



Towards a procedure model in terminology management

Terminology
management

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Received 8 April 2004
Revised 3 September 2004
Accepted 5 September 2004

Abstract

Purpose – There is a lack of efficiency when dealing with information and searching for the right content. Aims to present a procedural model which in essence is a generalized approach to terminology management, with which to build and maintain glossaries and taxonomies.

Design/methodology/approach – In addition to an extensive literature review, analysis of three action research cases with several corporate partners is presented. The first case focuses on the introduction of a glossary for a Swiss insurance company. The second illustrates the results from setting up a corporate taxonomy at an international professional services firm. The third case combines glossary and taxonomy for document classification and retrieval.

Findings – Glossary and taxonomy are suitable for solving a wide range of terminological defects. Usage and maintenance processes play a central role in the management of terms and should be well defined. Only a well-suited trade-off between centralized and decentralized terminology management will be sustainable.

Research limitations/implications – Other means besides clearly defined processes have to be defined to clearly eliminate certain issues. Furthermore, there is the question of whether the implementation of terminology management could benefit certain types of companies in certain industry branches more than others.

Practical implications – Concrete actions that have to be taken into consideration when introducing glossary and taxonomy systems.

Originality/value – Proposes a procedural model for the introduction of glossary and taxonomy as well as the cultivation of a corporate terminology.

Keywords Information retrieval, Classification schemes, Semantics, Controlled languages

Paper type Case study

1. Introduction

In this section we will first introduce the challenges of terminology management. Thereafter we define our article's objectives and illustrate our solution approach, concluding the section with the article's structure.

1.1 The challenge

The extensive use of information technology (IT) has led many companies to gain access to vast internal and external information sources. Intranets and enterprise portals have become popular, offering all employees the possibility of using the explicit knowledge enshrined in electronic documents (Latham, 2001; US Web/CKS, 1999). The world wide web (WWW), with its myriad of servers and millions of documents, can



Journal of Documentation
Vol. 61 No. 2, 2005
pp. 281-295
© Emerald Group Publishing Limited
0022-0418
DOI 10.1108/00220410510585223

also be a valuable information source. Nevertheless, efficiency in dealing with information and in searching for the right content is inadequate. "Information management must begin by thinking about how people use information ... " (Davenport *et al.*, 2001), otherwise practical usage is impossible.

Even though employees today have access to an astonishing number of different information resources, we observe major deficits in handling information, which often result in:

- *Disappointing search results.* An intranet search for certain topics can be frustrating, because although the user may know that there is information, no match will be found.
- *Fuzzy naming.* Examining a financial services sector company's internet site reveals that "structured financial products" and "alternative financial products" are listed below each other without a description, although the correct terms are "structured financial products" and "unstructured financial products". This problem is mainly caused by inconsistency in the classification schema and the vague use of terms.
- *Misleading use of terms.* When analyzing communication between people, it is obvious that the clarification of the term used in requests and replies requires much coordination effort.

Interestingly, similar challenges are successfully managed in other areas. The medical or pharmaceutical sectors, for instance, face equivalent problems. It is essential that two surgeons speak accurately when discussing the same part of the human anatomy in the case of, for example, a liver transplant. In the humanities, linguistics also concentrates on the use of terms (Hoffmann *et al.*, 1999).

Examining the above scenarios, it becomes apparent that the control of semantics (the meaning of terms) and the orderly classification of terms used in a business environment are the key to success in order to minimize the deficits associated with inefficiency (Dale, 2001; Felber and Budin, 1989). These solutions would also help to avoid the repeated development of existing components (e.g. in software development) due to an imprecise use of language that makes it impossible to recognize that components are indeed similar (Ottmann and West, 1995).

Currently these challenges are manageable: terms from different scientific areas are flanked by the theory of terminology management as a scientific discipline in its own right (McDavid, 1996; Bailey, 1994), which is "the conducting or supervising of the technical or special terms used in a business, art, science, or special subject" (Felber and Budin, 1989). In other words, terminology management is the sum of the organizational units, processes and instruments that support the creation and management of terms and classifications in a specific subject area. The resultant terminology management tools are glossaries and taxonomies (classification schemes) that serve as the foundation for search, navigation, storage and communication services between persons and/or systems. Furthermore, activities concerned with terminology management are also of significant importance.

Yet, even though the benefits of a taxonomy and glossary seem to be obvious, the question remains why only a few information-centric companies have implemented these two instruments to minimize their terminological deficits. A lack of implementation persists despite the fact that surveys have proved that the demand

for improved search and indexing capabilities within portals (which can be enhanced through these tools) still heads the wish list (Yankee Group, 2000; Delphi Group, 1999).

