Terminology Management As a Part of Documentation Development

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Tämä tutkimus käsittelee yrityssanastotyötä dokumentaation kehittämisen näkökulmasta. Tutkimuksen toimeksiantajana on nosturien sekä muiden nostolaitteiden valmistukseen ja kunnossapitoon erikoistunut suomalainen yritys. Tutkimuksen tavoitteena on tuottaa yritykselle monikielinen sanasto, joka kattaa tärkeimmät nosturialan termit, kuvata tätä sanastoprojektia sekä arvioida projektin onnistuneisuus. Toisena tavoitteena on ehdottaa, miten koottua sanastoa tulisi ylläpitää sekä miten yrityksen sanastotyötä voitaisiin jatkossa kehittää.

Tutkielman teoriaosassa määrittelen tutkimuksen keskeiset käsitteet ja esittelen tieteellisen terminologian periaatteet, joita käytännön sanastotyössä sovelletaan. Lisäksi käyn läpi, mitä sanastotyö pitää sisällään, miksi sanastotyötä kannattaa tehdä ja millaisia sanastoprojektit ovat. Teoriaosassa esittelen myös tutkimuksessa hyödynnetyn yrityksen sanastoprosessin kypsyyttä kuvaavan tasomallin.

Tutkimuksessa käytin kahta metodia. Sanaston laatimisessa hyödynsin ISO-standardissakin esitettyjä, vakiintuneita sanastotyön menetelmiä. Sanastoprojektin kuvaamisessa, analysoimisessa ja arvioimisessa käytetty menetelmä on puolestaan tapaustutkimus. Tutkimuksen aineisto voidaan samoin jakaa kahteen ryhmään: aineisto, jota hyödynsin sanastotyössä, pitää sisällään termi-inventaariossa käytetyn lähdemateriaalin ja materiaalin, jota käytin sekä opiskelumateriaalina että käsitteiden määritellyssä, kun taas tapaustutkimuksen aineisto koostuu projektisuunnitelmasta, projektikokouksista sekä projektin seurauksena syntyneestä sanastosta.

Ehdotan, että yrityksen sanastotyötä lähdetään kehittämään tekemällä sanastotyö tunnetuksi yrityksen sisällä. Sanastotyöstä saatavan hyödyn kannalta olisi suotavaa, että muutkin kuin dokumentaation parissa työskentelevät työntekijät käyttäisivät sanastoa. Kehitykseen kuuluu myös, että sanaston täydentämistä ryhdytään suunnittelemaan. Pidempiaikainen tavoite on, että sanastotyö otetaan huomioon tuotekehityksessä ja näin ollen sanastoprosessi voidaan ajoittaa oikein dokumentointiprosessiin nähden. Jotta sanaston laatu voidaan varmistaa jatkossakin, uudet termit tulisi aina katselmoida asiantuntijaryhmän kanssa ennen sanastoon lisäämistä.

Avainsanat: sanastotyö, sanaston hallinta, terminologia, dokumentointi, tapaustutkimus

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1. Introduction

A manual is an integral part of the product (ISO/IEC Guide 37 1995, 1), and consequently the quality of the manual affects the customer's impression of the quality of the product and his image of the company (Fähndrich 2005, 238). A poorly written manual might make the customer turn to another supplier. Quality is also a safety issue: unclear or inadequate instructions might result in injuries. One determinant of the quality of a document is appropriateness and consistency of terminology (Fähndrich 2005, 239).

This study addresses terminology management for the purpose of developing a company's technical documentation. By organised and continuous terminology management not only is the quality of documents improved but notable savings in writing and translation costs can be achieved. In addition, the time spent on these tasks decreases, and documents and translations can be released faster. Companies are slowly beginning to realise that terminology management is, from the point of view of both customer satisfaction and cost management, worth investing in. An indicator of this development is the rapidly increased number of terminology management systems on the market.

This study examines corporate terminology management through a case project, the purpose of which is to compile a multilingual crane terminology for a large, globally operating company, which manufactures and provides maintenance and modernisation services for cranes, other lifting equipment and machine tools. The aim of the study is to compile a terminology for the company, to describe the phases of this terminology project and to evaluate the project success. A second aim of the study is to suggest how terminology management should be organised in the company once the terminology is published and taken into use. In addition, a discussion of how the company's terminology work could be developed is included. Since the terminology project is a part of a larger development project aimed at harmonising internal and customer documentation, terminology management is examined from the viewpoint of technical documentation.

With the outlined research aims, multiple methods are needed. In the compilation of a multilingual crane terminology well-established terminological methods are used. The terminological methods used are founded on the principles of traditional terminology preoccupied with normative terminology. The method used for examining this particular terminology project and describing it in the study is the case study research method. Thus, the project is examined taking into account the context within which it was carried out.

The data to which terminological methods are applied consists of the source material from which the terms were retrieved and of the material that I used for both becoming acquainted with the subject field and for defining the terms. The data of the case study includes the project plan and other project documentation as well as the project meetings and the end result of the project, the compiled terminology.

Prior to the terminology project described in the study, the little terminology work that was conducted in the company was unorganised and restricted to individual departments or business units. Thus, the findings and suggestions of the study are valuable for the company, which aims at incorporating continuous terminology work into its processes. For other companies, the study serves as a useful example of how terminology work can be introduced.

The theoretical framework of the study is constructed from scholarly literature in the field of terminology, current discussions on terminology management and from publications of terminology standardisation organisations. A majority of the handbooks and introductory works on terminology include a description of the compilation of a terminology. The study serves as an indication of the extent to which these theoretical models of conducting a terminology project can be applied in a corporate setting, in which factors such as time and financial resources often come into play.

I will begin in Chapter 2 by defining the key concepts and principles of terminology, which form the basis for the practical terminology work. Chapter 3 is devoted to terminology management: what is understood by the notion of terminology management, how terminology

management is conducted and how the maturity of an organisation’s process for terminology work can be evaluated and increased. The methods and data used in the study are presented in Chapter 4. Chapter 5 focuses on the case project, which is described from the planning phase to the validation of the terminology. The description of the project is followed by an evaluation of the overall project success. Chapter 6 introduces a plan for long-term terminology management and suggestions for the development of the company’s terminology work, for which the process maturity model presented in Chapter 3 serves as a basis. Concluding remarks are made in Chapter 7.

2. Theory of terminology

The English word *terminology* is polysemous as it can be used in several meanings. The three different meanings of the word and their usage in the current study as well as other key concepts relevant for terminology work are discussed in this chapter.

2.1 Terminology as a field of study

When referring to a field of study, *terminology* or *terminology science* can be defined as the study of concepts and their representations (terms, symbols and names) in special languages (Tekniikan Sanastokeskus 1988, 22). Terminology is concerned with concepts, relationships between concepts, systems of concepts, definitions and terms (Tekniikan Sanastokeskus 1988, 22). Concept is the point of departure: terminology aims at identifying, analysing and structuring concepts and naming them (Cabré 1999, 37; Suonuuti 1997, 9). Terminology begins with concepts to which, only at a later stage, terms are assigned. This view in which concept is given primacy is called the onomasiological approach (Sager 1990, 56).

As a field of study terminology is relatively young. The emergence of scientific study of terminology is associated with the work of Eugen Wüster conducted in the 1920s and 1930s (Tekniikan Sanastokeskus 1988, 22). Wüster was the first to present a general theory of terminology (Draskau and Picht 1985, 27). Modern terminology work aimed at standardisation is largely founded on the principles of the Vienna school, the representative of which Wüster was (Cabré 1999, 12–13).

Terminology can be described as interdisciplinary since it has borrowed theories and methods from a number of disciplines such as semantics, logic, lexicography and information science, not forgetting the influence of the various scientific disciplines whose lexicon terminology describes (Sager 1990, 3). The status of terminology as a science is not indisputable. While in the ISO standard (ISO 704 2009, V) and in several other publications terminology is referred to as a

discipline, not all scholars (such as Sager, Kageura and Temmerman) recognise it as an independent scientific discipline and prefer referring to it as a branch or a subject field (Sager 1990, 1; Temmerman 2000, 15, 33).

2.2 Terminology as an activity and an end result

In its second meaning *terminology* refers to the practical work of terminologists. Terminology is hence "a set of practices and methods used for the collection, description and presentation of terms" (Sager 1990, 3). Terminology in this sense entails practices such as term extraction, concept analysis, defining concepts, linking concepts with terms and storing terminological data (Tekniikan Sanastokeskus 1988, 13).

In an attempt to avoid confusion, the activity is sometimes referred to as *terminology work* or *terminological work* to distinguish it from the field of study of terminology. However, the two, theory and practice, are closely linked. The theory of terminology provides a framework for terminology work (Sager 1990, 3). Proper terminology work is based on the principles of terminology, which are applied in practice (Nuopponen and Pilke 2010, 81). But the relationship between terminology and terminology work is not unidirectional: questions which arise in practical terminology work have the potential to inspire research in terminology (Sager 1990, 9–10).

Terminology is also the result of a particular terminological activity (Sager 1990, 3). In this third meaning terminology is "a set of designations of a particular subject field" (ISO 704 2009, V). A terminology is not simply any list of words, but a coherent entity representing a system of concepts (Sager 1990, 114). Ideally, a terminology should cover a single subject field comprehensively. As concepts (not terms) are the starting point in terminology, they determine the scope of a terminology.

For the purpose of clarity, the expression *terminology work* is henceforward used when referring to the practical activity involved in the compilation of the crane terminology, and the word

terminology (without an article) is reserved for the field of study. *Terminology* as a countable noun is used in the sense of a body of terms, such as the result of the case project.

2.3 Language(s) for special purposes

Since terminology is concerned with the lexicon of special languages, we need to define to what special languages refer. Special languages or languages for special purposes (LSP) are varieties or subcodes of language with a specific communicative function (Draskau and Picht 1985, 3). There is a need for precision and economy in communication within special fields, and LSP has been developed to meet this need (Draskau and Picht 1985, 4). LSP is a tool that can be used to classify, describe and transmit information within a special field (Nuopponen and Pilke 2010, 59). To fulfil its function as a medium for communication within a special field, LSP should be unambiguous, precise, clear and logical (Nuopponen and Pilke 2010, 59). LSP is contrasted with language for general purposes (LGP), which is used in unmarked situations and the acquisition of which requires no specialisation (Draskau and Picht 1985, 5–6). The line between LGP and LSP is not, however, clear-cut nor fixed. Expressions of LSP enter LGP and become widely used, and lexical items of general language are taken into LSP in which they acquire a special meaning (Draskau and Picht 1985, 4). What is noteworthy is that although terminology is concerned with the lexicon of LSP, lexicon is merely a part of LSP; LSP may be studied from the point of view of syntax or morphology as well (Draskau and Picht 1985, 21–22). The special field whose lexicon the case project aims to describe is the crane industry.

Having examined various crane standards published by different organisations and material of both the case company and its competitors, my view is that the lexicon of the crane industry is fairly well-established. A possible explanation for this is that as a product, the crane is not a recent invention, and although the machines have developed considerably, the main components have remained the same for decades, if not for centuries. The terminology of the crane industry has even been standardised by ISO, which has published a series of four standards under the title “Cranes-

Vocabulary". The purpose of these standards is to establish "a vocabulary of the most commonly used terms in the field of cranes" (ISO 4306-1 2007, 1). Although useful, the standards cover only about 250 concepts, a significant number of which are not related to the type of cranes that the case company manufactures. As in any field, terminology specific to a company or a department within a company nevertheless develops. Another source of differences in terminology in the field of cranes is language variety: certain concepts are named differently in British and American English. Examples of such pairs of terms are *end truck* and *end carriage* and *footwalk* and *walkway*. In addition to the industry specific terminology, the lexicon of the crane industry includes a number of terms that it shares with the field of electrical engineering, mechanical engineering or computer science.

2.4 Object, concept, term and definition

The lexicon of LGP is composed of items with general reference, namely *words*, whereas the lexicon of LSP contains a number of expressions which have a special reference, which are called *terms* (Sager 1990, 19). The theory of terminology, on which terminology work relies, is founded on the interrelations between term and three other constituents, which are object, concept and definition. The purpose of this chapter is to introduce these four basic constituents of terminology, which are referred to throughout the study.

Objects are part of the extra-linguistic reality. They are defined as "anything perceived or conceived" (ISO 704 2009, 2). Objects are not limited to the tangible things surrounding us: they can be either concrete or abstract, material or immaterial, real or imaginary (Nuopponen and Pilke 2010, 19). Objects are abstracted into concepts (ISO 704 2009, 4). Concepts are hence the result of a mental process and can be defined as units of thought construct through abstraction (ISO 704 2009, 2; Laurén et al. 1997, 106). Concepts are composed of the characteristics common to all the individual objects grouped under the same concept and serve as a means for categorising and

structuring objects (Laurén et al. 1997, 106, 111). Concepts are not language specific but they are to some extent culture-bound.

