELEC NCs. Two other examples relate to common systems to be used: the mark-up language XML and the collaboration tool Lifelink:

We had a quite flexible system at the CCMC side when it comes to processing of standards but now it is extremely formalised and slower. Now we got the discussion about the XML format. (...) This XML format discussion is triggered by ISO because they used XML. So it came via CEN to the CCMC. Now they ask us: in the next year you have to deliver all your files in XML. And I ask: what is the

benefit for our technical experts to deliver in XML? They can't give one single argument what the benefit is for our stakeholders. Then it even gets worse. They now have decided for administrative reasons that our technical experts in the committee have to deliver a special format of the files in XML on the one hand, and they have to deliver separately the pictures because this doesn't fit together. Our experts have additional work to do. (...) It's not getting more efficient, it's getting more and more difficult. We 'need' it because CEN has it.'

'Lifelink is a mess. Now, you have to use it. It's more efficient to have just one system. I said: Yes, but take our system. It's much better. Much more flexible. It's a very lean and very simple system but no, we have to use the Lifelink system. I said: why?'

CCMC is partly funded by the EC but faces budget cuts.

'Something has to be changed in order to cope with the reduction of the contribution from the Commission. I don't want to increase the membership fees.'

The merger of the two secretariats to CCMC was intended to lead to more efficiency and the financial figures show that it did, but NCs have to pay the same membership fees. This is related to the decrease in EU funding. The merger did not lead to better coherence between the standards from the two fields.

If even more emphasis shifts from work in CENELEC to IEC, then the role of the secretariat, CCMC, can be further reduced. This should lead to cost reduction. Moreover, some interviewees raise doubts about the cost-effectiveness of CCMC:

'Our idea is to focus everything on the IEC. To get back on the steering wheel. Finally this will lead to cost reduction, efficiency improvement and so on. This is quite beneficial for us, the big ones, but for the smaller ones as well because they have just the idea of cost reduction. Of course they want to have service at the CCMC but they don't want to pay for that. So we have a joint goal. (...) To shift the work to the IEC level finally leads to a reduced CENELEC office.'

To summarise, the interviewees do not see any benefits of the merger. Instead they notice the drawbacks in the form of extra paper work and CCMC interference to align positions with CEN, both sometimes leading to disadvantages for the electrotechnical industry.

2.8 Second generation member countries

CENELEC's predecessor CENELCOM was set up in 1959 by the EU countries Belgium, the Netherlands, France, Germany and Italy. In 1960, the CENELCOM members together with Luxembourg and the EFTA countries (at that time) Norway, Sweden, Denmark, UK, Switzerland, Austria and Portugal set up the CENEL cooperation to discuss IEC standards and to find out, by means of questionnaires, how far these standards were

being uniformly implemented within the 13 countries. Soon, Finland joined as well. In 1973, CENEL and CENELCOM merged into CENELEC, also including the Irish Republic but without Luxembourg. Spain joined in 1977, Luxembourg in 1978, Greece in 1980 and Iceland in 1988. The majority of these still have a separate CENELEC NC next to the CEN member body (Norway, Sweden, Finland, the Netherlands, Belgium, Germany, Switzerland, Austria, and Italy). Since 1997, anticipating EU membership, Bulgaria, Croatia, Cyprus, the Czech Republic, Estonia, Hungary, Iceland, Latvia, Lithuania, The Former Yugoslav Republic of Macedonia, Malta, Poland, Romania, Slovakia, Slovenia, and Turkey have become members. These countries do not have their own CENELEC NC. Most of them also have a smaller electrotechnical industry and thus less tradition in electrotechnical standardisation. The members of countries that used to be under influence of or part of the former Soviet Union have a different standardisation tradition in terms of the role of the national government. Since 2005, these countries in Central, Eastern and Southern Europe have the majority in CENELEC. According to countries that have an independent NC – the countries that initiated this research project – this causes some unforeseen challenges for the functioning of CENELEC:

‘The new members are blocking items in the system because they are not really interested in the electrotechnical sector.’

‘Countries without an electrotechnical industry miss the expertise to contribute to the process and should not have a vote in the standardisation process. It’s very strange that the countries with a long history in the electrotechnical sector can’t decide upon the future standardisation. It’s very important that the sector can decide because they know what is needed.’

‘Countries with no expertise are not able to make the right decision which lowers the competitive position in comparison with Asia, India or the USA.’

‘The technical decisions are done in a weighted voting system but at the governance level all votes are equal. The political decisions become more and more important and there the small countries have the same influence as we have even when they have no industry or proper knowledge. Wrong decisions can be made which can be costly for the industry.’

‘The new countries are dependent on government funding and will vote how the government wants them to vote. These countries have on average less economic power and industrial experience. These factors are not in balance compared to the power in the voting system. They vote with the same power as Germany or Great Britain which is unbalanced. A comparable system as in IEC could be a solution. Only participating members have a vote and observing members can only raise their concerns but can’t vote. In this way the system becomes more knowledge driven and prevent influence from countries which just vote yes.’

‘Most of these countries are used to centrally developed standards which are compulsory. (...) Countries which enter the EU are required to cooperate in the

standardisation process but some don't have the experience and history. The problem is that they don't want to invest money and resources in the process and are only waiting for compulsory standards. (...) Standardisation has to basically be voluntary, not a driving part of legislation.'

However, despite these complaints, the interviewees did not provide evidence of (in their perception) wrong decisions due to this majority. Rather, participation in CENELEC seems to be quite a burden for these countries.

'They see the meetings and documents from the CCMC as a burden. Mainly because they don't have an industry to talk to. As a result they often don't know what we are talking about.'

'At the governance level, they are not visible. They complain about cost, and not only that but also about documents they receive from CCMC and all the questionnaires, all the meetings. That's a too heavy burden for them. This is apart from the TCs themselves. It's mainly a burden for them because they have no feedback from stakeholders. Just take the preparation of the BT meeting. Tomorrow we have the BT meeting. It's an agenda of about 20 pages with many technical topics and political topics. In our country we have a quite clear cut system, as it is in the Netherlands, Austria and everywhere, where we try to collect our stakeholders' point of view and then we make a consolidated viewpoint. Then I go to the BT and represent the view of our industry. Our stakeholders' view. When you look at the smaller countries they are sitting in the BT with no clue of what to say. We have 20 pages of real detailed things where you need industry feedback. They are just sitting there and sometimes they don't even know what we are discussing about.'

Countries with less tradition in electrotechnical standardisation tend to participate less in policy issues. For instance, they did not participate in the preparation of recent amendments to the articles of association of CENELEC.

'Standardisation should be voluntary, market driven and satisfying the industry. The Eastern countries don't have an electrotechnical industry which makes them passive in the process. They seldom have input when we talk about innovation because they don't have a history in the electrotechnical sector and I have my doubts whether the Eastern countries want to participate at all. They are used to a more bureaucratic, administrative standardisation process dictated by the authorities instead of the voluntary market-driven standardisation. Now it has been some kind inefficient system in the middle.'

'We don't want to have any Commission money because we want to be independent but the countries from the East want the opposite. They want more money from the Commission. They don't have this history in CENELEC and market driven organisation. Standardisation in the former East, Romania, Hungary, Yugoslavia was owned by the authorities. The authorities did all the

standardisation work. It's a kind of double shaped. The one is market driven and the other ones comes from an authority driven, or whatever you call it. It has been some kind of trash in the middle.'

Most 'old' members have an independent NC, the new entrants do not.

'The majority switched over. The old countries missed to face this new challenge of these 10 new countries. We thought it would be as it has always been but we missed to adapt our structures with the voting system to the new situation.'

To summarise, the interviewees' NCs form a minority now although their stakeholders still represent the majority of the electrotechnical industry in Europe. They are afraid that the new majority may take technical or governance-related decisions that are not in the interest of this industry.

2.9 Red tape

In the perception of the interviewees, European standardisation has become increasingly bureaucratic.

'The system has become too bureaucratic.'

'We have to handle more and more political issues and more and more documents.'

'We have to document what we do in a detailed manner. I don't need all this information. I don't want new reports or new tools. My country has only 5 million residents.'

'The governance structure should be clear and non-bureaucratic. The structure of CEN-CENELEC is very complex. It has become very formalised and slow.'

'We know that not everything can be done on an international level but standardisation in Europe should be done by a slim and efficient party, by a market driven process.'

Bureaucracy at the European level has repercussions at the national level, both for the standards development process itself and for the administrative role of the NC. In particular, the standards that do not originate from IEC require a lot of attention for NC staff.

'80% of the standardisation is coming from the IEC in the electrotechnical sector and only 20% is really European. (...) 80% of my work is done for 20% of the standards. I'm fully covered with European business.'

The European Commission also requests information, the need of which is not always clear:

'Tomorrow we have to make more recalls to Brussels, to the Commission. We have to tell them what we are doing in a more detailed way. I don't know who needs this information. I don't need it. Don't ask people to do things they don't need. I don't think that the politicians really understand how to use the trends and the data in a constructive way for the future.'

2.10 Business models

Business models of standards bodies are outside the scope of this project, but these models are related to governance of standardisation. Each NC has its own business model. Most NCs rely on income from standards sales. Others (also) have governmental funding and some get income from participation or membership fees. Who should pay for (CEN and) CENELEC and their CCMC: members and/or the European Commission?

'The user of the standard should pay for the process.'

'The countries which profit from the standardisation and have an influence in the process should pay for it. The EU tax payer will pay for the EU driven standards, but in my opinions the user of the standard should pay for the process.'

'Financing is an issue. The Slavic countries don't want to put money in the process. Of course they don't have any electrotechnical industry so it's natural that they don't put money. But it's not right that they can decide on an administrative level on the future of electrotechnical industry on European level if they don't have anything in this sector.'

'We want to stay independent. If you agree to funds you will become a prisoner. Eastern countries would like to see these funds.'

2.11 Stakeholder involvement

Interviewees are not satisfied with the prominent position the European Commission gives to 'Annex III organisations': (EU-funded) associations for SMEs, consumers,

workers and environmental affairs at the European level.⁵ Their role affects CEN and CENELEC's country model – all stakeholders are assumed to be represented at the national level. Indeed, all are welcome, but in practice participation is unbalanced. This is the rationale behind the European Commission's choice to give these four categories of 'weak' stakeholders a voice at the European level.

2.12 Conclusion

The general directors of independent CENELEC member bodies all aim to support the electrotechnical industry in their country. From this perspective, they perceive a set of interrelated problems. These include:

- Concerns whether industry, the main stakeholder in electrotechnical standardisation, can remain in the lead for both technical and for governance issues.
- Concerns that current governance directs most of its attention at the European level of standardisation, whereas the international level is far more important for industry.
- Concerns about the increasing influence of the European Commission and the decreasing influence of industry.
- Concerns about the complex governance structure of CENELEC and its counterpart CEN.
- Concerns about further integration of CENELEC and CEN, which brings more 'political' (non-technical) and European (non-international) issues to CENELEC agenda, leads to a decrease in the influence of the electrotechnical industry on policy, and results in sub-optimal solutions for the electrotechnical sector.
- Dissatisfaction with CEN CENELEC Management Centre that is supportive in regular technical work, but insufficiently supportive in governance-related issues and sometimes putting the wrong emphasis.
- Difficulty to align with newer CENELEC members from Central, Eastern and partly Southern Europe which tend to have less involvement of the electrotechnical industry and have a different culture, which leads to differences in input in CENELEC.
- Bureaucracy: the huge number of governance-related committees and working groups which leads to vast numbers of meetings and documents and puts a huge administrative burden on NCs.

⁵ SBS (Small Business Standards), ANEC (The European Consumer Voice in Standardisation), ETUI (European Trade Union Institute), and ECOS (European Environmental Citizens Organisation for Standardisation).

3 Analysis

This chapter analyses the challenges raised by the interviewees using the same sequence as in Chapter 2. Is evidence available? What are the causes of the problems mentioned? Will other stakeholders agree? In order to improve the situation, change will be needed and therefore Section 3.12 uses a strategic change approach to discuss which kinds of changes might be feasible.

3.1 Industry lead

The electrotechnical industry needs standards to ensure that components, products and systems are interoperable and safe, and to support healthy competition in the market. Moreover, standards set common baselines for technology development. From a historical perspective, electrotechnical standardisation stems from joint efforts by (associations of) engineers and, in particular at IEC level, also scientists such as Lord Kelvin.⁶ Industry got involved via engineers. This industry included manufacturers of electrical components and equipment, and electricity companies. So this field of standardisation had multi-stakeholder involvement from the outset. The term ‘industry’ may hide this. Moreover, industry includes a diversity of companies in terms of, for example:

- size (from very small to very big)
- geographic coverage in production (single plant versus multinational)
- place/role in the supply chain (components, subassembly, product, system, grocery, retailer, installer, test institute, certification body, etc.),
- market size (local, national, European, international)
- market (business to business or business to consumer).

In the case of integrated systems, other stakeholders are also relevant, for example, medical institutions and insurance companies in the case of medical systems. Moreover, governments at the national and European level cannot be ignored, and societal stakeholders such as trade unions, consumer organisations and NGOs have become increasingly relevant.

In relation to standardisation, Jakobs⁷ distinguishes three categories of companies: Contributors, Followers, and Spectators:

- ‘A Contributor company is an active participant in the standardisation process and contributes to the development of the content of the standard. Yet, it is less interested in (or lacks resources for) influencing the strategic direction of an SSO.⁸ Innovating companies and manufacturers typically constitute this category.
- Followers want to enjoy full membership privileges and may occasionally want to influence the technical contents of a standard (in addition to gathering intelligence).

⁶ Frary, 2004; Teichmann, 2001.

⁷ Jakobs, 2014.

⁸ Standards Setting Organisation.

They are, however, not very interested to influence the strategic direction of an SSO. Large users, SME vendors and manufacturers are typical members of this category.

- A Spectator's main motivation for participation is intelligence gathering. Spectators do not actively contribute to the creation of the standard. Rather, they want to be informed about the technical nuts and bolts of a future standard. Typically, this group primarily comprises academics, consultants, and to some extent, developers and system integrators.'

The interviewees are afraid that essential choices are made by 'bureaucrats' from standards bodies (!) and the European Commission. However, data from CENELEC⁹ suggest that the industry is currently failing to take the lead in CENELEC. The main reason is that the industry thinks that IEC should take the leading role at the international level, and therefore wants to focus its involvement mainly on that level – this applies to both industry and to NCs. Indeed, the market for electrotechnical products is global, and many of the producing companies are multinationals or are located outside Europe, so in this sense there is no need to have other European standards than those fully identical to IEC standards. However, not only standards related to European (safety) regulation may be specific for Europe. Standards for complex systems in which electrotechnology is integrated with ICT is an application area which may be specific for Europe or relate to European priorities (and even the national or local levels may need specific standards). Examples include multi-modal transport, home care for the elderly and water management ('smart dikes'). Even the fully electrotechnical topic of the future energy supply in Europe has not been seriously discussed in CENELEC. The European Commission launches standardisation requests on such topics. Then industry has to react to these proposals and, if approved, may feel forced to participate in TCs whose agenda has been set mainly by the EC. Rather than blaming the EC, the industry, NCs and CENELEC might think about how to avoid this in the future and take the lead themselves, in balanced cooperation with other stakeholders. This will be further discussed in the next chapter.

