

# Standardisation in the Service Sector for Global Markets

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## 1 Introduction

For many European countries, the last few years were characterised by rationalisation and often defensive strategies. This is typical for phases of stagnation. Offensive strategies, in contrast, counted on product and process innovation as well as an active advanced market expansion. Especially effective for the German economy are the strategies tertiarisation, industrialization, and internationalisation.

In many sectors of goods production, globalised competition cannot be achieved. In this context, tertiarisation enabled a value-added strategy by professionalising customer-oriented value chains and offering standard services as a product. This strategy is successfully applied in engineering, plant construction, architecture, and textile industry. There is also a high potential in vehicle construction, medical technology, and craft.

Industrialisation as a second strategy is concerned with core areas of the service economy. Thereby, structures and methods of classic goods production such as division of labour, productisation, reduction of vertical integration, disaggregation of value chains and globalisation, were assigned to the service sector. In this context it can be alluded to industrialisation in the service sector. Eminently concerned thereof are the 'ripe' service branches such as finance services, media services, IT-services and telecommunication services.

The internationalisation concerns all branches of the national economy and also increasingly the service sector. (Eurostat 2004) The service sector is part of the classic strength of the German economy as a leader in world export. Economically, the service sector has the most potential.

For a long time the service sector was wrongly interpreted as labour intensive. It was, furthermore, said to exhibit high customer contact intensity and thus strongly resists standardisation and rationalisation. This impression has been rebutted in many branches (banking, insurance, tourism, trade, telecommunication, logistics, etc.). In the majority of cases, the use of information and communication technology was the main impulse. Meanwhile it can safely be assumed that information technology is the 'product engineering' of the service industries. In this approach, communication technology can surely be considered to be the 'logistics' of the service industries. Therefore the service sector displays much more radical possibilities for globalising value-added chains than the classic goods production sector.

The whole extent of this development has not yet been established and will not be suddenly implemented overnight. It will, however, show a dominant trend within the next 20 years. Yet there are several important conditions to be met: political stability, continued international distribution of labour (globalisation) and most importantly, productisation and standardisation in the service sector. It is furthermore presumed that standardisation is legitimate and reasonable in the service sector. There will be an attempt to transfer procedures for product, process and resource standards, etc., from the classic fields of standardisation to the service sector. On the other hand, there is also the question of where the limits of transferability lie.

## 2 Normisation and standardisation in the service sector

The initial question is whether standardisation in the service sector displays differences to classic standardisation. The answer is a definite yes, as will be explained later-on. In principal, a standard in the broadest sense is the result of a simplification (e.g. of products, processes, interfaces, etc.). This simplification can be performed in various systems, such as companies, branches, or economic area; nationally or internationally (Blum et al. 2001). Standards are created in various fields, with various participants, for various purposes. This process creates standardisation results (cp Table 1). One important type of standard is the norm. A norm is a specification, which is established in a predetermined method by a standards organisation recognized by the legislature. For Germany this is DIN (German Institute of Standardisation). The most important international standardisation organisation is the ISO (International Organisation for Standardisation) in Geneva. There, the company-spanning standardisation is realized, as will be further described in this article.

**Table 1.** Different types of standards and regulations result from their scope and the goals of those involved in their development

Providers	→ Types and Examples of standards/ regulations
... Individual companies or groups	→ Company standards
... Business consortia	→ Industrial standards, specifications
... Professional or trade associations	→ Association standards, e.g. VDI Guidelines
... National standards bodies	→ National standards
... International standards bodies	→ European and international standards
... State- or partly state-controlled bodies	→ Laws, regulations
... International organizations	→ EU guidelines
... Employees' organizations	→ Collective agreements, regulations on working hours
... Consumer organizations and other interest groups	→ Consumer standards, quality marks

The production and service sectors are related insofar as the full repertoire of product standards, process standards, standards for client interaction and resource standards is needed for 'industrialised' service sectors. This is especially true if an intensification of international exchange relations occurs in a relevant sector, such as, for example, in the financial sector. It can thus be assumed that there is a certain basic amount of similarities between the classic goods production and the industrialised service sector, which leads to similar approaches in the work of standardising.

On the other hand, through demand from related fields such as software technology, structures and processes of the current work in normisation were supplemented with faster methods of standardising. For example:

- Germany and other National Standards Bodies (NSB) were given the opportunity of creating Publicly Available Specifications (PAS). The PAS do not go through the classic normisation process and can quickly be published as a first normative result.
- In Europe, the publication of CEN-Workshop-Agreements (CWA) as a standard before the normisation was rendered possible by the European Committee for Normisation (CEN).
- The international normisation bodies ISO and IEC also offer corresponding possibilities.