For a concept to be capable of communication, a linguistic realisation representing the concept (a designation) is needed (Draskau and Picht 1985, 93; Kalliokuusi and Nykänen 1999, 175). When dealing with language for special purposes, the linguistic realisation is a term (Draskau and Picht 1985, 93). Terms are defined as "symbols which represent concepts" (Sager 1990, 22). Concepts must hence exist before the terms which are their designations. Ferdinand de Saussure's principle of arbitrarity holds for a concept and the term representing it: the relationship between a term and a concept is arbitrary; there is no reason for a particular term to represent a particular concept (Laurén et al. 1997, 79). The relationship is based on pure social convention.

Definition is "a linguistic description of a concept" (Sager 1990, 39). The function of a definition is to identify the concept, to distinguish it from related concepts and to delimit the concepts within a concept system (Tekniikan Sanastokeskus 1988, 41; Kalliokuusi and Nykänen 1999, 175). Definitions tie together concepts and the terms which designate them and (in normative terminology work) set standards to the use of the concepts in communication. (Kalliokuusi 1999, 45).

To illustrate the relationships between object, concept, term and definition ISO (ISO *Draft proposal on Guide to Terminology*, quoted in Laurén et al. 1997, 78) has adopted a tetrahedron model. The model is based on the semantic triangle proposed by Ogden and Richards (1923). Figure 1is a reproduction of the model.

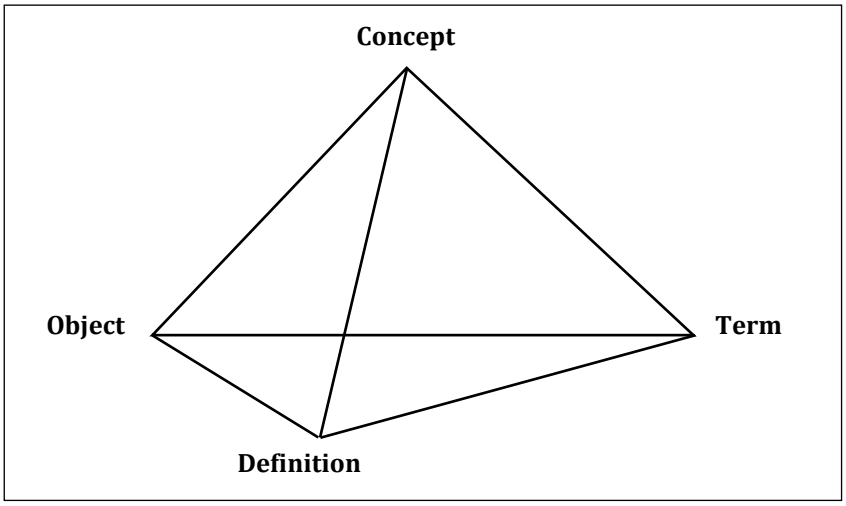

Figure 1. Basic constituents of terminology.

As Christer Laurén et al. (1997, 78) note and as it can be seen in the figure above, definition and term have the same status. Both the term and the definition are verbal representations of the concept, and hence the relationship between a concept and a term is identical to the relationship between a concept and a definition. The requirements of a well-formed definition and term are discussed in Chapter 4.1.

2.5 Different perspectives on *term* and *concept*

In the theoretical approach described in the previous chapters (generally referred to as traditional terminology), concepts are the starting point and seen as clear-cut entities (Temmerman 2000, 4–6). According to traditional terminology, the prerequisite for unambiguous and efficient communication is that the relationship between a term and a concept is univocal: a term refers only to one concept, and a concept is capable of realisation by one term only (Draskau and Picht 1985, 98). These principles of traditional terminology as well as its emphasis on terminological standardisation have received a fair amount of critique, and alternative approaches to terminology have been proposed. One of these is the so called socio-cognitive approach by Rita Temmerman.

In her theory, Temmerman (2000, 223–224) replaces concepts with *units of understanding*, which are not objective but experiential. Temmerman (2000, 224) explains that most units of understanding have a prototype structure and therefore can be named as *categories*. Unlike for

concepts in traditional terminology, the borderlines of categories are not clear, and they cannot be defined by describing their essential and delimiting characteristics (Temmerman 2000, 63–64). As opposed to the view of traditional terminology, according to which the analysis begins with concepts, Temmerman (2000, 45–46, 224) argues that terminology can only be studied in a textual corpus, making the term the point of departure. Temmerman (2000, 74) also states that the units of understanding evolve constantly and the inclusion of a diachronic perspective is therefore essential for the present understanding of units.

In this study, the work principles and terminological methods used are based on theory and guidelines which represent the view of traditional terminology. This view seems to be suitable for my purposes since the aim of the terminology project is to standardise the terminology used in the company, part of which is delimiting synonymy by selecting a term between two or more competing terms. Temmerman (2000, 219–221) does acknowledge the need for standardisation in some contexts but her theory provides a framework and methods for the description of terms, which in her view traditional terminology has discarded.

3. Terminology management

The theory of terminology presented in the previous chapter forms the framework for terminology management. The purpose of this chapter is to answer the following questions: what terminology management encompasses, why it is worth engaging in, what characterises terminology projects, how terminology projects are typically conducted and what the different approaches that can be taken in terminology work are. In addition, a model for evaluating the level of a company's terminology work and for developing it further is presented.

3.1 What is terminology management?

Terminology management may be understood differently depending on the context. We need to therefore determine how the concept is used in the current study. In a narrow sense, terminology management may be defined as the manipulation of terminological information, which includes practical terminology work and the systematic recording and presentation of terminological information (Wright and Budin 1997, 1–2). In this meaning terminology management refers essentially to managing data. However, terminology management is used in a wider sense as well, encompassing also the "strategic aspects of terminology planning" (Infoterm 2013). In the ISO standard (ISO 704 2009, V) this dimension is explained as "the planning and decision-making involved in managing a stock of terminology". In this meaning, terminology management may be considered a part of wider strategic language planning. Yet a slightly different, but also a wide definition is proposed by Stefan Kremer et al. (2005, 282) for whom terminology management is "the sum of the organisational units, processes and instruments that support the creation and management of terms and classifications in a specific subject area". This definition, which consists mainly of conditions and means, specifically refers to corporate terminology management. In the current study terminology management is used in the wider sense, referring to the planning, execution and development involved in the compilation of a terminology and its management and,

following the definition by Kremer et al., the tools and processes which enable it. This definition covers all the aspects of the type of systematic terminology work that the case company intends to engage in.

3.2 What is gained by investing in terminology management?

The importance of terminology work is self-evident to terminologists and those who work with language, but unfortunately decision makers do not always see the benefits and savings that terminology work brings. Arguing for terminology work might be challenging since accurate cost-benefit calculations for terminology work cannot be made in advance (Suonuuti 2013, 7), and some of the benefits of terminology work are not directly measurable. In addition, the initial cost of terminology work is relatively high, and the benefits are not immediately visible (Fähndrich 2005, 236). Improving quality and cost efficiency are often the reasons for launching a terminology project and the gain that companies hope to achieve by investing in terminology management. The ways in which terminology management actually improves quality and brings savings is discussed in this chapter. The reasons for undertaking a terminology project in the case company are presented at the end of the chapter.

Terminology work affects the quality of texts in at least two aspects. Seija Suonuuti (2013, 6) points out that the first one, namely term selection affects both the readability of a text and the ease of finding information within a text. A poor term or an incorrect one makes a text harder to comprehend and might negatively affect the image the reader has of the product or service (Suonuuti 2013, 6). The other aspect related to quality which has an even more significant effect on the readability and clarity of a text is consistency. Inconsistency in the use of terms is easy to spot in a text and it affects the user experience as well as the user's image of the product (Suonuuti 2013, 7). By consistent use of terms misunderstandings and communication difficulties can be avoided (Drewer and Schmitz 2013, 51).

Terminology work improves the quality of translated text as well. Having an understandable and consistent text as a source text facilitates and speeds up translation since the translator does not need to do additional research or guesswork on terms (Drewer and Schmitz 2013, 51; Suonuuti 2013, 7). A multilingual terminology database ensures the consistency in the use of terms in target texts as well (Drewer and Schmitz 2013, 51).

Thus, investing in professional terminology management results in savings in both text production and translation costs (Drewer and Schmitz 2013, 51). Work efficiency is improved since the time consumed by terminology related tasks can be spent on other work (Kelly and DePalma 2009, 8). The same terminological problem might be treated several times by different writers and translators. This unnecessary duplicate work is eliminated by having a carefully compiled and managed terminology. Translation costs decrease as a result of improved translatability of source texts, and most importantly the number of billed words drops when a multilingual terminology database is incorporated into the translation memory (Drewer and Schmitz 2013, 51).

Suonuuti (2013, 7) states that in reports of cost savings that companies have achieved by terminology management, the calculated savings are generally approximately 20 percent. The savings achieved naturally depend on the situation that pre-existed and the type of terminology work conducted (mono- or multilingual). To maximise the savings, the terminology should be used widely within the company (Suonuuti 2013, 8).

In the case company, the main motivations for engaging in terminology management were a desire to harmonise technical documentation, to improve translation quality and to reduce translation costs. The company's technical documentation is produced by several writers located in different countries, which poses a challenge for ensuring that the texts are unified. Standardising terminology is one of the means by which this challenge can be tackled. The company was not satisfied with the translation quality (which varied quite a bit) and saw that the cost efficiency could be improved. The aim of harmonised documentation encompasses that the layout of the manuals is

the same, that they have a uniform structure and that the terminology used in the manuals is consistent, which consequently improves quality and enhances customer satisfaction.

3.3 Terminology projects

Once the decision to engage in terminology management is made, a terminology project is launched. A terminology project may be defined as "a project aimed at collecting, developing, analysing and recording the terminology of one or more subject fields" (ISO 15188 2001, 2). Terminology projects share many of the characteristics listed in explanations of what a project in general is. These include defined start and end date, allocated resources, division of responsibilities and that there is a specific goal to achieve (Fähndrich 2005, 227; Nykänen 1999, 62). Thus, terminology projects can indeed be treated as "real" projects (Fähndrich 2005, 227).

According to Claudia Dobrina (2013, 12), all terminology projects have two things in common: the purpose and the result. The purpose of a terminology project is to fulfil a particular terminological need of a specific group of people (who form the target group), and the result of a terminology project is a collection of structured terminological information which can be compiled in a term list or a term bank (Dobrina 2013, 12). In addition to purpose and result, Dobrina (2013, 13) lists some characteristics which "proper" terminology projects share. These are project phases (presented in Chapter 3.3.2), the fact that terminological methods are used and that there is competence in both the subject field and in terminology within the project group.

3.3.1 Types of terminology projects

Based on five variants (objective, target group, scope, language and project steps) Dobrina (2013, 13) distinguishes six types of terminology projects, which I will briefly present here and indicate where the case project fits in Dobrina's classification.

The first two types of projects are, first, **a compilation of a monolingual terminology** and second, **a compilation of a multilingual terminology**. The most distinguishing feature between the

two is evidently language: in type one projects the terminology is compiled in a single language (preferably the first language of the project group), whereas in the second type at least two languages are covered, the source language being the first language of the project group. The number of languages included naturally affects the project steps; in a multilingual terminology project concept analysis must be done for each language separately (Dobrina 2013, 14). Both types of projects aim at covering concepts of a single or two neighbouring subject fields, and the target group consists of experts of a subject field or a few related subject fields (Dobrina 2013, 14).

In all of the next three types of projects in Dobrina's categorisation, existing terminological information is available. In the first type, namely **completing an existing terminology**, new terms, new type of information about the terms or new languages are added to an existing terminology. The second type is **improving the quality of an existing terminology** by restructuring and revising. This might be necessary if the original terminology was compiled by a non-professional. The last type of the three is **producing a comprehensive terminology** by combining existing terminologies into a single, large terminology which covers several domains. The objective and consequently the project steps of each of these three project types are different. (Dobrina 2013, 14–15.)

As a sixth type of terminology project Dobrina (2013, 15) distinguishes **providing terminological information on request**. This refers to services which customers use to request specific terminological information. The number of subject fields and languages covered is unrestricted. Such services are provided for instance by TSK (The Finnish Terminology centre) and TNC (The Swedish Centre for Terminology).

Terminology projects can be classified according to other criteria as well. For instance, Ursula Fähndrich (2005) divides terminology projects into two groups: internal and external projects. However, Dobrina's classification is comprehensive and gives an understanding of the various types of projects in which a terminologist may be involved. In addition, the classification is ideally

suited to characterise the case project, which matches for the most part with type-two project (compilation of a multilingual terminology): the terminology is compiled in several languages, of which English is the source language, and the project aims at covering a subject field (cranes).

Naming the target group of the project is slightly problematic. If Dobrina's definition of target group (a specific group of people whose particular terminological need the project aims to fulfil) is used, the company can be considered to be the target group of the case project. There is a need to harmonise the terminology used in the company, which consists of both terminology shared by the crane industry in general and of terminology specific to the company. However, if the company is said to be the target group of the project, then we need to distinguish another group, the user group of the terminology, which in this case is not the same as the target group. The primary user group of the terminology is formed by the employees who work in technical documentation. In the case project the user group of the terminology was of greater relevance in the execution of the project, and it is referred to again in the description of the project.