The lack of industry lead at the European level may also relate to another issue: the difficulty for industry to send knowledgeable people who can devote a substantial amount of time to standardisation. Traditionally, these were mostly experts from bigger companies such as Siemens and ABB. Such companies used to have, and in several cases still have, a standardisation department. However, such staff positions are in jeopardy or have already disappeared due to several reasons such as the following:

- Their work is service work with limited possibilities for automation. Other functions within companies, in particular, production, can profit much more from automation. This has made standardisation relatively more expensive.
- This applies to other central administrative staff functions such as human resource management and quality management as well. Meanwhile, it is business fashion to de-staff administration and leave it to the line organisation to take up traditional administrative tasks. Standardisation suffers even more because its strategic

⁹ The researcher received all governance-related documents that were sent to the CENELEC NCs by CCMC at the end of 2014 and at the beginning of 2015.

importance is not well understood. As a result, systematic attention for and knowledge of standardisation disappears – but who cares?

- This ‘who cares’ attitude relates to the company’s incentive structure. The Anglo-Saxon short-term shareholder thinking tends to ignore standardisation because by definition standardisation investment requires a medium-to longer-term perspective because most benefits will come after some years. This means that the activity can be scrapped in the short term without immediate harm to the company.
- Company management and business consultants lack knowledge about the strategic importance of standardisation – unseen and unloved.
- Practitioners lack knowledge and skills to do a good job and as a result often do a poor job, related to technical documentation rather than company strategy.¹⁰
- As a result, the tasks may be given to relatively older people who are experienced and conscientious, but maybe less open to new developments.
- Lack of recognised education with related academic and professional qualifications hinders the recognition of the professional as well as the profession.
- The lack of education relates to the lack of manifest demand. The request for standardisation education should come from industry, but they lack the knowledge and vision to request it – a typical chicken-and egg situation.

These interrelated factors constitute a situation in which it is increasingly difficult to send qualified people to technical standardisation committees and even more difficult to delegate people for governance-related activities. The alternative is to send staff from the NCs – they are full-time standardisers. However, the question is to what extent can they translate opportunities for industry and other stakeholders into an agenda for future standardisation? Most of the above-mentioned factors apply to them as well. So there is not only a capacity problem, but also a problem of knowledge and skills. This will also be addressed in the next chapter.

3.2 Three levels: International, European, national

Three levels of electrotechnical standardisation can be distinguished: international (IEC), European (CENELEC) and national (the NCs). The IEC continues to develop relevant standards and it makes sense to rubberstamp these as European standards to ensure adoption in national standards systems in Europe and to allow reference to these standards in European legislation. Moreover, the Stand Still Procedure¹¹ in combination

¹⁰ For instance, in the case of the task of industry participation in international standardisation, research has revealed more than 100 factors that contribute to successful participation (Brons, 2007). Most participants in international standardisation are not aware of such factors. They spend several days or weeks a year in standardisation activities and have the impression that they are doing a good job, but are not aware that their efforts could be much more effective.

¹¹ Agreement between CENELEC NCs not to take any action, during the preparation of a European Standard (EN) or after its approval, that could prejudice the intended harmonization and, in particular, not to publish a new or revised national standard that is not identical to an existing EN.

with the Dresden Agreement¹² avoids the development of deviating national standards. This approach is relevant also for the Transatlantic Trade and Investment Partnership. The best way to achieve the goal of “one standard, one test, accepted everywhere” is via international standards, developed by IEC (and ISO) and implemented in the national standards systems.¹³ Whereas the US has competing standards and also deviations per state, Europe has achieved harmonisation. This is a success story. However, as mentioned before, the European, national and even local level remain of importance. In fact, the local level is becoming increasingly important as part of the counter-movement against globalisation.¹⁴ This should also be a reason to strategically discuss standards development at the European level and then to decide which level or combination of levels is most appropriate.

For this discussion, it is necessary to distinguish the geographic spread of the *use* of the processes, products, services, and systems for which the standards are developed and the geographic spread of the *production* of process elements, products, services, and systems. To start with the use side, the question is: is there any reason why the processes, products, services, and systems should differ in different parts of the world? If not, then the international level is the natural one. If there are differences, then the question is: should the use be discussed at the lowest level applicable or at the levels above as well? For instance, in Switzerland, standards for climate systems in houses may differ per canton because requirements for buildings differ per canton. The national level is relevant, but also the EU level because of a relation to legislation such as New Approach directives. Many system components are identical to components for similar systems anywhere else in the world. Typically, standards for such systems should be discussed at all levels, and here the alignment between IEC and CENELEC and the current system of national membership (NCs) is a major strength.

At the supply side, the same levels apply. In this Swiss example, installers in their own canton will be more familiar with local standards than installers from other cantons, and they may have to comply with national safety standards for their operations. Component manufacturers may produce for the global market. So also from a supplier perspective, standards should be developed and discussed at different levels. Moreover, in order to influence standards at a ‘higher’ level, it can be beneficial to first develop them at a lower level. A company standard may be used as the starting document for a national standard, which in turn may be the starting point for a European or international one. This is an effective strategy because parties that bring a starting document for a new standard have much more influence than all other participants who then comment on that document.¹⁵ Due to this mechanism, promoting national or European standards for inclusion in other standards collections may be beneficial for the ‘home’ industry.¹⁶ Developing standards

¹² Agreement between IEC and CENELEC for parallel development of international and European standards.

¹³ Orgalime, 2015.

¹⁴ Alpe et al., 2013.

¹⁵ Blind, 2009; de Vries, 1999; Simons & de Vries; 2002; Swan, 2010.

¹⁶ An example is the agreement between BSI and China to put forward British and European standards for potential recognition in China. ‘Following the signing of this historic agreement (..) we received numerous

at the European level first, with a limited number of countries that have some similarities in culture and business practice may be easier than developing such standards at the international level from the outset. To conclude, it is important to note that although the international level is the most relevant for the industry, the European and national levels are important as well.

3.3 System technologies

Standardisation is an important instrument for successful technology conversion, in particular, in early stages of development. So standards are needed and it is a challenge for standardisation organisations to develop sets of coherent standards for convergent technologies.¹⁷ In a technical sense, electrotechnology is interwoven with ICT and other fields, and as a consequence, markets also converge.

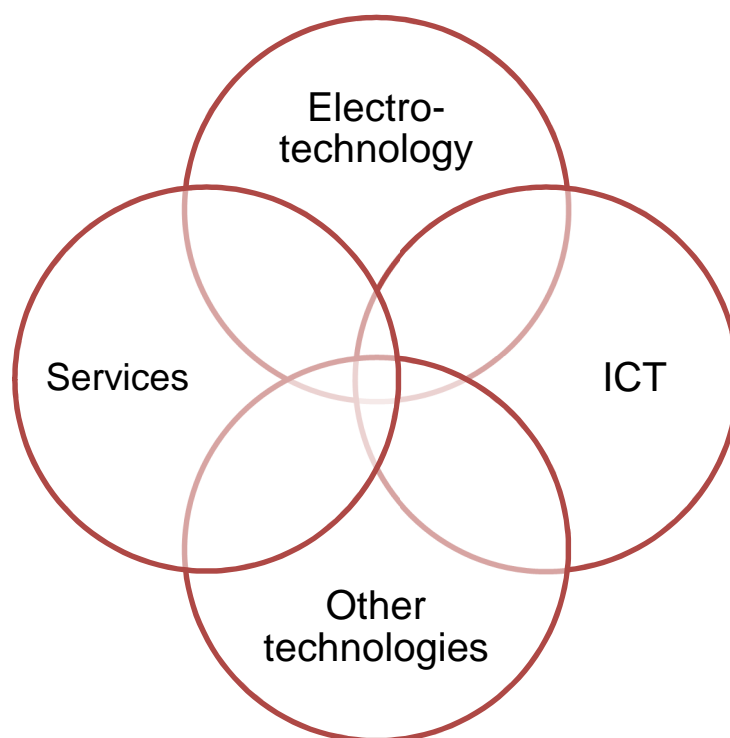


Figure 1: Converging of technologies and related markets

Specific electrotechnical standards remain, but in complex systems standards from various domains are combined and some standards are a mix of various domains, e.g., standards for specific sensors. The ‘natural’ level for developing system-related standards is case-dependent and may be local, national, European or international.

recommendations of British standards for adoption in China. The purpose of this recognition will be to promote UK trade in China.’ (BSI, 2014, p. 22).

¹⁷ Gauch & Blind, 2015.

The IEC introduced a systems approach to new fields of standardisation. ‘The multiplicity of technologies and their convergence in many new and emerging markets, however particularly those involving large-scale infrastructure demand a top-down approach to standardisation, starting at the system or system-architecture rather than at the product level. Therefore, the Systems Work will define and strengthen the systems approach throughout the technical community to ensure that highly complex market sectors can be properly addressed and supported. It promotes an increased co-operation with many other standards-developing organisations and relevant non-standards bodies needed on an international level. (...) The Systems Evaluation Groups (SEG) identify new technical areas and anticipate emerging markets/technologies that require a systems approach as well as define and implement enhancements to the TC/SC structure for improved functionality, notably to improve coordination on issues that cross traditional boundaries. Systems Committees (SyC) aim to extend the use of strategic or other horizontal groups to bridge areas covered by more than one or two TC/SCs. TCs with a Systems Function remain unchanged and continue working on Systems.’¹⁸

Topics for which the IEC uses a systems approach include Smart Cities, Smart Grids, Ambient Assisted Living, Electrotechnology for Mobility, and Smart Energy. Such projects may reveal whether it makes sense to also have standards for lower levels: regional, national, local, and maybe also standards from industry consortia, trade associations, or professional societies.¹⁹ But then it also makes sense to discuss sets of standards for systems at regional and national level if that system which is relevant for a region or country (e.g., standards for a Tsunami warning system) may be not relevant for Europe. But, maybe such a first impression is wrong (in the Tsunami case, European donor agencies may want to be involved and European manufacturers might design or produce system components). It can even be argued that the move towards the international level for systems standardisation and for global business will make the regional context become more and more important because these (connected) systems, especially with an increasing share of software, are not developed for a one stop shop, the system will have to be tailor-made to specific user needs. Then the context of complex products and systems becomes important. In network theory, complexity moves towards its edges if the complexity of a centralised system increases. Should the international level indeed be the natural level for systems standardisation or should European stakeholders take the initiative via CENELEC?

In order to develop a coherent set of standards for system technologies, a systems approach to standardisation is needed.²⁰ Using such an approach requires specific standardisation expertise. The question is whether companies, standards bodies, and other stakeholders have this expertise. In general, they lack it and this constitutes a problem for future standards development. Those with the better expertise, particularly Korea, may become the leaders in standardisation and this may result in business

¹⁸ IEC, 2014.

¹⁹ de Vries, 1999.

²⁰ See for a description and further references De Vries, 1999, Chapter 13.

leadership. In the Korean case, the expertise is related to the country's forerunner position in international standardisation education and research.²¹

The Expert Panel for the Review of the European Standardisation System (EXPRESS)²² has not addressed system technologies explicitly, but has recommended a link between the identification of future fields for standardisation and future foresight activities, including technology road-mapping under the R&D Framework Programmes – a notable advice.

3.4 Role of the European Union

The current role of the European Union in relation to European standardisation can be better understood by examining how their relation has developed over the years. First (3.4.1), we highlight some elements from the history of European standardisation. Next (3.4.2) we present some findings from an academic study on the European Commission's interventions in European standardisation. Then, we delve deeper into the roles of public and private organisations, and finally we discuss the relation between the EU and CENELEC.

3.4.1 History of European Standardisation

The roots of European standardisation are not in industry but in the Marshall Plan. On invitation of the European Organization for European Economic Co-operation (OEEC), a subsidiary body to the Marshall Plan, representatives from national standardisation organisations in Europe were invited for a meeting in Paris in the early 1950s to discuss cooperation in the field of standardisation to increase economic integration in Europe. Since then they have met every year.²³ The initial idea was to develop and unify standards of public interest and improve implementation, with national and international standards bodies responsible for the technical work. The French proposed integration within the framework of the European Economic Community, established in 1958, whereas non-member countries disagreed and founded the European Free Trade Association EFTA in 1960. To intensify the cooperation in the field of standardisation in Europe and ignoring the political tension between EEC and EFTA countries, the Comité Européen de Coordination des Normes CEN (later: Comité Européen de Normalisation) was created, in 1961.²⁴ CEN was reluctant to develop its own standards, but served to promote the development and application of ISO standards. CEN's first standard, EN 2, was published in 1972. The massive production of European standards started when the European

²¹ The Korean association of standardisation researchers, Society for Standards and Standardisation, has more members than its European counterpart European Academy for Standardisation EURAS. For the education side, see Choi and De Vries (2013). For a strategic analysis of the need for better education about standardisation in Europe, see Hesser & de Vries (2011).

²² EXPRESS, 2010.

²³ Abécassis 1995; Czaya, 2007; Hesser & Csaya, 2010; OECD, 2013.

²⁴ Abécassis, 1995; Czaya, 2007; Hesser & Czaya, 2010.

Commission requested specific standards that it could refer to in its directives, in the early 1970s.²⁵ CENELEC's history has already been described in Section 2.8. It was founded in 1973 and its emphasis has always been on the common adoption of IEC standards. The number of 'own' CENELEC standards has remained limited.

The third European Standardisation Organisation, the European Telecommunication Standards Institute ETSI, was founded in 1988. Before this time, the Conférence Européenne des Administrations des Postes et Telecommunications (CEPT) had been responsible for telecommunication standardisation in Europe. In the 1970s and 1980s, they took steps to exchange views with industry. The topic of functional standards (FSs), which provide a chosen set of functionalities from the options given in the Open Systems Interconnection (OSI) model, led to a competition between CEN, CENELEC and CEPT, each claiming this area. The EC and EFTA managed to convince them to cooperate on this issue and they created the Information Technologies Steering Committee (ITSTC). However, the national delegation system of CEN and CENELEC and the PTT membership of CEPT did not allow direct industry participation, which triggered the creation of the European Workshop for Open Systems (EWOS). The EU asked EWOS to develop European FSs. Neither OSI nor FSs became successful in the market, but this form of cooperation in standards setting was seen as appropriate for the ICT field and influenced a Green paper on telecommunications²⁶ in which the European Commission proposed to introduce competition in the telecom market, and to ensure interoperability by means of standardisation. An independent European telecommunications standards institute was proposed to assure the timely development of the necessary standards. The creation of this body caused another battle between CEN, CENELEC, and CEPT. CEPT finally managed to establish ETSI in 1988. ETSI is recognized by the European Union (EU) as an official European Standards Organization (ESO).²⁷

Czaya²⁸ concludes that the foundation of CEN and CENELEC, though based on private initiative, was motivated not only by technical and economic, but also by political considerations. However, better than politicians at that time, they managed to unite EEC and EFTA member countries. This tradition has continued. Today, non-EU and non-EFTA countries such as the Former Yugoslav Republic of Macedonia and Turkey are CEN and CENELEC members. ETSI has opened membership to companies outside Europe.