### 3 Systemising standardisation demands

#### 3.1 Method of systemising

The various ways of standardising and forming standards, independent of the content to be standardised, show that before a reasonable standardisation can be performed, an exhaustive examination of the standardisation content is necessary. This is especially true for services and their occasionally hard to grasp characteristics, since only few scientific works focusing on standardisation are known and businesses have not spread any efficient procedures so far. The first research in service standardisation and normisation of services appeared in the 90s (e.g. Burghart and Kleinaltenkamp 1996, Corsten 1991, Dichtl 1998, Fließ and Möller 2002, Gersch 1995, Mühlbauer and Cornelissen 1998, Vries de 1999) and show that standardisation of services as a field of research is still in its early stages. Different viewpoints from economy and science show that due to the complexity of services, there is no one and only standardisation of services, but that differentiation is necessary. By means of the Service Standards Engineering (Mörschel 2002), a general method for developing service standards, (an example for systemising standardising demands) will be described in the following section.

The complex action of developing standards for services can be simplified in a phase model (cp Fig. 1).

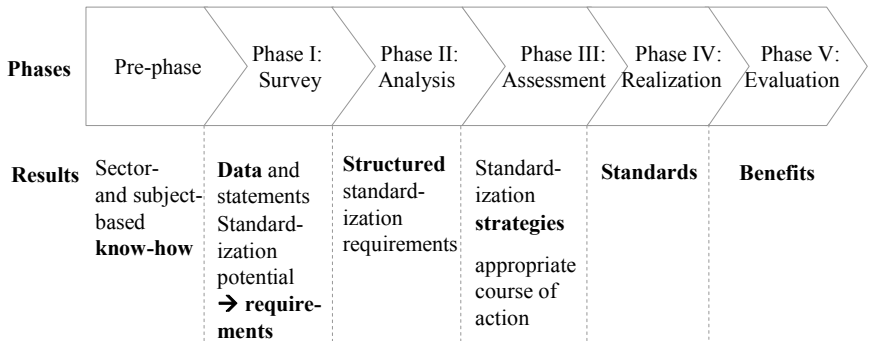
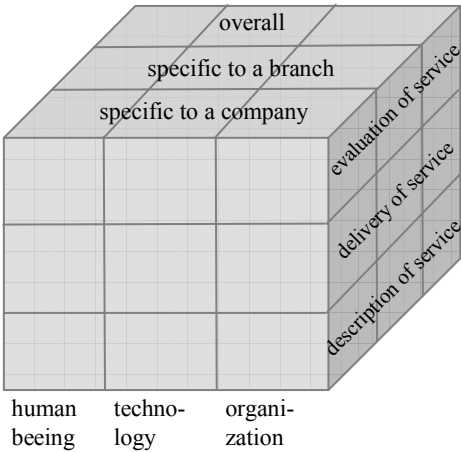


Fig. 1. Reference model of service standards engineering

The phases in this case are not to be seen as a strict chronology but rather as an iterative procedure. The procedure is presented very generically and thus allows for adaption to further detail levels as well as orientation towards the specific conditions of a field, a company, or a topic. Users of the reference model are made up of businesses that render services and businesses that accept services as clients, as well as organisations that accompany standardisation processes (such as normisation institutions, research institutes, associations, etc.).

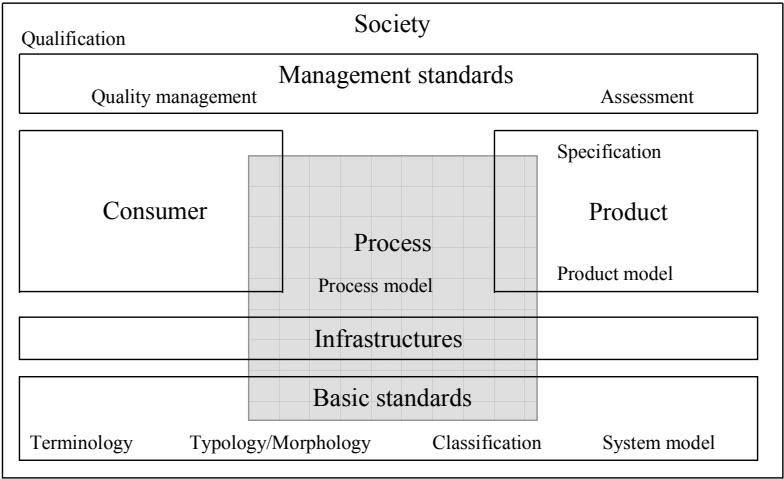
It is the goal of Service Standards Engineering to identify company-specific and -spanning standardisation potential in services as well as to initiate, support and perform activities to standardise services. The reference model is composed of a selection of activities and instruments, which are recommended for the development of service standards. As an example, several structuring patterns serve as decision support for deriving standardising strategies. They have been derived from services, scientific approaches and general standardisation activities, which all withstood the test in practice.