3.3.2 Phases of a terminology project

Seeing that internal corporate terminology work does not differ in methods from terminology work conducted elsewhere (Tekniikan Sanastokeskus 1988, 141), the project phases of a corporate terminology project should follow those of a terminology project conducted in national and international terminology centres, for instance. This chapter introduces two phase models of terminology projects, of which the first model by Olli Nykänen was published already in 1999, whereas the second, proposed by Dobrina (2013), is highly recent. The two models are compared to see which one is better fitted for describing the case project.

Nykänen (1999, 63) divides terminology projects into five phases, the first one of which is **planning**. The planning phase includes analysing the need behind the project, which serves as a basis for defining the objectives of the project. Other important tasks in the planning phase are finding resources and drawing up a project plan. In their presentation of terminology projects, Anita

Nuopponen and Nina Pilke (2010, 81–82) add a fifth task to the planning phase: selecting and delimiting the subject field (i.e. the scope of the project), in which time and financial resources often play a role. The project plan should include the need behind the project, the objectives of the project, estimation of the resources needed to complete the project, a schedule, a description of the result (the terminology and in which form(s) it will be published) and the benefits the project will bring (Nykänen 1999, 63).

According to Nykänen (1999, 64), the actual project begins once the planning is completed, and the funding for the project is secured. However, before going ahead to the terminological work, the work needs to be organised. In the second phase, which Nykänen (1999, 64–65) names as **starting phase**, the project group is selected, responsibilities are assigned, the project members are trained (principles and methods of terminology are introduced to the subject matter experts involved in the project), and the tools and methods to be used are agreed upon. At this stage, it might be necessary to revisit and revise the project plan. In internal corporate terminology projects it should be decided in the starting phase how the project is going to be led and overseen (Nykänen 1999, 64). Nuopponen and Pilke (2010, 87) add to the starting phase the deepening of the terminologist's understanding of the subject field.

The third phase is the **implementation phase**, during which the terminology is compiled. According to Nykänen (1999, 65), the compilation of a terminology begins with gathering the source material, from which the so called pre-terms (expressions which appear to be terms) are collected. The result of the term harvesting is a collection of terms significantly larger than the final terminology, which is reached through delimiting and selecting.

The terms to be included in the terminology having been selected, the next steps in the implementation phase are concept analysis and definition writing (Nykänen 1999, 66). This part, which Nykänen (1999, 65) notes to be the most time-consuming part of the entire project, includes identifying the concepts, constructing concept systems to illustrate the relationships between the

concepts and defining the concepts. In addition, the final choices concerning the terms and their status are made. As noted in the previous chapter, in multilingual terminology projects the concept analysis should ideally be done for each language respectively, but Nykänen (1999, 66) points out that often this is not the case; instead, the analysis and the defining of concepts are done for the source language only, after which equivalents for the concepts in the target language(s) are searched for. The case project does not form an exception: the concepts are defined solely in English, and the compiled terminology is then translated into various target languages.

Before the terminology can be validated and published, a round of comments is in place (Nykänen 1999, 67). The purpose of the **review phase** is to ensure that the terminology is correct and fulfils the objectives laid down in the project plan (Nykänen 1999, 67). Statements should be gathered from subject matter experts, who represent the target group and in some cases the user group of the terminology as well, to ensure that the terminology meets their needs (Nuopponen and Pilke 2010, 92).

The fifth and final phase of a terminology project is the **finalisation phase**. Based on the comments gathered and observations made by the project group, the terminology is finalised and published in a suitable form (Nykänen 1999, 69). The target group and others concerned should be informed of the publishing of the terminology.

Nykänen (1999, 67) points out that although his model proposes that the phases of a terminology project are consecutive, in practice this is hardly the case: the phases might overlap, and sometimes it might be necessary to go back and, for instance, rework on the concept system.

In her discussion on terminology projects, Dobrina (2013, 12–13) presents a simpler phase division of a terminology project. According to Dobrina, all terminology projects consist of three phases, which include several steps. The steps within a phase may vary between different terminology projects. The first phase in Dobrina's division is the **preparatory phase**, which includes the gathering of relevant terminological information, for instance. The second phase,

named as **main phase**, which corresponds to Nykänen's implementation phase, comprises of activities such as concept analysis and definition writing. The final, **presentation phase** includes, among others, the structuring of the processed data.

Both Dobrina (2013, 13) and Nykänen (1999, 69–70) mention the follow-up and updating of the terminology, but do not consider it part of the actual terminology project. In external projects, that is projects in which the service provider and the customer do not belong to the same organisation, this is probably the case; the project is considered completed once the terminology is finalised and delivered to the customer. Possible updating of the terminology is agreed separately between the customer and the service provider. Fähndrich (2005, 256) notes that in some cases, once the project of compiling a terminology is completed, a transition to a support project is made. In this case, the project as such does not end, but it changes in nature. The purpose of the support project is to keep the compiled terminology up to date and to handle feedback from the users (Fähndrich 2005, 228). Although Fähndrich's discussion concerns certain external projects, I believe this holds for most well-planned internal projects. In the case company, this is the most likely course of development: once the terminology is finalised and published, a person is assigned the responsibility of adding new terms and making changes to existing data based on feedback received from the users of the terminology. The terminology project does not end, but shifts into a support project, which no longer employs the terminologist full-time.

Evaluation of the project is also part of the follow-up (Nuopponen and Pilke 2010, 94). With future projects in mind, it is useful to record the time spent on the project and to comment on the work methods and tools used (Nykänen 1999, 70). For the case company, this study serves as a detailed project report of the crane terminology project, which can be consulted when subsequent terminology projects are undertaken.

As the phase models suggest, terminology projects do not consist merely of terminological work. In Nykänen's (1999, 71) model, the first two phases (planning and starting phase) as well as

gathering feedback and the final phase of publishing and informing concern project management, whereas the implementation phase and the finalisation of the terminology are part of terminology work. Conducting a terminology project therefore requires not only knowledge of the methods and principles of terminology, but project management skills as well.

The principle idea in the two models presented seems to be the same, the same main steps are included in both, but the grouping of the steps into phases is what differs. Although not a recent one, the model by Nykänen is by no means dated and seems to be applicable for the type of extensive corporate terminology project as the case project. Another advantage of Nykänen's model is that the model is comprehensive and clearly structured, and it was therefore chosen as a basis for describing the case project (see Chapter 5).

3.4 Descriptive and normative terminology

In the project phase model by Nykänen (1999) assigning the terms a status is listed as one of the tasks to complete in the implementation phase, but in fact this holds only in terminology projects with a normative approach. Depending on the need and aim, terminology work can be either normative (prescriptive) or descriptive or in nature. Terminology work which aims at describing the current use of terms and concepts is called descriptive terminology work (Nuopponen and Pilke 2010, 83). Descriptive terminology work merely ascertains an existing situation (Draskau and Picht 1985, 173–174), whereas normative terminology work aims at establishing a unified system of terms and concepts used within a subject field or organisation (Nuopponen and Pilke 2010, 83). Descriptive and normative terminology work hardly differ in methods; normative terminology work begins with descriptive terminology work, that is, an investigation of the current situation (Nuopponen and Pilke 2010, 84). In other words, descriptive terminology work is always included in normative terminology work. Only, in normative terminology work, the analysis is taken a step further, and to achieve uniformity, the terms are assigned a status, which guides the use of the terms (Draskau and Picht 1985, 173–174).

The terminology work described in this study is normative, but solely within the limits of the company. The terminology works aims at harmonising the terminology used in both internal and customer documentation of the company. Ideally the same terminology would be used across the company, in all business units. To ensure a consistent use of terms in documentation, the acceptability of terms is indicated by classifying them as preferred, admitted or deprecated, which correspond to the acceptability rating by ISO 704 (2009). The rating is presented in more detail in Chapter 5.4.

3.5 Terminology management tools

Today, information technology is routinely utilised in terminology work and not merely for the purpose of storing terminological information. Given their central role in the practical terminology work, terminology management tools are understood to be a part of the broad notion of terminology management (see Chapter 3.1). This chapter introduces terminology management tools and shortly describes the tool used in the case company.

Terminology management tools are tools designed for the management of terminological data (Wright and Budin 2001, 539). Bassey Antia (2000, 171) notes that although commonly the expression *terminology management tool* is used in connection with tools that enable the storage and publication of terminological information, terminology management tools also include tools that support the extraction of terms from corpora or the construction of concept systems or graphical presentations of concept relations. Terminology management tools may support one or a combination of the stages involved in terminology work (Antia 2000, 171). Term banks or terminological databases are hence a type of terminology management tools, as they may be used for storing, publishing and retrieving terminological information.

Some of the requirements of a good terminology management tool are that the structure is to some extent flexible (enabling the addition of new data fields), that the user can define and edit the order in which the term records are shown, and that there are various search possibilities and a fast

basic search (Kudashev 2004, 10–11). In addition, a good terminology management system is stable, reliable and user-friendly (Kudashev 2004, 11).

In the case company, the tool used for terminology management is a system called Acrolinx. Since the Acrolinx system will be the medium for storing, publishing and accessing the terminology, the terminological data was structured according to the system, taking into account its limitations. The principle idea and main functions of the system are presented here because the system was such a determinant factor in the compilation of the crane terminology and because it relates to the continuous terminology management that follows the completion of the crane terminology.

The Acrolinx system is not purely a terminology management tool but designed for checking language issues (such as grammar, spelling, style and terminology) in a text (Acrolinx 2014). Terminology management is one of the components of the system. The system has two interfaces, a plug-in tool and a web-based interface called Acrolinx dashboard. The plug-in tool, which works within an authoring tool (such as Microsoft Word or Adobe Reader), checks a text for language issues, highlights possible problems and suggests how they should be corrected (Acrolinx 2014).

The Acrolinx dashboard is for terminology management. The system includes a terminology database, which is accessed through a browser. The terminology management system allows storing terminologies, linking terms together, grouping terms into domains, making modifications and additions to the terminology and browsing terms (Acrolinx 2014). There are different types of user accounts with different user rights. This enables allowing a terminologist alone to make additions and modifications to the terminology but at the same time allowing other employees who need to find terms to access and browse the terminology. Acrolinx can be used for term extraction as well. The plug-in tool checks each word in a text against the stored terminology and highlights, in addition to the deprecated terms, potential terms in the text, which the user can then propose as new terms.

In my experience, Acrolinx is well-suited for the maintaining and updating an existing terminology: importing terms to the database is fairly quick and easy, and the existing terminological data can be easily edited, for instance by adding new, deprecated or additional preferred terms to the head term, editing the definition or changing the status of a term. However, the plain appearance of the dashboard and the poor visualisation of the terminology and the relationships between linked terms weaken the user experience.

3.6 The maturity of a company's terminology process

One of the objectives of this study is to discuss how terminology work in the case company could be developed. Hanne Thomsen (2005, 243–249) provides a maturity model for terminology work, which is specifically intended to serve as a tool for assessing the state of terminology work within a company and for determining how it could be improved. This chapter outlines the model and, using the model, describes the situation that pre-existed in the case company. The model is revisited in Chapter 6.3, which discusses how the company's terminology management could be improved in the years to come.

The model, which is based on the information process-maturity model by JoAnn Hackos (1994, 1997), determines six levels of maturity from zero level to level five (Thomsen 2005, 243). In fitting terminology work on the scale, Thomsen (2005, 245) takes into account the following aspects: how terminology work is organised in the company; the purpose and target group of terminology work (here target group is defined as the group of people whose use the terminology); what the terminology covers; whether a terminology database exists and what data is included in the database; and the extent to which the quality of the terminology is controlled.

On level zero, the company does not have terminology work at all since the employees are unaware of the need for terminology work (Thomsen 2005, 245). At level one, the terminology work in the company can be described as **ad hoc**. In this case, individual employees, such as

translators or writers have randomly collected terms in a list or other form to facilitate their own work (Thomsen 2005, 245).

A step further is taken if the individuals who have compiled lists of terms share knowledge and work together (Thomsen 2005, 245). At this level two, named as **rudimentary**, the terminology work is yet unorganised and not seen as a high priority compared to other tasks (Thomsen 2005, 245). According to Thomsen (2005, 245), the aim of terminology work at this level is improving consistency in communication with customers and/or saving time in translating, and the target group consists of employees who work with language. Thomsen (2005, 246) states that in larger companies different departments might each have their own terminology but an initiative for a common and centralised term database has not been taken. Thomsen (2005, 253–254) describes the terminology at level two as a list or database which includes previously gathered words and their equivalents in another language or languages.

