

Best Practice In Company Standardisation

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Abstract	<p>Though the majority of standards are company standards, scientific standardisation literature pays hardly any attention to them. In this paper we describe results from a research project on company standardisation (Oly & Slob, 1999). The researchers investigated six chemical and petrochemical industries in the Netherlands: Akzo Nobel, Dow Chemical, DSM, Gasunie, NAM and Shell. These companies have numerous standards for their installations. Best practice for developing such standards was developed by examining the companies and using insights from relevant literature. This paper describes the scientific approach used and some of the best practice results.</p>	
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Best Practice in Company Standardisation

Florens J.C. Slob¹ and Henk J. de Vries²

Though the majority of standards are company standards, scientific standardisation literature pays hardly any attention to them.³ In this paper we describe results from a research project on company standardisation (Oly & Slob, 1999). The researchers investigated six chemical and petrochemical industries in the Netherlands: Akzo Nobel, Dow Chemical, DSM, Gasunie, NAM and Shell. These companies have numerous standards for their installations. Best practice for developing such standards was developed by examining the companies and using insights from relevant literature. This paper describes the scientific approach used and some of the best practice results.

Company standardisation - definition

To define the area of research we have to define company standardisation.' The official definition of 'standardization' can be found in the ISO/IEC Guide 2 (ISO/IEC, 1991):

Standardization is the activity of establishing, with regard to actual or potential problems, provisions for common and repeated use, aimed at the achievement of the optimum degree of order in a given context.

Notes:

- 1. In particular, this activity consists of the processes of formulating, issuing and implementing standards.*
- 2. Important benefits of standardization are improvement of the suitability of products, processes and services for their intended purposes, prevention of barriers to trade and facilitation of technological co-operation.*

The ISO/IEC Guide 2 defines a standard as:

Document, established by consensus and approved by a recognized body, that provides, for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context.

This definition focuses on formal standardisation at the international or the national level. In our case, we have to deal with standardisation at company level. Therefore, we need a more specific definition.

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³ Main exceptions are some German books in the series DIN Normungskunde (for instance: Adolphi, 1997; Bouma & Winter, 1982; Hesser & Inklaar, 1997; Schacht, 1991; Susanto, 1988). Professional publications on company standardization include AFNOR, 1967; British Standards Society, 1995; Nakamura, 1993; Ollner, 1974; Simons & De Vries, 2002; Toth (Ed.), 1990; Verity Consulting, 1995; Wenström, Ollner & Wenström, 2000; Winter, 1990).

ANSI's⁴ handbook on standards management adds another standardisation definition, developed by EIPSC⁵ that lists different entities on which standardisation can be applicable (Mackay, 1990):

Standardization: The process of establishing by common agreement the engineering criteria, terms, principles, practices, materials, items, processes, equipment, parts, sub-assemblies, and assemblies appropriate to achieve the greatest practicable uniformity of products and engineering practises, to ensure the minimum feasible variety of such items and practices, and to effect optimum interchangeability of equipment parts and components. (The product of a standardization effort is a documentary standard).

This definition better describes the way most companies look at company standardisation but has a weakness in the limited enumeration. Several other definitions of standardisation have been listed and discussed by De Vries (1999, Chapter 8). By analysing these and linking them to the way the term standardisation is used in practice, De Vries has developed a new definition:

Standardization is the activity of establishing and recording a limited set of solutions to actual or potential matching problems, directed at benefits for the party or parties involved, balancing their needs, and intending and expecting that these solutions will be repeatedly or continuously used, during a certain period, by a substantial number of the parties for whom they are meant.

Notes:

1. *A matching problem is a problem of interrelated entities that do not harmonize with each other. Solving it means determining one or more features of these entities in such a way that they do harmonize with each other, or of determining one or more features of an entity with a view to its relation(s) with one or more other entities.*
2. *An entity is any concrete or abstract thing that exists, did exist, or might exist, including associations among these things. Example: A person, object, event, idea, process etc.*

For our research project we have used this definition, because it covers all essential elements of the other definitions and appears to be well applicable in practice.

Company standardisation is a particularization of standardisation to the company level (Simons & De Vries, 2002, p. 31):

Company standardisation is standardisation within a company, including its positioning towards external standardisation.

In this paper we will exclude the positioning towards external standardisation.

⁴ ANSI = American National Standards Institute.

⁵ EIPSC = Engineering and Information Processing Standards Council of the National Bureau of Standards (Nowadays NIST: National Bureau of Standards and Technology).

Company standardisation in process industries

For companies in process industries, the two main areas of standardisation concern their products and their installations. Standards for (chemical) products include standards that specify requirements for these products and standards that describe methods to test them. Standards for the installations are primarily engineering solutions that define how to design, construct, and maintain manufacturing facilities (Simpkins, 2001). Our study focuses on developing the latter category of standards.

‘Developing’ does not mean that each company standard has to be designed from scratch. A company standard may have the form of (De Vries, 1999, p. 231):

- a reference to one or more external standards officially adopted by the company;
- a company modification of an external standard;
- a subset of an external standard (for instance, a description of the company’s choice of competing possibilities offered in an external standard, or a subset of the topics covered in the external standard);
- a standard reproduced from (parts of) other external documents, for instance, suppliers’ documents;
- a self-written standard.

Importance of engineering standards for process industries

Engineering standards provide the following advantages:

- Predictable quality for installations and processes, leading to efficient and effective operations.
- Exchangeability of components.
- Safety of installations and processes, for the benefit of employees and environment.
- Advantages in human resource allocation (less time for introduction thanks to more routines).
- Assortment management, leading to savings in purchasing (quantity rebates, easier ordering), less stock, and easier maintenance.
- Less dependency from specific parts suppliers.
- Less equipment breakdown, because of better availability and exchangeability of components, and because component behaviour is better known which facilitates preventive maintenance.
- Cost savings in engineering and maintenance, because know-how and experience have been laid down (in standards).
- Quality assurance.
- More ease in meeting legal requirements concerning, for instance, machine safety, environment, and occupational health and safety.