Meanwhile, there are more than 50,000 European standards and similar deliverables. Approximately 100,000²⁹ experts are active in standardisation committees at the European or national level. This requires a huge investment in time and thus money³⁰ but the business stakes should justify this. Research suggests that 10% to 30% of gross national product growth is directly related to such standards, which demonstrates the enormous importance of standards for the single European market.³¹

²⁵ Abécassis, 1995.

²⁶ Commission of the European Communities, 1987.

²⁷ Chauvel, 2004.

²⁸ Czaya, 2007; Hesser & Czaya 2010.

²⁹ Estimation by the author by extrapolating figures from some countries.

³⁰ Spring and Weiss (1995) estimated the cost of developing one IT standard to amount to \$ 10,000,000.

³¹ Blind & Jungmittag, 2008.

We can conclude that the start and growth of European standardisation was mainly triggered by the political environment, and this is continuing. The European Commission embraces it as an important instrument for the functioning of the single market without barriers to trade, to strengthen Europe's industry, to support innovation, and to facilitate the realisation of other policy objectives. However, it does this primarily by means of legislation – an instrument that might be counterproductive.

The first and most important EU initiative was to national legislation, mainly about product safety, and references to standards in this legislation. Meanwhile, this has been accomplished: product safety regulation has been established at the European level in the form of European directives. Its contents has to be implemented in national legislation. Then laws at the national level refer to the national version of the European standard. The 'New Approach' directives in which essential requirements for (mostly) safety are laid down started with the Low Voltage Directive in 1973.³² The 'New Approach' is a European success story, and the system is probably superior to the American one.³³

The first European legislation about standardisation itself was the Directive 83/189/EEC on a procedure for the provision of information in the field of technical standards and regulation.³⁴ This directive obliged national standards bodies to inform the European Commission and the other national standards bodies in EEC member countries about its standardisation programme. Other legislation relating to standards followed, for instance in the areas of public procurement³⁵ and product liability.³⁶ The most recent legislation, which combines several previous ones, was published in 2012.³⁷

The interviewees are not the only actors to express concerns about the current role of the European Commission. Relating to voting rights within standards bodies, Orgalime³⁸ argues: 'I strongly believe that it is not up to regulators to seek to impose governance rules on private organisations such as ESOs that would not be considered as acceptable and desirable by their members, the national standards organisations (NSOs). (...) It should be entirely up to ESOs to decide the conditions and procedures to put it in place to do it, free from any interference from public authorities.'³⁹

To conclude, there is an issue about the private character of national and European standardisation organisations. The increasing public recognition of the role of standards

³² Council of the European Communities, 1973.

³³ Therefore, the Transatlantic Trade and Investment Partnership (TTIP) is a serious danger to the European system, integration of the two systems would affect European industry. For a clear introduction to this topic see CEN-CENELEC, 2014.

³⁴ European Council, 1983.

³⁵ Blind, 2009.

³⁶ Stuurman, 1995.

³⁷ European Parliament and Council, 2012.

³⁸ European federation representing the interests at the level of the EU institutions of the European mechanical, electrical, electronic and metal articles industries.

³⁹ Orgalime, 2011b, p. 2.

has led to a growing interest from the public side to get a grip on standardisation by means of regulation and other measures such as ‘mandates’.

3.4.2 European Commission intervention in Standardisation

This subsection presents some findings from a recent study about interventions of the European Commission in standardisation.⁴⁰ As such, public authorities’ involvement in standardisation is not new. ‘For over two thousand years, political leaders have presided over the creation of standards and have used their authority to enforce the use of particular standards. Through this involvement, rulers and regulators sought to enhance their own prestige and power, while simultaneously seeking to improve their own economic fortunes and those of their constituents.’⁴¹ Governmental involvement in national standardisation organisations can also be observed, in various and changing forms, not only in central economies but also in countries such as Denmark, Norway and the Netherlands.⁴²

Meyer⁴³ studied four cases of European Commission intervention in standardisation: mobile telecom (GSM and UMTS), High-Definition Television, digital television, and containers for intermodal transport. He distinguishes between two forms of intervention: hierarchical interventions and entrepreneurial interventions. The former are command-and-control-based and prompt industry to develop and/or comply with a standard by means of positive or negative sanctions. Instruments include legislation and ‘mandates’. Entrepreneurial interventions are ‘soft’ and non-hierarchical and include agenda-setting (discovery of unfulfilled needs and suggesting innovative means to satisfy these⁴⁴), promoting consensus-building, conflict mediation, and ensuring commitment. Hierarchical interventions hinder standardisation because they increase the number of ‘veto players’ and make the standardisation process more political, at the cost of the technical character. Even the threat of a hierarchical intervention has a negative impact. Entrepreneurial interventions, on the other hand, can have a positive impact in cases when industry players cannot reach consensus. This is, in particular, the case (1) if companies have already made considerable investments in competing technologies so that a common standard would lead to serious losses for some of them, (2) if strategic interests diverge, (3) if companies expect the new standard to deteriorate their current market position, or (4) if network effects and scale economies allow individual companies to unilaterally set a de facto standard. Cases show that the European Commission was able to perform three vital functions: identifying standardisation problems, proposing solutions, and mobilising standardisation coalitions. To nuance the claims of EC interventions: other researchers state that in the GSM case and the HDTV case, the EC intervention was less relevant than described by Meyer.⁴⁵ Meyer bases his assessment

⁴⁰ Meyer, 2012.

⁴¹ Russell, 2007, p. 9.

⁴² Bundgaard-Pedersen, 1997.

⁴³ Meyer, 2012.

⁴⁴ Kingdon, 1984, as quoted by Meyer, 212, p. 30.

⁴⁵ Bekkers, 2001; Simons & de Vries, 2002.

of intervention on its positive or negative impact on the standardisation effort, but it can be questioned if this should be the only criterion. Is it not too technocratic to be used in a political context? In his study, he uses the term 'output legitimacy': does the outcome justify an intervention? He also discusses 'input legitimacy' and in the case of entrepreneurial intervention, there is a problem with this legitimacy because democratic accountability is at stake.

3.4.3 Abraham Kuyper's Societal Architecture

We now will examine the issue of public interference in private organisations more in general, before applying the findings to the relation between (CEN and) CENELEC and the European Commission. Different views on the relationship between public and private sectors exist, and these can be related to political preferences. The current mainstream seems to be liberalism, often advocating a 'small government' – the 'invisible hand' of market forces should contribute to a state of common welfare. In contrast, socialism does not want to rely on the market and sees a need for governmental involvement in many areas. Liberalism and socialism have in common that they see government 'above' other organisations and 'autonomous' citizens. The EU shows a mix of liberal and socialist characteristics. Both stem from the Enlightenment and subsequently the French Revolution which stopped the 'ancient regime' of monarchy, and aristocratic and religious privileges. A different and innovative political approach was developed in the Netherlands by Guillaume Groen van Prinsterer (1801-1876) and later, by Abraham Kuyper (1837-1920). This approach may be relevant for the current debate about the balance between public (national government, European Commission) and private (industry and other non-governmental organisations including standards bodies at the national and European level). For Kuyper, the term "sovereignty" was important. He noticed two extremes. In the French approach, rights originated with the individual, whereas in the German approach all rights are derived from the state. Instead, he wanted to honour the "intermediate bodies" in society, such as schools and universities, the press, business and industry, the arts etc., each of which would be sovereign in its own sphere and, in the end, derive this sovereignty from God and be dependent on Him. Each sphere (or sector) of life has its own distinct responsibilities and authority or competence, and stands equal to other spheres of life. Sphere sovereignty implies that no one area of life or societal community is sovereign over another. Each sphere has its own created integrity. Then government is not 'above' other organisations, but next to them on the same level. Its responsibility includes legislation and this may include legislation for the relationships between different societal communities in order to avoid that these harm each other. Kuyper advocated parliamentary democracy with two houses of parliament: a house of commons elected by citizens, and a senate which should represent the various interest, vocational and professional groups in society. Norms apply for each category of societal communities (such as those for purposes of education, worship, civil justice, agriculture, economy and labour, marriage and family, artistic expression, etc.). Boundaries between different societal communities should be respected. During history, new societal communities

emerge and existing ones get a more distinct profile, this is called 'differentiation' within society.⁴⁶ In this way, society develops bottom-up instead of top-down.⁴⁷

3.4.4 Sphere Sovereignty and European Standardisation

In terms of Kuyper, the start of the development of national standards and IEC standards in the early 20th century can be seen as the sphere of business developing itself by setting rules for its functioning, and differentiating by creating distinct organisations for this purpose. It was and is this sphere's own responsibility to do this in a proper way, and there is no need at all for government to intervene. If the business sectors had taken their responsibility, governments would not have needed to come up with technical regulations. The fact that they did signals that industry did not take its responsibility seriously enough, because apparently their products and methods could seriously affect consumers and workers. Such irresponsible behaviour can justify governments to intervene, using an instrument that fits their special role in society: legislation. Here Kuyper would have been a strong supporter of a system in which the law sets only essential rather than detailed requirements, and would then have preferred industry to prepare the standards. Indeed, this is the basic idea behind the New Approach at the European level, but also used at the national level in many countries.

Cooperation between national organisations to create common European organisations can be a next step in societal development. This applies both to states that cooperate by forming the European Communities and later the European Union, and to national standards bodies establishing European standardisation organisations. Such cooperation may include the common decision to move a part of the national sovereignty to the European level, in the sense that the national organisations would agree to adhere to common European rules. However, Kuyper would have been reluctant to give the European level too much power to interfere because then differentiation of society would degenerate into enforced unity. In current practice, the standardisation organisations at the European (and international) level allow their members to be quite diverse, so this does not seem to be a major issue. The agreement that national standards have to be withdrawn if they contradict European ones may be more problematic because specific national circumstances and preferences may justify having deviating national standards. Here the internal regulations of CEN and CENELEC provide an escape, though only in exceptional cases of special national circumstances such as climate, electrical earthing conditions, or national regulation.⁴⁸

The European Union was created as a union of independent national states but meanwhile it has several state-characteristics itself. It uses the organising principle of subsidiarity: 'Under the principle of subsidiarity, in areas which do not fall within its exclusive competence, the Union shall act only if and in so far as the objectives of the proposed action cannot be sufficiently achieved by the Member States, either at central

⁴⁶ Kuyper, 1898.

⁴⁷ van Duijn, 1984, p. 25.

⁴⁸ CEN-CENELEC, 2011, Annex ZB.

level or at regional and local level, but can rather, by reason of the scale or effects of the proposed action, be better achieved at Union level. The institutions of the Union shall apply the principle of subsidiarity as laid down in the Protocol on the application of the principles of subsidiarity and proportionality. National Parliaments ensure compliance with the principle of subsidiarity in accordance with the procedure set out in that Protocol.⁴⁹ This principle, a secular version of the similar principle developed by the Roman Catholic Church, should avoid centralisation of power at the European level, but in practice does not withhold it. Moreover, the phrase ‘in areas which do not fall within its exclusive competence’ allows the EU to have areas in which it does have exclusive competence. In practice, the subsequent versions of the EU Treaty and EU practice move the EU further in the direction of the United States of Europe.⁵⁰ To conclude, the EU increasingly imposes measures on member states and, moreover, this is not limited to the sphere of the state, but also impacts other spheres in society including companies and, more specifically, standardisation organisations and their activities, at the European and subsequently also at the national level.

3.4.5 EU Position

The researcher had the opportunity to ask European Commission staff involved in standardisation matters some questions about a document in which they clarify their role in relation to the European Standardisation Organisations.⁵¹ One of the questions was: How does the Commission see itself, as a stakeholder next to other stakeholders in standardisation or above these? The answer was: ‘As a stakeholder next to other stakeholders. However, in its role as legislator, the EC has to ensure that the system of ‘mandates’ functions as intended.’ Another question was: How does the Commission see standardisation, as a legal activity or as an economic activity? The answer was: ‘As an economic activity with legal implications in terms of private law, but sometimes (20% of the cases) also in public law.’ These answers seem to provide opportunities for a dialogue to find a proper balance of responsibilities, authorities and tasks for the European Commission and CENELEC (and CEN and ETSI).

In a second interview, the European Commission representatives emphasised that standardisation is relevant for several European policy areas such as the internal energy market for electricity and gas, and the Digital Agenda for Europe including the Connecting Europe project. Standards have a prominent place in making things happen. The international position is also relevant. Currently, Europe is losing intellectual base to India, the US and other countries because the ESOs are insufficiently prepared for the challenges of today. The European aerospace industry is an example of this. Airbus and its suppliers decided to go to the US to establish standards. The European Aviation Safety Agency EASA now has a veto right in the US, whereas they do not even have the right to speak in CEN. So, because of both the European Commission’s priority areas and Europe’s international competitive position, the EU needs a well-functioning European

⁴⁹ European Commission, 2010, Article 5 – 3.

⁵⁰ Luitwieler, 2009.

⁵¹ European Commission, 2014b.

standards system. Therefore, the European Commission would prefer the ESOs to play a more pro-active role. The EC is willing to respect ESOs' governance structure, and there will always be a willingness to co-operate, whatever choices the ESOs, as private organisations, make. Currently, the ESOs have a privileged position, laid down in legislation,⁵² and industry and other stakeholders should welcome and make use of this position, more and better than they currently do.

3.4.6 Conclusions and Discussion

We can conclude that the decision of the NSBs to establish CEN and CENELEC can be seen as the business world taking its responsibility to contribute to the political wish to have a single European market without barriers to trade. The EC's New Approach with references to standards in legislation shows respect for the distinct responsibilities of the private sphere of standardisation and the public sphere of legislation although the amount of legislation may be disputed – is all of it really necessary?⁵³

Additionally, there is the issue of the EU regulating the standardisation process and its organisations. On the positive side, this provides extra legitimacy for the work of CEN, CENELEC, and ETSI which is important not only for public authorities but also for companies and other stakeholders. So backing up the standardisation work by regulation makes the activities of CENELEC (and CEN and ETSI) even more relevant, but also puts a huge burden on their daily work. The cases of the International Organization for Standardization ISO and the International Electrotechnical Commission IEC that manage to function without such legislation⁵⁴ suggest that this regulation is superfluous and a perfect candidate for the priority of the current European Commission to remove unnecessary legislation. Kuyper would argue that this legislation in its current form is undesirable for two reasons: the public sphere at EU level should not intervene in the private sphere of the European Standardisation organisations, and the EU should not force national governments in member states to intervene in the private sphere of national standards bodies. It would be better to leave the decisions up to the nations. The examples of ISO and IEC show that countries all over the world manage to find their own solution – with or without national legislation.⁵⁵

Meanwhile, the number of industrial consortia that develop standards is increasing. These consortia escape European rules but have become so important, in particular in the ICT field, that the new legislation⁵⁶ now provides more space for them. It would be interesting to study whether the growing market share of consortia in standards setting is related to dissatisfaction about formal standardisation and, in the European case, to EC interference in the rules they impose and the standardisation agenda they influence. However, this is beyond the scope of this study. The rise in the number of consortia has resulted in a non-

⁵² European Parliament and Council, 2012.

⁵³ The (EU-recognized) European Standardisation Organisations CEN, CENELEC and ETSI.