According to Thomsen (2005, 246), in a company which has reached the third level, called **organised and repeatable**, terminology work is well-organised (for instance, an employee is appointed responsible for validating the terms) but still seen as a time stealer. The quality of the terminology is good: it attempts to cover all relevant fields, it includes such terminological information as definitions, notes or concept systems, and there are even some guidelines for updating the terminology (Thomsen 2005, 246). The aim of the terminology work is quality and consistency in communication, and anyone who writes customer documents should use the terminology (Thomsen 2005, 246).

In Thomsen's (2005, 247) view, when terminology work is included in the overall planning and both time and adequate financial resources are allocated to terminology work, it has reached the fourth level, a maturity level described as **managed and sustainable**. Thomsen (2005, 247) says that at this level terminology work often takes place concurrently with product development. In her article, Suonuuti (1998, 14) discusses the importance of timing of a terminology process. Suonuuti

states that considering its profitability, terminology work is ideally conducted alongside the product development process and completed by the time the writing and translation processes begin.

At level four the aim is that the terminology covers all relevant fields and languages, and the target group is no longer translators and writers but all company employees (Thomsen 2005, 247). According to Thomsen (2005, 247), once the terminology work has developed this far, it is an integral part of the company's daily activities and routines and there is no longer a risk that it will be entirely dismissed.

The final, **optimised** level in Thomsen's (2005, 247) maturity model involves improving the work processes and systematically maintaining the terminology database. Suonuuti (1998, 15) mentions likewise the continuous development of the process and work methods as a prerequisite for a successful terminology work process. In addition, she underlines the importance of communicating and receiving feedback from the target group of the terminology (Suonuuti 1998, 15).

In the case company, the situation before the terminology project was launched closely resembles Thomsen's description of the rudimentary level (level two). Several small-scale terminology projects had taken place in different business units, but no initiative had been taken for compiling a single, centralised and managed term database for the entire company. A possible reason for this is that there was uncertainty of which department should be in charge of terminology work. The terminology work can then be described as an unsystematic compilation of simple lists of terms, most often in the form of an excel sheet. The lists have been produced for the purpose of a specific project and have never been updated. The lists include terms and their translations into one or a few languages. Definitions or comments are not included. The low quality of these terminologies is also reflected in the fact that they include a number of words that belong to language for general purposes. As no term database that would serve as a reliable source for

verifying terms has been available, technical writers have relied on the MOT dictionaries and the subject matter experts in terminological issues.

4. Data and methods

The methods used in the study can be grouped into two categories: the first category consists of terminological methods used in the compilation of a crane terminology for the company, whereas case study research method forms the second category and the method enabling the description of the project and evaluation of its success. The two categories are presented in the following chapters.

4.1 Terminological methods

The methods of normative terminology work founded on the principles of traditional terminology are well-established and even standardised (ISO 704), and their presentation in the handbooks and introductory works on terminology is nearly identical. For this reason, and to ensure the validity and quality of the end result, these methods were used in the compilation of the crane terminology – nonetheless taking into account the needs and wishes of the company and the available resources. The overall process of compiling the terminology is treated in Chapter 5 in which each phase of the project is described. The following chapters present the principles of two terminological methods that were the most important ones in my work. In addition to these methods, the methods of analysing the relationships between concepts and organising concepts into concept systems were applied in the compilation of terminology.

4.1.1 Formulating definitions

One of the largest tasks in the compilation of a terminology is defining the concepts. There are a few general principles concerning what constitutes a well-formed definition. In the case project these principles where used as guidelines in writing definitions.

There are different types of terminological definitions, but the most commonly used and the recommended one is the intensional definition (De Bessé 1997, 68–69; Kalliokuusi 1999, 46). Thus, the intensional type was used in the case project as well. Intensional definition consists of the immediate hypernym of the concept and the characteristics which distinguish it from concepts of

the same class (delimiting characteristics) (De Bessé 1997, 69–70). The definition should depict the position of the concept in the concept system and its relation to related concepts (Kalliokuusi 1999, 46). The definition can include terms of the same field familiar to the users or terms representing concepts defined in the same terminology, but the repetition of the characteristics of these concepts should, however, be avoided so that one concept only is described per definition (Kalliokuusi 1999, 46–48). On the list of things to avoid are also negative definitions, definitions that contain inessential characteristics of the concept and definitions that are either too narrow or too broad (Kalliokuusi 1999, 48–49).

When defining concepts, the knowledge of the users and the use of the definitions should be taken into consideration so that the definitions satisfy the needs of the users of the terminology (De Bessé 1997, 70; Kalliokuusi 1999, 56). Virpi Kalliokuusi (1999, 50) points out that there are no universally right definitions, but the definition of a concept depends on the point of view from which the concept is examined. As an example Kalliokuusi (1999, 50–51) mentions technical devices which can be defined either according to their technical features or the intended use. In the case project the primary user group of the terminology consists of technical writers wherefore the use of highly technical expressions in the definitions needed to be avoided.

Bruno De Bessé (1997, 73) notes that in writing definitions, the assistance of subject matter experts is imperative since terminologists rarely have sufficient knowledge of the subject field. This was taken into consideration in the case project: a training manager and a field service engineer were assigned the task of helping me in formulating the definitions.

4.1.2 Selection and formation of terms

The ISO standard (ISO 704 2009, 38–41) presents a list of general principles that should be followed in the formation of terms or in the harmonisation of existing terminology. These were taken into account and formed a part of the criteria according to which the selection of a preferred term for a concept was made in the case project (discussed in Chapter 5.5).

First of all, a term should be transparent, so that the concept the term represents is deducible from the parts of a term (ISO 704 2009, 39). This is achieved by using a delimiting characteristic of the concept in the formation of the term. Second, terms should be appropriate, which means that they should be in accordance with established patterns of meaning in the language and that they should be neutral (ISO 704 2009, 39–40). Neutral or unmarked terms are terms the usage of which is not restricted by the circumstances of communication.

From a broader perspective, terms should "integrate into and be consistent with the concept system" (ISO 704 2009, 39). This criteria of consistency means that, for instance, the different technical properties of a crane are named according to the same pattern either as *travel speed* and *travel height* or as *traveling speed* and *traveling height* respectively.

As regards their form, terms may be words (*crane*) or phrases (*under running crane*) (Draskau and Picht 1985, 93), and verbs and adjectives may as well function as terms, although most terms are nouns (Nuopponen and Pilke 2010, 62). What is important is that terms conform to the morphological, morphosyntactic and phonological rules of the language and preferably allow subjection to derivation and compounding (ISO 704 2009, 40–41). For instance, the noun phrase *anti-derail device* could not be accepted as a preferred term because the prefix *anti-* cannot be added to a verb.

Suonuuti (2007, 9) adds an important selection criterion to those presented in the ISO standard: the understandability from the consumer's or reader's point of view. Suonuuti (2007, 9) points out that too often the formation or recommendation of a term is done with a specialist in mind, for whom the terminology is already familiar, although he might not represent the actual user group of the terminology or the group of readers of the documents in which the terms appear. Suonuuti (2007, 9) also warns against too long terms: a term should be such that it can be easily used in a sentence without having to abbreviate it.

4.2 Case study research method

This study is a case study which examines the execution of a terminology project in a particular company. The case study research method can be defined as "the study of the particularity and complexity of a single case, coming to understand its activity within important circumstances" (Stake, 1995, XI). The words *understand* and *circumstances* could be highlighted in the definition, since they best describe the essence of case study. The primary aim of a case study is to understand in depth that one particular case (Stake 1995, 8–9). The understanding can be achieved only if the case is examined within its temporal, historical, economic, social and cultural context (Saarela-Kinnunen and Eskola, 2010, 192). The case study research method is used to respond to *how* and *why* questions posed about a present set of events that is not detachable from its context (Yin 2009, 10–11, 18).

Typical examples of a case are an individual or a small group, but an event or an entity such as a program, a process or a project might just as well form a case (Yin 2009 29, 33). What is important is that a case is specific and has boundaries (Stake 1995, 2). The researcher should clearly delineate the case (Saarela-Kinnunen and Eskola 2010, 193) which is the object of study.

The ways in which the case study research method is practiced –the techniques used to collect, analyse and interpret the data– are not limited to a single strategy, instead various methods may be used (Yin 2009, 18). Accordingly, case studies might be either qualitative or quantitative in nature or combine both types of methods and evidence (Yin 2009, 19).

A common critique of case study research method is its weakness to produce generalisations (Yin 2009, 15). The types of statistical generalisations as are made in quantitative studies cannot be drawn from a single case, and case studies do not try to argue against this. The emphasis in a case study is on a thorough understanding of the case itself, which is unique and of special interest (Stake 1995, 8). This does not mean that case studies cannot say something about the topic on a more general level. Although a case is unique, it is often at the same time a common one (Stake

1995, 1), meaning that the same phenomenon or process can be found among another groups, or in different organisations or communities as well. Thereby, case studies imply knowledge of the other, similar cases (Stake 1995, 8). The results of a carefully conducted case study are transferable to similar cases (Saarela-Kinnunen and Eskola 2010, 196–197). In addition, a case study might provoke a modification of an existing generalisation by providing a counter-example (Stake 1995, 7–8).

The basis for choosing case study research as the method of this study stems firstly, from the object of the study. The object of the study, namely the crane terminology project can easily be constructed into a case: the project has a defined start and end, as well as a predetermined aim, and hence the boundaries are quite clear. In addition, the project is a specific, contemporary set of events. The project is tied to a certain context, and contextual factors such as the company, the line of business, the larger development project of which the terminology project is a part and the resources allocated to the project cannot be discarded in the examination and interpretation of the project as a case. The special interest with this case is that it is an extensive project and first of its kind in the company. It is the first well-planned and organised terminology project undertaken in the company and the first initiative taken to introduce systematic terminology work into the company.

Secondly, one of the research aims of the study led to the use of the case study research method. The case study research method was a natural choice, once I had formulated the research aim of describing, analysing and evaluating the project of compiling of a large multilingual crane terminology, or in broader terms, the introduction of terminology management into the company.

4.3 Data

The data of the study can be divided into three groups: the first group consists of the data from which the terms to be included in the terminology were collected; the second group is formed by the material used in both learning about the subject field and in formulating the definitions; and the

third group comprises of the material used to evaluate the success of the project. The first two groups of data were used in the terminology work involved in the compilation of the crane terminology, whereas the third group of data was used to reflect and evaluate the process.

The first group of data, the source material from which the terms were collected, was gathered for me. This data includes:

1. previously compiled lists of terms
2. a software generated list of the most frequently occurring expressions in manuals (5,000)
3. a dictionary of the terms stored in the company's product data management (PDM) system.

Before the project was started, the manager responsible for the documentation development project saw to it that all kinds of existing lists of terms were gathered from different business units. All of these lists received are in the form of excel sheets and typically consist of terms and their translations into one or a few languages. It is unclear whether the lists are correct and up-to-date. Some of the lists have been made for a specific component (such as an inverter or condition monitoring unit), while others cover general crane terminology.

The list of the 5,000 most frequently occurring expressions in manuals includes the following information: the frequency of the proposed term (how many times it occurs in the source material), the immediate context in which it occurs and the path to the files in which it can be found. The manuals from which the list was generated did not cover documents of all the company documentation teams, and therefore central terminology of some products is missing from the list. Since the list has been produced by a program, it includes a large number of irrelevant lines such as product names, codes and subject plus verb constructions (*operator shall*), which no doubt occur frequently in manuals but are not terms.

The dictionary of the product data management system includes about 3,000 English terms and their translations into the 22 official company languages (not available for all terms). Until recently, the dictionary was not centrally managed, and anyone could add new items to it, which is

reflected in the quality of the dictionary. For the same reason, it includes some duplicates (such as *control unit; brake* and *brake control unit*) and a number of synonyms (such as *adjusting plate* and *adjustment plate*). In addition, some of the items in the dictionary are words which can be considered to belong to general language (such as *chair* and *flashlight*).

The second group of data used in the terminology work, the source material for familiarising myself with the subject field and for defining the concepts, consists of material such as sales and marketing material, e-learning material, articles on the company wiki, and guides and presentations, all of which were accessed through the company intranet, as well as internal and customer manuals. In addition, I participated in a company training, which is designed for all non-technical employees for the work of whom product knowledge might be useful. In formulating the definitions, my source material included, in addition to the above mentioned, standards by European Committee for Standardization (CEN), ISO, American Society of Mechanical Engineers (ASME) and Occupational Safety and Health Administration (OSHA), as well as specifications of Crane Manufacturers Association of America (CMAA). Yet another important source of information in defining the concepts was subject matter experts within the company, who I consulted via e-mail.

The third group of data consists of the project plan, other project documentation, the project meetings, all of which I attended, and the compiled terminology. This is the data used, by the means of the case study research method, for describing how the project was conducted and for evaluating the overall success of the project.