One of the reasons for this state of affairs might be the existence of factors that hinder terminology management's rapid implementation, such as:

- a lack of awareness of terminological problems, their costs and the existing initial approaches with which to solve them;
- a lack of term classification standards; and
- non-specification of the support processes that will be responsible for solving terminological defects.

1.2 Objectives and the research approach

The overall objective of this paper is to offer a procedural model for terminology management. Following the established business engineering approach (Österle, 1995) we aim at a high level of formalization. To ensure the systematic development of the procedural model itself, we will use a research discipline called method engineering (Gutzwiller, 1994; Österle and Heym, 1993). It has been used for the definition of various methods that are currently being used successfully in practice.

Although a comprehensive method would include the techniques, result documents, roles, and a meta-model, we focus on a procedural model containing the recommended sequence of all the top-level activities (Alt *et al.*, 2000) to demonstrate the two proposed instruments' (glossary and taxonomy) synergetic effects as illustrated by three practical cases on the process and systems level.

The research and descriptive processes are based on action research (Whyte, 1991; Gummesson, 2000) undertaken with several corporate partners. The results comprise workshop results and those from projects undertaken with research partners over a two-year period. The results are currently being tested and expanded with further partners.

1.3 Article structure

Section 2 discusses related work in the area of terminology management and introduces the two tools on which we focus: glossary and taxonomy. Knowing the capabilities and constraints of these tools, we then propose a procedural model for terminology management in section 3. Section 4 illustrates three examples of the successful implementation of our approach. The first two cases focus on the usage of either glossary or taxonomy, while the third case illustrates the combination of both as realized with a matching IT solution. In section 5 we conclude by drawing a conclusion and proposing directions for further research.

2. Terminology management tools

We start by outlining related work in terminology management before introducing glossaries as tools for the control of semantics (the meaning of a term). Finally, we present taxonomies, which focus on the orderly classification of terms.

2.1 Related research

The problems caused by inadequate definition of terms have already been dealt with in a variety of situations (Buchan, 1994; Symons and Tijsma, 1982; McDavid, 1996;

Brenner and Österle, 1986). Classification schemes and other means of describing terms and their relationships play an important role in natural sciences in particular. Further examples can be found in chemistry or linguistics, with translation services naturally being very concerned with glossaries that allow specific terms or entire phrases to be assigned to specific expressions in other languages. Here, the term itself as well as the context plays an important role, which can make the process very complex.

In business administration and in the practice of business life, a precise definition of the meaning of terms has also become increasingly essential. This practice has hitherto mainly been used when dealing with transaction-oriented data that can be managed company-wide with enterprise resource planning systems (ERP) like SAP R/3. These systems integrate means of managing terms as used in their specific context. SAP, for instance, provides a comprehensive glossary for their terms (SAP, 2002). However, low structured data, such as documents, e-mails and reports, have not been of great concern in the past, mainly because they are not part of traditional ERP systems. Yet today, low structured data are at the center of attention in the field of knowledge management, which is concerned with how an organization can make low structured information (e.g. knowledge) accessible so that it can be retrieved and reused (Probst, 2001; Bach *et al.*, 2000; Davenport and Marchand, 2001). Terminology management's important role is best illustrated in, for example, the Customer Knowledge Management model, developed at the University of St. Gallen's Institute of Information Management (Gebert *et al.*, 2002).

As the preceding paragraphs have illustrated, terminology management needs to be perceived as an interdisciplinary approach that is useful in a variety of fields. In this paper, a special focus is the application of these interdisciplinary findings to the field of knowledge management in order to solve the deficiencies outlined in the introduction.

The foundation on which terminology management with its term, term system and term description rests is essential for information and knowledge processing (Felber and Budin, 1989). A terminology management system should therefore provide tools which aid humans to trace the life cycle of terms, i.e. to acquire, maintain, modify, and disseminate terminological information (Ahmad *et al.*, 1994). Felder and Budin (Felber and Budin, 1989) furthermore point out that document thesauri (glossaries) and classification schemes (taxonomies) are two very important terminology management tools.

As stated in the introduction to this paper, glossaries and taxonomies address different issues. Glossaries deal with the control of semantics (the meaning of a term) by providing a collection of terms with meanings, whereas taxonomies focus on the orderly classification of terms (Wayne, 1991; Moriarty, 1990; Logan, 2001; Rich, 1992).

2.2 Glossaries

A knowledge management glossary, for example, defines all basic and relevant terms concerning this particular area. These definitions are mainly relevant to a closed group or domain such as a company or a division. It is important that this group's participants all have a common understanding of these terms and are involved in the definition process. To run a definition process, all participating persons have to agree on the "definition framework". The "definition framework" consists of attributes and values that have to be defined for each term (Ortner, 1997). It not only contains the term itself, but also the intention, extension and source control attributes (e.g. the primary

key, version, expiry date, etc.). The intention is the definition of the term, while the extension is the sum of other terms that are included in the original term to which the intention applies. To some extent it makes sense to define a relevant domain for a term, e.g. within one or more organizational units, to differentiate between similar terms with different meaning.