Research design

Because of these advantages, many (big) process industries pay attention to standardisation in a systematic way. This research project stems from a wish of five big Dutch process industries, namely, Akzo Nobel, DSM, Gasunie, NAM, and Shell, to try to improve their own company standardisation performance by learning from each other. At a later stage, Dow

Chemical joined this group. The research project aimed at developing a ‘best practice’ for company standardisation. This best practice should be established by comparing the standardisation activities of the six companies and by, subsequently, choosing the best way of performing these. In order to be able to compare the companies, a common model was needed. The model should describe the processes needed for developing and implementing a company standard. For determining ‘best’, the expected contribution of standards to business results was chosen as starting point. For ‘best practice’ of a process, its expected suitability for contributing to a successful company standard was the criterion. In order to assess this, findings in company practice were completed by insights from (standardisation) literature. In the next two sections we will describe and elucidate the developed model and the way of assessing processes.

Company standardisation model

Company standardisation starts with an initiative to develop a standard and ends with its implementation. In order to describe it we have used a process approach and developed an input-process-output model:

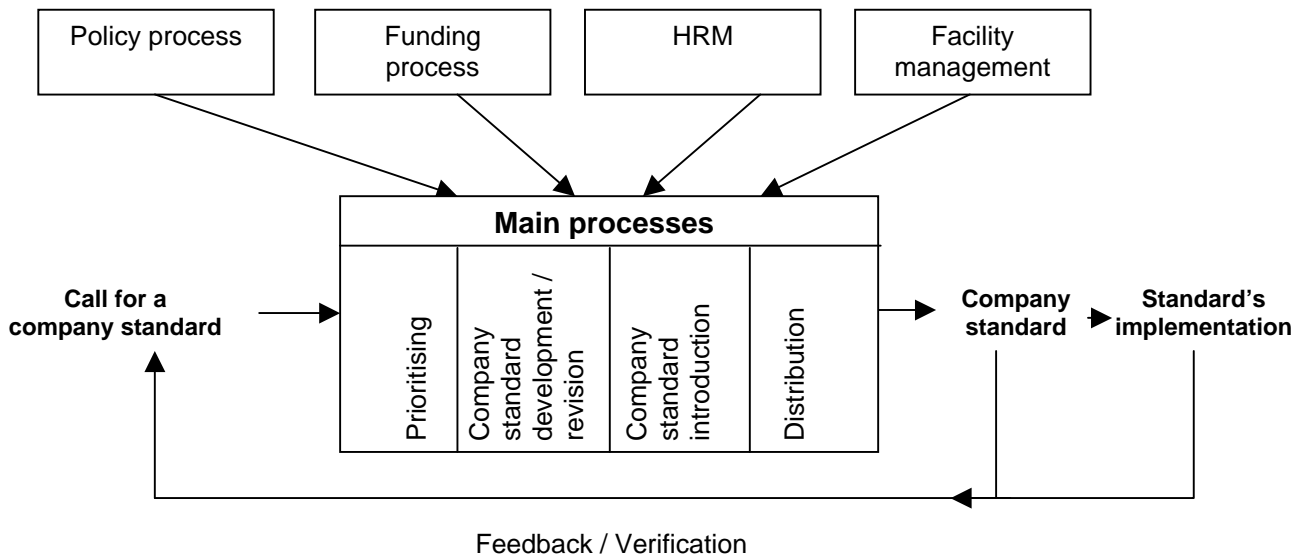


Figure 1: Company standardisation model

The demand for a (company) standard starts either within the organisation or arises from external obligations, such as legislation. Company standardisation has to result in a standard that is used in practice (a written standard which is perfect in theory but is not used has no reason). The first step to ensure that the standard is being used is that the potential users know about its existence and its potential fitness for solving a problem. Secondly, they must be able to get access to the standard easily. After that, the user must be willing to implement the standard and be capable of understanding and implementing the standard and using its implementation.

Within company standardisation several processes can be distinguished. The output of a process often forms the input of the following process, although sometimes the processes can be parallel. For instance, it can be important to start with the *introduction* (promotion) of the

standard already during its development. The processes can also be divided in core and facilitating processes.

Policy is needed to steer the core-processes – a global policy on a company level, more detailed on department level. Budget is needed to *finance* the core-processes – standardisation activities ask for investments. Costs precede benefits. The break-even point may be after, for instance, three years. A competent *personnel* has to realize the established policy, so human resource management is needed. The core processes are also *facilitated* by IT, like the publishing of standards and information about standards on the Intranet.

The *feedback loop* in the model is essential as the developed standard should be an answer to the question for which it was produced – are the (potential) users of the standard satisfied? In fact, the picture is a simplification – more feed-back loops might be drawn because the (quality) management of each process needs a form of feed-back as in the Deming circle: plan, do, check, act.

The core-processes start with setting priorities. Which company standard will be developed and which will not? The development of the standards is the next process; this process consists of the composition of draft version of the standard, commentary rounds, the writing of the final version of the standard and the approval of this standard. The approved standard has then to be introduced to the potential users of the standard. During the introduction process the benefits of the standard and the reasons for certain choices in the standard have to be explained. The more and the better the standard is known to its (potential) users, the higher the chance that it will be actually used in practice and that it will be used in the right way. Also after the introduction period the “promotion” of the standard has to continue.

The next process is called the distribution of the standards. The purpose of this process is to assure that the standards reach the user in a fast and easy way. This can be done by, for instance, subscription, ordering on demand, or in the form of “publishing on demand” using an Intranet.

What is success?