5. Crane terminology project

Chapter 3.3.2 presented two models which describe the phases of a typical terminology project. In this chapter the case project is presented phase-by-phase, using the phase model by Nykänen (1999, 62–71) as a basis. It should be pointed out that, at the time of writing this thesis, the project is still ongoing. Nevertheless, all of the main tasks, excluding the tasks of publication and translation have been, if not fully, at least partly completed. As mentioned in the Introduction, the crane terminology project is part of an extensive documentation development project. I will therefore briefly present the company documentation and indicate the position of the terminology project in the big picture of documentation development before describing the course of the terminology project.

The company documentation is produced in-house: there are nine different documentation teams located in seven countries on three continents. A documentation team may be responsible for the documentation of a specific business unit or a brand. The types of internal and customer documents produced include assembly and installation instructions, owner's manuals, operator's manuals, service instructions, online helps, technical guides and spare part catalogues. American English is the company language and the source language from which customer manuals are translated into all of the 22 official company languages; for internal manuals the number of target languages depends on need.

Considering that the company documentation is geographically scattered and some of the documentation teams work relatively independently, the degree of variation in ways of working, tools used, terminology as well as the design and structure of the documents is high (as noted in Chapter 3.2). The various sub-projects under documentation development tackle these issues. The higher level aims of these projects are four: first, to harmonise the document portfolio by defining the document types, their structures and layout and, in addition, to harmonise the safety messages and symbols used in documents; second, to harmonise the working methods by implementing a common process for document creation; third, to improve translation quality and to reduce

translation costs by implementing proofreading practices and by engaging in terminology management; and fourth, to develop and introduce common tools. In this extensive documentation development program the crane terminology project is one of the individual sub-projects. It was launched as a response to aim number three, to improve translation quality and to reduce translation costs.

5.1 Planning and starting phase

The planning of the project can be said to have taken place in two phases. The initial planning was made as early as 2012, and the approval to go ahead with the project was given at the turn of the year, but due to the primacy of other development projects and the lack of resources, the project did not start until late autumn in 2013. The need behind the project and the resources needed for the project had been discussed in the first planning phase. In addition, an estimation of the schedule was made. The second, a more detailed planning was made in the kick-off meeting for the project held in October 2013.

The participants of the kick-off meeting included the manager of a documentation team, who is leading the development project, a manager of another documentation team, an information designer, who has been in charge of introducing the Acrolinx software, and myself. The following matters were discussed and decided on in the meeting: motivation for and aim of the project, size and structure of the terminology, primary users of the terminology, source material, publishing of the terminology and a preliminary schedule for the project. Since the project had been on the agenda for some time already, most of these issues seemed to be evident. As a result of the meeting, a project plan was established. Creating a project plan is according to Nykänen (1999, 63–64) a necessary tasks in the planning phase, and it should not be disregarded.

The aim of the project was defined as the compilation of a terminology that covers the most important terms in the field of cranes. The products and services that the company provides are not limited to cranes, but it had been decided that terminologies for lift trucks and machine tools (if

compiled) would be kept separate. As mentioned in the Introduction, the motivation for the project was clear: a desire to harmonise documentation, to improve translation quality and to reduce translation costs. The aim of harmonised documentation would be achieved by standardising the terminology (indicating which terms are to be used and which are not by assigning the terms a status) and by importing the terminology to the Acrolinx system, which checks a text for terminology. The consistency of terminology in source texts is enough to improve translation quality, but the significant quality improvements and cost reductions would be achieved by translating the compiled terminology into all the official company languages, proofreading the translated terminologies and including the terminology in the translation memory.

The scope of the terminology was set to a maximum of one thousand concepts. This was estimated to be large enough a terminology to cover the most important concepts and yet be manageable and capable of being produced within the time scheduled for the project. The intention is that the terminology can be expanded after its publishing. There was no need to discuss the structure of the terminology since the software used for terminology management defines it, as mentioned in Chapter 3.5. The information to be included in the terminology is the preferred term, deprecated term(s), additional preferred term(s), a definition and translations into all official company languages. It is also possible to include images, comments and examples of contexts in which the terms appear, but we decided to leave those out at least for the moment.

The profile of the user group was determined as non-specialists. The primary users of the terminology are technical writers and information designers, in other words, the employees who work in documentation. As mentioned in 4.1.1, this needs to be taken into consideration in formulating the definitions by avoiding overly technical definitions. Although the terminology is produced especially for the documentation teams, it was decided that in addition to importing it to the Acrolinx system, the terminology would be published in some other format as well, so that all

company employees could access it. The deadline for the project was set to June 2014, which we later on realised to be unrealistic.

Since the case project's starting phase did not include much work, it is treated here together with the planning phase. For Nykänen (1999, 64–65), the starting phase consists of organising the work, training and deciding what methods will be used. I was the only person with the primary responsibility of compiling the terminology, so there was no need for organising the work. Neither was training given to subject matter experts involved in the project. This was partly due to lack of time and partly due to the relatively large number of subject matter experts who would participate in the project, either by commenting the compiled terminology or by assisting me in writing definitions. Prior to the crane terminology project I had completed another, although a much smaller terminology project, which consisted of compiling a lift truck terminology for the company. With that project and the lessons learned during that project fresh in mind and a deeper knowledge of terminology work, I had a clear idea of how I should proceed with the project. I decided that I would follow the work methods that are based on traditional terminology presented in ISO 704 standard and in central introductory works on terminology, insofar as these methods would be applicable.

5.2 Implementation phase

Once the project plan had been established, and I had decided what work methods I would use, the terminology work could begin. The implementation phase is the middle phase and the core of the project because the terminology is compiled during this phase. The implementation phase of the crane terminology project included three main tasks, all of which required a fair amount of time and work. These three tasks are presented in the following chapters.

5.2.1 Term harvesting

According to Nykänen (1999, 65), the first task in the implementation phase is gathering the source material. As this was done already prior to my involvement in the project, the first task in my work was term harvesting. The idea of the term harvesting is to gather potential terms from the source material.

I started the term harvesting by first going through the list of expressions extracted from manuals. The motivation for selecting this list as my starting point and primary source derived from the objectives of the project: from the point of view of both reducing translation costs and harmonising the terminology used in the manuals, the most important terms to include in the terminology are the ones that occur most frequently.

Once I had gathered the potential terms from my primary source, I looked through the previously gathered lists of terms and the dictionary drawn from the PDM system. The disadvantage of the last mentioned sources was that they include nothing but terms (in one or more languages), which made it difficult to evaluate which of the terms are commonly used and important ones. Given that at this point I had little technical knowledge of cranes, it was overall difficult to assess whether a term was worth including in the terminology or not. For the same reason, the list of terms that resulted from the term harvesting included a number of synonymous terms, which I could not recognise as synonyms.

Thus, the main challenge that I had in this phase was deciding whether to include a word in the terminology or not. Delimiting and defining what belongs to the lexicon of the subject of field of cranes turned out to be problematic. For instance, I hesitated whether to include words such as *modem* and *extranet*, which are computer related terms but at the same time central terms concerning the company's remote monitoring and reporting service. As a solution, we decided that the manager and information designers in my team would review the list of terms that I had gathered and share their opinions concerning the inclusion or exclusion of certain terms. Although

the reviewers are not exactly subject matter experts, I found it to be useful to go through the list of terms with them.

As Nykänen (1999, 65) points out, the number of terms gathered in the term harvesting tends to be multiple to those included in the final terminology. I noted this in my work as well: the result of the term harvesting was a list containing 3,200 terms, more than three times the number that we had agreed to include in the terminology. Consequently, I needed to cut down on the number of terms and to select which terms would be the important ones. As mentioned in Chapter 4.1.2, terms are most often nouns. The majority of the terms that were gathered from the source material represent the part of speech of nouns, but a few adjectives were included as well, an example of which is the term *explosion-protected*.

5.2.2 Categorisation and selection of terms

Before I started to work on the preliminary list of terms I had gathered, I spent some time familiarising myself with the subject field of cranes. I felt that this was necessary in order for me to understand what the concept of crane entails and to form an overall image of the concept system that I should describe. Nuopponen and Pilke (2010, 87) point out in their discussion of terminology projects that one of the terminologist's tasks is to gain knowledge in the subject field, although they place it in the starting phase. As mentioned in Chapter 4.3, I utilised the material available on the company intranet as learning material. This material includes e-learning material, product presentations and brochures, and articles on the company wiki. In addition, I had access to the material used in the company base training, a training in which I later took part.

In Nykänen's (1999, 66) model, once the terms to be included in the terminology have been gathered, the next task is concept analysis, which consists of identifying the concepts and the relations among the concepts and visualising the concept system by the use of diagrams. Considering the size of the terminology and the amount of time available for the completion of the project, it was not possible to conduct a detailed concept analysis and to draw a comprehensive

diagram that would include all the concepts and indicate the relationships between the concepts. Instead, I structured the concepts into different categories or what you might call smaller concept systems, but did not further analyse the concepts within those systems. Figure 2 is an example of the kind of partitive concept system I constructed from *hoist*, which is one of the main components of a crane.

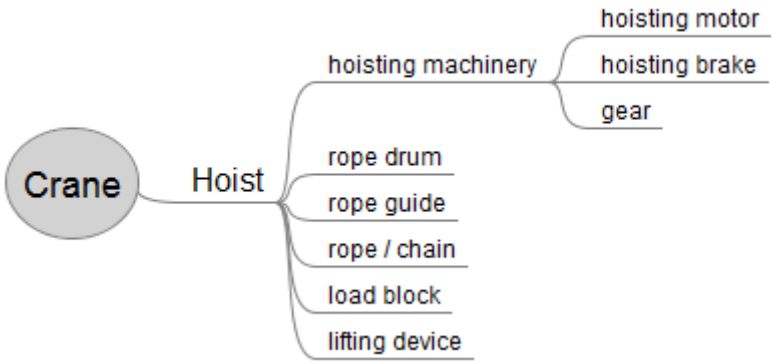

Figure 2. Partitive concept system of hoist.

Construction of the kinds of concept systems as in Figure 2 helped me to structure the information into smaller, manageable units and to ensure that essential concepts would not be missing from the terminology. The categories into which I grouped the terms were the following:

1. Types of Cranes
2. Crane properties
3. Steel structure
4. End carriage
5. Hoist
6. Trolley
7. Machinery
8. Control mechanism
9. Electrical equipment
   I. Inverter
   II. Monitoring devices
10. Safety, lights and optional equipment
11. Maintenance
12. Service products

The base training material and an introductory e-learning module served as a basis for the categorisation presented above. The categorisation was reviewed by my team members as well. I

grouped the terms in the preliminary list into these categories and at the same time omitted irrelevant terms. A reason to exclude a term from the final terminology was either that I found few or no occurrences of the term in the manuals and other company material, or that the term was too specific considering the limited scope of the terminology. An example of too specific a term is *taper roller bearing*, which was excluded from the terminology but whose hypernyms *roller bearing* and *bearing* were included in the terminology. After the categorisation and selection, the number of terms in the terminology was approximately 1,500.

5.2.3 Definition writing

The third considerable task in the implementation phase is defining the concepts. Heidi Suonuuti (1997, Annex) recommends that in defining the concepts, existing standards be cited, when possible. As mentioned in Chapter 4.3, I had access to various standards by European Committee for Standardization (CEN), ISO, American Society of Mechanical Engineers (ASME) and Occupational Safety and Health Administration (OSHA), and specifications of Crane Manufacturers Association of America (CMAA). I used these standards as my primary source for definitions. If the standards did not provide any help, I turned to manuals, internal guides, presentations and training material, and product brochures. If these sources did not prove to be useful, I contacted a subject matter expert via e-mail. In addition to a training manager and a field service engineer who had in advance promised to assist me, I contacted a dozen subject matter experts during the project.

The standards served as a reliable source for definitions. However, the definitions provided by the standards are occasionally quite long and complex. This was noted as well by some of the subject matter experts, who commented that certain definitions quoted from a standard should be rephrased to improve understandability. As noted in Chapter 4.1.1, the definitions should be written with the intended users of the terminology in mind. In the case project, as the primary user group consists of non-specialists, it was crucial that the definitions are clear and not overly technical. As

mentioned in Chapter 4.1.1, one way of avoiding overly technical definitions is that a concept is defined by stating its intended use, as opposed to its operating principle, as in the example below which is taken from the crane terminology:

anti-condensation heater
heater used to prevent the accumulation of condensation water inside an enclosure

In defining the concepts I followed the terminological principals presented in 4.1.1. Thus, whenever possible I used intensional definitions. In addition, I tried to write definitions that would provide enough information but that, on the other hand, would not contain inessential information about the concept. Below is an example of an intensional definition extracted from the terminology:

manual chain hoist
chain hoist which is operated by manually pulling a chain

The above definition of the term *manual chain hoist* is formulated so that the first part identifies the concept by stating its immediate hypernym, *chain hoist*, and the latter part indicates the characteristic which differentiates the concept from other related concepts (such as electric, pneumatic and hydraulic chain hoist). In this case the difference is in the means by which the chain hoist is operated. Most of the definitions in the terminology are structured in the same manner.