When standardizing terms, the length of time taken presents a considerable problem. During a workshop that our institute conducted with partner companies, the definition of the term “portal” took nearly an hour. Still, it is crucial that this standardization is achieved in a bottom-up process to create a common understanding that reflects business reality. As Champe (1996) points out, “when people need to discuss the description of some word, it is very important that everyone understands the description in the same way”. In light of this, it is recommended that only important or company-critical terms that are strongly related to a company’s value creation and which can be derived from mission statements, business reports, product catalogues, and department or job descriptions should be defined in order to reduce effort to a minimum.

One way of reducing the time spent on defining terms is to search for existing industry-specific or subject-specific glossaries and to establish these as standards (Logan, 2001). Institutes for standardization, like the International Organization for Standardization (ISO), or Chambers of Commerce, are good starting points when looking for existing glossaries (Bundesministerium für Wirtschaft und Arbeit, 2002). For example, Deutsche Telekom AG, a market leader in telecommunication in Germany, offers a specific telecommunications glossary. However, while this facilitates communication with external partners, it might create an acceptance problem inside the company. Similar to other project-based approaches, strong change management is necessary in such cases.

2.3 Taxonomies

As stated above, a taxonomy is a classification schema with which to organize information in a hierarchical manner (Gaus and Leiner, 2000; Bailey, 1994). Complexity reduction and navigation facilitation are the main reasons for using taxonomies (Logan, 2001).

In the area of knowledge management, taxonomies are often used to structure corporate portals’ content. One public example is the Open Directory Project’s taxonomy (Figure 1), in which over 3.8 million web sites are organized in more than 460,000 categories (DMOZ, 2002).

Whereas dmoz.org’s results are based on the manual work of more than 53,000 editors, no cost-oriented organization could ever afford such complexity. Unfortunately, technical solutions, like automatic classifiers, cannot as yet solve the problem (Warzecha, 2001; Hagen, 2000). Human intervention is still necessary, for example to decide on taxonomy node names or labels. It is also true that in many enterprises no single set of categories will satisfy all the users. Some terms, even if they are common across the enterprise, may not be uniform. As already stated in the previous section, a domain specification is necessary, for example to build taxonomies for the different organizational units within a company. Again, a trade-off is required between the centralization and decentralization of terminological work.