Systemising service standards can be ascribed to the systemisation of standards as well as the systemisation of services. A systemisation is thereby always aimed towards a certain purpose. The foundation for this is usually already provided in the pre-phase, which serves the characterisation and limitation of the object of investigation. Pre-structuring is then performed in the survey phase (Phase I) with the help of the survey instrument, for example, by means of a questionnaire or its structure. This allows for potential standardisation contents to be divided into the topics of basics, client interaction, organisation and contributors (for further sub-ordinated topics see also chapter 3.2). In the analysis phase (Phase II), information, which was gathered from various sources (scientific publications, expert talks, internet inquiry, workshops, research activities, etc.) in Phase I, is analysed. The results can, for example, be integrated into the structuring scheme shown in Fig. 2. and thus create a three-dimensional matrix. The structuring criteria in this example can be distinguished into one dimension according to the integral, system-oriented division (human, technology, organisation), a second dimension according to the service process (evaluation, performance and description of services), as well as a third dimension according to the extent of the effects of the standardisation (specific to company, specific to a branch, overall). This matrix points out that the sweeping statement that 'a service can be standardised' can not generally be agreed on but that a differentiation between standardisation contents is necessary. At the same time this will question whether services in their entirety can be standardised. At this point it is to be noted that the authors of this article also use this sweeping statement, but they understand it rather as individual aspects of services and choose not to use a more differentiating statement at some points in the article for reasons of practicability.



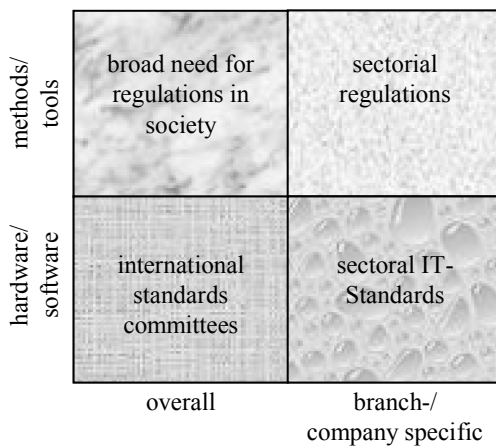
**Fig. 2.** Scheme for structuring standardisation potential of services

For further structuring and grouping, the socio-technical system shown in Fig. 3 can be consulted. It attempts to display as broadly as possible the fields of standardisation and its interfaces, which can occur in a service system, at a general level. The system is based on scientifically and practically recognized viewpoints of services using the dimensions of potential, process, result, and market (Bullinger and Meiren 2001) that have been transferred into standardisation fields. This created general, yet meaningful types of service standards.



**Fig. 3.** Scheme for categorising standardisation potential in socio-technical terms

The goal of the evaluation is to determine an appropriate strategy for standardising a certain content. An example for the derivation of standardisation strategies is the typology shown in Fig. 4, which was established for services involving IT. It is based on the organisation of standardisation processes in general, as will be substantiated with examples in Chapter 4. The dimensions regarded are, for example, ‘effect’ and therefore vertical (within a branch) and horizontal (branch-spanning, general) standards as well as ‘content’, which is distinguished by methods and tools as well as hardware and software. In the example in the lower left quadrant, this means that the more general and more far-reaching topics focusing on hardware or software, should be standardised in international standardising bodies.



**Fig. 4.** Example for fields of action and strategies for standardisation

After an appropriate standardisation strategy is derived, the next step is the implementation phase (Phase IV). It comprises the initiation of standardising bodies with all necessary affected and participating parties. Following this is the development of the standard. Due to the extent of this article, this specific procedure will not be covered here. The results of such standardisation processes will be recapitulated in chapter 4 of this article.

Finally, the evaluation of the standardisation process and investigations about the usefulness of the developed standard takes place. Such new and complex processes must undergo a critical reflection, the goal of which is to identify success and failure factors as well as potential for optimisation. The experiences can be documented in the form of ‘Lessons Learned’. The following subchapter gives an example of the application of this method.

3.2 Results of an empirical study

The presented method was performed exemplarily in the BMBF research project ‘Service standards for global markets’. The following will outline a section with examples for the standardisation potential for services, which sums up partial results from the survey and analysis phases.

For the survey about standardisation demands for services, a branch-spanning written survey including several secondary surveys was conducted in 2001. The feedback was 115 questionnaires, which is a feedback ratio of 5.0 percent. Developers and users of standards were the target group of this survey. Among other things, the participants were asked to evaluate service-specific topics concerning necessity of standardisation and identification of demand for future standards for services. The four main topics were ‘basics’, ‘customer interaction’, ‘organisation’ and ‘personnel’.

Figure 5 shows the relevance of basic topics of service management. In the answer categories standards were given, which might have a high relevance for material products but are not yet that common for services. Thereby, so-called ‘soft’ topics were disregarded in this group, but were examined at another point. The result was that ‘terminology’, ‘specification of services’, and ‘evaluation of services’ had a high relevance. A more detailed inquiry about the used form and the preferred form of a standard, showed that currently an average of 50 percent of the used ‘basics’-standards are company-specific in nature. There is a significant deficit in the field of branch-spanning and national standards.