ISO standard (ISO 704 2009, 44) advises that an extensional definition be used when it is a more efficient way of defining a concept than by an intensional definition. Relying on this principle, I defined a few concepts in the terminology by an extensional definition. An extensional definition is "structured as a list of subordinate concepts related to a single criterion of subdivision associated with the generic superordinate concept [hypernym]" (ISO 704 2009, 44). Below is an example from the terminology of a concept defined by an extensional definition:

safety alert symbol
hazard symbol, mandatory action symbol or prohibited action symbol

The above definition describes the extension of the concept by enumerating all of the immediate subordinate concepts. The subordinate concepts are all defined in the terminology as well.

Zero definition constitutes a special type of definition. When the parts of a term describe all the essential characteristics of the concepts, the definition of the concept is a zero definition (Tekniikan Sanastokeskus 1988, 54). The definition does not provide any information, since the concept the term represents can be identified from the parts of the terms. The definition is simply unnecessary. An example of a zero definitions is found in the terminology:

rubber buffer
buffer which is made of rubber

Instead of the zero definition, the term could have been left undefined or the definition could have been replaced by a reference to the defined part(s) of the terms (Tekniikan Sanastokeskus 1988, 55), (in the example case: see **buffer**). The parts of the term should be defined in the terminology unless they describe a known concept (Tekniikan Sanastokeskus 1988, 54). The term *buffer* is defined in the terminology, but the term *rubber* is considered as generally known and therefore not included as a separate term.

Even at this phase, the content of the terminology was somewhat reshaped. When consulting a subject matter expert I would learn that two or three terms are in fact synonyms or that a term is nonessential and could be therefore omitted.

5.3 Review phase

The third phase in Nykänen's (1999, 67) model is the gathering of comments. Once the terminologist has compiled the terminology, the terminology is reviewed by subject matter experts. For the terminology to be widely accepted and used within the company after its publication, we wanted to gather comments from a wide group of people from different business units of the company. The project manager formed a terminology steering group, a group which consisted of four employees, all of whom represented a business unit. In addition to these, the person responsible for the dictionary of the PDM system was included in the group. The role of these steering group members was to gather comments from subject matter experts in the business unit they represent

and to bring those comments into the steering group meetings in which the terms were validated. We decided on in advance which subject matter experts would be consulted. Each steering group member decided themselves how they would gather the comments, by e-mail or by organising a review.

Nykänen (1999, 67) notes that when the terminology is sent for commenting, a clarification of what is expected from the reviewers should be included. In the case project, we asked the subject matter experts to comment on the following aspects:

1. Are the definitions and the terms correct?
2. Which of the synonymous terms should be selected as the preferred one and why?
3. Are there other synonymous terms in use than those listed in the terminology?

First of all we wanted to ensure that the terminology is correct, which Nykänen (1999, 67) considers as the primary purpose of this phase. We asked that the reviewers focus on the content of the definitions and leave linguistic issues aside. Given the normative nature of the terminology work, the aim was to select one of the synonymous terms as the preferred one and to label the others as deprecated. For this reason, we asked the subject matter experts to give their view on which term should be the preferred one. Since the Acrolinx system detects deprecated terms from a text, in addition to the preferred term, all possible synonyms of the preferred term should be stored into the system to maximise the benefit of using the system.

The primary challenge in this phase was involving some subject matter experts in the project. It was difficult to convince some people of the importance of the project and that they would benefit from the compiled terminology as well. This seems to relate to a general disregard for the importance of technical documentation. If documentation is not seen as part of the product and as worth investing in, but rather as a necessary evil, it is hard to argue for the importance of a terminology project which aims at improving the quality of documentation. As discussed in Chapter 3.2, people who do not work with language might need to be convinced of the benefits of

terminology work. The steering group members tried to emphasise that once the terminology is validated, the preferred terms are the ones that will be used in the manuals for the product that the subject matter experts represent, and therefore this project concerns them and should be of interest to them as well. Another challenge in this phase was time: the gathering of comments demanded quite a lot of time, especially if the terminology was reviewed in a meeting, and finding the time for a review on top of the normal tasks posed some challenges for the subject matter experts and the steering group members.

5.4 Validation and finalisation

Nykänen (1999, 69) states that the remaining phase in a terminology project after the round of comments is to finalise the terminology based on the comments received and to publish it. According to Nykänen (1999, 66), the terms are assigned a status in the implementation phase. Because in the case project we wanted to take the subject matter experts' opinions into consideration in selecting the preferred terms, the decisions concerning the status of the terms were not made until after the comments had been gathered.

As discussed in Chapter 3.4, the terms are assigned a status to indicate whether they are to be used or not and thereby to ensure consistency of terminology in documents. A term is labelled either as preferred, admitted or deprecated. The classification is presented in the ISO standard (ISO 704 2009, 35–36), according to which a preferred term is the primary term chosen for a given concept and one which should be used, whereas an admitted term is "an acceptable synonym for a preferred term" (ISO 704 2009, 36) and, a deprecated term is a term that has been rejected and rated as undesirable. A reason for rejecting a term, according to the ISO standard (ISO 704 2009, 36), is that a term is incorrect or not in accordance with the principles of term formation, or because synonymy needs to be avoided. The classification used in the crane terminology corresponds to the one by ISO, except for the class of admitted terms, which are defined in the crane terminology as terms that can be used but with care. The term entries of admitted terms in the crane terminology

usually include a usage note. To provide an example, the term *floor-operated crane* was labelled as admitted, and the usage note of the term advises the user to use, whenever possible, the terms for the subordinate concepts, *radio-operated crane* or *pendant-operated crane*, instead.

The selection of the preferred terms and the finalisation of the terminology were done in the steering group meetings. The agenda of these meetings was to go through the terminology term-by-term, each steering group member presenting the comments she or he had received. Based on the comments the definitions were, if needed, corrected, and for each concept the preferred term was selected.

The criteria for choosing the preferred terms had been decided on in advance, before the first steering group meeting. In addition to subject matter experts' views and the term selection criteria by ISO presented in Chapter 4.1.2, the arguments for choosing a term as the preferred term for a given concept included the following: the terms is used in standards, the term is used by the manufacturer, the term is used across the industry, or that the term is a global, commonly known term. Seeing that the company language is American English, American English terms should be preferred to British variants.

A fine example of a term that meets ISO's criteria of transparency mentioned in 4.1.2 is *data plate*. The term was selected as the preferred term on the grounds that the concept the term represents (defined as "plate on a machine or a component which provides information, such as type, serial number or technical values, about the machine or the component") is easily deductible from the term. Several terms were rejected relying on the criteria of consistency, one of the criteria by ISO listed in 4.1.2. To provide an example, the terms *safety goggles*, *safety shoes* and *safety gloves* were labelled as preferred and, on that account, their respective synonyms *protective goggles*, *steel toe boots* and *protection gloves* were rejected.

As pointed out in Chapter 4.1.2, one of the selection criteria should be conciseness. For the sake of both understandability and usability, too long terms should be avoided. In the crane

terminology several examples of terms that were labelled as deprecated because they were considered too long and complex can be found: *main power isolation switch*, *ship-to-shore quay gantry crane* and *regenerative network braking system*.

The language principle was not blindly followed, and for instance the term *cabin* was selected as the preferred term although the American English variant and the term found in standards is *cab*. The grounds for selecting *cabin* as the preferred term was that it is much more commonly used across the industry.

Although standards served in general as a guide in choosing the preferred terms, on a few occasions the recommendation of the standards was discarded. As an example, the term *bridge crane* was selected as the preferred term due to the fact that it is more commonly used within the company and considered more understandable than the term used by American standards, *overhead crane*.

The validation process proved to be quite time-consuming. For most of the concepts from one to as many as eight synonyms are in use in the company, and there are differing views among the subject matter experts on which of the synonymous terms should be the preferred one. Consequently, reaching a consensus on the status of the terms was not an easy task. In addition to differences in the terms used for a given concept, on a few occasions the concept to which a term refers differed. It was hence not only a matter of harmonising terminology but occasionally the harmonisation of concepts was in fact needed.

The steps of definition writing, the gathering of comments and the validation of terminology were completed in iterations: after I had defined approximately a hundred concepts, I sent those for the steering group members, who then reviewed the terms with their groups of subject matter experts, and once the comments had been gathered, we held terminology steering meetings in which we validated the terms. This was an efficient way of completing the three tasks since I could always work on the definitions while waiting for comments from the previous list of terms and in between

the steering meetings. Another advantage of the iterative validation process was that the review task did not place such a burden on the subject matter experts because it was done in smaller bits. However, since the decisions concerning the status of the terms were made only after I had formulated the definitions, it was necessary to go through the definitions after the validation phase to ensure that the definitions did not contain deprecated terms. It was decided that once a preferred term had been chosen for each concept, the complete terminology would be once again sent to the subject matter experts for approval. In addition, before publication the terminology would be reviewed by a native English speaker to verify the linguistic accuracy of the terminology.

As noted, at the time of writing this thesis, all of the project phases have not been fully completed. The remaining task after the review and validation is publication. The terminology is imported to the Acrolinx system and published in some other format as well. As in the planning phase the final decisions concerning the format in which the terminology would be published were not made, the various options are examined in Chapter 6.1. As mentioned, the crane terminology project is a multilingual terminology project: the terminology is compiled in English and then translated into various languages. The translation of the terminology follows the translation process that is generally in use in the documentation teams. The translation is done by a translation agency, and the translated terminologies are proofread by subject matter experts within the case company. The terminologies are stored into the translation memory.

5.5 Evaluation of project success

As Nykänen (1999, 70) notes, once a terminology project is completed (the terminology is compiled, reviewed, finalised and published), what remains to be done is to evaluate the project. As noted, at the time of writing this thesis, the project is still ongoing. However, as we have worked through most of the steps included in the project phases, it is possible to comment on what went well and what was learned during the project. The first part of this chapter is an evaluation of the project as a whole, and the second part focuses on the quality of the end result.

5.5.1 Project evaluation

A terminology project is closed by preparing a final report. The purpose of the project final report is to both inform those who did not participate in the project of what was done and to serve as an aid in similar future projects (ISO 15188 2001, 8). In this chapter I will evaluate the success of the case project, using as a basis a final report template (Konecranes 2010) that is followed in the case company's documentation teams. The following matters are discussed: the estimated workload versus the actual workload, the original schedule versus the actual schedule, communication in the project team, and the challenges and successes of the project.

The scheduling of the project was unsuccessful as the actual time needed to complete the project exceeded considerably the initial estimation. Two main reasons for this can be found. The first one is the fact that I am not a highly experienced terminologist. As I had not previously participated in such an extensive terminology project as the crane terminology project I could not accurately estimate the workload. The second reason is that none of us in the steering group had experience of the type of validation process that we decided to use, and therefore we did not know how much time the validation process would require. For the same two reasons, the original schedule of the project did not hold. The first deadline of the project was set to the end of June 2014, but after we had held the first steering group meetings and seen the amount of time it took to go through the comments and to select the preferred terms, the deadline was moved to the end of the year 2014. Although the project could not be completed within the original schedule, the "error" was corrected early by setting a new, more realistic deadline.

As regards communication, what could have been done differently in this project, is the informing of the subject matter experts of the project and of their role in it. This is one of the tasks that Nykänen (1999, 64) includes in the starting phase. The informing of the subject matter experts was left in the hands of each steering group member. Although there were no remarkable misunderstandings, it might have been best if the subject matter experts had all been given the same

presentation (preferably in person) of the project covering the following aspects: why the project is undertaken, what the aim of the project is, how the terminology is compiled (the process) and what is expected of the subject matter experts in the review phase. In addition, the subject matter experts could have been informed about the terminological principles of defining concepts as they were precisely asked to comment on the definitions.

From the point of view of project management, the main challenge in this project was finding time. Often, the more people there are involved in a project, the harder it is to find time for meetings. As all of the steering group members, excluding myself, were involved in a number of other projects as well, finding time for the steering group meetings posed challenges. From the point of view of terminology work, the challenges of this particular project derived from the scope of terminology and the disunity of the terminology in use in the company. Compiling a terminology of a 1,000 concepts is quite an endeavour. As a comparison, in his article Nykänen (1999, 71) cites the compilation of a terminology covering 200 to 300 concepts as an example of a terminology project. On the positive side, because the terminology in question is such a comprehensive one, it is unlikely that there will be a need for enlarging it significantly in the near future. In the validation phase it became visible that there are many synonymous terms in use in the company. Different business units use different terms, and different terms are used in the United States and in Europe. This at the same time highlighted the importance of the project but also posed challenges for creating a terminology in which each concept is represented by a single preferred term. As the successes of the project I would count the facts that the project was well-planned and well-organised and therefore unexpected setbacks were avoided.

5.5.2 Product evaluation

The quality of the end result, the compiled terminology, can be considered one of the measures of the project success. ISO (15188 2001, 14) provides a checklist that can be used to ensure that the compiled terminology complies with the principles of terminology and thereby to assure its quality.