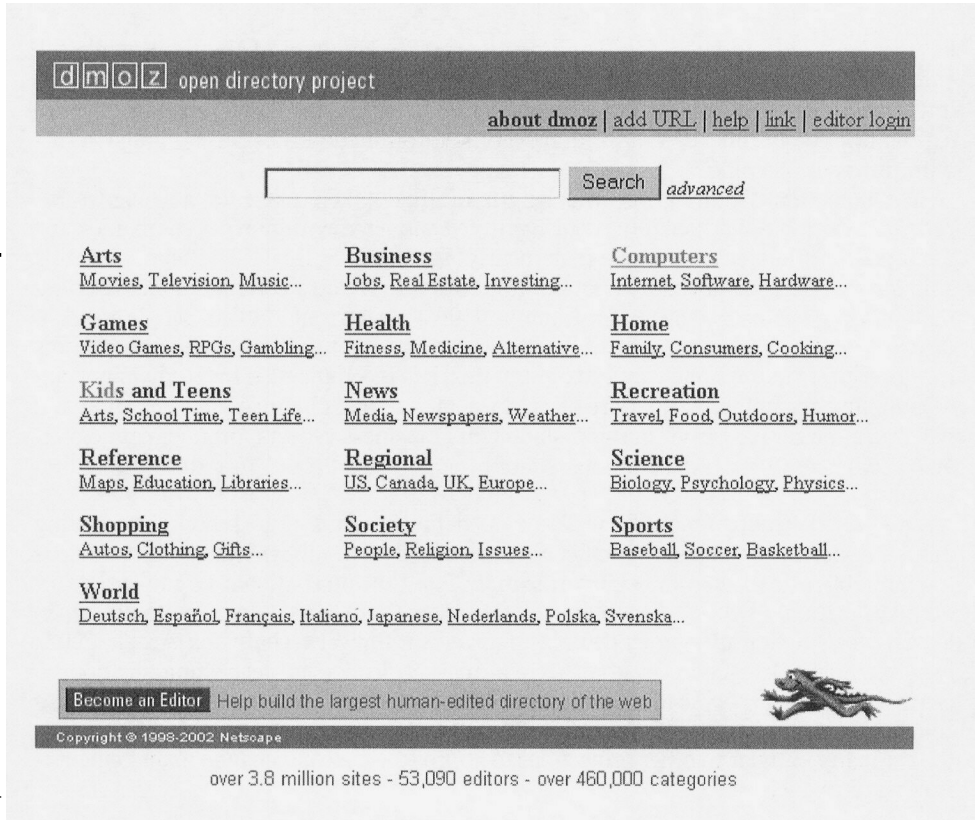


Figure 1.
The Open Directory
Project's taxonomy

Currently, many hierarchical classification schemes are available on the WWW, and using and adopting these taxonomies can achieve time reduction. A link list of controlled vocabularies, thesauri and classification systems that are available in the WWW can be found on the Lund University Libraries web site (Koch, 2002).

3. Procedural model for terminology management

Combined usage of taxonomy and glossary can be shown to solve the defects described in the introduction to this paper. The use of a taxonomy enables adequate classification of information, thereby providing improved search results that are not only based on the appearance of key words. By using a glossary, the search results can be further improved since it places a term within context and ensures that users have a common denominator as far as the meaning of terms for which they are searching is concerned. As Gilchrist (2001) and Varian and Lyman (2000) point out, "our ability to store and communicate information has far outpaced the ability to search, retrieve and present it. Some see taxonomies as part of the answer to this problem". The example in the introduction of fuzzy naming of different financial products could be resolved by applying a glossary that explicitly allows the definition of relationships between terms. Simultaneously, a defined taxonomy of disjunctive classes will eliminate inconsistencies in the classification schema. Inconsistencies also exist in the example of the mixed storage within a file server, where a taxonomy can be used to eliminate



them. The misleading use of terms in everyday communication could be improved by introducing a company-wide glossary, especially if it covers multiple languages.

These examples specifically show that ideally, both tools should be used together, since they complement each other. It is easy to grasp that a taxonomy would not work if there were no common understanding of the terms and dimensions included therein, leading to ambiguous classifications.

The systematic introduction of terminology management to a company, a process that can become very complex in a large organization, is one way of overcoming these problems. This requires a careful trade-off between the decentralization and centralization of activities. The process of the initial development of such a glossary and taxonomy, derived from action research and illustrating the above, follows. Once they have been introduced, both the taxonomy and the glossary can be very dynamic when employed in a business environment (in contrast to a scientific context) because terms go through a lifecycle that constantly refreshes a corporate vocabulary, a fact that can never be sufficiently emphasized (Figure 2).

This lifecycle not only causes new terms to appear, but also causes the disappearance of old terms. It therefore needs to be taken into consideration when defining processes for terminology in an organization's management. Consequently, it is crucial to be specifically focused on the processes of terminological instrument management once they have been established because they will obviously not contribute benefits if detached from reality. This view is also supported by McDavid (1996), who states that "a repository of business terms [...] can be maintained dynamically as the models evolve. It is important to establish a data administration function to make sure that updates, backups, and data consistency matters are attended to".

The process of developing a taxonomy and glossary is illustrated in Figure 3. It is important to design this process as a bottom-up analysis (McDavid, 1996). The first step is to define the valid domain of the taxonomy/glossary (i.e. a certain company, work group or community). Second, all the terms of this domain have to be collected and their definitions reconstructed by domain experts. In order to maximize efficiency,