The second step to develop a Best Practice concerns defining success. When is it possible to say that company standardisation has been successful? Because there is not much literature about the subject of (company) standardisation we had to look mainly at the practical situation within the six companies. The definition of success resulted from the interviews carried out within the companies and from discussions with people who work with, or are professionally engaged with standardisation. These findings were completed with insights from literature.

The success of company standardisation results from the processes that constitute it and that have been made visible in the model. We relate ‘success’ to these processes in the following three steps.

Step 1: the standard should be there

It is evident that company only can be successful when the output is a company standard (or normative document). This is in fact the output of only one of the processes, the standard-development-process. Other processes take place before or after this process. To develop the

standard there is a need of competent personnel (HRM) and the development of the standard has to be paid for (funding process). Because there will not be enough competent personnel or funding not every demand for standardisation can be met, there has to be a prioritising process. To manage these processes there has to be a pre-defined policy for company (policy process) and IT-tools support them (facility management). Once the standard has been developed the organization has to know that it is available (company standard introduction) and of course the standard has to be distributed to the (potential) users. They implement it and use this implementation. Evaluation of this implementation may form the basis for withdrawing, maintaining or changing the standard.

Step 2: the standard is known and available

When a standard has been developed (and accorded for by the specialists), the next step is the introduction of this standard in the organisation, as the potential user of the standard has to be aware of its existence. After that, the standard also has to be available for the users (physically), therefore there has to be a distribution process. This is the next step towards success. The users know about the existence of the standard and the standard is physically directly available for the user. An extra success factor is that the user always works with the right version of the standard. After a period of time the standard may be revised, so the distribution process has to be defined in such a way as to make sure that always the right version of the standard is being used. So we now can define success as a standard that is known and available to the potential users.

Step 3: the standard is used

In fact we have to realize that the overall process can only be a success when the standard is really used in practice (in the right way). A standard that is of a high quality but that is not used in practice has no value, there has to be a “market” for the standard. We can even define the success one step further when we look at our standardisation definition. The product of the company standardisation, the company standard, has to solve the matching problem. The standard has to be the answer to the demand out of the organisation, which was the starting point of the process. When the standard is not a good answer to the demand for a standard, it will not be used in practice.

How to measure success?

In the research project it appeared to be difficult to measure the success, mainly because of difficulty in measuring the real usage of a standard. To develop a good method to measure success (and to develop a best practice) we have looked at several possibilities to benchmark the companies.

Frequency of use

Measuring frequency of standard’s use seems to be a valid method, because a standard that is not used cannot be a success. The same holds for a standard that is only being used once, because the power of standardisation is using it over and over again. But it can be questioned if measuring the frequency is a valid method. What to think about the following situations that may occur?

- Within a business unit there is one set of standards for the whole unit, so there is more than one user. Then, the number of subscriptions is not a valid indicator.
- People use uncontrolled copies of the standard.
- A user knows the contents of the standard from memory without referring to that standard. Is he a user or not? It is not possible to measure the frequency of usage, because he does not read the standard but consults his own knowledge (memory / experience) of the standard.
- A business unit, contractor or sub-contractor uses their own standards that do comply with the minimal requirements of the company standard. They do not use the company standard itself, but they do comply with it.

Even if it were possible to measure the frequency of use, it would be a very time-intensive method. So there are good reasons to look for a better method.

What if not?

The company standard is being developed to solve a matching problem. After its implementation this matching problem should no longer occur. When the problem or incident still occurs, then this could be a signal that the standard has not been used (another conclusion could be that the standard was not effective). That is another way to measure the use: measuring lack of use by researching the incidents.

However, it is possible that even when a standard is not used there will not be any incidents or other problems. Only in case of an incident or a manifest problem there is a measure-point. So, the factor of “luck” prevents from getting a reliable data. Besides this, the gathering of the data is difficult, because a company is not eager to give a lot of details about problems and incidents. It can be observed that after an incident there is always more focus on standardisation – it is too late to lock the stable door after the horse has bolted.

What influences the use of standards?

As the success of the company standardisation process has been defined as “a standard that is known to the users and that is used in practice”, we have tried to find factors that positively influence the use of the standards. By defining these factors, the companies can be compared to each other. The companies can be scored per factor with a score on a pre-defined scale. This appeared to be an applicable method for the best practice study. For carrying out this research, scorecards can be used. Chiesa et al. (1996) use this method in their article on the development of a technical innovation audit. They divide the innovation process into sub-processes (main processes and facilitating processes). For every sub-process they define characteristics that are associated with success or failure of the sub-process and the overall innovation process. All these characteristics are put in a statement on a scorecard. The answer on the statement can be put in a scale, for example from 1-5, from ‘not-applicable at all’ to ‘completely applicable.’

Innovation and company standardisation have a lot in common. Innovation is concerned with the development of a new product or process, or the improvement of an existing product or process. The innovation process can only be really successful when there is a market for this product or process. In company standardisation a standard is developed or revised. This also only can be called a success when there is a “market” for the standard.

Scorecards

The scorecard method is also very useful to compare the different practices and to develop a Best Practice. For every process we have therefore developed scorecards with propositions that define a (supposed) best-practice situation: ‘best’ in the sense of the expected contribution of the process to the overall success of company standardisation. The statements have been developed on the basis of discussions with specialists from both the practical area (the users and developers of company standards) and the professional area (university staff and experts from the national standards body). Company standardisation literature has played a minor role as, in general, it does not provide in-depth best-practice data. Each proposition could be answered on a scale from 1 (not applicable at all) to 5 (very much applicable). The score of 5 is considered to be ‘best practice.’

For every company the scorecards have been filled in both by the companies themselves and by the researchers (‘objective party’). The scores have been put together with the scores of the other companies and a mean-score has been determined. These figures have been presented in tables, the interesting ones also in graphs. This has been done per process. For every process the order of companies was made differently, so that the companies could not recognize which score belonged to which other company. By comparing their own score with the best practice and with the other companies it was possible for the co-operating parties to distinguish focus and improvement points for their future policy on company standardisation.