The checklist consists of 19 yes-no questions concerning the work methods used and the produced terminology. All of the items on the checklist are not relevant for the type of terminology project as the crane terminology project. Thus, I will go through a few, selected items from the checklist and comment on whether the crane terminology meets the requirements presented in those items. The selected items concern concepts, definitions and terms.

The checklist includes two points about concepts that should be verified. The first one is that the concepts have been identified and concept systems have been established (ISO 15188 2001, 14). As mentioned in Chapter 5.2.2, in the crane terminology project, a detailed concept analysis was not completed, but the concepts were structured into 12 categories. The second item on the checklist that concerns concepts is the question of whether the concept systems correspond to the definitions and vice versa (ISO 15188 2001, 14). To meet this requirement, the definition of each concept should indicate the position of the concept in the concept system by stating its immediate hypernym (as explained in Chapter 4.1.1). As noted in Chapter 5.2.3, this was exactly the principle that I followed in formulating the definitions. Thus, the definitions in the crane terminology should indicate how the concepts are related to the other concepts within the same system.

The first questions on the checklist that concerns the definitions is whether the definitions comply with the requirements outlined in ISO standards 704 and 10241. In writing definitions I followed the terminological principles that are presented in several introductory works on terminology and in the ISO 704 standard. These principles, which were introduced in Chapter 4.1.1, include for instance preference for intensional definitions. The second question that deals with definitions, “Have the definitions been validated by experts?” (ISO 15188 2001, 14), can also be answered with *yes*. In the review phase, the subject matter experts were asked to check that the definitions are correct and adequate.

As regards the terms, it should be verified that the preferred terms meet the following criteria: they are accepted by subject matter experts, they are concise and allow subjection to derivation

(ISO 15188 2001, 14). In the crane terminology project, the subject matter experts were asked to comment on which of the synonymous terms of a concept should be selected as the preferred term. As differing views existed, the preferred terms in the crane terminology are not necessarily accepted by all of the subject matter experts consulted, but by the majority of them. The criteria that were used in selecting the preferred terms (presented in detail in Chapter 4.1.2) included conciseness and the ability of the terms to subject to derivation. However, because other factors, such as transparency, industry standards and understandability, were considered as well, not all of the terms in the crane terminology meet these two criteria. The checklist also includes a question about the deprecated terms, the appropriate labelling of which should be verified (15188 2001, 14). In the crane terminology project, the terms that should not be used were labelled as deprecated (or in rare cases, as admitted). The label which indicates the acceptability of the term is included in the term entry in the Acrolinx system.

In the preface to her guide, Suonuuti (1997, preface) argues that what best determines the quality of a terminology is its internal coherence. To achieve internal coherence, the crane terminology was systematically compiled, and the definitions were formulated according to the same pattern. In addition, once all of the terms have been validated, the definitions will be checked again to ensure that they are not contradictory and do not contain deprecated terms.

6. Follow-up and development

The case company launched the crane terminology project with the intention of introducing systematic and continuous terminology work into the company. Terminology work, therefore, does not end once the crane terminology project is completed. This chapter addresses the questions of how the compiled terminology should be kept up to date after its publication and how terminology work in general could be developed in the company. This chapter is especially important for the company since first, no plan for the maintenance and updating of the crane terminology currently exists and second, because there is a desire in the company to further develop its terminology work once the crane terminology project is completed. Because it has not yet been decided which would be the most suitable medium for making the terminology available for all company employees, a discussion of the various options is also included in this chapter.

6.1 Publication of the terminology

As mentioned in Chapter 5.1, in the planning phase of the project it was discussed that in addition to storing it into the Acrolinx database, the terminology would be published in some other format as well. This way employees outside the documentation teams could also use the terminology. The different media for publishing the terminology that were suggested in the project kick-off meeting include the company wiki, Excel and the MOT service. In this Chapter, I will present these three options and a solution that was proposed by the Acrolinx company, considering the benefits and disadvantages of each option. As the information I have about some of the options is limited, I cannot suggest which one would be the most suitable medium of publication. The discussion can, however, provide a basis for the decision making that is ahead.

Initially, the idea was that the terminology would be published, at least partly, in the company wiki. Wiki is not, however, an ideal place for publishing a terminology. Wiki is by definition a website the content of which any user can edit. As previously mentioned, the crane terminology

project is of the normative type, meaning that the terminology sets guidelines for the use of terms to achieve a unified use of terminology across the company. The conflict between the nature of the terminology work and the collaborative content creation principle of wiki is a significant one. Presumably it is possible to restrict the editing rights of a wiki page, but even if that is the case, a wiki does not enable the type of data structuring that terminology management systems do, and the addition of new terms would be inconvenient as they would have to be added to the terminology one by one. The benefit of a wiki is that feedback could be easily gathered as users could leave their comments of a term on the wiki page.

Distributing the terminology in the form of an excel sheet is not an option that can be recommended. This would mean that each time additions or modifications are made to the terminology, the list would have to be sent again to everyone, and ensuring that everyone is actually using the same version of the terminology would be impossible. Furthermore, a terminology in the form of an excel sheet is not usable, for instance in a situation in which the user wants to quickly check a term.

The company that provides the MOT dictionaries has a terminology service called TermLink. According to the presentation on their website (Kielikone Oy 2012), it is possible to incorporate a company terminology to the MOT service. The terminological data that can be included in the terminology are terms and their definitions. According to the presentation, the terminology can be updated and new terms can be added to it. The advantage of incorporating the terminology into the MOT service would be that as the dictionary service is already in use in the company, finding the terminology and taking it into use would be easy for the users. There would be no need to introduce a new system into the company and to instruct people on how to use it. The disadvantage of this solution would be that the terminology would have to be managed in two systems, both Acrolinx and the MOT service. In addition, the acquisition of the TermLink service would bring some costs.

In addition to the three options proposed in the project kick-off meeting, it would be possible to use a tool provided by Acrolinx. Seeing that not everyone in the company needs the Acrolinx plug-in (which checks a text for language issues) and because of the relatively high licence costs, it is not reasonable to acquire the Acrolinx system for the entire company. What could be adopted instead, is a web-based reference tool called Term Browser. The Term Browser can be used to search for and view terms that are stored into the Acrolinx terminology database. Accessing the browser does not require logging in, so anyone in the company network can use it. The browser includes a simple search and filters that the user can set for the search results. The information that is shown for each term can be customised according to the wishes of the company. The advantage of the Acrolinx Term Browser is that it would not bring any additional costs. In addition, the terminology would be stored and managed in a single place, and the users would have at all times an up-to-date terminology in use. However, since Acrolinx is not familiar to most of the company employees, the tool would need to be promoted in order for employees to find it and to take it into use. As there are already so many programs and systems that people use in their work, there might be reluctance to adopt a new one.

6.2 Maintaining and updating the terminology

For a terminology to be useful it needs to be regularly updated. The updating of the produced terminology is normally planned during the project (Tekniikan Sanastokeskus 1988, 203). Planning the maintenance and updating of the crane terminology includes that the following matters be considered: who is going to be responsible for the terminology, how feedback from users is gathered, how often updates are made to the terminology and how the requested changes and additions are validated. These will be discussed in the following paragraphs.

After the completion of the crane terminology project, the first step in organising the terminology work is appointing a person as responsible for the terminology work. It is important that the primary terminology users as well as the product development teams know who to contact

in terminology related issues. A person should be on track of the additions and modifications made to the terminology. With the Acrolinx terminology management system, this would mean that the terminologist's user rights are given to a single user, who can edit the term entries and add new terms to the database. Evidently the person in charge of the terminology work should have knowledge of the principles of terminology and be acquainted with the process by which the original terminology was compiled.

The Acrolinx system provides a partial solution to the question of how feedback from users is gathered. As mentioned in Chapter 3.5, the Acrolinx plug-in highlights, among other things, potential terms (expressions that appear to be terms, but that are not included in the terminology) from a text. What the user can do with the highlighted potential terms is to select "propose as new term", in which case the term is stored into the system as a term the status of which is "proposed". The user with the terminologist's user rights can see the proposed terms in the Acrolinx dashboard and add them to the terminology either as deprecated synonyms of existing terms or as new terms. For feedback concerning the editing of existing terms or definitions and for those employees who do not use the Acrolinx system, another medium for giving feedback should be made available. This could simply be contacting the person in charge of the terminology via e-mail. When the employees are informed of the publication of the terminology, it should be clearly stated to whom feedback and term proposals can be sent.

To ensure continuous quality of the terminology, new terms should be reviewed and validated before they are imported to the database. As in the compilation of the original terminology, subject matter experts should review the definitions to ensure that they are adequate, and in case several terms exist for a single concept, the subject matter experts can suggest which should be selected as the preferred term. Preferably a native-language speaker would check the linguistic correctness of the terms and definitions. For certain terms, it might suffice that a subject matter is consulted before the term is added to the terminology. For instance, if the term in question is specific for a certain

product only, it would suffice to have the manager of that product approve the term and the definition. For terms that are in use widely across the company and especially for terms that have synonyms, several subject matter experts from different business units of the company should participate in the review. The subject matter experts, each of who represents a business unit, could be selected from the larger group of subject matter experts who participated in the review of the original terminology. Involving subject matter experts from different business units in the validation of new terms is an effort to ensure that the terminology represents the lexicon of not a single business unit but the entire company. At the same time, it is an as effort to gain wide acceptance for the terminology and thereby a wide user group.

If the above proposed validation process is adopted, it is not reasonable to add a term to the terminology every time one is proposed. Instead, it could be decided that, the proposed terms are reviewed with the subject matter experts, for instance, every three months and added to the terminology. To gain the benefits of reduced translation costs and improved translation quality in the future as well, the translated terminologies have to be similarly updated. Considering the translation and proofreading process, the translated terminologies are not likely to be updated as often as the source language terminology. A suitable translation interval for the added terms could be 8 to 10 months.

The role of the subject matter experts is not of course limited to the validation of the new term entries. The terminologist needs assistance from subject matter experts in evaluating which of the proposed terms are important to add to the terminology and in formulating the definitions for the terms. It should be discussed beforehand which subject matter experts could be willing to participate in terminology work by providing their expertise.

6.3 Developing terminology work

Chapter 3.6 presented a process maturity model that can be used both to evaluate at which level a company’s terminology work is and to develop it further. In connection with the presentation of the

model, I stated that before the crane terminology project was launched, the company's terminology work resembled the maturity level two, named as rudimentary. Several, simple term lists had been produced around the company, but the work was unorganised, and no central term database existed.

By planning and executing the crane terminology project the maturity of the company's terminology work has already developed from the starting level of two to the level three, which Thomsen (2005, 246) names organised and repeatable. At present the company's terminology work is well-organised: a terminology project is ongoing, and the responsibility of terminology work has been assigned to a person. The terminology has been systematically compiled so that it covers comprehensively the subject field of cranes. The terminological data is not restricted to terms but definitions, deprecated terms and sources of definitions are included as well. The quality of the terminology is controlled by having subject matter experts review the definitions. In addition, an advanced terminology management system has been taken into use.

Thus, as the development of terminology work continues, the next aim in the company is the level four in Thomsen's maturity model, a level described as managed and sustainable. The following two chapters discuss how the company's terminology work could be developed so that this aim would be reached. As a basis for the discussion I will use the following four aspects of terminology work, which Thomsen (2005, 245) includes as measures of the maturity of a company's terminology work: the organisation of terminology work, quality control, the comprehensiveness of the terminology and the user group.

6.3.1 Organisation of terminology work

Probably the most significant measure of how mature a company's terminology process is, is the position the terminology process has attained among the company processes and how it relates to the other processes. The aim is that the terminology process and the product development process take place side by side (Thomsen 2005, 247). As noted in Chapter 3.6, in an ideal situation the terminology work is completed before the document creation and translation processes begin. To

meet this aim, terminology work should be taken into account in product development, and the evaluation of terminological needs should be added on the task list of the product development process. It would be the responsibility of the product development to contact the terminologist to discuss the needed terminology. Another option would be that the needed terminology is discussed in the kick-off meeting for the document project.

The above-described position of the terminology process will not be achieved overnight. As whenever new processes or new ways of operating are introduced, it will require time before a product development process which takes into account terminological needs is actually adopted throughout the company. Well-organised and systematic terminology work is still in its infancy in the company, as the terminology project which forms the case of this study is the first well-planned and organised terminology project undertaken. Since the expertise of subject matter experts is required in terminology work, the inclusion of terminology work in product development cannot be achieved before the importance of terminology work is widely recognised in the company. The first step should then be to make terminology work generally known and appreciated within the company by bringing forth the benefits of continuous terminology management. Once this is achieved, the implementation of a terminology process that is tied to product development can succeed.