⁵⁴ However, the Technical Barriers to Trade Agreement of the World Trade Organization is an example at the global level of a tight relationship between public authorities and standards setters.

⁵⁵ However, because the legislation gives the ESOs a privileged position they may want to keep it.

⁵⁶ European Commission, 2012.

transparent number of standards, making it difficult for companies and other stakeholders to choose the right one. This hinders investments in new technologies and as a result, innovation is hampered instead of stimulated.⁵⁷ This suggests that the European Commission's interventions are counterproductive, also because most interventions are hierarchical rather than entrepreneurial.

CENELEC and its NCs cannot ignore the current European legal framework, but could focus more on their private character. Ultimately, European industry might create a new alternative standardisation infrastructure, which would have advantages compared to the current cocktail of consortia as well as to the current situation of ESOs being held hostage by the European Commission.⁵⁸

Kuyper developed his approach as an alternative for liberalism and socialism. The EU's policy has characteristics of liberalism in the sense that the free market is seen as essential for economic growth and prosperity. However, the EU has implemented many instruments for regulation of markets and support of societal objectives, and in this sense it may be characterised as more socialistic. More specific in relation to standardisation, the European Commission recognises the value of market-driven standardisation, but then regulates it and forces the system to increasingly follow the 'state' agenda, for reasons of 'the common good': a combination of free market and control. Following Kuyper would have strengthened the recognition of the importance of private standards bodies to compensate market failure. Why shouldn't this also be appreciated by both liberals and socialists?

In summary, CENELEC (and CEN and ETSI) should become more pro-active in setting priorities in standardisation in Europe. This does not exclude the possibility that these standards are developed at the international level – also for standards related to legislation this would not be a problem for the EC. Then the ESOs would be a stronger partner for the EU, 'next' to them and not 'under' them. EC representatives have expressed that they would fully appreciate this.

3.5 CENELEC governance structure

The management literature distinguishes various 'management by' options, such as 'management by objectives', 'management by delegation', 'management by exception' and even 'management by walking around'. Standardisation organisations seem to 'manage by creating committees' and this leads to an overloaded governance structure. The activities of the various groups in CENELEC's governance structure leads to a considerable workload for the NCs and for stakeholders in the member countries, if they get involved. The national permanent delegates to the CENELEC Technical Board play

⁵⁷ van de Kaa, 2009.

⁵⁸ The researcher heard this suggestion from an industry association representative involved in European standardisation policy making.

a central role.⁵⁹ The working group CENELEC/BT Action Plan has made an inventory on how they prepare a national position.⁶⁰ Cases from Bulgaria, Denmark, Estonia, Germany, Italy, the Netherlands, Poland, and Slovakia show that each country takes the documents received from CCMC as the starting point. Often it is not immediately completely clear how to handle them, so the permanent delegate takes a quick look and forwards them to the right people, and/or puts them on the NC's intranet, and/or takes action himself. Documents related to technical matters go to the applicable technical committee at the national level, but not all NCs have a mirror committee for each CENELEC TC. Moreover, there is no CENELEC TC for some topics, so no mirror committee either. The NCs differ in how they handle these documents. In some cases, they also contact national stakeholders not yet represented in their national technical committees. Based on the feedback, if any, the national delegate decides how to vote / react. In some countries, this is done directly by the mirror committee in charge. It is even more complicated to prepare a national position for non-technical topics. Bigger countries tend to seek feedback from a small group of devoted stakeholders. In other countries, all positions are prepared within the NC, without feedback from national stakeholders.

From reading agendas and meeting reports, the impression is that most meetings are about details. This even applies to the working group on BT Efficiency. The main strategic technical issues and the strategies related to these are not discussed – at least this is not reflected in any of the hundreds of pages the researcher received. It is astonishing to notice that even the options for future electricity supply in Europe and consequences of this for the standardisation agenda are not discussed in CENELEC.

3.6 Merger between CEN and CENELEC

CEN and CENELEC have a lot in common. From a technical and from a business point of view, the reasons to have a separate committee for electrotechnical standardisation seem to have disappeared. A merger would allow one spot shopping for customers. Duplication of efforts would be avoided, which would be beneficial for common member bodies. At secretariat level, this could lead to a reduction in costs.

Mergers and acquisitions have been studied by Professor Hans Schenk of the University of Utrecht, the Netherlands. His research shows that most mergers fail because the intended benefits are not achieved or the results are even negative: in the case of listed companies, 65% in the financial sector, and 85% in other sectors.⁶¹ CEN and CENELEC are not listed companies but also for them, there should be strong arguments for a

⁵⁹ Remarkably, representatives of the European Commission and the EFTA Secretariat and, subject to contractual agreements, other organisations are invited to attend Technical Board meetings as observers. In special cases, the chairman may also invite experts to take part in Technical Board discussions (CENELEC, 2014a).

⁶⁰ CENELEC, 2014b.

⁶¹ Source: personal communication with Professor Schenk.

merger, otherwise, following Schenk, it is better not to merge. Are the above arguments indeed strong enough?

CEN and CENELEC are different legal entities and each have their own set of technical committees headed by a Technical Board, but the way these TCs operate has been aligned almost entirely. In the governance structure, they have their own General Assembly and Administrative Board and several other committees and groups. The structure is rather similar and they have several joint committees.⁶² CENELEC is related to IEC and CEN is related to ISO, and in the majority of member countries, the member body is the same. However, in nine countries the CEN and CENELEC members are different organisations.

From a historical perspective, CEN and CENELEC exist next to each other because ISO and IEC are separate organisations. The IEC started in 1906 at the international level from the outset and its members are just 'National Committees'. ISO's roots go back to 1926⁶³ but the organisation was founded in 1946. ISO was created as a form of cooperation between independent National Standardisation Organisations. These differences are still visible in current practice. CENELEC has much more focus on the adoption of IEC standards, whereas CEN develops more own standards.

The electrotechnical field used to have and partly still has clear main stakeholder groups: producers of electrotechnical products and equipment, electricity producers and distributors, and installers, authorities in charge of safety, inspection bodies, and certification organisations. Most standards concern safety and interoperability. In ISO and CEN, there are many technical fields with a huge variety of stakeholders and standardisation topics. The 'monolithic' character of IEC and CENELEC made it relatively easy to appoint industry representatives to leading positions. They not only steered the programme of standardisation activities, but also steered the organisation. This is less feasible in ISO and CEN. Why should companies or even trade associations allocate substantial human capacity to organisations that work for the benefit of business and society as a whole? Stakeholders in separate technical fields are responsible for the programme of technical activities (organisational level: Technical Committee), but the responsibility of strategy and management lies with NSB representatives: directors of these organisations or external affairs officers – 'bureaucrats' in the perception of several interviewees.

Maybe because the main reasons for standardisation in the electrotechnical field, safety and interoperability, are so obvious, technical education in this field tends to pay more attention to standards than in most other fields, and practitioners are more accustomed to the use of standards. This seems to lead to a more positive culture about standards.

⁶² CEN-CENELEC, 2014a.

⁶³ In 1926, the International Federation of the National Standardizing Associations (ISA) was founded. It focused on mechanical engineering. ISA was disbanded in 1942 because of the war. Then it was re-organised and received a new name, ISO, in 1946.

Meanwhile, two important changes can be observed. First, from a technical point of view, electrotechnology is no longer a separate field. Electrotechnical and mechanical engineering were integrated some decades ago, and later electrotechnology integrated with information and communication technology. Currently, this combination is integrated with all kinds of application areas, each with their own technical background, reaching from agriculture (e.g., robot systems for milking cows) to construction (e.g., electricity-generating boilers using a Stirling motor), and from the textile industry (e.g., electronic systems for transfer of customer wishes to production machines to facilitate mass customisation) to healthcare (e.g., curing and caring at distance). The two standards bodies are having difficulty in keeping pace with this evolving technical integration. For example, CEN and CENELEC have each developed standards for valves, sometimes overlapping or even with contradicting requirements. At international level, it took time to integrate standards for televisions (consumer electronics) with those for PC monitors (IT).⁶⁴ The IEC used to be the main standardiser for lighting, but failed to take LED on board in a proper way. IEC TC 34 Lamps and related equipment prepares some standards for lamps and glow starters, but the main standards for LED-based lighting systems are made in The Connected Lighting Alliance.⁶⁵ This consortium develops open standards for 'smart lighting' to enable wireless connection between luminaries, lamps, dimmers/switches, sensors, remote controls, and internet gateways.

Second, the integration of technologies has resulted in new markets with new stakeholders. This may include stakeholders already participating in CEN committees. But a merger does not necessarily help.⁶⁶ A 'legacy structure' may hinder the development of standards in fields that converge.⁶⁷

Another development is that a big share of the production of components and electrical products has moved to Asia, and increasingly research and development is being done in Asian countries as well. Some of the traditional producers have disappeared, while others have become global players. Liberalisation of energy markets also caused substantial changes in the stakeholder landscape. Both developments, together with the shrinking or dismantling of standardisation departments mentioned before, makes it more difficult to recruit staff for leading positions in CENELEC. The declining number of companies that still want to allocate capacity for such positions prefer to focus on the international level, thus IEC. Should 'bureaucrats' then take over? Then the 'industry-lead' argument against a merger also disappears.

From an electrotechnical perspective, an argument against a merger is CEN's financial dependency on the EU and EFTA.

⁶⁴ Simons & de Vries, 2002.

⁶⁵ <http://www.theconnectedlightingalliance.org/home/>

⁶⁶ A documented historical case concerns EN 10238 Automatically blast-cleaned and automatically prefabrication primed structural steel products. A lack of coordination of the responsible TC, ECISS TC 10 Structural steels - Grades and qualities with the TCs in charge of Paints and varnishes, Construction and Environment resulted in a standard that was blamed to be detrimental to the health and safety of people on the shop floor, unnecessarily detrimental to the environment, bad for the quality of the end product, and disadvantageous for certain stakeholders (Grünbauer, 1996).

⁶⁷ Gauch & Blind, 2015.

	CEN part (71%) ⁶⁸	CENELEC part (29%) ⁶⁹
Membership fees	60%	81%
EC/EFTA	38%	17%
Other	2%	2%

Table 1: Financing of CCMC in 2013

Money may bring influence. NC and industry interviewees feel that the EC has a lot of influence on CEN, but this is denied by EC administration interviewees – they are not satisfied with what the ESOs do. Nevertheless, to avoid the danger of dependency, the simple solution would be to stop accepting EU and EFTA funding. CENELEC is in a position to do so, but this would be much more difficult for CEN. However, also for CENELEC this is not easy because then NC contributions would have to increase or costs would have to decrease. The main source of income for many NCs is standards sales, which tend to be rather stable. An increase in expenditures is not feasible. For countries without a strong electrotechnical industry this would be impossible – they need a decrease, they cannot afford an increase.

In some aspects, IEC seems to function better than ISO. Productivity in IEC is higher and its financial figures are better. IEC seems to have relatively more ‘self-developed’ standards, whereas in the working groups in ISO, tend to start with a document already developed somewhere else due to a tightening of maximal standard development times. ISO’s role is more in providing legitimacy to the document than in developing a standard from scratch themselves.⁷⁰ The differences make that CEN can rely less on ISO than CENELEC can rely on IEC, though this may differ considerably per technical field in ISO/CEN. In other words, there are good reasons why CEN has a high percentage of self-developed standards and why CENELEC rubberstamps IEC standards.

The European Commission has complained that the system of European standardisation is too slow. Here a distinction should be made in the speed of standards development and the ‘speed’ in running and improving or even innovating the organisation. At the technical side, there are indeed good reasons to speed up the process of standards development. Time to market and product life cycle have been reduced enormously, and standards development time has to keep pace. Development times in CEN and CENELEC have decreased from an average of six years in 2000 to four years in 2007 and 2.5 years in 2013.⁷¹ This was mainly achieved by changing procedures and imposing stricter procedure applications. However, the process of achieving consensus takes time and this cannot always be planned. There is a tendency to pre-develop standards in, for instance, a consortium and use these as a starting document for the standardisation

⁶⁸ CEN, 2014.

⁶⁹ CENELEC, 2014a.

⁷⁰ ISO also seems to face difficulties in defining a proper strategy for the future. Its draft strategy document (ISO, 2014) ignores ISO’s shrinking market share in the growing market for standardisation, it neglects the trend of integrated systems, it lacks any analysis, and it has the wrong answer to the external demand for faster standards development.

⁷¹ CEN et al. 2014.

process. But then the added value of formal standardisation organisations is reduced to rubber stamping. The wish of the European Commission to further reduce the time for developing mandated standards by 50% then undermines the role of ESOs, and means that they will probably increasingly use documents developed by others.

A last difference between CEN and CENELEC is that industry representatives are more directly involved in governance issues as well as priority setting in CENELEC than in CEN. Apart from the differences in culture, there is a simple reason for this: CENELEC serves one sector whereas CEN serves many. However, this makes a merger unattractive for independent NCs that want to represent the electrotechnical stakeholders in their countries. A merger would mean that these stakeholders would have less managerial influence.

To conclude: although there are no technological or market reasons anymore to maintain separate organisations for electrotechnical standardisation, there are no strong arguments in favour either. Some duplication of efforts could be avoided, which would be more beneficial for common CEN/CENELEC member bodies rather than for the stakeholders they serve. In the perception of the electrotechnical interviewees, the integration so far (common committees, CCMC) has hindered rather than helped (see also the next section). There are several arguments against a merger and these are mainly from the perspective of the electrotechnical industry: if the smaller, but from their perspective better functioning organisation CENELEC were to merge with the bigger organisation CEN, they would have less influence and less service. Section 3.12 will present an important additional argument for this. Also given the experiences that the majority of mergers do not bring the intended benefits, it would not be wise to take this direction now. The situation could change in the future.

3.7 CCMC

L'histoire se répète. A study by Roland Berger in 2000 showed that CEN members preferred the CEN Management Centre (CMC) to focus on the management and facilitation of standards development, and to refrain from all activities that go beyond its core competencies.⁷² However, the researchers advised otherwise: even in a scenario of a reduced number of standards to be developed, 'CMC should be more proactive towards the NSBs to identify services like marketing, info workshops, conferences and training that would better be performed centrally at European level (and develop the necessary skills).' And in Scenario 2, *Demand for value added services*, 'CMC should identify opportunities for European coordination of the new "value-added" products/services.'⁷³ A recent survey among the members of CEN and CENELEC⁷⁴ shows a similar picture: priority is given to activities that relate to 'normal work' and the lowest priority scores are for activities that relate to a more pro-active attitude of CCMC: those related to possible

⁷² Roland Berger & Partners GmbH, 2000, p. 31.

⁷³ Roland Berger & Partners GmbH, 2000, p. 43.

⁷⁴ CCMC, 2014.

new fields of activity (research/innovation; 'anticipating (cross-)sectional interactions), and those related to external relations (European trade and regulatory dialogues; international technical cooperation; European partners). The interviewees' complaints about CCMC are not reflected in their satisfaction about CCMC's services. The overall satisfaction rate for 23 services is 74% and the average for the interviewed NCs is only slightly lower (70%). In general, the satisfaction of independent CEN members (67%) and independent CENELEC NCs (69%) is lower than common members' satisfaction (79%). So maybe the services as such are good, but does CCMC offer the right services?