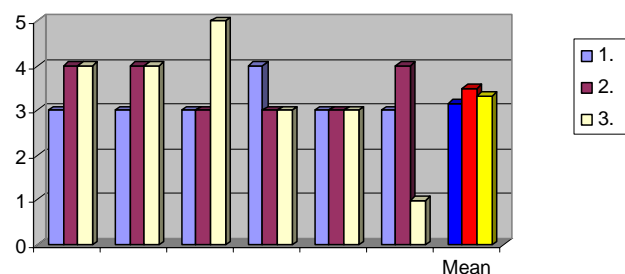
Moreover, besides an overall research-report for all companies a small report per company has been made with a description of their actual company standardisation and the focus points for them to work towards best practice. This has been supported by a presentation within the company for a group of people involved in the different processes of standardisation. In this session there was also the possibility to discuss the best practice situation in relation to the possibilities of the company. Of course best practice can have a different follow up in each company. Beside the report these individual sessions have been seen as a helpful method to analyse the status of the current situation on company standardisation and to identify focus points for its future optimisation. In this discussion the presented model for company standardisation appeared to be very helpful to make the discussion more clear and structured.

To elucidate the score cards method we will here give an example: a graph of three different criteria out of the scorecard for the company standard development process.

Nr.	Description	Score
1.	The party that demands for a new or revised company standard is involved in the development process of the standard.	
2.	During the development process of the standard the potential users of the standard are involved.	
3.	It is possible for contractors or suppliers to give input for a company standard.	

These propositions describe the importance of involving the (potential) users of a standard in the development process. This is to make sure that the standard is user-friendly, that it can be used in practice (and not only in a theoretical situation) and that it really helps the user. Besides that the standard

**Involvement of 1 demanding party /
2 end-users / 3 suppliers or contractors in the
development process**



must be a solution for the initial demand out of the organization.

The scores of the six companies on these three propositions are visualized below in a graph. You can see 7 different pairs of bars. The first six represent the scores of the six different companies, the seventh the mean scores on these criteria. So now the companies can compare their scores with those of the other companies, the mean scores and the best practices.

There is an interesting situation when most of the companies score low at a certain proposition. This can mean two things, either this is a point of attention for the company on which they can do better, or this is a weak point in the best practice. (Thirdly it could mean that this part of the best practice does not fit in the company culture)

Best practice examples

The result of the research study is a best practice model. The best practice can be divided in best practices for each process. Every company has its own specific needs, culture and ways of doing. So the best practices have to be adapted to the specific situation of the company and, therefore, a company-best-practice can differ from company to company. The model presented here was partly deducted from literature, but the bigger part is based on real practices.

Steering group

Standardisation work can always be postponed for a day, directly productive labour always comes first. But postponing may lead to doing nothing at all. Without a clear standardisation-policy and an organisation structure to fulfil this policy, standardisation is not effective. Having a company standardisation steering group is an important part of the best practice. A few of the investigated companies have such a steering group. The steering group develops the policy and the board of directors approves this policy. The steering group consists preferably of (technical) managers from the several departments or business units. The standardisation activities have to be linked to the interests of these business-units / departments. The line-management has to commit itself to the year-plan drawn up by the steering group.

The standardisation department acts as the steering group's secretary and brings in standardisation skills. The standardisation department co-ordinates and supports the standardisation activities, the business unit managers can be addressed for providing their technical experts (with their skills). The standardisation policy has to be a deduction of the general company policy. To support this, a steering group membership of a general (technical) director can be very helpful.

Literature hardly mentions the idea of a steering group. De Gelder (1989) and Simons and De Vries (2002) describe and advice it. The British Standards Society (1995, p. 40) mentions a 'standards committee' but do not talk about a real steering responsibility. ANSI's best practice research (Verity Consulting, 1995) apparently did not find steering groups in the multinational companies they investigated nor did Adolphi (1997) in his research in German companies in the areas of mechanical and electrical engineering. Adolphi's book is devoted to the organization of company standardisation. He pays a lot of attention on the role of a central standardisation department. Other sources do this as well, whereas the British Standards

Society (1995, p. 40) only mentions a 'standards *specialist*' (where in an earlier edition of this publication (British Standards Institution, 1970) they mentioned a standards *department*). Indeed, most companies do not want to have a special (staff) department on standards, despite all its advantages, but may have such a specialist somewhere in the organisation. Of course, this also depends on the size of the company, our research concerned big companies.

Participation of users

Crucial in the development of standards is the way the actual users of the standards participate in this process. The investigated companies recognise the importance of user participation but often still give too little attention to this crucial detail. From both literature (particularly, Nakamura (1993)), and practice it is known that involving the users in the standards development process has a positive influence on their actual usage. User involvement makes standards more acceptable and applicable and for this reason, acceptance rate increases. Because in practice it is impossible to involve all users, a group of representatives is the best option. So, not only does one specialist develop the standard, but an entire committee. After completing a draft-version of the standard other users and specialists can be involved through commentary rounds.

These findings in the area of standardisation are supported by experiences and literature in quality management (for instance, Dale and Oakland, 1991, Chapter 15) and in knowledge management (for instance, Nonaka, 1991 and 1994).

During the research not only the six companies were visited but also several contractors and suppliers. These external parties are obliged to use the company standards, although sometimes they have a better alternative themselves. This cannot be called best practice. Increasingly, engineering is out-placed. We just concluded that involving the user is important and, therefore, external parties should be also involved in developing certain company standards.