6.3.2 Quality control and comprehensiveness of the terminology

Thomsen (2005, 252) explains that if a company's terminology work is at maturity level four, the terminology is always checked for quality. If the case company adopts the validation process for new terms proposed in the previous chapter, then the quality of the new term entries will unexceptionally be verified by subject matter experts before they are added to the database. At level four the quality of the terminology is controlled also by filling in the required data for each term and by following terminology standards (Thomsen 2005, 252–254). In the case company, the only required terminological information in addition to the preferred term (head term) is the definition. If

synonymous terms are in use, the undesired terms are labelled as deprecated terms. In addition, if standards are used as a source for definitions, the standard from which the definition is quoted is indicated. I believe that if the person who is assigned the responsibility of terminology work is someone who is familiar with the principles of terminology, it goes without saying that the work methods used will comply with terminology standards, and consistency in the inclusion and presentation of terminological information is maintained.

As regards the comprehensiveness of the terminology, Thomsen (2005, 247) says that at maturity level four, the expansion of the terminology is planned so that all relevant fields will be covered. As previously noted, the compiled crane terminology is in itself a large terminology. Nevertheless there are certainly areas which have not been fully covered. For instance, terminology of certain products is missing due to a lack of interest on the part of the representatives of that product and consequently a lack of source material. There are also deficiencies in the terminology concerning the service business. Feedback from users is likely to reveal some gaps in the terminology as well. If the terminology work is to be developed, the terminologist should find out which areas have not been worked on so far and evaluate the need for subsequent, smaller-scale terminology projects. The prerequisite for this type of development is that the resources allocated to terminology work are sufficient so that, in addition to updating and maintaining the existing terminology, the terminologist can, when a need arises, undertake new terminology projects to complement the company terminology.

6.3.3 User group of the terminology

For Thomsen (2005, 245) one of the measures of the maturity of a company's terminology work is the user group of the terminology. Ideally, the user group is formed by all company employees. As mentioned, the primary users of the crane terminology are people who work in documentation. There is nonetheless a desire to expand the user group of the terminology so that the terminology would benefit other employees in their work as well. To name an example of such a group,

employees who work in marketing or corporate communications would surely find a tem database useful for their work. To familiarise the employees with the terminology and to gain users, the terminology should be advertised once it is made available. The company intranet news page and the periodical newsletter by the IT department would be, in my view, the most effective channels for advertising the terminology.

Thomsen (2005, 247) describes that at maturity level four, all employees consider the terminology as useful and as an asset for the company. Thomsen's description seems almost unattainable, at least in large companies such as the case company. Nevertheless employees' attitude towards terminology work can be influenced. First, the quality of the terminology certainly influences the user numbers and the way in which terminology work is seen. The definitions (and other information included in the term entries) should be helpful for the users, and there should be no contradictory information. A part of quality is the comprehensiveness of the terminology. If a user searches for terms, and each time the search returns zero results, she or he is likely to give up at some point. A second factor which is likely to influence user numbers and employees' attitude towards terminology work is the usability of the term browsing tool. A user-friendly term browsing tool is intuitive and straightforward and allows the user to make both quick and advanced searches.

7. Conclusions

This study has examined corporate terminology management from the point of view of documentation development. The method that was used to address the topic is case study research. The case of this study was formed by a corporate terminology project the purpose of which was to compile a terminology of the most important terms in the field of cranes. The case project was described using a theoretical phase model of terminology projects. The study showed that the theoretical model, although not specifically addressing terminology work in companies, can be applied to corporate terminology projects as well. If the methods used in terminology work are based on the principles of terminology, corporate terminology work does not differ significantly from the terminology work conducted by terminology standardisation organisations. However, the case project implies that in large, multinational companies the validation of a terminology, namely selecting which terms should be used and which ones should be rejected, is a more demanding task than what the theoretical phase model suggests.

The study was conducted as a commission, and one of the aims was to produce a multilingual crane terminology for the commissioning company. In the compilation of the terminology I used terminological methods that are standardised by ISO (ISO 704, 2009) and presented in several introductory works on terminology work as well. The methods are based on the principles of traditional terminology and apply to normative terminology in particular. At the time of writing this thesis, the terminology project has not been fully completed. The terms to be included in the terminology have been selected and categorised but some of the terms have not yet been defined and validated. The finalisation and publication of the terminology remain likewise unfinished. Apart from the fact that the project's deadline had to be postponed, there have been no significant setbacks, and the project has proceeded according to the project plan. Taking into account the factors which make the project a challenging one, the scope of the terminology, the relatively large

number of people that are involved in the project and the fact that the project is the first of its kind in the company, the project has, in my view, been successful.

For myself, the project has been a learning process as it is the first extensive terminology project that I have undertaken. Because of my inexperience as a terminologist, I had challenges in estimating the time needed for completing each task. In addition, delimiting what belongs to the subject field that the terminology covers was somewhat difficult. The project has taught me that the systematic compilation of a large, coherent terminology which covers the selected subject field comprehensively requires time and patience. Before the terminology is published, several phases and tasks need to be completed. And the terminology work extends beyond the publication, since the terminology needs to be kept up to date.

In addition to producing the terminology and describing that project, the second aim of this study was to suggest how the compiled terminology should be maintained and kept up to date after its publication. To ensure that the quality of the terminology does not weaken, the modifications and additions should be handled centrally by a terminologist, and new terms should be reviewed and validated by subject matter experts. To continue and to further develop the company's terminology work, the next steps would be to start planning the completion of the terminology and to expand the user group of the terminology outside the documentation teams. A long-term aim is that terminology work is taken into account in the product development process, and the terminology process is timed in such a manner that the needed terminology is available when the document content creation begins. The benefits of terminology work are maximised when the terminology is in wide use and the terminology process takes place alongside the product development process.

Since my aim was to examine and to describe a current terminology project in a particular company, the case study research method served the purpose well. However, perhaps atypically for case studies, I myself participated in and had a central role in the case project. Because of my role,

the study could be criticised as a description that accounts for only a single point of view. The inclusion of an interview from the project manager to the data would have enriched the description and the evaluation of the project. The project description was not, however, the sole aim of this study, which set boundaries for the amount of data that I could include in the case study.

As regards the methods that were used in the compilation of the terminology, what could be criticised is the fact that I did not complete a thorough concept analysis and draw a visualisation of the entire concept system depicting the relationships between the concepts. I nevertheless structured the concepts into smaller concept systems, and in writing definitions I did consider how a given concept was related to the other concepts in the system. Thus, I doubt that the terminology suffered in coherence and quality because of my choice.

Although the crane terminology project and the context within which it was executed is unique, in several companies the position of terminology work and its maturity are likely to resemble those of the case company before the crane terminology project was started. As suggested in Chapter 3.2, and as the case of this study implies, the benefits of terminology work and the importance of harmonising the terminology used might not be widely recognised in a company. The initiative to launch a terminology project is likely to be taken by those who work with language. The driving force for engaging in terminology work may be a desire to reduce writing and translation costs and to improve the quality of documents. For companies that are planning to engage in terminology work, this study provides an example of how systematic terminology work can be introduced and displays the challenges of terminology standardisation in large companies.

This study also provides topics for further research. Since the publication and the taking into use of the terminology fall outside the scope of this study, it would be interesting to conduct a follow-up study to see how these have been carried out and what the reception has been like. In addition, it would interesting to examine, for instance, two years from now how the company has

organised and developed its terminology work, and whether terminology work has brought the desired savings in translation costs and improvement in document quality.

8. References

Acrolinx. 2014. Platform & Services. [Internet] Acrolinx. Available from http://www.acrolinx.com/platform-services/. [Accessed 11 March 2014]

Antia, Bassey E. 2000. *Terminology and language planning: an alternative framework of practice and discourse.* Amsterdam: John Benjamins.

Cabré, Teresa M. 1999. *Terminology. Theory, methods and applications.* Philadelphia: John Benjamins.

De Bessé, Bruno. 1997. "Terminological definitions." In *Handbook of terminology management: Basic aspects of terminology management*, ed. Sue Ellen Wright and Gerhard Budin, 63–74. Amsterdam: John Benjamins.

Dobrina, Claudia. 2013. "På tal om terminologiprojekt." *Terminfo* 4: 12–16.

Draskau, Jennifer and Heribert Picht. 1985. *Terminology: an introduction.* Guilford: University of Surrey.

Drewer, Petra and Klaus-Dirk Schmitz. 2013. "Terminology Management in Technical Communication –Principles, Methods, Training.". In *Proceedings of the European Colloquium on Technical Communication 2012*, ed. tekom, 50–61. Stuttgart: tcworld.

Fähndrich, Ursula. 2005. "Terminology project management." *Terminology* 11, 2: 225–260.

Infoterm. 2013. Terminology management. [Internet] Vienna, Infoterm. Available from http://www.infoterm.info/standardization/terminology_management.php. [Accessed 28 March 2014]

ISO/IEC Guide 37. 1995. *Instructions for use of products by consumers*. Geneva: ISO/IEC.

ISO 15188. 2001. *Project management guidelines for terminology standardization.* Geneva: ISO.

ISO 4306-1. 2007. *Cranes -- Vocabulary -- Part 1: General.* Geneva: ISO.

ISO 704. 2009. *Terminology work—principles and methods.* Geneva: ISO.

Kalliokuusi, Virpi. 1999. "Määrittelyn monet kasvot." In *Toimikunnista termitalkoisiin: 25 vuotta sanastotyön asiantuntemusta,* ed. Kaisa Kuhmonen, 43–57. Helsinki: Tekniikan Sanastokeskus.

Kalliokuusi, Virpi and Nykänen Olli. 1999. "Sanastotyön sanastoa." In *Toimikunnista termitalkoisiin: 25 vuotta sanastotyön asiantuntemusta,* ed. Kaisa Kuhmonen, 170–181. Helsinki: Tekniikan Sanastokeskus.

Kelly, Nataly and Donald A. DePalma. 2009. The Case for Terminology Management. Common Sense Advisory.

Kielikone Oy. 2012. Sanojen hallinta on helppoa. [Internet] Kielikone Oy. Available from http://www.kielikone.fi/mottermlink. [Accessed 8 July 2014]

Konecranes. 2010. *Final report template.* Internal Wiki. Company confidential material. [Accessed 20 August 2014]

Kremer, Stefan, Lutz M. Kolbe and Walter Brenner. 2005. "Towards a procedure model in terminology management." *Journal of Documentation* 61, 2: 281–295.

Kudashev, Igor. 2004. "Millainen on hyvä terminhallintaohjelma?" *Terminfo* 2: 10–11.

Laurén, Christer, Johan Myking and Heribert Picht. 1997. *Terminologi som vetenskapsgren.* Lund: Studentlitteratur.

Nuopponen, Anita and Nina Pilke. 2010. *Ordning och reda: terminologilära i teori och pratik.* Finland: Nordstedts.

Nykänen, Olli. 1999. "Sanastoprojektin vaiheet." In *Toimikunnista termitalkoisiin: 25 vuotta sanastotyön asiantuntemusta,* ed. Kaisa Kuhmonen, 62–71. Helsinki: Tekniikan Sanastokeskus.

Saarela-Kinnunen, Maria and Jari Eskola. 2010. "Tapaus ja tutkimus = tapaustutkimus?" In *Ikkunoita tutkimusmetodeihin. Metodin valinta ja aineiston keruu: virikkeitä aloittelevalle tutkijalle,* ed. Juhani Aaltola and Raine Valli, 189–199. Jyväskylä: PS-kustannus.

Sager, Juan C. 1990. *A practical course in terminology processing.* Amsterdam: John Benjamins.

Stake, Robert E. 1995. *The art of case study research.* Thousand Oaks: Sage.

Suonuuti, Heidi. 1997. *Guide to terminology*. Helsinki: Tekniikan Sanastokeskus.

Suonuuti, Seija. 1998. "Sanastotyön asema yrityksen prosesseissa." *Terminfo* 4: 12–15.

Suonuuti, Seija. 2007. "Suuhun sopiva termi." *Terminfo* 4: 9.

Suonuuti, Seija. 2013. "Sanastotyön alkutaipale: perusteet hyvälle sanastotyön aloitukselle." *Terminfo* 1: 6–8.

Tekniikan Sanastokeskus, ed. 1988. *Sanastotyön käsikirja: soveltavan terminologian periaatteet ja työmenetelmät.* Helsinki: Suomen Standardisoimisliitto.

Temmerman, Rita. 2000. *Towards new ways of terminology description: the sociocognitive-approach*. Amsterdam: John Benjamins.

Thomsen, Hanne Erdman. 2005. "Om at komme fra ord-arbejde til terminologiarbejde: Procesmodenhed på terminologiområdet." In *Proceedings fra Nordterm,* ed. Ágústa Þorbergsdóttir, 243–255. Reykjavík: Íslensk málstöð.

Wright, Sue Ellen and Gerhard Budin. 1997. *Handbook of terminology management: Basic aspects of terminology management.* Amsterdam: John Benjamins.

Wright, Sue Ellen and Gerhard Budin. 2001. *Handbook of terminology management: Applications-oriented terminology management.* Amsterdam: John Benjamins.

Yin, Robert K. 2009. *Case study research. Design and methods.* London: Sage.