An issue raised by industry representatives is that the European Commission sees CCMC as the representative of the industry, but that it is primarily the voice of CEN-CENELEC. CEN has more influence than CENELEC and thus the 'apparatchiks' (term used by one of the interviewees) have more influence than the industry representatives. CENELEC would like more industry influence and so there is a conflict. EC interviewees report that they receive conflicting information from CCMC and from industry representatives from individual companies or from industry associations, and that the input from industry representatives in CEN and CENELEC differs. Apparently there is a problem to articulate a common vision on matters related to standards and standardisation. This applies both to technical issues as well as to governance-related issues.

Interviewees state that the merger of secretariats should avoid duplication of efforts and thus lead to more efficiency. Indeed, CCMC figures show some cost reductions, but these do not lead to fee reductions for NCs due to the decrease in EU funding. Meanwhile, the number of documents from Brussels has increased and some measures, such as the choice of ICT systems, have worsened rather than improved the situation for both independent NCs and industry. The researcher's own experience in the CEN/CENELEC Joint Working Group on Education about Standardization confirms this perception and also suggests an explanation. CEN/CENELEC staff manage the activities as if it were a standardisation committee in which the participants have to do the real work and CCMC's role is to facilitate the meetings. However, the topic education deserves pro-active project management and, where necessary, some essential activities need to be outsourced. In the education field, the ISO Central Secretariat has done a much better job, without committees but with real accomplishments, whereas CCMC has failed to carry out activities approved by the CEN/CENELEC/ETSI Joint Presidents Group and instead has carried out some activities that were not included in the approved plans, such as distributing a questionnaire among members. These deviations from the approved plans were justified by referring to 'the members', although these were apparently not the members involved in the working group. Another experience of the researcher is related to the follow-up on his study on SME access to European Standardisation.⁷⁵ Rather than immediately implementing a subset from the toolbox of 58 recommendations to support SMEs, CCMC created groups so that their members could study the recommendations.

Sending a questionnaire to the members and creating these study groups illustrates an attitude of uncertainty avoidance, a fear of making mistakes by taking initiatives. The researcher observed a similar attitude towards the European Commission, in the case of

⁷⁵ de Vries et al, 2009.

the revision of the 'Vademecum'.⁷⁶ CEN and CENELEC members complained about this Vademecum and CCMC shared their concerns. However, during the workshop on this subject, CCMC proposed several detailed suggestions for improvement and their attitude was rather cooperative.⁷⁷ CCMC appears to feel strategically and financially pressurised from two sides, and tries to cope by pleasing both sides: the CEN/CENELEC members and the Commission. Uncertainty avoidance is one of the cultural dimensions distinguished by the sociologist Hofstede who compared cultures in different countries, initially by studying different IBM offices. He defines uncertainty avoidance as 'the degree to which the members of a society feel uncomfortable with uncertainty and ambiguity. The fundamental issue here is how a society deals with the fact that the future can never be known: should we try to control the future or just let it happen? Countries exhibiting strong UAI⁷⁸ maintain rigid codes of belief and behaviour and are intolerant of unorthodox behaviour and ideas.'⁷⁹ Standards themselves are an instrument to be used to avoid uncertainty, so in this sense the rationale behind this cultural dimension is confirmed daily, although it is not necessarily the dimension needed to run the secretariat of major European standards bodies. In particular, in 'competition' with the more entrepreneurial consortia, this cultural dimension can hinder, and can confirm prejudices. Of course, CCMC should follow and support its members, and via these members industry and other stakeholders in the various countries, and it should cooperate with the European Commission, but a professional secretariat knows what its members and other major stakeholders need, and takes proactive steps to meet those needs. For instance, taking the education example, CCMC could have shown a proactive attitude to the members in the Joint Working Group on Education about Standardisation by exploring possibilities for funding the intended activities, or by arranging the development of an educative standardisation game. In ISO 9001 terms, this means: 'enhancing customer satisfaction'.⁸⁰

The apparent culture of uncertainty avoidance may have hindered the synergy advantages of a common secretariat. Moreover, the CEN structure, with more 'bureaucrats' at strategic positions, confirms the uncertainty avoidance attitude at the cost of more dynamic and pro-active support preferred by the interviewees. However, this is not necessarily what other CENELEC members prefer. For them, having to deal with one common secretariat is much clearer and more convenient than having to deal with two secretariats.

CCMC has managed to reduce its costs over the years. This was an urgent priority due to the reduction of EU funding. However, does CCMC do the right work? Ironically, the reason for the cost reduction is that in the perception of the EU, CEN, CENELEC and their common secretariat are not effective in addressing current market needs.

⁷⁶ http://ec.europa.eu/enterprise/policies/european-standards/documents/vademecum/index_en.htm.

⁷⁷ This observation is not supported by the EC. They see CCMC as opposing them rather than being cooperative.

⁷⁸ Uncertainty Avoidance Index.

⁷⁹ Hofstede et al, 2010; <http://geert-hofstede.com/dimensions.html>.

⁸⁰ ISO, 2008. CCMC has an ISO 9001-based quality management system.

A last issue mentioned by many interviewees is that fact that CEN, CENELEC, and CCMC have a common secretary general. Although this may be a disadvantage, as appears from the examples, it could also help to align the three organisations in taking a pro-active stance. However the person in charge should be aware of the different roles he plays, and should to be replaced if there is a conflict of interest. This advantage of being able to align the organisation more easily and the additional advantage of paying only one salary instead of three should be balanced with the risk of giving most of the power to one person. In summary, in the perception of many interviewees, the current leadership is part of the problem rather than part of the solution, so it might be time for a personnel change. And, if indeed a cultural change of the organisation is needed, then the current CEO is, by definition, not the right person to lead this.

To conclude, the members of CEN and CENELEC seem to favour a secretariat that just gives proper administrative support, and this is what they get. In some cases, support to meet the wishes of CEN members conflicts with support for CENELEC. CCMC is discouraged to be pro-active and shows characteristics of uncertainty avoidance which further hinders it to be more pro-active. The current situation may be acceptable in terms of efficiency, but not in terms of effectiveness. CCMC is expected to hinder rather than support a process of renewal of CENELEC.

3.8 Second generation member countries

Electrotechnical standardisation is primarily an international activity. Therefore, we made an inventory of the involvement of European countries in IEC (instead of in CENELEC). Figure 2 shows that there are great differences in the number of participants in IEC committees per country.

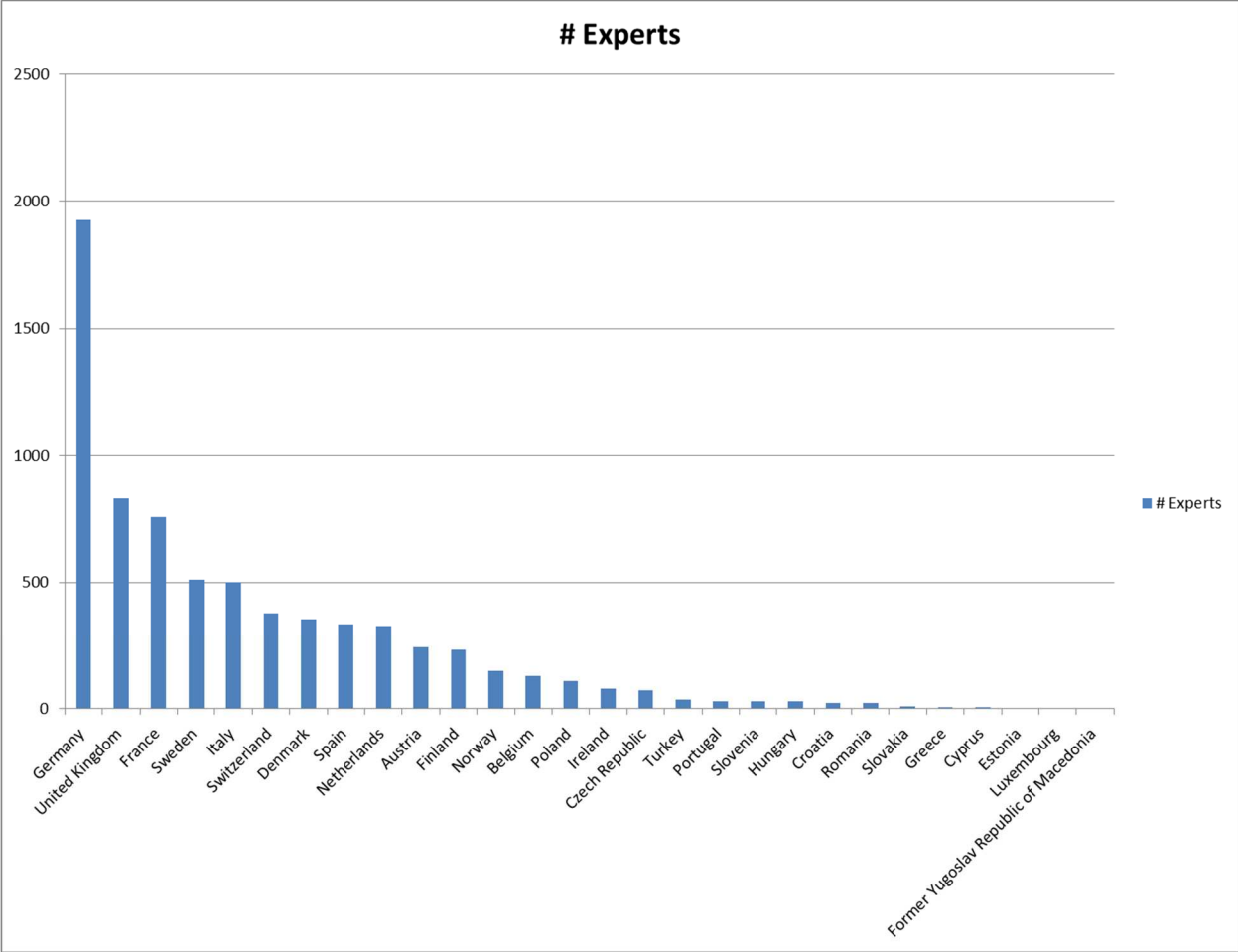


Figure 2: Number of participants in IEC committees per country.

The number of participants is highly correlated to GDP.⁸¹ This also leads to huge differences in the number of secretariats (see Figure 3).

⁸¹ Correlation 0.917, P-value 0.000.

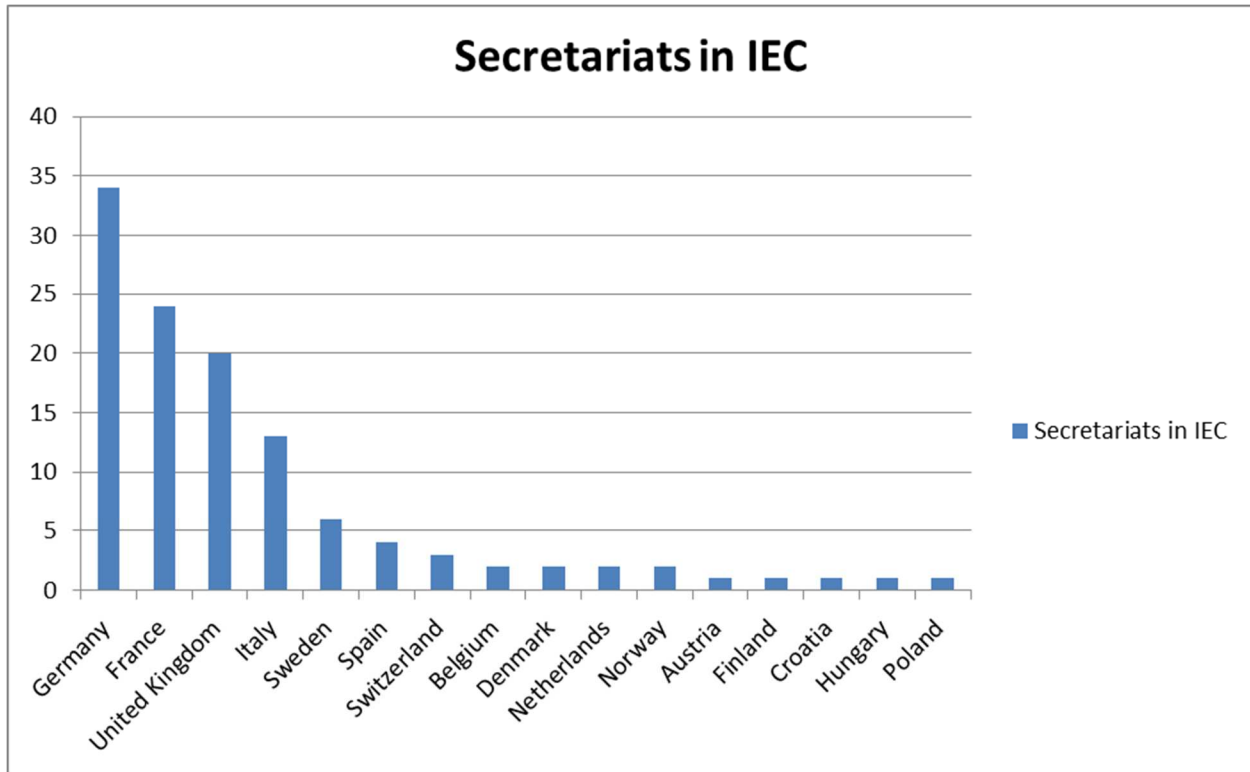


Figure 3: Number of IEC TC secretariats per country

From the two figures above, we can see that some countries hardly contribute to the technical work in IEC, which means that CENELEC is of little interest to them. Most of these countries became CENELEC members when they joined the EU. Some may have felt forced to join because CENELEC (and CEN) membership was part of the compulsory package for all new EU member states. Of course, these countries apply electrotechnology, but they are ‘standard takers’, not ‘standard makers’. It is therefore not surprising that they are reluctant to contribute to the governance of CENELEC. A complete merger with CEN would be better for them. Each country has an agricultural and a construction industry, and most have other important sectors as well, so CEN would be more relevant to them – as standards takers, but maybe also as standards makers. If CENELEC continues to exist, they might get the chance to refrain from participating in the TCs but also in organisational committees including the General Assembly. Of course, this then should also limit their decision rights to only those technical and governance-related boards, committees and other groups in which they would continue participation.

In his study on the IEC, Büthe⁸² notes that governments were notably absent from the outset. At the first IEC meeting, only two countries sent governmental representatives.⁸³ This private character remained, but the countries that used to be part of or influenced by the former Soviet Union have a history of standardisation as an instrument of the state economy. Meanwhile this has changed, but elements of the culture in which the state has

⁸² Büthe, 2010.

⁸³ International Electrotechnical Commission, 1906.

more influence has remained: hierarchy is more pronounced and bureaucracy more common. NCs in such countries may appreciate rather than dislike the situation of European Commission influence and money, and have little problem with formal rather than pro-active support by CCMC, provided it is not too costly.

The challenge will thus be to find a solution that meets the needs of the big and the small countries, the forerunners and the laggards, and the countries somewhere in-between. A selection menu rather than one-size-fits-all solution is needed.