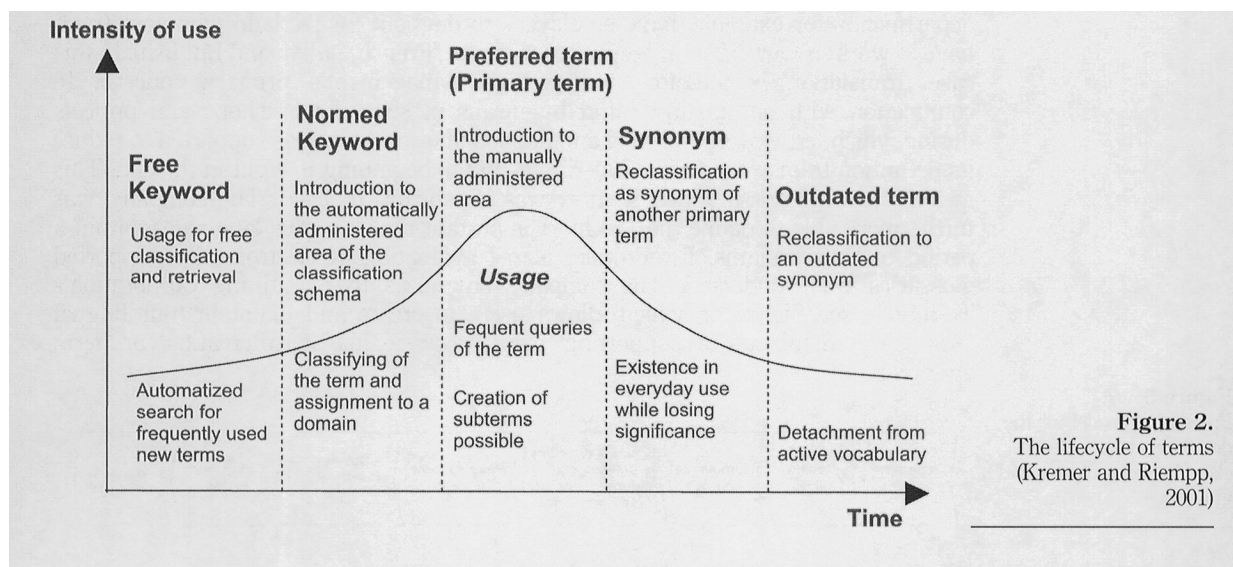


Figure 2.
The lifecycle of terms
(Kremer and Riempp,
2001)

it is useful to concentrate on the most important terms in the beginning. Possible sources for terms are dictionaries, interviews/workshops, existing systems, or the analysis of processes.

To avoid having the same term show up in multiple sources, the sources are summarized. Terms that are synonymous are clustered in equivalent classes and a preferred term is determined for each class. If required, translation is also done within this step. In a further step, term defects such as homonyms (one term has several definitions) or the vagueness of a term need to be eliminated or dealt with. The goal is to finally have one term (Buchan, 1994). A major issue is the development of the classification logic, which means that now the hierarchy or relationship among the terms needs to be established to form the taxonomy. Checking and revision through the questioning of users, the analysis of search queries and terminological checks are necessary to ensure that all requirements are met by the new taxonomy/glossary. The checking and revising process in this step is also instrumental in establishing the pattern of later maintenance processes. The final step is to make the results available for use in operational systems. Similar to other transformation approaches, the introduction of terminology management into a company has to follow good project management practices like planning, time and expense tracking, change management, etc.

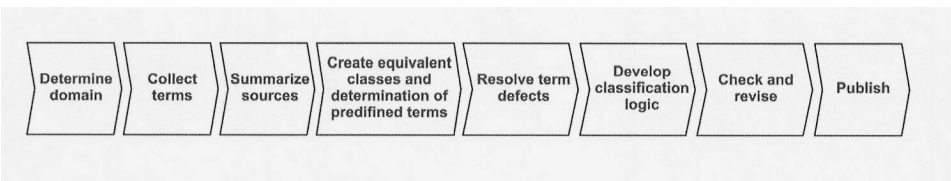
4. Application of the procedural model in real-life cases

In this section we illustrate the successful implementation of the procedural model introduced in the previous section. First, two short cases will illustrate the separate adoption of either a glossary or a taxonomy and highlight the key facts learned. The last case demonstrates the synergetic effects realized through their combined adoption together with a matching IT solution.

4.1 Glossary for a Swiss insurance company

The first case pertains to an insurance company in Switzerland facing several terminological challenges, and deals with glossaries. Many of the company's departments, for example, have employees throughout Switzerland who sometimes have to work in four different languages (German, French, Italian and English). In this case, translation is therefore terminology management's primary concern. In conjunction with our institute, and by means of several workshops and projects during which terms were collected and defined, the company was supported to reduce its definition framework from 45 attributes in the beginning to eight in the end. This meant that the glossary user's effort was drastically reduced. The company was furthermore able to define the 150 most important terms in four languages within a period of three months. In addition, a tool evaluation of electronically supported glossaries was conducted. The company now uses the MultiLing Corporation's TermStar (see Figure 4), which allows users to create and maintain multilingual terminology databases by supporting major processes like "term creation" or "term approval".

Figure 3.
Procedural model for the development of classification schema and glossary