Automatic usage

Most of the times when the user wants to use a standard he first has to read the paper or electronic version of the standard. It is not self-evident that the user then really will use the standard or use it properly. Sometimes, the standard's contents can be built into, for instance, software. In this way the standard is used automatically. One of the researched companies has done this in the form of a computer program for the selection of piping materials. By inserting certain variables such as, working temperature, pressure, the liquid that is transported through the pipe, and the environment where the pipe is applied, the program determines the required material, thickness and diameter. Only when it is really necessary, the user will consult the real standard. This document can be directly consulted on the computer screen. A list of preferred suppliers can also be added to the same system, even delivery time and conditions, when necessary.

Bouma and Winter (1982, p. 12) provide examples of automatic usage of standards: they can be implemented in directions for use, drawings, specifications, machine setting, forms, software or gauges. Other Dutch sources pay attention to it as well (for instance, Simons & De Vries, 2002, p. 44). In non-Dutch standardisation literature we did not find anything about automatic standards usage.

Scorecard example

Below, we will discuss one of the scorecards in more detail: the scorecard ‘policy making – strategic level.’ The policy-making was the only process that has been divided in three parts, namely, the strategic, tactical and operational level. Because ‘best practice’ includes management support for company standardisation we have chosen this one. After discussing the strategic level we add some remarks on the tactical and operational level.

Policy making – strategic level

Scorecard Policy Making – Strategic level		
Nr.	Description	Score
1.	There is a clear strategic policy on company standardisation.	
2.	At the corporate level a clear framework has been for operating company standardisation.	
3.	At the corporate level tasks, competencies and responsibilities for company standardisation have been defined.	
4.	Standardisation expertise has sufficient influence on the company’s strategic policy.	
5.	At the corporate level, management is aware of the importance and benefits of having (company) standards and standardisation.	
6.	The maintenance of the existing system of company standards is a part of the strategic policy on company standardisation.	
7.	The business units have sufficient influence on the strategic policy on company standardisation (to make sure that their needs in this area are met).	
8.	The business units commit to the strategic policy on company standardisation.	
9.	The strategic policy on company standardisation is derived from the general strategic policy of the company (it supports the general policy and it does not conflict with it).	
10.	In this strategic policy on company standardisation the goals are clearly defined.	
11.	The management is willing to steer company standardisation at a high (top) level in the organization in order to minimize the danger of sub-optimisation.	
12.	The management is aware that by using (company) standards company-wide the company can achieve cost-benefits for the purchasing of materials.	
13.	The management is aware that by using (company) standards company-wide the company can reduce cost of engineering and maintenance.	
14.	The management is aware that (company) standards use is needed to assure a specified quality-level of the company.	
15.	The management recognizes company standardisation as an essential activity and steers this activity at a corporate level.	
16.	Corporate management has authorized the strategic level company standardisation.	
17.	The strategic policy on company standardisation has enough status and is being pursued by the total company.	

To make company standardisation work, there has to be a (organizational) framework and a policy within which the standardisation activities are executed. There has to be enough engagement to the policy by the people that have to carry out the standardisation activities and their management (and the higher levels of management). In our best practice, top-management is represented in company standardisation or at least support it. The most effective way to make this work is by means of a steering group in which the standardisation department, (technical) managers from business units and a member of a top-level management (for example the technical director) are represented.

Figure 2 presents a possible organizational structure. For making a good standard the technical expertise of one or more technical experts (who, in general, work within the business units) should be combined with the standardisation expertise of a standards engineer

(who may work within a standardisation department). A networking structure, in one way or another, is expected to be the best way to do this.

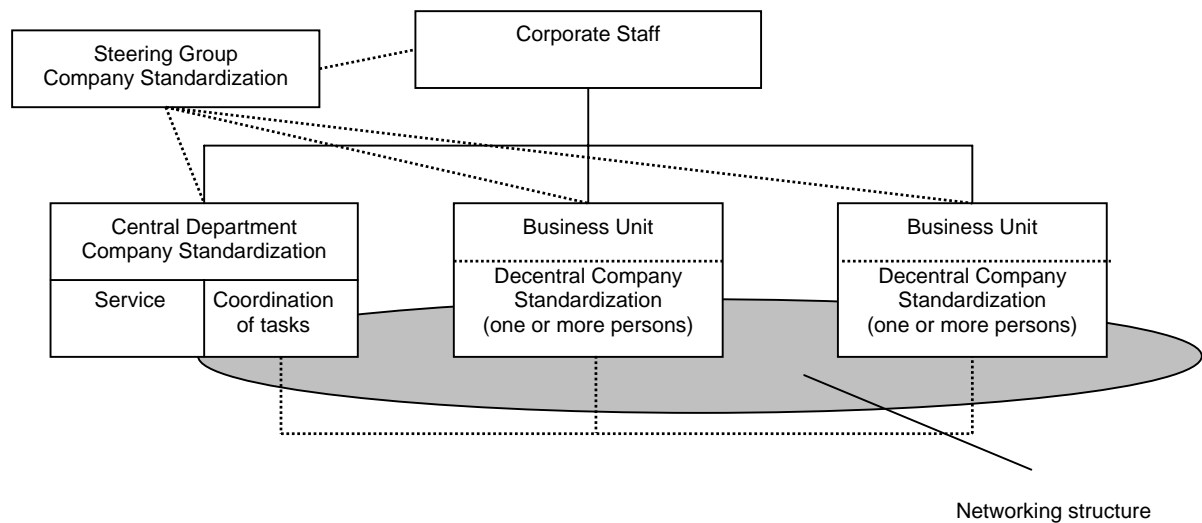
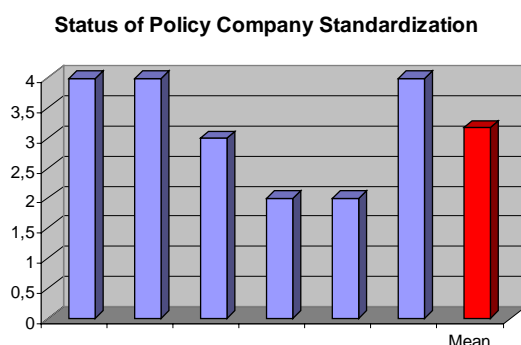


Figure 2. Possible organizational structure for company standardisation

All the companies have filled in the above-presented score and the score has been discussed. In the following section we will present a few of the interesting graphs that can be constructed out of the answers of the six companies.