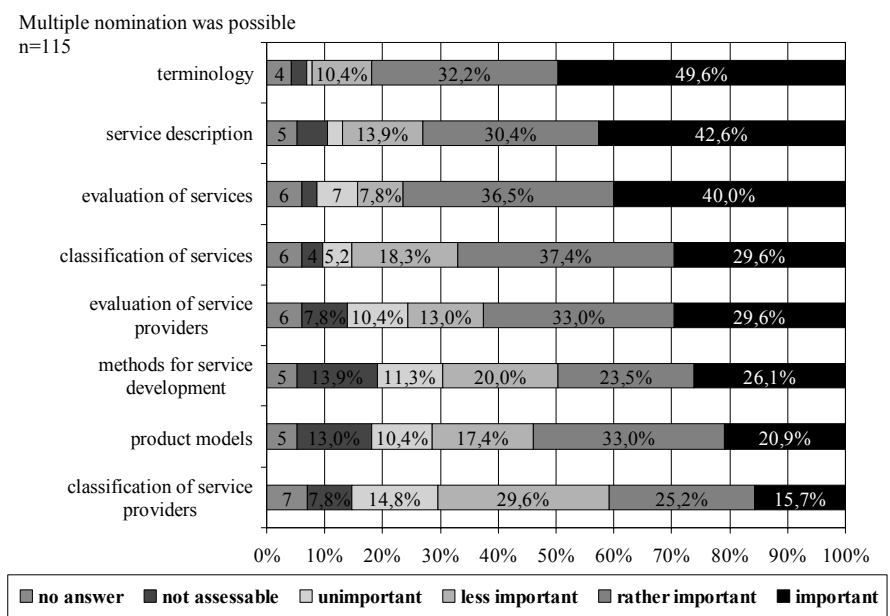
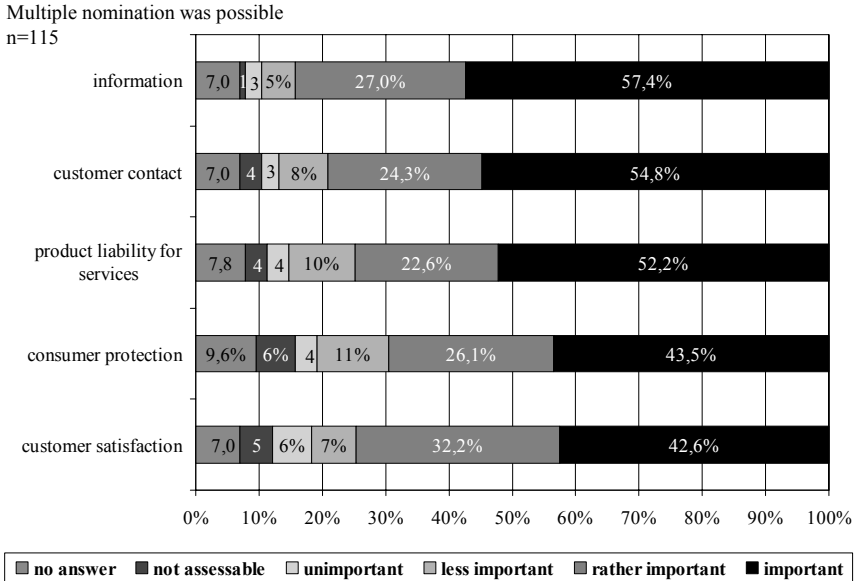


Fig. 5. Importance of service standardisation aspects: basics



In a second main field, topics of client interaction were asked about (cp. Fig. 6). The interaction between client and service provider from the first contact up until the provision of the service, is a central feature of services. As can be seen by comparing topics from other main fields, the respondents see a high relevance in all topics. The form of used standards is mainly company-specific, however, branch-specific and national standards are used in many companies as well. There is still a demand for development in the field of international and branch-spanning standards.

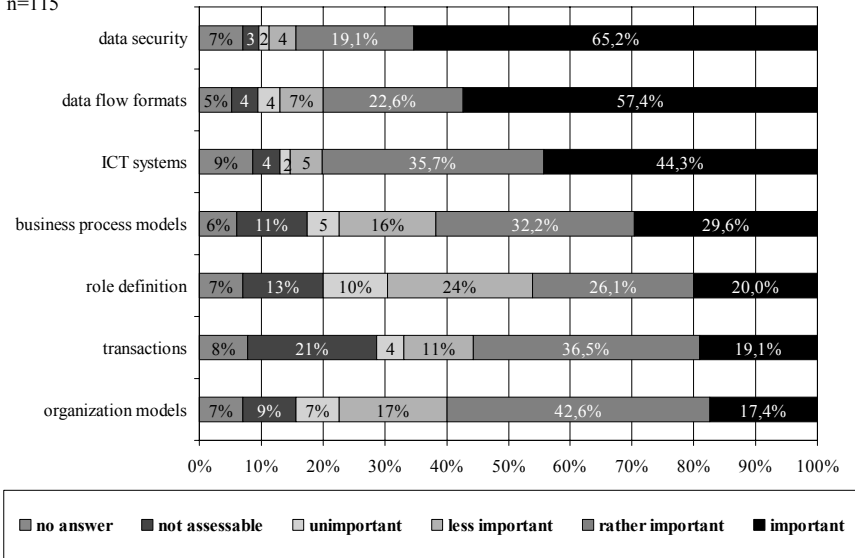


**Fig. 6.** Importance of service standardisation aspects: customer interaction

The third main field inquires about the relevance of standards for organisation, that is to say standards, which lead to more efficient performance through transparency and interface coordination. In particular technical topics, such as data security, data exchange formats and information systems, were evaluated by the respondents as needing a high level of standardisation (cp. Fig. 7). It is also in these topics that the orientation towards international standards as opposed to less technical standards is the strongest.