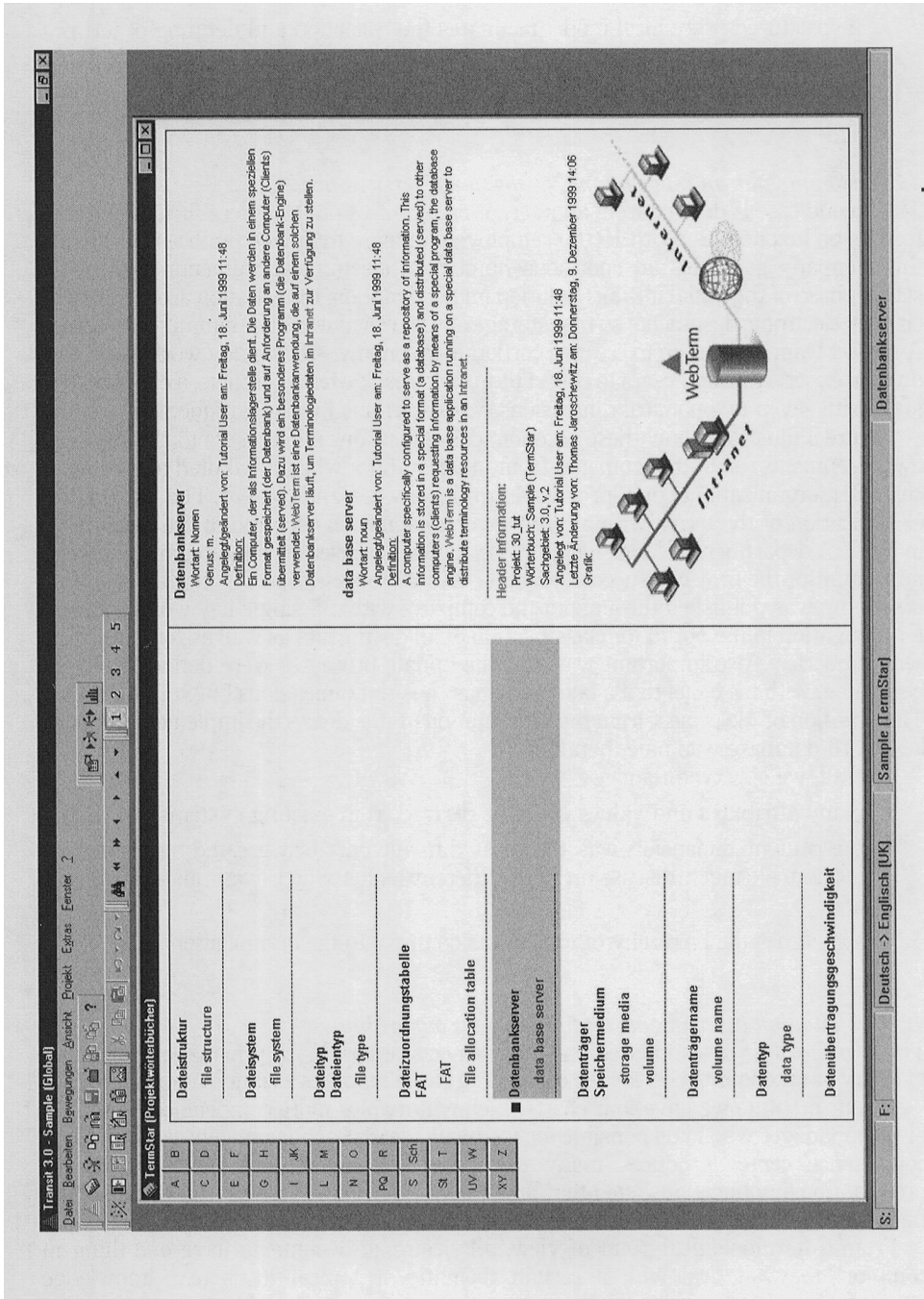


Figure 4. TermStar

From this implementation we learned that:

- a structured procedural model facilitates the collection and defining of terms;
- a “lean” definition framework reduces the time required for term definitions, and
- adequate tool support ensures user acceptance.

4.2 Taxonomy for an international professional services firm

The second case is derived from an international professional services firm and mainly focuses on taxonomies. With 150,000 employees in more than 150 countries worldwide, this company generates an enormous number of electronic documents. During the set-up phase of the initial intranet solution implementation, the question arose of how to classify electronic documents so that storage and retrieval would be simplified in future. A project team was set up to create a corporate taxonomy. After many workshops with domain experts and end users to collect terms and resolve term conflicts, a classification logic with seven taxonomical dimensions was determined within six months.

Figure 5 illustrates how these taxonomical dimensions allow users to classify their own documents, or find documents from other authors when attributed according to customer, organizational unit, product, location, process, and content. The fact that the classification of the terms within these seven dimensions occurred at the level of the individual departments is considered to be critical for user acceptance, and therefore important for the project’s success. Another critical success factor is that the resulting taxonomy was published throughout the company within a single key-word database for navigation in the portal for classification of all documents as well as for employing search queries. Also important was that the update processes were defined from the beginning, with the belief that a taxonomy has constant dimensions but variable terms. The duration of the project from the presentation of the idea to the implementation of a key word database was nine months.

Overall, we observed that:

- many attributes and values could be derived from existing systems (e.g. HR);
- the content dimension was the most difficult part because the agreement on terms took much discussion with different teams which was time-consuming; and
- sometimes the hierarchy of topics was contrary to the organizational hierarchy.