Statement 17: The strategic policy on company standardisation has enough status and is being pursued by the total company

The presented statement 17 is one of the statements in which there is a variation between the scores of the different companies. These are the more interesting statements. It can mean three things; either this part of the best practice does not fit within the culture of this company, or this is not best practice, or it is a focus point for the company to improve its process. These statements have been the focus points in the discussions with the companies. All companies saw Statement 17 as best practice and, therefore, as an important focus points in the case they scored low.

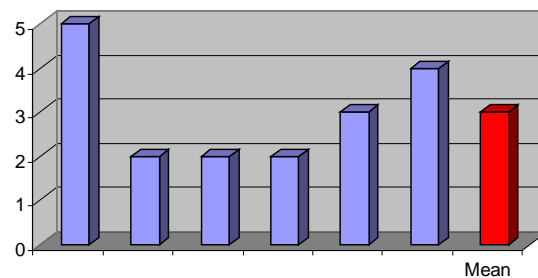


It is important that company standardisation has enough status, to make sure that standards are being developed and used. It helps a lot when company standardisation is supported at a corporate level within the organization, because frequently the company focus is on short-term money-making. The graph shows that most companies do not score high on this statement.

To give company standardisation enough status it is helpful when at a corporate level in the organization the importance of standardisation and the benefits that it can bring are recognized and formalized. When, subsequently, this policy is communicated in the right way it is more likely that company standardisation becomes a success.

Companies that scored low on the status, also scored low in the participation of the business units in the definition of a strategic policy on company standardisation. So, though recognition of the importance of standardisation at a high level within the organization is an essential factor, this is not enough. In order to make it work also on the other levels, these levels must be involved in the formulation of the strategic policy. In practice the importance of this fact was recognized, but not many of the companies did in fact involve the BU-'s in strategic policy development.

Influence of BU's on strategic policy Company standardization

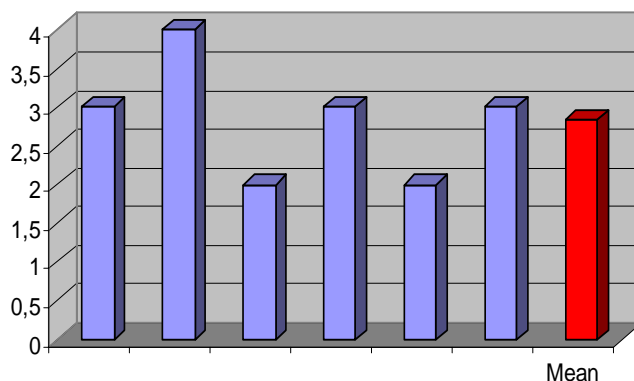


Now we will – in short – address the tactical and operational level in policy making. The best practice statements related to these levels can be found in Annex 1.

Policy making – Tactical level

Additionally, on this level the participation of the business units is important for the overall commitment towards (company) standardisation. In a situation where a staff-function also, as

Influence of BU's on criteria for prioritizing process



a company standardisation department often is, has to work in a demand driven market-situation it is important to know what that market wants. The 'market' concerns the demand for standards within the company. Therefore, that market, the (potential) users of the standards, should be given a possibility to speak. They should be involved in the prioritising process, the definitions of criteria-criteria and the recognition of certain areas of attention.

Policy making – Operational level

At the operational level there is an important point of interest. A lot of the input for standards comes from the technical experts. In general, they work within a BU, so there is no hierarchical relation between the standardisation department management and these experts. Standardisation is only one of their activities. These technical experts have to report to their 'line' management in their BU. Often, these BU managers do not consider standardisation a top-priority. Their lack of support is related to the fact that they are mostly not involved in the corporate policy-making process on standardisation. This makes it very difficult for the standardisation department to really manage company standardisation.

Knowledge management

Company standardisation can be regarded as a form of knowledge management, where tacit knowledge is transformed into explicit knowledge. Slob (1999) has compared the conclusions of the best-practice study (real practice) with literature on knowledge management (the English-language sources were Brown (1991), Essers & Schreinemakers (1996), Kriwet (1997), Nonaka (1991 and 1994), Nonaka & Takeuchi (1995), Polanyi (1966), Schreinemakers (1996), and Thayer (1968)) and concludes that knowledge management literature does not add real new insight to the best practice founded during the practical research. This underpins that it is really a best practice.

Company standardisation can be seen as a way to manage technical knowledge. Figure 3 shows the way company standardisation is often organized in organizations. The technical specialist(s) together with the standardisation department are responsible for the realization of the standard. Knowledge is recorded (in the standard) and transferred to the other workers/users. Knowledge management literature (for example, Verkasalo, 1998) distinguishes between the knowledge domain of the providers of the knowledge (in our case, the technical specialists) and the receivers of the recorded knowledge (in our case, the workers/users of standards). Both have their own knowledge domain. This has to be an important consideration when the knowledge is recorded.