3.9 Red tape

Are standards really all necessary? For one laptop, 251 technical interoperability standards are needed.⁸⁴ These will be used partly by the Original Equipment Manufacturer and partly by the component suppliers, but each has the problem to select the relevant ones. At the common European level, there are many more standards now than any of the member countries had before. Who determines which standards are to be developed? Can industry sufficiently determine which standards they really need? Do standard bodies at the national and/or the European level push the development of standards too much? Does the EC give too many 'mandates' to develop standards and does industry have sufficient knowledge and power to protest against this? Industry is concerned about this flood of standards. Business Europe⁸⁵ states: 'The European Standardisation Organisations (ESOs) should be more critical in assessing the impact of new work items (...) Before accepting a new work item the market relevance for the main economic players must be demonstrated.'⁸⁶ Reducing the number of standards to the necessary minimum should be a priority and helping users to trace relevant standards is important.⁸⁷ Some measures have been taken to improve the latter (e.g., putting abstracts and tables of contents of standards at a website) but it seems that reduction of the number of standards is not on the agenda.

The words 'red tape' and bureaucracy have a negative connotation, but standardisation processes require a well-structured process flow, supported by documents in a pre-described format. This is directly related to the principles of formal standardisation and should be seen as a strength. Of course, the processes, the documents and their formats, and the IT systems supporting these may be up for improvement. It is beyond the scope of this study to further delve into any details.

Governance-related processes also require documentation. Each of the many boards, committees, and working groups generates its own pile of documents. The interviewees

⁸⁴ Biddle et al., 2010.

⁸⁵ Association of 41 central industrial and employers' federations from 35 European countries. To nuance their comment: New work items are accepted only if a minimum number of countries is willing to participate in the work.

⁸⁶ Business Europe 2009, p. 1, 4.

⁸⁷ de Vries et al., 2009; de Vries & van der Zwan, 2008; de Vries et al., 2008.

complain about the vast number of documents they receive. They may receive dozens of documents, with hundreds of pages for one meeting. It is very time-consuming to read or even scan these documents, and of course not everything is equally important. One of the industry interviewees stated: 'Per document, 3% is relevant.' In order to prepare a national position, the NCs have to send a subset of these documents to certain other people to get their feedback. Even for the biggest NCs, this is hardly doable. The merger of secretariats into CCMC has increased the burden both in terms of the number of documents and in terms of their character, which has become more 'political', due to the role of the EU.

The more committees, the more documents. Reducing the number of committees is an option, but the core issue is not about committees and documents but about priorities. What are the real issues? The strategic choices about technical contents should be the priority. However, these are not the main topics on the agenda, maybe due to the overwhelming number of other issues and to the number of standardisation requests from the European Commission.

In a 'lean' approach, activities that do not directly contribute to the main goal of the organisation are 'waste'. This main goal should be related to customers. In the case of standardisation, there are different stakeholders, both standard developers and standards takers. National standardisation bodies (NSBs) are primarily responsible for the core processes related to developing user-friendly standards where these are needed. The core task of these national bodies is to enable a variety of stakeholders to give their input and develop standards that give the optimal compromise between the differences at stake. For the standards-takers, processes should also stop the continuing increase in the number of standards and should aim at reducing them to the necessary minimum.

This increase in the number of documents is also caused by the increased complexity of the business environment, and this is unavoidable. But does CCMC really need more than 1000 bilateral agreements? Should all issues be solved in committees? Probably not.

3.10 Business models

Chesbrough & Rosenbloom propose a business model is the specific way by which a business creates value and then to capture at least some of that value for the organisation. They specify six functions of a business model: to articulate a value proposition, to identify a market segment, to define the structure of a firm's value chain, to specify the revenue mechanism(s), to describe the position of the firm within the value network or ecosystem, and to formulate the competitive strategy.⁸⁸ Or even shorter: A business model 'describes the rationale of how an organization creates, delivers and

⁸⁸ Chesbrough & Rosenbloom, 2002.

captures value.⁸⁹ The core term is value proposition – what does the organisation deliver to its customers? Assessing this value proposition for CENELEC (and CEN) could be the starting point for improvements. Both CEN and CENELEC have established a working group to do this, and the outcome of these discussions could be important.

3.11 Stakeholder involvement

As mentioned in Section 3.1, electrotechnical standardisation used to have a rather clear set of stakeholders. This is changing, and now the stakeholder map differs per topic, and the diversity and the number of stakeholders is increasing and sometimes even huge, particularly in the case of standards for integrated systems. Involving these stakeholders is primarily a national issue, but also gives challenges at the European level. Balanced stakeholder representation is needed for (CEN and) CENELEC's 'license to operate' in developing standards that relate to legislation or, in a broader sense, mandates. This, in turn, may have major consequences for NCs. CEN and CENELEC and all their members therefore should aim to facilitate stakeholder involvement at national level. Currently, the EC is dissatisfied about the involvement of 'weak' stakeholders via the national level and therefore they intend to further strengthen the role of (EU-funded) Annex III organisations. This affects CEN and CENELEC's country model. EC representatives do not share the concerns of other interviewees' that these organisations cannot be independent because they are funded by the European Commission. Practice shows examples of Annex III organisations that feel free to oppose EC positions.⁹⁰

CENELEC became a "legitimate" standard setter when there was no competition from other standards setters⁹¹, and its legitimacy was strengthened by its relation to the IEC and the NCs. This legitimacy was officially confirmed due to its legal status, and reconfirmed in 2012.⁹² However, due to its continued inability to take a sufficient number and variety of stakeholders on board, both at the national and at the European level, this legitimacy is at stake in the perception of the European Commission. Meanwhile, industry no longer takes formal standards bodies as their default choice, as can be seen from the increasing number of consortia. So the core question for CENELEC (as well as CEN and ETSI, and the formal standardisation organisations at the international and national level) is: how can we continue to be relevant or, even better, how can we become more attractive for all stakeholders as the self-evident source of standards and the platform to develop these standards?

⁸⁹ Osterwalder et al., 2005, p.17.

⁹⁰ Reihlen (1996) stated that these organisations may play an important role in motivating the rank and file of their party to participate in European standardisation. However, they lack a process of consensus building to back their position in standardisation committees and this disqualifies them for playing this role.

⁹¹ Büthe, 2010.

⁹² European Parliament and Council, 2012.

3.12 Strategic change

During the years, organisations follow a sequence of changes in strategy. Hardjono studied such changes,⁹³ and his findings may be informative to better understand CENELEC's current situation, and the options for change.

Phase 1: Creativity. Any organisation results from an initiative, so the first stage requires creativity. The organisation then combines an orientation on change and an orientation on the outside world. In the case of CENELEC, this phase took a long time. The first creative idea was to informally coordinate and stimulate the implementation of IEC standards in European countries, for the benefit of industry. Then, the next creative step was to give this a boost by 1) developing European standards, preferably fully aligned with IEC standards, 2) implementing these in the national standards systems, and 3) withdrawing conflicting national standards. The last creative idea was the New Approach, which harmonises safety regulations between EU member states and relates common voluntary standards to legislation.

Phase 2: Effectiveness. These ideas then need to be put into practice and not immediately be replaced by other ideas, so that the external orientation remains but the orientation towards change is replaced by an orientation on control. External and internal are dichotomies, these cannot be applied at the same moment.⁹⁴ Effectiveness results from a combination of external and control orientation. CENELEC, indeed, brought these ideas into practice and CEN did a similar job. They developed a relevant set of European standards. CENELEC mainly rubberstamped IEC standards and standards related to New Approach directives, and this was an important cornerstone for the Single European market so CENELEC and CEN were really effective.

Phase 3: Efficiency. Once Effectiveness has been achieved, the activities become 'business as usual' and the organisation can shift to a next phase, Efficiency. This phase combines control with internal orientation. Again there is a dichotomy: internal and external orientation cannot be combined. CENELEC (and CEN) are currently in this phase. Standards are being developed, new work items are put on the agenda, mainly stemming from the IEC or the European Commission, and serious attempts are being made to create an even more efficient organisation, also by integrating CENELEC with CEN.

Phase 4: Flexibility. The attention on efficiency leads to awareness of the internal strength of an organisation, which forms the basis for a new strategy focused on flexibility. Flexibility combines an internal orientation and an orientation on change. The introduction of 'New deliverables' might be seen as an element of flexibility, but here CENELEC (and CEN) made the wrong choice: instead of improving their own processes, e.g. by professionalising the way standardisation is being supported, they jumped to a combination of external orientation and change, thus for this part again Phase 1, but not in an innovative way. The new deliverables are rather weak copies of services offered by

⁹³ Hardjono, 1997.

⁹⁴ Here Hardjono builds on Quin and Rohrbaugh, 1983.

'competitors' (industry consortia) and, even worse, these partly violate own principles. CENELEC (and CEN) should have improved their own processes while sticking to these principles.⁹⁵ According to Hardjono, flexibility, in turn, leads to a strategy of change and is a solid basis for a new focus on creativity and innovation –going back to Phase 1.

The two dichotomies in the Four-Phase Model

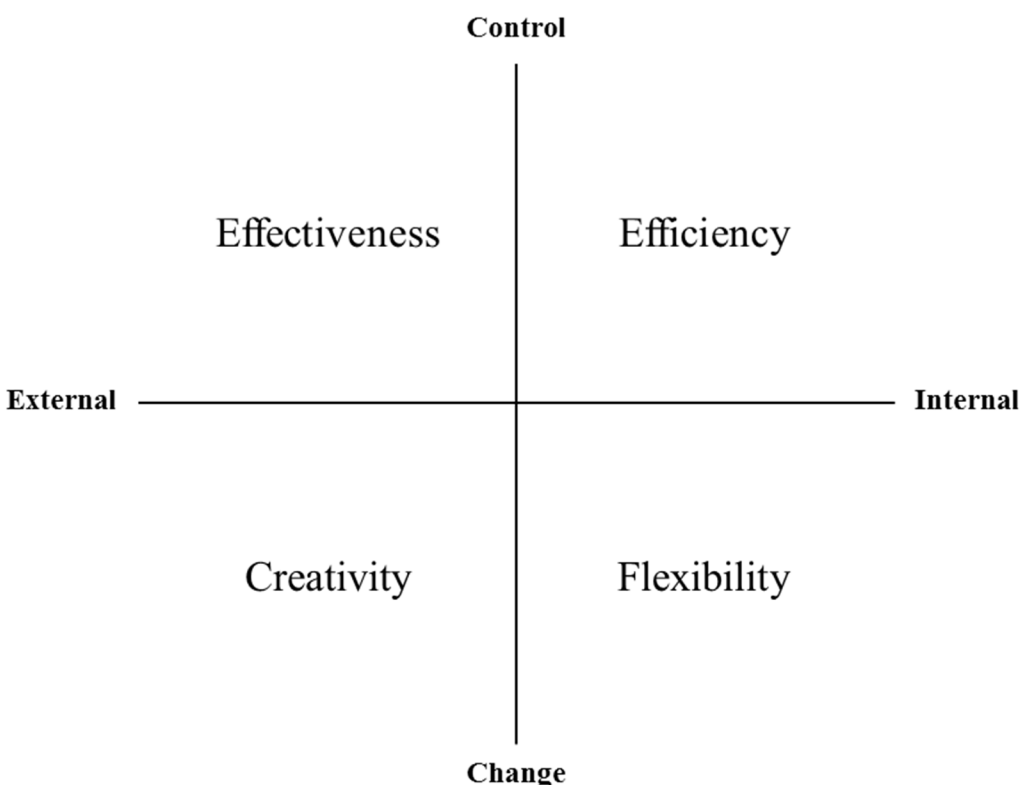


Figure 2: Four Phases Model (simplified).⁹⁶

Bureaucracy. CEN and CENELEC did not move to this next phase of Flexibility and added a small element of Phase 1 which soon also became business as usual and then they stayed in the Efficiency phase for two decades. According to Hardjono, staying too long in one Phase may turn positive characteristics into negative ones. In the case of staying in the Efficiency phase, the positive characteristics of control can then turn into 'rigidity' and the positive characteristics of internal orientation may lead to 'inertia'. This combination results in bureaucracy, the opposite of efficiency. Unfortunately, this is exactly what CENELEC and CEN experience now. This explains the current efforts to enhance efficiency, by better integrating the two organisations to avoid duplication of activities. This seems reasonable, but Hardjono argues that to escape from the 'iron cage of bureaucracy' the solution is not to focus more on efficiency, but to move to the next

⁹⁵ de Vries, 1999.

⁹⁶ Based on Hardjono, 1997.

phase, Flexibility. However, he argues that external circumstances may make it necessary to set another step than just to move to the next phase. This seems to be the case. Probably CENELEC needs to move in the opposite direction. Due to its internal orientation, the organisation was insufficiently aware of changes in its external environment. These include:

- Integration of technical areas that used to be separated.
- Integration of markets that used to be distinct.
- Extension of standards for products and services with standards for processes, software, services and management systems, and the consequences for the contents of standards (also non-technical).
- Broadening of the purpose of standardisation: from technical to (also) commercial to (also) societal.
- Extension of categories of interested people: from mainly engineers, researchers and business people to more stakeholders, including societal stakeholders.
- Extension of markets: first from national to global, then also European. Now a counter-movement with a re-discovery of national and even local levels for which standards may also be relevant.
- Shift of power in international business and thus also in international standardisation from North America, Europe and Japan, to other Asian countries and, to a smaller extent, to other regions in the world.
- Shift from a technical to a business paradigm in standards setting: less emphasis on sound technical solutions and scientific underpinning, and more emphasis on standards as a result of a power-play between stakeholders (“affected by negotiation” or “commercially pushed”).
- Less emphasis on due process including consensus-based decision-making, and more emphasis on standards resulting from competition in the market.

These trends can be summarised in one word: complexity. The environment for electrotechnical standardisation is becoming increasingly complex and this has consequences for CENELEC. Therefore, a renewed external orientation is needed. The organisation should move from an internal towards an external orientation while – for the time being – maintaining a focus on control. A complete shift towards Creativity would not be feasible immediately. The combination of external and control orientation will result in Effectiveness and diminish bureaucracy, as a ‘side effect’ instead of as a purpose in itself. Because of the dichotomy between internal and external orientation, it is not feasible to combine Effectiveness and Efficiency. Continuing to focus on Efficiency by further integrating CEN and CENELEC will make the situation worse instead of better. It will hinder an external orientation and increase rather than diminish bureaucracy because it focuses on activities of internal employees rather than on current and future customers.