4.3 Combination of taxonomy and glossary at our institute

The two previous cases focused on single aspects of terminology management, either glossary or taxonomy, whereas the concluding case illustrates a combination of the two.

At our institute we have four chairs, each with two or more competence centers. A project manager who is responsible for the results leads each competence center. Each competence center produces many electronic documents (e.g. lecture materials, presentations, publications, etc.) that are stored in various systems (e.g. a file server, Lotus Notes databases, web content management systems, etc.).

From a terminological point of view, all electronic documents have one thing in common: they all deal with a certain thematic or topical focus (e.g. knowledge management, enterprise application integration, business networking, etc.).

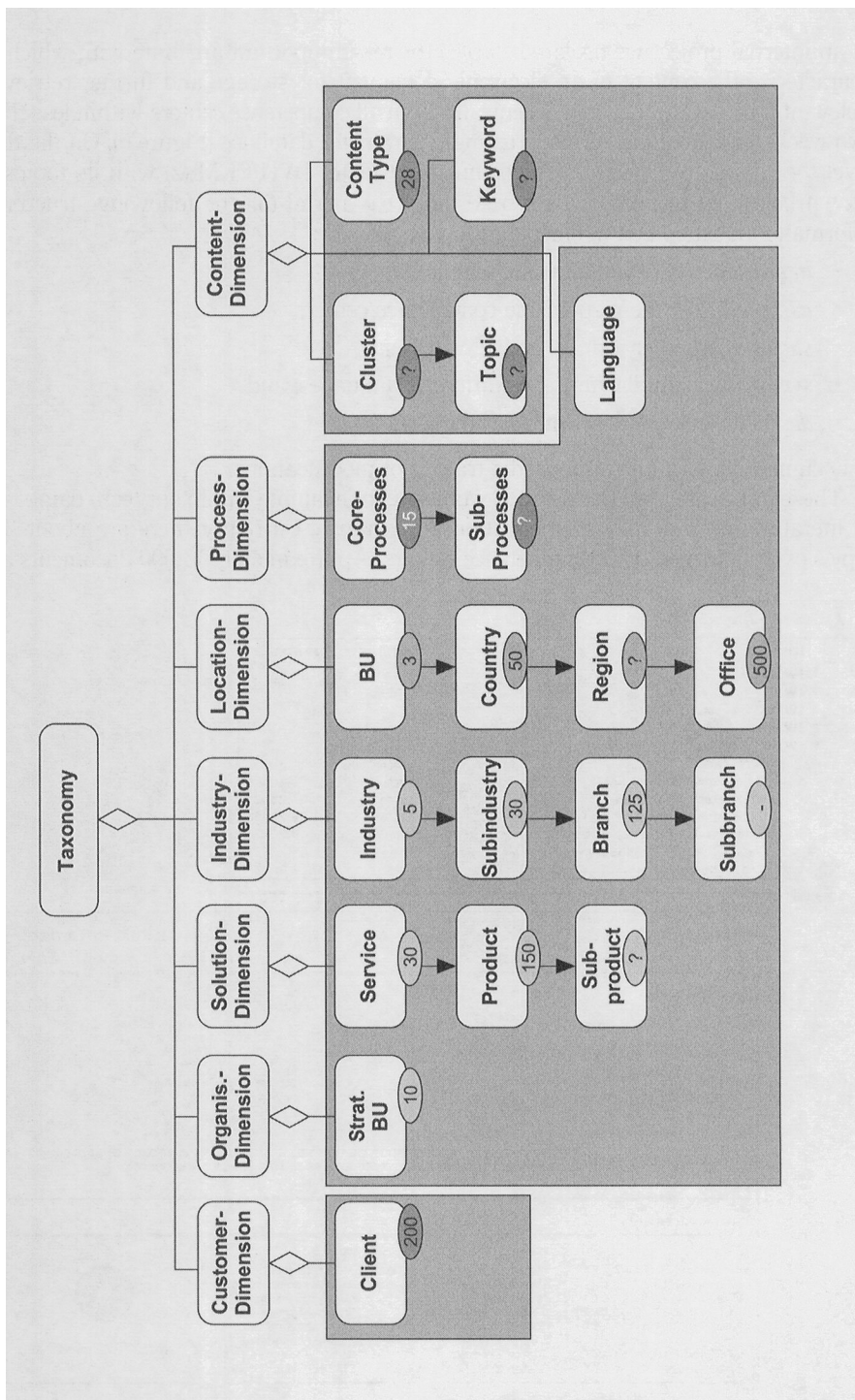


Figure 5. Taxonomical dimensions

In an internal project we declared “topic” the most important attribute with which to characterize the content of an electronic document for storage and further retrieval. Relevant topics were collected decentrally from all competence centers within less than two weeks and stored as terms in a single parameter database (Figure 6). On the first level the chairs are listed (1). The competence center IWI4/CKM (2) with its topics is shown below. In respect of a concrete topic, e.g. portal (3), the following structured information is embodied in our definition framework:

- *item* – the preferred term for a topic;
- *assigned to* – the responsible competence center;
- *status* – whether a draft, active or frozen;
- *synonyms* – similar terms or different languages; and
- *description* – the description of the term (4).