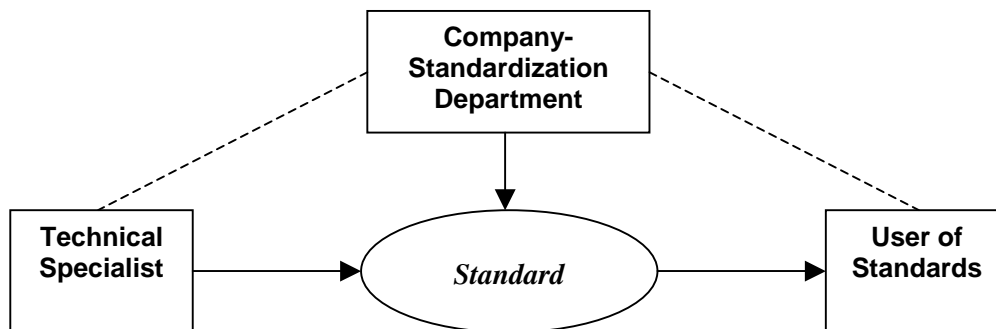


Figure 3. Model for company standardisation (the old way)

Slob (1999) focuses mainly on standard development. It appears to be successful when the (technical) knowledge that is captured in standards is available for the users *and* the standards are actually used within the company. To achieve this the standard should be user-friendly. To arrive at this situation, the actual user should play an important role in the standard development process. In practice this is done too little. Arguments for user involvement of the can be found in several sources of literature, like Nakamura (1993), Adolphi (1997), Brown & Duguid (1991), Gouldner (1954), De Gelder (1989), and Winter (1990).

This leads to a slightly different model for company standardisation.

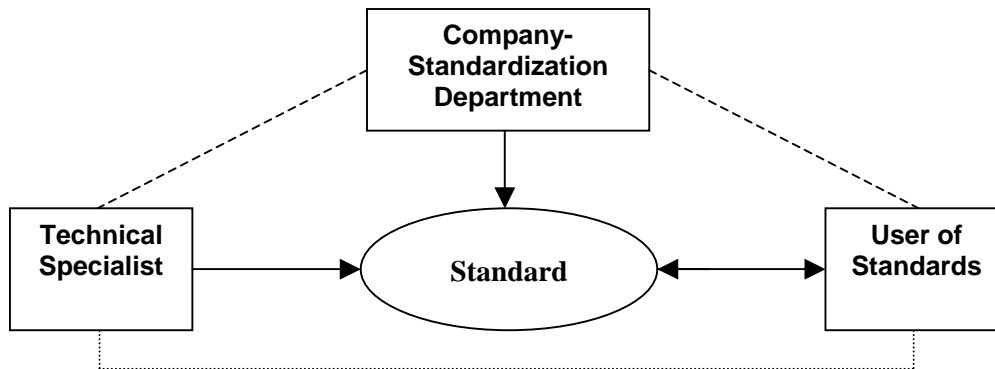


Figure 4. Model for company standardisation (best practice way)

In this model, the practical knowledge and experience of the user is connected with the technical knowledge of the specialist and with the standardisation knowledge of the company standardisation department. By involving the user in the development of standards experience and practical knowledge flow into the standards. Even more important is that their knowledge about using standards can help to make the standards user-friendlier. A user-friendly standard influences the actual using of the standard positively. The standardisation process can only be successful when the standards are actually used.

Slob (1999) concludes that:

- company standardisation is a way to manage technical (company) knowledge;
- standardisation is a structured way to transfer tacit into explicit-knowledge;
- when tacit knowledge is made explicit, it should be considered by whom this codified knowledge will be used in future;
- it should also be considered that there can be a important difference in the knowledge domain of the specialist(s) or writer(s) of the standard and the intended users of that standard;
- these users of the standards should, therefore, be drawn into their development.

The presented new model for company standardisation (Figure 4) compromises these conclusions.

Summary and conclusions

In this paper we have described results from a research project on company standardisation in six chemical and petrochemical industries in the Netherlands, restricted to the development and use of engineering standards. Best practice for developing such standards has been developed by examining the companies and using insights from literature. In order to study company standardisation in a systematic way, a company standardisation model has been designed, based on the processes that constitute company standardisation.

Main benchmark for ‘best’ in ‘best practice’ is the success of the company standard. A company standard is successful when it is used and appears to solve the problem for which it was developed. Methods for measuring ‘success’ have been discussed. It appeared that it is

hardly possible to measure final success. Success results from a combination of successful performance of the company standardisation processes that can be distinguished and that are shown in the company standardisation model. Therefore, for each of these processes several good practice indicators have been developed, based on (good) practices in six companies and on standardisation literature, if any.

Findings have been presented in the form of scorecards. Using these scorecards, the individual companies can benchmark themselves against the others, the mean score and the best practice. The six companies differ in scores. No one is overall the best or the worst – each one has ‘good’ as well as ‘bad’ performances in different areas. They can use these results to improve the performance of their company standardisation processes and, in this way, improve the effectiveness and efficiency of their company standardisation activities.

Our approach, model and some of the best practices are new in (company) standardisation literature.

Discussion

The research concerned the development of engineering standards for big Dutch chemical and petrochemical companies. The following remarks can be made concerning the applicability of the results for other companies.

- The advantages of some of the engineering standards increase with growth in company size. For instance, quantity rebates related to preference ranges of parts are more feasible in big companies. Small companies will not always have the possibilities to have a standardisation department, a steering group, an intranet, etc. Small enterprises need less formalization so their need for standards is less. But they will need them and the processes described apply for them as well. However, best practice for them may be expected to be more ‘low-profile.’
- Our research concerns engineering standards. In most branches of business, standards related to the products or services are the most important ones. Though these are different standards, there is no reason why company standardisation and the best practices for it are fundamentally different, though small differences may apply. For instance, the organizational setting will differ as standardisation in such companies will be more directly linked with product or service development and marketing.⁶
- Possibly, some of the best practices are ‘typical Dutch’ and in other cultures other practices would be better. Some differences between Dow Chemical (with a culture that mixes American and Dutch influences) and the other companies suggest this. For reasons of confidentiality we cannot mention examples. In general, corporate culture of all such multinational companies is becoming increasingly ‘international.’

These three issues are certainly topics for future research.

⁶ Adolphi (1997) provides a thorough discussion on several ways to organize company standardization.

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Best practices for company standardisation process

Policy process – Strategic level

See the main text.