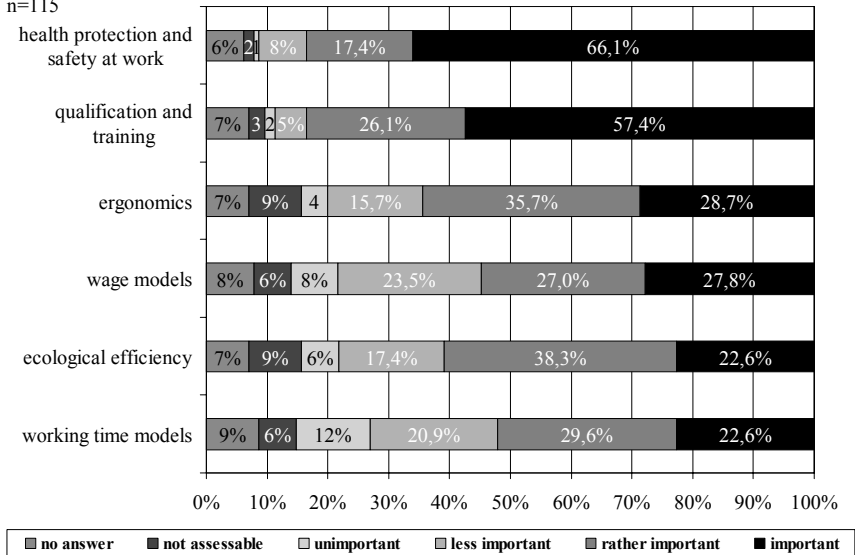
The last main field of topics about identification of standardisation demands for services focuses on the human being as a resource. Labour and health protection as well as continuing education about standardisation are especially relevant here (cp. Fig. 8). The percentage of used company-specific and branch-specific standards is average. This trend of applying a large portion of such standards should be continued in the future. Compared to the other fields of topics, the percentage of favoured international standards is lower here.

Multiple nomination was possible  
n=115



**Fig. 7.** Importance of service standardisation aspects: organisation

Multiple nomination was possible  
n=115



**Fig. 8.** Importance of services standardisation aspects: personnel

The survey has shown that there is a demand for development, distribution and application of standards for services on a general level. The questioned companies see advantages not only in the company-spanning standardisation but also in the company-internal standardisation. The demand concerns mainly international standards, but also branch-specific and -spanning standards. In conclusion it can be noted that three priority fields of action have been identified and confirmed:

1. Basic standards, such as terminologies, specifications and evaluation procedures
2. The development of supporting standards concerning security and information technological topics
3. The client interface.

## **4 Balancing previous company-spanning measures**

### **4.1 Measures on a national level**

Chances for developing strategic advantages in international competition are boosted by increased normisation and standardisation. This clear statement in favour of the instrument of normisation was the main focus in the 2004 agenda of the federal government's 'Innovations and future technologies in medium-sized businesses – High tech master plan'. Furthermore, the agenda presented several measures, which are meant to strengthen the innovative power of in particular small and medium-sized businesses. The government's goal was to broaden the field of use for normisation in Europe and internationally and thus enhance the capability of new technologies and services entering the worldwide market.

With the above mentioned project 'Service standards for global markets', measures were initiated early in Germany in order to set the course for standardisation in the service sector. One significant goal of the project, which was successfully completed in 2004 after a duration of four years, was to strengthen lastingly the innovation and competition capability of the German service industry by applying European and international standardisation processes more broadly. The project goals and central questions defined for this purpose were the following:

#### **Project goals:**

- Identification of company-specific and -spanning standardisation potential
- Initiating and supporting activities for the standardisation of services
- Derivation of recommendations for action

#### **Central questions:**

- Where is the standardisation demand in certain fields and certain topics?
- Which services are suitable for standardisation?
- Which services are not suitable?
- Which standards exist so far?

- Which existing standards are branch-specific or branch-neutral?
- What can be standardised, or more specifically, which components, processes, methods and tools can be standardised?
- Which type of standard or which procedure model can be applied to which standardisation potential?

The main objective of the project was a long-term improvement of the German participation in national and international standardization. This included raising the awareness of all parties involved in order to stimulate their interest in international standards activities, defining the German position in international standardization and creating innovative standardization models. The aim was to build up conditions which enable a free and fair trade, bring forward the competition, support economic growth and contribute to the opening of markets. The conditions are formed by the development of national and international standards.

The project partners started by focusing on four themes: advanced vocational training, e-commerce, infrastructural services, and public services. Figure 9 shows the areas for standardisation activities in the German service sector, as identified by the project ‘Service Standards for global Markets’.