Alignment with EU phases. Beusman and Hardjono applied the same model to the development of the European Union⁹⁷ and it is interesting to see how the development of European standardisation relates to this and to the challenges the EU currently faces. The phase of establishing the EU was the Creativity phase. The wish not to engage in war again and to cooperate and become interdependent was a strong motivator. The

⁹⁷ Beusman & Hardjono, 2015.

predecessors of CEN and CENELEC started at this time. In the next EU phase, Effectiveness, these ideals were put into practice by creating a society of peace, safety and prosperity. Having a single market without barriers to trade was seen as supportive and because deviating standards per country hinder such a common market while common standards help, the standards bodies could have made the same step: to create standards for this common market, but they failed to do so. Their Creativity phase continued but actually without much creativity: they focused on the national and international level without paying too much attention to Europe. The Maastricht Treaty in 1992 marked the shift of the EU to the phase of Efficiency. Organisations needed standards, and then the standards bodies started their Effectiveness phase by initiating a huge amount of European standardisation activities. Their subsequent move towards Efficiency was rather gradual. The European Union was successful in creating the single market and in expanding with many new members, but lost attention for the original ideas and neglected the social system, which also should have led to self-reflection. This prevented them from moving on to the next phase of Flexibility, and instead they stayed in the Efficiency phase for too long which led to bureaucracy. This situation is similar to what happened to CEN and CENELEC, as described above. The legislation on standardisation⁹⁸ and the Vademecum⁹⁹ are examples of this ‘iron cage of bureaucracy.’ Beusman and Hardjono¹⁰⁰ show four options for the EU. The first is inertia, i.e., doing nothing. This is likely to lead to economic decline and to increase the tensions between North and South and also between France and Germany. The second option, doing less but doing it more effectively, as proposed by the UK, will probably lead to similar effects. The third option is to repair what was neglected in the Efficiency phase by moving to a political union next to the monetary union and giving the EU more autonomy. The fourth option is to move to a new phase of Creativity in which diversity should be seen as a strength rather than a weakness and in which soft power is used. Beusman and Hardjono prefer the last option. Disentanglement of EU and European standardisation would support this – it is beneficial for both the EU and for European standardisation.

3.13 Conclusion

In this Chapter, we have examined the root causes of the problems mentioned in Chapter 2. The aim of the independent NCs is to serve industry in their country better. However, this is hindered by the way standardisation is organised, by the relationship between CENELEC and CEN and their common secretariat CCMC, and by the European Commission. This may affect industry leadership in CENELEC, but this leadership is also affected by developments within the industry such as the diminishing number of standardisation departments and experts in combination with the increasing complexity related to systems in which electrotechnology is integrated with ICT, and with other technical fields and services. CENELEC’s close alignment with the international level is a strength, but specific European interests also play an important role, particularly in

⁹⁸ European Parliament and Council, 2012.

⁹⁹ European Commission, 2014b.

¹⁰⁰ Beusman & Hardjono, 2015.

relation to complex systems. National and even local levels are also relevant for such systems. The success story of European standardisation could turn a new page by leaping at the opportunities of these new fields of standardisation. However, this is currently out of focus because CENELEC is becoming increasingly bureaucratic, which is worsened by European Commission interference, and its lack of respect for the private character of the ESOs. Counterintuitively, further integration with CEN appears to hinder rather than help electrotechnical standardisation, and the functioning of CCMC also hinders a move towards better market relevance. CENELEC's next strategic move should be to enhance effectiveness.

4 Discussion

Before presenting three scenarios for the governance of electrotechnical standardisation in Europe, this chapter first discusses a starting point for these scenarios: the contribution electrotechnical standardisation can give to welfare in Europe. The final section provides a conclusion.

4.1 Back to the roots of private standardisation in Europe

The EU and its predecessors were founded in order to build a new Europe without war. This should be achieved by making countries dependent on each other in an economic sense. For Robert Schuman, one of the founding fathers, it was more than just that. Ideals such as freedom, equality, solidarity, community, diversity, peace and reconciliation played an important role in striving for European unification.¹⁰¹ Meanwhile, the EU has been established, Western and Central Europe are no longer at war, all EU member states have democracy, and the single market has brought prosperity. However, currently, the EU is in crisis. Citizens increasingly show resistance against the on-going unification, against the EU moving towards the 'United States of Europe'. The EU administration has turned into a bureaucracy. The introduction of a common currency in unequal economies has affected these economies, first in the South, but also in the North, and has created tensions between member states. A combination of a financial and a political crisis may lead to an economic crisis and these subsequently re-enforce each other. In this changing political landscape, the role of standardisation and its governance may have to change as well. First by being able to continue in the case of a collapse of the EU, by becoming more independent. Second, by linking to the increased attention for 'differ-integration' in the EU. More than half of EU policies are implemented in different ways¹⁰², whereas the European standardisation system is much more homogeneous. The huge differences between CENELEC NCs suggest that more differentiation may be needed. In the EU, Greece and the UK are cases of differentiated disintegration. This might be an option in standardisation as well.

Standardisation in Europe has much older roots, going back to the guilds in the Middle Ages. It is consensus-based – stakeholders meet in committees to agree on common standards, in contrast to the more 'market-based' approach in the USA (a battle between competing solutions should lead to a de-facto standard) or the governmental approach in China.¹⁰³ In this sense, the international standardisation in ISO and IEC fits better in the European culture, and of course this applies to CEN, CENELEC and ETSI as well. The consensus-based standardisation relates to the 'Rhinelandic' model of business in which the main purpose of companies is not short-term benefits but longer term survival and prosperity for the company itself, but also for other stakeholders, in contrast to the short-term Anglo-Saxon model. Meanwhile, globalisation has created a new situation: many

¹⁰¹ Luitwieler, 2014.

¹⁰² Leruth & Lord, 2015.

¹⁰³ Meyer, 2013.

companies operate at a global scale. They need standards and are confronted with different standardisation cultures and systems. They tend to switch in a pragmatic way between the different modes of standardisation. Meyer argues that these different systems should not be seen as competitors – each system has distinct competitive advantages. Rather than competing against other systems, the regions should innovate their own systems.¹⁰⁴

Standards bodies should therefore not simply stick to the system they developed almost a century ago, but modify it to honour three major changes. First, the societal importance of standardisation has become much more prominent, which means an increased awareness of the in stakes involved (e.g., environmental issues) and related stakeholders (e.g., environmental pressure groups). Second, time to market and product life cycles have been shortened and intellectual property rights have become more important. And third, technologies, processes, products and services are increasingly interrelated and combined in complex systems. Standards are of utmost important to provide the interfaces within and between such systems, but it is more and more difficult for individual players to take the lead in the necessary standardisation trajectories.

Remarkably, the system of European standardisation has incorporated elements of the American and the Chinese system which undermine its own strengths. The CEN-CENELEC Workshop Agreements undermine the basic principles such as the country model, openness, consensus, transparency and coherence.¹⁰⁵ The situation in Europe increasingly mirrors characteristics of the Chinese system – the European ‘state’ has enormous influence. In the positive sense, this may be called a Public Private Partnership: ‘Voluntary and collaborative relationships between various parties, both State and non-State, in which all participants agree together to achieve common purpose or undertake a specific task and to share risks and responsibilities, resources and benefits’.¹⁰⁶ Although EU officials say that they see themselves next to, rather than ‘above’ the standards bodies, practice is partly different. This undermines the system of voluntary standardisation. A third development undermining standardisation is bureaucracy. Although formal procedures and related documents are inherent to the process and even a strength of it, the same is applied at the governance level as well. Dozens of committees and working groups have many meetings, address all kinds of issues and hundreds of documents are related to this. The issues are not fully irrelevant. On the contrary, but the time spent on them distracts attention from a real strategic agenda and innovation of the system. CENELEC’s standardisation agenda is determined by the IEC and the European Commission. Both for good reasons, but this has resulted in a very passive CENELEC. Combined with bureaucracy, this leads to a downward spiral, with CENELEC becoming irrelevant. Moreover, because of the EU crisis, CENELEC’s ‘partnership’ with the EU may turn out to be unreliable. Rather than being connected to EU bureaucracy and thus being perceived as part of the European problem, it would be better for CENELEC go back to its private roots in order to be part of the solution to European problems by being proactive. As appears from Section 3.12, this requires an orientation of Effectiveness,

¹⁰⁴ Meyer, 2013.

¹⁰⁵ de Vries, 1999,

¹⁰⁶ UN General Assembly, 2005.

However, the answers to the CCMC survey and the interviews indicate that the NCs prefer to focus on alignment with the IEC and advocate a more passive role for CENELEC. This scenario will be examined in the next section. Section 4.3 describes a scenario with a more proactive European role. In both scenarios, there are dilemmas about the rate of integration with CEN, the role of CCMC, and the governance of CENELEC. These two scenarios have been discussed in a focus group consisting of the CEOs of the NCs participating in this project plus Belgium. They decided to examine a third scenario, which mitigates the disadvantages of Scenario A and then moves in the direction of Scenario B. Scenario C is presented in Section 4.4.

4.2 Scenario A: Follow the IEC

4.2.1 The scenario

In this scenario, CENELEC's purpose could be defined as: develop, approve and disseminate trustworthy and sound standards in the field of electrotechnology, relevant for European stakeholders. CENELEC primarily adopts and disseminates standards developed at the international level by the IEC. It only deviates from these or develops additional European standards in exceptional cases.¹⁰⁷

European industry and other stakeholders participate in the IEC through national committees. CENELEC maintains its structure of TCs parallel to IEC TCs, and their main task is to adopt IEC standards in the European system, preferably unchanged and only in exceptional cases with deviations. Safety standards, referred to in the New Approach directives are, as far as possible, revised or developed at the international level and aligned with standards elsewhere in the world. Differences in legal systems and safety levels required in these systems may give a need for deviations per region and in these cases, the EN version may provide the European version of the international standard.

In this scenario, CENELEC no longer honours EU standardisation requests: the default answer to these requests is 'no'. Only in exceptional cases are European standards developed additional to IEC standards. If the EU brings topics to the agenda that have not yet been addressed in the IEC, these are proposed for inclusion in the IEC programme. Given the number of European countries active in IEC, this should not be a problem, but topics will only be accepted if industry and other stakeholders agree.

Continuing as a separate organisation does not imply that CEN and CENELEC cannot have a common secretariat. For reasons of synergy, alignment, effectiveness and efficiency, a common secretariat seems to be the better solution. However, CCMC's current working model leads to unnecessarily heavy workload. The secretariat, but also CEN and CENELEC themselves, currently tend to solve problems 'in a standardisation way' by creating committees. This should be stopped and committees working on these

¹⁰⁷ This purpose formulation is more condensed than the one laid down in the Articles of Association and in the proposals by the CENELEC Working Group Purpose.

issues should be dissolved. Even in this ‘low profile’ scenario, CCMC should be more proactive and entrepreneurial and do work that is currently done in governance-related committees. This cultural change is challenging and might be a main reason for CENELEC to find another secretariat. A second reason for the current workload is that CCMC links European standardisation to the EU too strongly, because it also serves CEN and because of its financial dependency on the EC. This brings additional and partly unnecessary topics to the agenda of NCs and leads to more ‘political’ issues instead of more technical issues on this agenda. The secretariat should focus on ‘normal’ support for technical work and be very selective in sending other documents, CCMC should rather handle them themselves. Because the role of CENELEC is rather limited in this scenario, an alternative would be to move the secretariat to the Belgian member body BEC, where it was in the past. CENELEC members would no longer be hindered by CEN preferences. Another option is to create two business units – one for CEN and one for CENELEC. In this case, CENELEC could express its wishes and in the case of extreme dissatisfaction move to another secretariat provider or create its own office. Such a solution seems to be more feasible than CENELEC’s departure, which a majority of NCs would probably not support. Actually, this is more or less the current situation in CCMC. CENELEC fails to express what they want from CCMC and when they do, they do not always get what they want. If the secretariat stays at CCMC, it will have to undergo a major change– rather than preparing meetings, making minutes and distributing documents, CCMC will have to develop proposals themselves.

4.2.2 Answers to the research questions

We now answer the research questions for this scenario:

1. How can formal standardisation be organised in such a way that it enables industry to have optimal impact with minimal efforts, without compromising reasonable participation and influence by other stakeholder groups such as Government/Legislator?

On the technical side, minimal efforts for industry can be achieved if the delegates in CENELEC TCs and those in IEC TCs are the same. They then just put on the CENELEC ‘hat’ and achieve consensus about the European adoption of an IEC standard or, in exceptional cases, a European variant. The CENELEC TCs do not need to have separate meetings, and all activities can be done in conjunction with IEC meetings or – even better – at distance. Of course, the national mirror committees would be identical as well and parallel voting can be applied. A CENELEC TC would need to have a separate meeting or perhaps an additional TC is needed, only if special European circumstances require the development of a separate European standard. Then other European stakeholders can also participate.

In this scenario, the CENELEC TCs monitor IEC developments, and if there is no TC, the CENELEC Technical Board (BT) decides what to do. The applicable TC will have to operate within the framework of the general CENELEC policy.

The CENELEC Administrative Board (CA) prepares strategic decisions and takes care of all daily issues. CCMC prepares all issues that are currently done in the working groups, the CA takes the final decisions, and the working groups are dissolved.

The CENELEC GA is organised in conjunction with the IEC GA to avoid unnecessary traveling, and because the main policymakers from industry are assumed to attend the general assembly. In the case there are no major policy issues, the meeting is cancelled. Other decision-making is by correspondence.

CCMC is very selective in sending documents to CENELEC NCs. This policy is fine-tuned between BT and CCMC. Moreover, each document should be related to one or more categories and NCs can choose not to receive any documents about certain categories (e.g., nothing about education).

2. Does CENELEC have any added value as a separate European standardisation organisation next to CEN and ETSI?

For historical reasons (installed base of standards, pattern of current cooperation) but also because of the current differences between IEC and ISO, CEN cannot have a similar strategy as the one described above. It would probably be wiser if CENELEC did not further integrate or even merge with CEN. Further integration would bring other people in the leading positions: from other industries and/or from a majority of non-electrotechnical national standards bodies, or even worse, people that lack affinity with 'real' standardisation work. They will not necessarily agree to have a different strategy for electrotechnical standards. Under CEN dominance, the chances of achieving substantial changes in CCMC and more distance from the European Commission are also lower. And, last but not least, integration would be a focus on efficiency that would hinder effectiveness. Thus a separate CENELEC aligned with IEC is needed to ensure market-driven electrotechnical standardisation in Europe. The main added value of CENELEC in this scenario is to ensure that the IEC standards are implemented in the national standards systems of all member countries which should benefit the electrotechnical industry and help to have a common European market without barriers to trade.

3. How can it be ensured that industry defines market relevance of standardisation projects?

The main decisions about market relevance are made in the IEC, and European stakeholders can participate at that level via their NC. It is assumed that the standards developed in the IEC are relevant in Europe as well. European deviations or additional standards are only developed in exceptional cases. These could be included as options in the IEC standards, next to options preferred in other parts of the world, in order to increase transparency to standards users. NCs should encourage stakeholder participation in their country.

4.2.3 Strengths and weaknesses of scenario A

Main strengths:

- Companies and other stakeholders get common European electrotechnical standards optimally aligned with IEC standards for minimal efforts (incl. traveling, IT systems).
- Substantial reduction of administrative work for NCs.
- No dependency on the EU.

Weaknesses:

- No real answer to the trends mentioned in Chapter 1.
- More dependency on IEC implies that CENELEC has little 'own' added value.
- CENELEC ignores European political priorities and approved policies – realistic or ostrich attitude?
- The 'default no' to mandates causes a problem for the EU. If CENELEC refuses standardisation requests, the EU will turn to CEN and CEN will have to involve its members, in some countries excluding CENELEC members.
- No change in the weak involvement of societal stakeholders.
- No improvement in time to market (however, if the role is mainly rubber-stamping, this is no problem).