Policy process – Tactical level

- (Line) managers of experts involved in company standardisation are involved in setting the company standardisation policy.
- People responsible for setting company standardisation policy at the tactical level have enough knowledge to be able to do so.
- The Company Standardisation Department (CSD) is involved in establishing (separate scores):
 - the way of funding company standardisation activities;
 - the status of company standards (voluntary or compulsory);
 - priority areas (for instance, ‘engineering standards’ or ‘standards to assure and improve environmental performance’);
 - criteria for prioritising.
- Business units (BUs) are involved in establishing (separate scores):
 - the way of funding company standardisation activities;
 - the status of company standards (voluntary or compulsory);
 - priority areas (for instance, ‘engineering standards’ or ‘standards to assure and improve environmental performance’);
 - criteria for prioritising.
- There is a clear company standardisation policy deployment to all people concerned.
- CSD informs all people concerned on company standardisation issues.

Policy process – Operational level

- CSD co-ordinates the operational standardisation activities and monitors progress.
- Progress of activities is evaluated on a regular basis.
- CSD reports delays, line management decides on corrective and actions, if any.
- People involved in standardisation are encouraged to propose suggestions for improvement of standardisation policy.
- Standardisation policy at the operational level is evaluated on a regular basis.

Prioritising process

- Each employee is authorized to submit proposal for developing, changing or withdrawing company standards.
- (Final) users are encouraged to submit (change) proposals.
- CSD co-ordinates gathering proposals.
- Company standardisation expertise is used in prioritising.
- Criteria for prioritising are in line with general company policy.
- Criteria for prioritising are evaluated on fitness for use on a regular basis.
- Optimal overall company results prevail over BU benefits (no sub-optimisation).
- Once priorities have been set, CSD makes a proposal for planning and budget in co-operation with (representatives of) the intended participants.
- Planning and budget are realistic and performable.
- CSD informs the interested parties on the annual planning and makes it available to them.

- CSD monitors whether set priorities are being realized.
- In the case of an absence of agreed-upon expert-involvement in developing a company standard, CSD is responsible to ask the heads of these experts to charge them to pick up their duties.

Company standard development process

- Those who have asked for standards become involved in their development.
- Intended standards users become involved in their development.
- Supplier and/or contractors can provide input in the company standard development process.
- Standards writers communicate with stakeholders during the development process.
- Each company standard is assessed on its expected fitness to contribute to business results.
- The company has a meta-standard that provides criteria for its company standards.
- This meta-standard is known by all involved in company standards development and they apply it.
- On a regular basis, the requirements in this meta-standard are assessed on topicality and fitness for use.
- Company management has authorized this meta-standard.
- The company standard is not just based on the personal opinion of one expert but it is broadly based.
- Participants in standard development consider their task as important and urgent.
- The status of writing standards equals the status of carrying out projects.
- There are enough competent employees for writing new standards and maintaining the quality and consistency of the existing standards collection.
- A ‘why-document’ is attached to each company standard. It provides the underpinning of the most important choices/decisions that have been made during standards development.
- A draft of each new company standard is sent out for comments to a relevant group of people within the company.
- There is a procedure for processing comments.
- Everybody is allowed to comment on draft standards.
- CSD co-ordinates comments processing.
- Comments, if any, are sent to the development team. They decide on adoption or rejection.
- In the case of rejection they give the reasons why.
- CSD checks the standard against the requirements in the meta-standard.
- Company management authorizes the standard.
- IT tools are used in developing and writing the standard.

Company standards introduction process

- CSD is the central help-desk for questions concerning company standardisation.
- CSD is able to answer questions concerning company standards or to refer to experts who can answer these questions.
- CSD announces new, modified and withdrawn standards, when necessary via BU officers responsible for standardisation or via certain (other) users within the organization.
- CSD is able to communicate with the rest of the organization about new, modified and withdrawn standards.
- There is a procedure for how to announce company standards.

- CSD is able to tailor information to the needs of specific user groups.
- CSD monitors user satisfaction concerning the provision of standards-related information.
- Each BU has appointed one or more officers responsible for the diffusion of standards-related information.
- CSD uses IT tools for standards introduction.
- The information concerning changes in the standards collection includes reasons for the (new / modified) standard and for major choices within the standard, and expected advantages. In the case of withdrawal, the reasons for this are mentioned.

Distribution process

- CSD makes standards available.
- Company standards can be obtained on request or by subscription to the whole collection or to a part of it.
- CSD can advise on searching and ordering standards.
- CSD operates a database with bibliographical data on all company standards.
- Out-dated versions of existing standards and withdrawn standards remain available for consultation.
- CSD operates a system that shows who has which standard, including the version of this standard.
- In the case of a new version all users of the replaced version get the announcement.
- Users can get standards in a form (electronic and/or paper) and format that suits them.
- The version of a standard is clear to the users.
- CSD publishes company standards in electronic format and makes them available in a virtual way.
- Virtual company standards are, as far as the text is concerned, available in text mode (not in pixel mode only), which enables text search on headwords.
- On a regular basis, CSD monitors the effectiveness and topicality of its subscription system. Subscriptions include department name and name of the employee concerned.

Facility management process

- CSD monitors the market for IT tools that may support its processes.
- CSD has a budget for investments in facilities.
- IT facilities to support company standardisation should fit with IT used elsewhere within the organization.
- IT facilities to support company standardisation should fit with IT used by the national standards body for producing, making available, distributing, and searching its standards.
- The company operates an intranet and uses it for standards-related information.
- Within the company e-mail can be used for communication about company standards.

Funding process

- Funding for the maintenance of the system of company standards is assured.
- Funding for company standards that are essential for the company is assured.
- Fixed costs for CSD are charged on the company as a whole.
- Corporate management decides on the way these fixed costs are charged on the BUs.
- Variable costs for company standardisation are paid by those that have caused these costs (the part of the company for which the standard has been developed).

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