	Overall	E-commerce	Infrastructure services	Public services	Training
public Relations	Survey and assessment of existing standards and regulations				
	Increasing awareness of and assessing need for standardization				
	Initiation of and participation in standards work				
	Basic research				
	Structuring the areas »customer, product, processes«				
	Industry-specific questions				
	Regulations required in social partnership				

**Fig. 9.** Areas for standardisation activities in the German service sector (Fähnrich 2002)

The results have been published in, among others, the DIN Technical Report 116 ‘Standardisation in the German Service Economy – Potentials and Demand for Action’ (see DIN 2002).

The insights gained in the project ‘Service Standards for Global Markets’ will now be briefly described.

In order to make services describable, it is important to proceed systematically and to take into account all standardisation relevant components. For this, the use of Service System Engineering (Opitz and Schwengels 2005) is recommended. This system enables existing Service Engineering approaches to be complemented with system-theoretic approaches in order to develop theory-based concepts for

services. Depending on the definition and modelling of service systems, approaches (e.g. product-, process- and resource-related approaches) arise here.

Products and services can be described by product models. As opposed to material products, there are only a few approaches for service product models. They deal mainly with the information technology presentation of services, which makes unambiguously specified products out of hard to describe services. Although these approaches have a high potential for service companies and their partners, according to Mörschel 2005, there are yet a few aspects to resolve.

- Taking into account strategic aspects in modelling (namely aspects beyond the information technology presentation)
- Integrated and interdisciplinary product models
- Linking of non-cash benefits, services and software
- Integration of process models in product models
- Procedures for the establishment of special service product models
- Typing product models depending on the application purpose
- Standardising product models (e.g. within a branch)
- Electronic catalogues and uniform data exchange formats for service

There are two approaches in practice, which especially have the potential to advance the electronic trade with services. One of them is the classification system eCl@ss, which helps vendors and purchasers by electronically supporting acts of acquisition, describing products effectively, defining subjects of contract and meeting business-internal demands as well. The other one is the DIN encyclopaedia of features, which provides standardised product features. In order to make these classification approaches internationally recognised, constant revision is necessary. (Mörschel and Hoeck 2005)

Standardisation from the client's point of view is another important component of service standardisation. The client is usually a user/consumer as well as the producer of a service. The client must thus be integrated into the value-added chain of the service provider, which results in the following potential for standardisation (Jehle 2005).

- Transaction models (cooperation between the participants is supported)
- Standards for construction of the physical environment (the client contributes to the value-added chain)
- Standardised performance categories (performance portions of clients and producers are determined)
- Security standards
- Instruments for avoiding and eliminating errors
- Procedures for assessing client performance

Standardisation in the public field have not only positive effects on the provision of services but also have consequences for fields such as work (rates, qualification, work organisation, etc.). In a survey of E-Government, standardisation demands were identified in the fields of human-machine-interfaces, data ex-

change, data security, basic technologies, as well as quality of employee performance. Employee representatives did, however, fear a violation of personal rights from the introduction of standards concerning the quality of employee performance and thus rejected it.

In the field of E-Learning/continuing training, standardisation creates both advantages and disadvantages. One advantage of standardisation in the market of continuing education is higher transparency. Standardised continuing education modules can be expanded flexibly. Problems arise from the increasing amount of certificates. A structure must be set, which provides an overview over the certificates. The resulting lack of flexibility of continuing education companies with respect to client desires is, furthermore, considered a problem. If the opportunities for internationalisation in the market of continuing training are to be made use of, a higher level of quality in performance and in qualification of the employees is necessary. (Waller 2005)

A review of progress achieved and of the various approaches in creating standards for services was presented at the conference 'Service Standards for Global Markets', which brought together approximately 120 experts from around the world at the DIN on 30 September 2002. On 1 October 2002, within the scope of a CEN (European Committee for Standardisation) STAR Trend Analysis Workshop, demands in the fields of E-Learning, E-Commerce and E-Government for future work in Europe were discussed and a large variety of fields of action were identified.

Erwin Staudt, the former head of IBM in Germany, pointed out the eminent importance of confidence building for the increasingly complex market of information and communication technology in general and the internet in particular.

Furthermore, international examples of service standardisation of fields such as fair and exhibition management, personal finance consulting, maintenance contracts and quality assessment in regional railway traffic were discussed. The representatives of the various fields of application agreed about the strengths of service standardisation.

The explanation of the terms and the establishment of a basis for comparison cause a higher market transparency for the standardisation of services and thus boost international competitiveness.

George Willingmyre (GTW Associates, USA) stressed the potential for progression for the German service sector. At that time, approximately 79.9 percent of the employees in the United States were working in the service sector and the share of services in the gross national product was 78.4 percent (approximately 70 percent in Germany), (Willingmyre 2002). At 19.7 percent the United States were leaders in the world export of services. Germany ranked after Great Britain and France with 6.3 percent. George Willingmyre presented the results of a study, which was ordered in the context of the project (see Willingmyre 2002). The study was a report concerning the ongoing activities and current issues of service standardisation in the United States.