4.3 Scenario B: Steer the development and dissemination of electrotechnical standards in Europe

4.3.1 The scenario

In this scenario, CENELEC's purpose could be defined as: develop, approve and disseminate trustworthy and sound standards in the field of electrotechnology, relevant for European stakeholders. CENELEC primarily adopts and disseminates standards developed at the international level by the IEC and develops additional European standards to meet European priorities if necessary.

The international level is by far the most relevant level for electrotechnical products. However, the European, national and even local levels are relevant as well for installations, grids and integrated systems. Then simply relying on IEC standards is not an option. In many cases, electrotechnology is interwoven with ICT and a variety of application areas so standardisation activities in CENELEC, ETSI and CEN need to be closely aligned, and common architectures are needed in system technologies. After such an architecture has been developed, an assessment is made about which standards are needed, which ones already exist, and to what extent these need to be developed. A stakeholder analysis should reveal which business and non-business stakeholders apply, in which countries, which stakes they have, and which standardisation organisations are best equipped to develop the necessary standards. This may include formal standards bodies at the international, European and national levels, and consortia which then may

'feed' them. However, for legitimacy reasons, the preferred solution is that the formal bodies such as ISO, IEC and ITU develop the standards. In this scenario, CENELEC takes the lead in initiating European discussions about systems, partly following IEC and partly initiating new fields. These preferably come from industry, but also stem from European research projects. CENELEC actively stimulates that standardisation becomes fully integrated in the European research agenda. It maintains a partnership relation with the European Commission. 'Mandates', if any, stem from CENELEC rather than from the European Commission.

This scenario requires knowledgeable people, particularly in the roles of convenors and secretaries. Developing systems-related sets of standards requires people that can combine in-depth standardisation knowledge with the ability to understand business and societal needs. They need to know how standards can be used to meet these needs, create opportunities and solve problems. Besides designing the standards, they need to manage the standardisation process and to maintain relations with all relevant stakeholders. Knowledgeable convenors and secretariats also know how to reduce throughput time¹⁰⁸ and how to involve societal stakeholders.¹⁰⁹

This pro-active role of CENELEC requires a knowledgeable and pro-active secretariat – a role that cannot be played by CCMC in its current shape and culture. If CEN does not take similar steps, then it is not feasible to continue with a common secretariat. Joining forces with ETSI is one option (the disadvantage of the distance may turn into an advantage because it helps to create 'distance' from the European Commission). For industry, the question is whether they are willing to allocate high-level experts to CENELEC or to IEC or whether they prefer to establish a consortium, to invite their preferred stakeholders to join and, in this way, be more influential.

¹⁰⁸ Unfortunately, the current rigid throughput time requirements show a lack of understanding of the standardisation process by the EU but also by standards bodies and industry representatives. The main source of delay is the time between subsequent meetings when little activity takes place. Already 30 years ago, the author managed to have standards ready in 20% of the normal time without any procedural change. The 'secret' was to get consensus about the process, including who should do what and when, before getting consensus about the technical contents of the standard. So target dates were set but no strict deadlines because exceptions could be needed. At that time, the researcher was secretary to several standardisation committees, and used a two-week planning schedule. Standardisation combines a design process (the standard has to be designed) with a decision-making process. Designing can be done by one or a few people, but all stakeholders need to be involved in the decision-making process. Rather than 'jumping to a design', it makes sense to first agree on functional requirements, then have a creative session to explore in which ways these functional requirements can be fulfilled, next, select one way, and then start the real design. Being the committee secretary, the researcher then 'managed' the project (not officially – because this is up to the convener) by maintaining the relations with the participants, other external stakeholders and the internal organisation (the latter e.g. for ensuring consistency with standards in adjacent areas, for making technical drawings and for a language check). This needs to be combined with designing a (modular) architecture of standards in relation to an architecture of technology, and in relation to the stakeholders and their stakes.

¹⁰⁹ Current efforts to enhance their involvement focus on increasing participation at the national or European level. The problem is that a set of barriers hinders this participation. The solution is to have a stakeholder analysis per project. This will reveal whether the issue is relevant for societal stakeholders and what their stake are. The committee then may be asked to make explicit how they addressed these stakes – also in case the applicable association cannot participate.

4.3.2 Answers to the research questions

We now answer the research questions for this scenario:

1. How can formal standardisation be organised in such a way that it enables industry to have optimal impact with minimal efforts, without compromising reasonable participation and influence by other stakeholder groups such as Government/Legislator?

This scenario requires a pro-active approach from industry. In addition to Scenario A, industry and other stakeholders should be involved in exploring new areas for standardisation. This requires people with the right knowledge and skills. Once potential standardisation topics have been defined, the secretariat and the stakeholders should carry out a feasibility study and a stakeholder analysis for each potential new area of standardisation. Next, an architecture of standards needs to be designed which includes functional requirements for each of the standards, and finally a proposal must be approved about which standards bodies could develop these standards. This is a major task for the secretariat. Next, 'normal' standards development can start – partly in CENELEC, partly in other standardisation organisations.

In this scenario, in addition to the organisation structure mentioned above, a much more active and professional secretariat and more stakeholder involvement at various stages is needed. CENELEC TB and CENELEC Administrative Board will play a more active role. CENELEC might consider the model the IEC uses for its Standardization Management Board to limit NCs' workload in the CENELEC BT. Six of its 15 seats are reserved for member bodies that make the largest contribution measured in terms of the number of secretariats and membership fees. The remaining seats are filled for a three-year term through elections in the assembly of member body presidents, the IEC Council, to ensure a balanced geographical distribution.¹¹⁰

The new pro-active way of working will require more NC involvement. Also in this scenario, most of the current working groups can be cancelled. Because of the increase of CENELEC work, more documents will have to be handled. If NCs are interested in a new area, they will have to mobilise national stakeholders and in some cases they can choose to develop additional national standards or support the development of local standards. But they can also choose not to join.

Because the work done by CENELEC is less exclusively linked to IEC work, the CENELEC GA should not be organised in conjunction with the IEC GA. An option is to organise it in conjunction with CEN or ETSI GA.

2. Does CENELEC have any added value as a separate European standardisation organisation next to CEN and ETSI?

¹¹⁰ Bütthe, 2010.

For historical reasons (installed base of standards, pattern of current cooperation) but also because of the current differences between IEC and ISO, CEN cannot have a similar strategy as the one described above. It would probably be wiser if CENELEC did not further integrate or even merge with CEN. Further integration would bring other people in the leading positions: from other industries and/or from a majority of non-electrotechnical national standards bodies, or even worse, people that lack affinity with 'real' standardisation work. They will not necessarily agree to have a different strategy for electrotechnical standards. Under CEN dominance, the chances of achieving substantial changes in CCMC and more distance from the European Commission are also lower. And, last but not least, integration would be a focus on efficiency that would hinder effectiveness.

3. How can it be ensured that industry defines market relevance of standardisation projects?

As in Scenario A, the main decisions about market relevance are made in the IEC, and European stakeholders can participate at that level via their NC. It is assumed that the standards developed in the IEC are relevant in Europe as well. Additionally, they can participate in European projects – not only for standards development but also strategic studies about an architecture of standards. They may even carry out such studies themselves. They should accept and even support that societal stakeholders get involved as well.

4.3.3 Strengths and weaknesses of scenario B

Main strengths:

- CENELEC is better prepared to respond to the trends mentioned.
- Private stakeholders can continue to solve European problems and strengthen business and society via CENELEC even if the EU were to fall apart.
- CENELEC gets a prominent role in the support of European political priorities and approved policies.
- Alignment with international standardization (IEC).
- Where needed, Europe is prepared to take the lead in IEC.
- CENELEC strengthens its 'own' added value.
- CENELEC is a well-respected partner. EU 'mandates', if any, result from real co-operation, and are not 'imposed'.

Weaknesses:

- NCs that currently have limited involvement in IEC's and CENELEC's activities are probably not ready to accept a potentially substantial increase in technical work.
- First feedback suggests that NCs in countries with more active electrotechnical industry are also not prepared to play such a role.
- Lack of knowledge and skills, both in companies and in NCs, to be able take the lead in designing coherent sets of sophisticated systems-related standards.

4.4 Scenario C: Moving from IEC follower to a more pro-active European role

Scenario C starts with Scenario A, with some small changes to tackle the main weaknesses, and then provides the opportunity to move in the direction of Scenario B, also with some slight modifications. In this sense, it can be seen as a ‘growth scenario’.

In this scenario, CENELEC’s purpose would be similar to Scenario B: develop, approve and disseminate trustworthy and sound standards in the field of electrotechnology, relevant for stakeholders in Europe. CENELEC primarily adopts and disseminates standards developed at the international level by the IEC and develops additional European standards if needed to meet European priorities.

Main modifications to Scenario A:

- Mandates: ‘no’ as the default option but if the EU wishes standardisation in a certain field, create a group to discuss this, develop a proposal in co-operation with the EU, and let the members decide.
- CCMC: Redefine its role and responsibilities. Activities should include carrying out strategic studies to explore new fields. Develop a service level agreement including key performance indicators. Improvements should be visible within a year, otherwise a new secretariat should be found.

Preparations for a shift in the direction of Scenario B:

- Identify European research programmes that focus on electrotechnology and examine whether there is a need to develop new IEC and/or CENELEC standards (hire research capacity to prepare this and educate CCMC staff to be prepared to do this in future). BT decides if new activities are needed and, if so, in IEC or in CENELEC.
- Explore whether European variants of the IEC systems projects are needed.
- Conduct a pilot study with a systems-oriented standardisation project in which electrotechnology is important (e.g. future electricity supply in Europe).

Recently, common CEN/CENELEC member bodies have proposed further integration of the two organisations. As mentioned in Section 3.6 and 3.12, the less obvious disadvantages seem to outweigh the obvious advantages. In any case, no matter which scenario CENELEC prefers, A, B or C, major changes are needed. If these two main decision making bodies are integrated, it will be more difficult to make these changes, including the option to dismantle CCMC. Only in the case of the zero option, i.e., changing nothing, could integration make sense from the perspective of some efficiency benefits for the staff of common members. It would confirm the common trend of further marginalisation of European standardisation, to the detriment of European business and society. However, if CEN were to take a similar – but not identical! – upgrade direction as proposed for CENELEC, integration of the two organisations would make sense at a later stage

4.5 Conclusion and medium-term perspective

This study aims to answer the following questions:

1. How can formal standardisation be organised in such a way that it enables industry to have optimal impact with minimal effort, without compromising reasonable participation and influence by other stakeholder groups such as Government/Legislator?
2. Does CENELEC have any added value as a separate European standardisation organisation next to CEN and ETSI?
3. How can it be ensured that industry defines market relevance of standardisation projects?

Based on an analysis of the problems perceived by seven independent NCs, three scenarios have been developed. Scenario A is in line with what the independent NCs emphasize: focus on alignment with IEC. Scenario B adds a proactive European role. In both scenarios, the overload of committees and working groups is stopped simply by dismantling most of them. Although they may be important, they hinder more important work. Their work should stop or be (partly) taken over by the secretariat.

In Scenario A the focus shifts further to the international level by aligning European structures and meetings with international ones and by putting the European Commission at distance – the default answer to standardisation requests is ‘no’. Compared to the current situation, CENELEC becomes leaner, industry can focus on the technical work and the administrative workload of NCs is reduced considerably. It requires a more proactive role of the secretariat. If CCMC is not prepared to play this role, a move to another secretariat can be considered. However, this scenario more or less ignores European issues and the default rejection of standardisation requests is not realistic. The focus on IEC leads to less rather than more integration with CEN. This might be beneficial for the electrotechnical industry, but is not necessarily supported by CEN and CENELEC members, in particular those members from countries that have a limited electrotechnical industry and thus hardly any involvement in IEC.

In Scenario B, the needs in the European market get more priority. The market for electrotechnical components and products is global, but the market for systems in which these are applied can be either global, European or national, or even local. In these systems, electrotechnology becomes interwoven with ICT, other technologies, and services. In Scenario B, CENELEC takes a forerunner role in developing architectures of standards for such systems. CENELEC develops the electrotechnical standards themselves in cooperation with IEC, while leaving the remaining standards to other standards setting bodies including ETSI and CEN. In this scenario, CENELEC cooperates with the European Commission but in a different way than it currently does – ‘next’ to it, not ‘under’ it. This pro-active role requires a pro-active secretariat, knowledgeable in the art of systems-related standardisation. CCMC in its current shape is not in a position to play this role. Many conveners of committees and standardisation officers at the national level need additional education to enable them to lead and support this more

sophisticated form of standardisation. In this scenario, CENELEC remains independent from CEN, 1) because of this sophisticated character, 2) in order to allow industry to be in the lead, 3) because of its relation to IEC, and 4) to ensure an external focus. However, if CEN moves in a similar direction, more integration between CEN and CENELEC makes sense at a later stage – the historical reasons for having separate organisations disappear due to the integration of technologies and markets.

First feedback suggests that most NCs involved in this project are not prepared to play a more active role in Europe and therefore prefer Scenario A. However, because of the weaknesses of this scenario, a third scenario has been developed, which starts as an improved version of Scenario A and then moves in the direction of Scenario B. CENELEC's purpose would be to develop, approve and disseminate trustworthy and sound standards in the field of electrotechnology, relevant for stakeholders in Europe. In this growth scenario, CENELEC starts with a pilot project of system-related standardisation. The three scenarios all can be positioned as measures of Effectiveness: doing the right things. However, opinions may differ about what the right things are and in this sense scenarios A and B differ substantially. Scenario C provides a growth path within the phase of Effectiveness but this path should not take too long because the phase as such should not take too long.

CENELEC, as a cooperation between independent NCs, faces the additional problem of strategic decision making because the NCs differ enormously, also in terms of the phases they are in themselves, in terms of Hardjono's theory. Here the solution seems to be to allow more differences in speed and emphasis, by allowing the forerunner countries to take new initiatives while giving others the option to refrain from participation. However, these differences may hinder consensus-based decision making so that decisions are postponed and the organisation fails to move to a next phase in time. At the end of the day, standardisation activities should be beneficial for stakeholders all over Europe, at affordable cost.

In his model for strategic changes in organisations, Hardjono combines the four phases with four basic core competencies: material competence, commercial competence, social competence, and intellectual competence. He suggests an intervention for each of these in each of the four phases, so a maximum of 16 interventions. However, due to the dichotomies only eight of these can be used at the same moment. In the case of standardisation, material competence is related to the business models of the organisations at the national, European and international level – these are diverse, and up for improvement. Commercial competence is related to market relevance – the positioning of formal standardisation organisations next to industry consortia requires better involvement of 'weak' stakeholders, including small businesses and societal stakeholders. Social competence is a strength of formal standardisation, via stakeholder participation per country and consensus-based decision making. However, actual participation differs substantially across countries. Meanwhile, new technologies allow new and maybe better forms of involvement. Intellectual competence relates to the knowledge and skills needed to perform standardisation in a professional way. Vocational or even academic education is required for all kinds of professions. Standardisation

people have the illusion that understanding some procedures followed by learning on the job is sufficient. Better performance requires better education, underpinned by scientific research.¹¹¹ Standardisation bodies that manage to systematically improve these four competencies will do the best job.

¹¹¹ de Vries, 2015.

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