A document history (5) supports the tracing of modifications.

These topics are used to classify documents, for example within our team databases or literature, as well as our publication applications. Currently there are about 350 topics overall, owned by 30 competence centers. Approximately 11,000 documents are

The screenshot displays a software interface for managing a taxonomy and parameter database. It consists of several key components:

- Taxonomy Tree:** A hierarchical list of items. The top level shows 'IWI' (1) with sub-items IWI1, IWI2, IWI3, and IWI4. Under IWI4, there is a sub-category 'CKM' (2) which includes items like 'Community Management', 'Competence Management', 'Content Management', 'Enterprise Information Retrieval', 'Geschäftsprozessmanagement', 'Knowledge Management (allgemein)', 'Portal', and 'Sicherheit'.
- PARAMETER Window:** A detailed view for a selected parameter, 'Portal'. It shows:
 - Item:** Portal (3)
 - Assigned to:** IWI4 - CKM
 - Status:** active
 - Synonym(s):** Portals, Portale, EIP (4)
 - Description:** A Portal is a concept of a unification platform that allows for a collection of application services to work together to facilitate access to role specific and therefore personalized information.
- Document History Table:** A table tracking modifications to the parameter.

Date	Editor	Action
15.03.2002 12:56:41 CET	Martin Sander	Document created
15.03.2002 12:57:02 CET	Martin Sander	Status switched to "active"
15.03.2002 12:58:01 CET	Martin Sander	Document modified
18.03.2002 09:15:26 CET	Stefan Kremer	Document modified
20.03.2002 14:31:12 CET	Stefan Kremer	Document modified
20.03.2002 14:41:51 CET	Stefan Kremer	Document modified
27.03.2002 16:45:54 CET	Stefan Kremer	"Portal" appended to synonym list
27.03.2002 16:46:06 CET	Stefan Kremer	"EIP" appended to synonym list

Figure 6. Taxonomy and parameter database

classified within these terms for further retrieval (e.g. via our public web site or within our competence centers' team databases). Additionally, the parameter database serves as a glossary of our most important terms.

Changing topics do not result in a re-classification of already classified documents, but aggregation and synonym handling will occur on a higher level if this controlled vocabulary is exported and used as a search engine thesaurus.

From our own implementation we learned that:

- a "lean" taxonomy with only few dimensions reduces the work load of document classification;
- a few simple (centralized) "rules" for topic definition are helpful (e.g. naming conventions); and
- the decentralized definition of terms ensures acceptance and usage.

4.4 Lessons learned

Summarizing the lessons learned from the three cases we conclude that usage and maintenance processes play a central role in the management of terms and should be well defined.

Most terminology management projects start off being too complex. Reduction of the definition framework entries for glossaries and simplification of taxonomy dimensions help to implement both instruments swiftly and efficiently.

Furthermore, definition framework and taxonomical dimensions work best if they are constructed by a top-down (centralized) approach. But filling glossaries and taxonomies should be done using a bottom-up (decentralized) approach.

Lastly, existing standards for both should be identified inside as well as outside an organization for usage or further adoption.

5. Conclusion

As this article shows, glossary and taxonomy, which are important instruments of terminology management, are suitable for solving a wide range of terminological defects. With the illustration of three cases, the article suggests that the issues with which terminology management deals are widespread, and therefore the relevance of these instruments can be extended to all companies that share certain needs. The article proposes a procedural model for the introduction of these concepts and the cultivation of a corporate terminology.

Clearly defined processes are an important aspect in overcoming typical problems when introducing terminology management in general. Yet, other means have to be defined to completely eliminate problems such as the lack of awareness and cost assignment. Furthermore, there is the question of whether the implementation of terminology management could benefit certain types of companies in certain industry branches more than others.

There are at least three important aspects for further research. It is important to determine how information technology can be enhanced and optimized in order to support terminology management better. However, the effect of a controlled vocabulary on the creativity and innovation of employees needs to be explored, as it is not clear whether the regulation of terms used in corporate communication has any effect on these characteristics. Finally, proving the performance of terminology management (i.e.

ROI issues) within the corporate setting is a challenge for future projects. Our future research will focus on how this can be accomplished with existing and future partners.

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