Two Publicly Available Specifications (PAS) were published in December 2002 by the DIN (German Institute of Normisation), as two further results of the

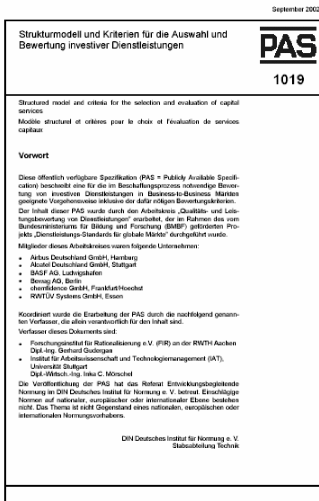
research project ‘Service Standards for Global Markets’. They aim at increasing transparency of the service variety: PAS 1018 (see DIN 2002a) describes a ‘basic structure for the description of services in the bidding phase’, PAS 1019 (see DIN 2002b) specifies a ‘structure model and criteria for the selection and evaluation of investive services’.



### PAS 1018:

#### Essential structure for the description of services in the procurement stage

- Requirements for an essential structure to describe services
- Definition of a procurement process
- Elements of specification for services in the procurement stage
- Further needs of action
- Terminology



### PAS 1019:

#### Structured model and criteria for the selection and evaluation of capital services

- Requirements and features for the selection and evaluation of services
- Approaches to the measurement of service quality
- Structured model and information process of the systematic evaluation
- Criteria for selection and evaluation of capital services
- Definition of parameter value and implementation

**Fig. 10.** Two basic standards for the specification and evaluation of services

The two documents have evolved from the research groups ‘Specification of Services’ and ‘Quality and Performance Assessment of Services’, which the Fraunhofer IAO has conducted together with further research partners and several

industrial businesses from 2001 to 2002. The assessment systematics introduced in PAS 1019 is meant to reduce the insecurity of the client as much as possible before the procurement decision, and to quickly and easily evaluate the actual achievement potential of the service supplier by means of appropriate features. The insights gained this way can be consulted for long-term observation of the suppliers and their purposeful advancement. Subject of the assessment systematics introduced in PAS 1019 are the so-called investive services. This includes all those services that businesses provide to one another (Business-to-Business-services).

In cooperation with the project VAWI (Virtual Training and Continuing Education for Information Management) DIN managed to form a national mirror committee of the ISO SC 36 works about E-Learning. The foundation was significantly influenced by the project 'Service Standards for Global Markets'. Standards for this topic have been published in the DIN as PAS 1032 Training and Continuing Education with special consideration of E-Learning Part 1: Reference Model for Quality Management and Assurance – Planning, Development, Implementation, and Evaluation of Educational Processes and Choices and Part 2: Didactic Object Model, Modelling and Description of Didactic Scenarios (see DIN 2004). Part 1 has meanwhile been incorporated into the international normisation and is about to become an international norm.

In cooperation with the Media@Komm project, boards for the unification of communal business processes have been established at DIN and first results have been developed. With support from the project 'Service Standards for Global Markets', PAS 1021 Procedure Model for Designing Business Processes in Public Administration – Change from Functional to Process-Oriented Administration has been compiled. This topic has also been integrated into an official national normisation plan.

### **4.3 Measures on European Level**

After preparatory work has been done on a national level and standards have been suggested and developed, another important step has been initiated. Service standardisation and research is now being promoted on the European level as well.

More than 60 percent of all employees in the EU work in the service sector (e.g. services for businesses, trade, hotel and restaurant trade, transportation, power supply, telecommunication, tourism and recreation, etc.). As a part of the internal market strategy, the European Commission published an extensive compilation of the limits that hinder the transborder provision of services in the EU. It lists, for example, lacking transparency, lacking trust when using service providers of other member states and differences in regulations. As follow-up action, a notice concerning the competitiveness of services for companies was presented in 2003. Various non-legislative measures are generated in this notice and European normisation is named as one of those measures.



On 6 July 2003 the European Commission accepted a report to the European Parliament and Council about the security of services. On the one hand the report describes and assesses the regulatory and factual situation on a communal level and in the member states and on the other hand, options for future initiatives are introduced and preparatory measures of the Commission are illustrated. At the same time it points out that national measures and laws concerning service security can be supported by the development of European normisation and the creating of a specific framework is announced, which, after determining demand, allows for the issuing of appropriate assignments. European normisation could thus contribute distinctly to politics in this field. The programme, which will be developed by CEN (European Committee for Standardisation), CENELEC (European Committee for Electrotechnical Standardisation) and ETSI (European Telecommunication Standards Institute), can then serve as a basis for further normisation orders, which will determine the political and financial support that is necessary for the enhancement of existing standards. This order has deliberately been kept broad.

This is meant to guarantee that all possibilities of normisation for services are considered appropriately. The variety and number of service fields and the numerous functional areas require that the normisation committees are in no way limited in this early stage of planning.

In an order from the EU to the European Normisation institutions, CEN, CENELEC and ETSI have been asked to draw up a normisation programme for the promotion of the internal market in the service sector. Service fields, which already are or will be part of the intra-community service traffic are prioritised. A second focal point will be the fields, in which the (commercial and corporate) interest groups push exceptionally for normisation. During the compilation of the normisation programme, CEN, CENELEC and ETSI will incorporate existing standards and norms, which are being prepared on a national, international, or European level. In CEN's follow-up survey in national normisation institutions, DIN has presented the results of the research project 'Service Standards for Global Markets' for Germany.

## 5 Conclusions and recommendations for action

The following conclusions are drawn from the current observations:

- The disaggregation of value-added chains (establishing new value-added chains, outsourcing) transforms intra-business interfaces into inter-business interfaces. This reduces the success of the increased degree of specialisation and work distribution, which in turn enforces standardisation of the interfaces.
- Using communication and information technology as automation technology requires massive standardisation concerning the practical system integration (which equals factory integration) as well as 'business objects' and fundamental 'handling processes'. A typology evolves for handling processes, proce-

dures and objects in the same way as for product engineering. The demand for standardisation of components of this novel automation technology is high here.

- Currently, the service sector is hardly familiar with vertical structures in education, methodology and tools used. The reason for that is the high degree of diversification. In the course of justifying 'industrial engineering' for mature service branches, however, horizontal knowledge structures (generalized procedures, methods and tools) - just as in product engineering and construction design - will evolve. The demand for formalisation and standardisation there is high, especially for basic standards (terminology, classification, typologies, morphologies, system models, architectures, modelling methods).
- Productisation in the service sector can only be promoted successfully if the relevant suitable fields of service economy accept and use the definition of the product entirely (and not only as a metaphor). This has far-reaching consequences. In order to realise customer orientation and productivity at the same time, services from parameterised components must be configured client-specifically. Formalised product descriptions and subsequently performance agreements must be rendered possible. In the field of IT services, the term Service Level Agreement is used. The result of this is a high demand for standardisation of product models, product catalogues and client-oriented product descriptions including the derived artefacts such as performance agreements as well as quality and conformity standards.
- The service industries announce a high demand for integrating process standards. These incorporate product standards and standards of client interaction and are based on resource standards (e.g. IT infrastructure). In most cases, however, it will not be reasonable to standardise processes in a branch-spanning way, but rather to standardise a 'kit' for processes.

Services exhibit several characteristics, which are generally more pronounced than in goods production. Their structure is more abstract or immaterial than goods and can therefore be better compared to the software field. The so-called soft factors (human factors, client interaction, emotionality) play a more important role. The client is potentially active in all phases of the life cycle of a service. The product model and provision of services are subject to limitations, which are not necessarily justified in themselves but are rather of a regulatory nature.

Similar to the software sector, standardisation in the service sector requires standards on a high level of abstraction: Reference models, architectures, logical component models and especially standardisation of interfaces. Description methods for this purpose are still partly to be developed, but definitely to be standardised.

The development of 'horizontal' standards should be promoted in particular. They are of branch-spanning importance. They include on the one hand basic standards for terminologies, classifications and system models, but on the other hand also technical basic standards or general resource standards, especially for IT-based services. There is also a demand for standards in the fields of client in-

teraction and product description. Management standards and beyond that regulations with commercial importance also belong to the class of horizontal standards.

As opposed to horizontal standards, there are already comprehensive activities for vertical, branch-specific standards. Unlike the horizontal standards, which are of broad concern, vertical standards should be initiated and financed 'bottom-up' as an initiative of relevant branches including the relevant associations. For horizontal standards, however, funding from public sources (e.g. in the context of development-accompanying normisation) is still necessary and reasonable, since an economically relevant innovative infrastructure is being established.

As mentioned before, standards in the service sector evolve mostly 'bottom-up' while integrating the corresponding 'stakeholder' (affected and participating parties). This development can clearly be seen in the allied software sector. Special value is placed on customers or users (e.g. in the field of public service providers). The classic structures of normisation are complemented with innovative services. The choice affected by tradition is endorsed with services such as cooperation management, knowledge management, process and document management, and consensus processes.

Innovative 'products' in terms of services for standardisation have been and must further be developed. They must be embedded in a master plan (reference process), but should divide it up into independent partial products with increasing complexity and consensus needs according to a shell model. The hard to balance demands 'speed', 'justifiable input' and 'liability' can thus be optimised step by step. Extremes range from open source models through public specifications to a classic standard. In Germany, a lot of effort has been invested into a German Normisation Strategy. In order to develop this future-oriented strategy, which is supported by all interested parties, a circle with representatives from economics, politics, research and normisation has discussed the vision of the German normisation work and elaborated five strategic goals (DIN 2004a).

In conclusion, the perhaps most important development should be pointed out. In the context of European integration and worldwide globalisation it will be very important that Germany (i.e. politics, economics and science) plays an active role, or maybe even leads the way in standardisation. Supported service research in particular is in great demand here.

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<http://www.springer.com/978-3-540-29858-8>

Advances in Services Innovations

Spath, D.; Fähnrich, K.-P. (Eds.)

2007, VIII, 312 p., Hardcover

ISBN: 978-3-540-29858-8